

**DETERMINANTS OF CHOICE OF HEALTH INSURANCE PLAN  
AMONG RURAL HOUSEHOLDS IN KENYA.**

**BY**

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**DECLARATION**

I hereby declare that the research paper is my original work and has not been submitted in any other university for an award.

**SIGN** .....

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**APPROVAL**

The Research Project has been submitted for examination with my approval as the University Supervisor.

**SIGN** .....**DATE**.....

**DR. PHYLLIS MACHIO**

## **DEDICATION**

I dedicate the research paper to my mother- Martha Munini Makau, my late father- Gideon Gilbert Makau and the entire Gideon's family- Victor Makau, George Nzioki, Anthony Kioko, Irene Mutindi and Christopher Mutunga.

## **ACKNOWLEDGEMENT**

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## LIST OF ACRONYMS

AU	Africa Union
CBHI	Community-Based Health Insurance
GDP	Gross Domestic Product
GHE	Government Health Expenditure
HH	Household Head
KCBHFA	Kenya Community-Based Health Financing Association
KHHEUS	Kenya Household Health Expenditure and Utilization Survey
KNBS	Kenya National Bureau of Statistics
NHIF	National Health Insurance Fund
NPISH	Non-Profit Institutions Serving Households
OOP	Out-of- Pocket
PHI	Private Health Insurance
RUM	Random Utility Model
TGE	Total Government Expenditure
THE	Total Health Expenditure
UHC	Universal Health Coverage
WHO	World Health Organization

## **ABSTRACT**

In Kenya, health insurance coverage is low with approximately 17 percent of the country's population having a form of prepayment health insurance cover. Health insurance coverage has largely remained an urban phenomenon with rural households excluded from the insurance market. Only 12 percent of household living in the rural areas are covered by health insurance against 27 percent of urban household. This study aims to understand the determinants of health insurance choice among rural households. The study builds from the utility maximization framework where individuals choose a set of alternative that produce the highest utility. Using the Kenya Household Health Expenditure and Utilization Survey 2013, multinomial model is estimated. The results show that household income, wealth and employed status significantly increases the likelihood of health insurance ownership. Also, education, age, marital status and access to information significantly contributes to health insurance ownership and choice. However, individual who indulge in smoking are less likely to insure against illness with any form of health insurance. Policies targeted at improving living standards, education levels and health insurance awareness are likely increase health insurance demand among rural households.

## CHAPTER ONE

### INTRODUCTION

#### **1.1. Background.**

Healthcare costs significantly affect household consumption and income. In case of illness household incur two economic costs: the cost to acquiring healthcare and opportunity cost due to reduced labour supply (Pham and Van, 2016). These costs are essentially unpredictable in nature and households are incapable of smoothing consumption in the event of major illness (McIntyre *et al.*, 2006). This is mostly the case for developing countries, especially where health insurance coverage is very low. Additionally, households in these countries are unable to access credit markets to smoothen their consumption (Morduch, 1999). Consequently, they rely on savings, liquidating assets, and social networks to respond to health shocks. These channels are more likely to push households facing illness into poverty or and in worst case scenario into extreme poverty.

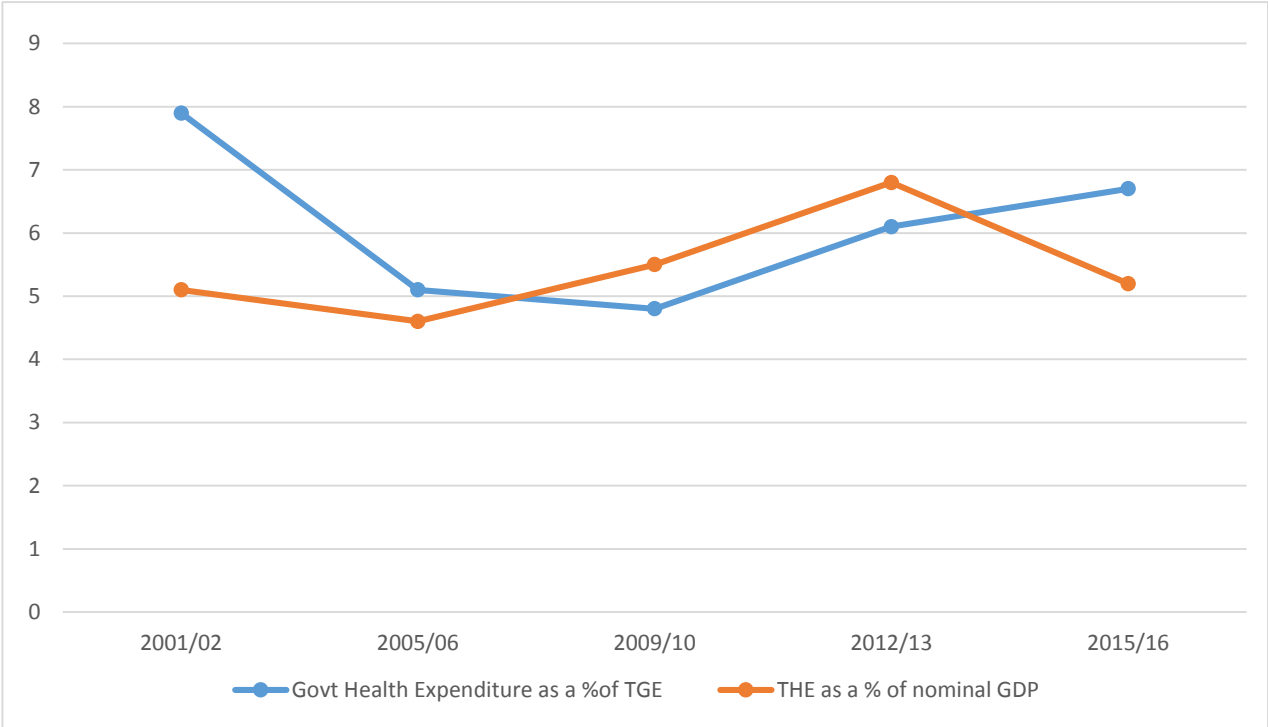
Globally, healthcare financing has been predominantly based on Out-of-Pocket (OOP) expenditure. An estimated 11.7 percent of the global population averagely spent 10 percent of their household expenditure (as measured by total household expenditure or income) on OOP health expenditure (World Health Organization (WHO), 2018). This is due to lack of access health insurance that provides financial protection and the situation is worse in sub-Saharan with low income levels. Health insurance substantially reduces the risk of catastrophic OOP expenditure (Jung and Streeter, 2015; Waters *et al.*, 2004). Essentially, health insurance plays a role in reducing economic burden of accessing healthcare by pooling resources and distributing the risk of unanticipated health events. Reducing healthcare risk is essential particularly in sub-Saharan Africa as majority of the countries allocate inadequate resources in the health sector (World Bank, 2013).

#### **1.2. Situation of Healthcare Financing in Kenya**

Globally, healthcare financing is considered a major investment. For countries such as Kenya, the government health expenditure (GHE) as a percentage share of GDP is quite low which has resulted to most households financing their health expenditures through OOP expenditure (Barasa *et.al*, 2012). Over the last decade, the GHE as a percentage share of total government expenditure

(TGE) has moderately remained constant ranging between 6 to 8 percent. Figure 1 illustrates GHE as a percentage share of TGE from 2001/02 to 2015/16. The GHE as a percentage share of TGE sharply rose from 4.8 percent in 2009/10 to 6.7 percent in 2015/16. This is comparatively low, given that the global GHE as a percentage TGE averaged at 11.7 percent during the same period. This is also considerably below the Africa Union (AU) Abuja Declaration set countries to dedicate a least 15 percent of the total government expenditure to the health sector. Health expenditures as a proportion of GDP has risen to 5.4 percent from 5.1 percent (see figure 1).

**Figure 1: Government Health Expenditure as a Percentage Share of Total Government Expenditure and Total Health Expenditure as a Share of Nominal GDP**

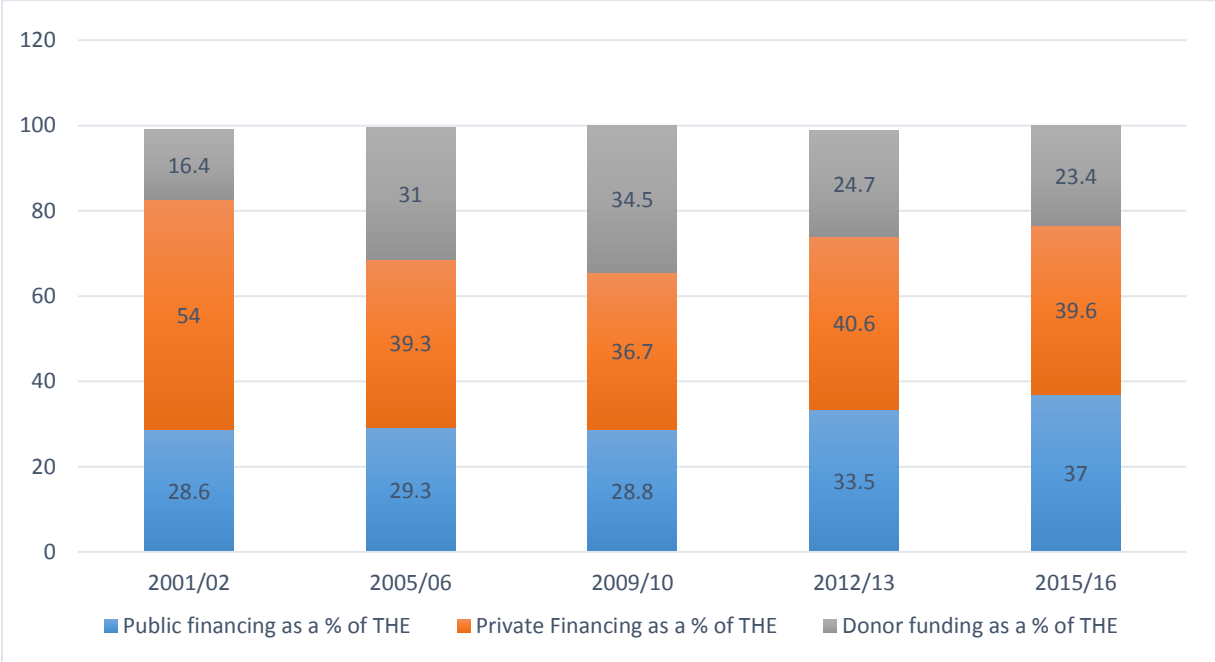


Source: Kenya National Health Accounts 2015/16

The private sector sources (both OOP and Non-Profit Institutions Serving Households (NPISH)) has primarily been the top financier of the health sector. OOP accounts for the largest share of the private funding. The share of the private sector to total health expenditure (THE) was 39 percent in 2015/16 with OOP having the largest share of 24 percent (figure 2). Large share of OOP acts as a burden as well as a barrier to access to healthcare. OOP expenditures implies escalated catastrophic expenditures which can potentially lead to poverty. Also, increase in OOP often leads

to households' underutilization of healthcare (Mwabu *et al.*, 1995; Kimani *et.al.*, 2016). According to the Kenya Household Health Expenditure and Utilizations Survey (KHHEUS) (2013), outpatient care account about 78 percent of the OOP expenditure, while inpatient care account for 21.6 percent. These OOP expenditures greatly vary by gender and household expenditure types. For instance, women were found to spend more on healthcare than men. Women spent approximately 43 percent more than men counterparts who spent on outpatient services and spent 41 percent across all health services

**Figure 2: Contribution to the total health expenditure**



Source: Kenya National Accounts 2015/16

The public sector financing remained stable from 2001/02 to 2009/10, standing at about 29 per cent of THE (figure 2). Public financing increased by 3.5 from 33.5 percent in 2012/13 to 37 percent in 2015/16. Donors' funding over the same period had grown more than two-fold, from 16 percent in 2001/02 to 35 percent in 2009/10 but stabilized at around 23 percent in 2012/13 and 2015/16 (see figure 2 above).

### **1.3. Health Insurance in Kenya.**

Households typically choose from three main health insurance alternatives: state-based health insurance and private-based health insurance-encompassing community-based health insurance and private health insurance. These alternatives are briefly discussed below:

#### **1.3.1. Private-Based Health Insurance Schemes**

##### ***1.3.1.1. Private Health Insurance***

Enrollment to this health insurance system is voluntary. Uptake of this insurance is at the discretion of individual/households. In this scheme consumers pay a pre-payment (premium) to cover for cost of healthcare in case one falls ill. The premiums are mostly related to the healthcare expected cost. Principally, the riskier consumers typically pay high premiums compared to the less risky individuals. In Kenya, private health insurance (PHI) exists in two categories that is direct and employer-based (Wang'ombe *et.al*, 1994). However, due to price consideration the uptake of private health insurance has mainly remained accessible to households with high income and inaccessible to low income households (Kimani *et.al* 2014). Furthermore, PHI is considered as an urban phenomenon and has the highest percentage of uptake compared to rural residents, perhaps due to cost of premium consideration. According to KHHEUS (2013), only 4 percent of rural residents PHI while nearly 14 percent of urban residents. This implies, rural households are forced to heavily rely on OOP as the only way to finance healthcare given PHI covers substantial part healthcare costs. Moreover, PHI excludes individual suffering from chronic diseases and long term diseases, and even when covered the cost is unaffordable to household residing in rural areas due to low income compared to those in urban areas (Chuma and Okungu, 2011).

##### ***1.3.1.2. Community-Based Health Insurance***

Enrollment to this scheme is usually voluntary. The scheme is a pre-payment mechanism which pools health risks and funds at a community level for people sharing similar characteristics (WHO, 2010). Most often, membership premiums are at a flat and unlike PHI and are independent of individual specific health risks. Community-based health insurance (CBHI) is particularly suitable for the poor who usually reside in rural areas and are often excluded in the social health insurance and PHI schemes (Preker *et al.* 2002). Ekman (2004) argue that CBHI provides an effective way of protection to the members by significantly reducing the OOP payment for healthcare. Given the

risk pooling, the success of the scheme requires some form of government intervention through investments and regulation (Preker & Carrin, 2004). However, Pauly *et.al* (2006) argue that government intervention through subsidizes often leads to the adverse selection problem.

In Kenya, enrollment into this scheme is partly attributed to some form of regulatory environment, though enrollment greatly influenced by social capital at the community level (Gitahi and Okech, 2018). However, coverage of this scheme is limited despite been established 1999 (Kimani *et.al* 2014). Since inception, there are about 38 schemes with about 470,550 beneficiaries (Kenya Community-Based Health Financing Association (KCBHFA), 2015). According to KHHEUS (2013), only 1.3 percent were insured by CBHI and majority of them are those from rural areas. This is quite low given this is the only form of private health cover that is affordable to most of the rural households. However, just like other insurance markets, CBHI face the problem of adverse selection with many individuals joining the scheme when they are ill and when they already know the expected benefit of the scheme (Carrin *et al.*, 2005).

### **1.3.2. State-Based Health Insurance**

#### ***1.3.2.1. National Health Insurance Fund***

This is a government sponsored health insurance cover. The cover is compulsory for those working in the formal sector while the scheme those working in the informal enrollment is voluntary. The scheme was established by an Act of Parliament 1966 and has been amended severally to improve service delivery. The idea of the scheme was to provide a national contributory health insurance cover for all citizens in the country. The enrollment to the scheme has mainly been those working in the formal sector while limited coverage for those working in the informal sector (Kimani *et.al*, 2004).

In 2015, the Kenyan government adopted National Health Insurance Fund (NHIF) as the steering vehicle to realize the universal health coverage (UHC) for all, targets to cover about 21,000 household that have typically being excluded from health insurance scheme (NHIF, 2015). This has led to increased health coverage compared to previous years. Increased coverage has been accompanied by increased member contribution (Okech and Lelegwe, 2016). Achieving UHC through NHIF provision means, ensuring that all people regardless of their income are able to obtain the essential health services without necessarily being exposed to economic hardship.

According to KHHUES (2013), most of the insured are covered by NHIF accounting for approximately 88.4 percent. Urban households have slightly high coverage with 92.2 percent while rural areas have 85.2 percent, this is partly because of NHIF enrollment mainly channeled through the formal sector. Majority of this covered by NHIF were the poorest in the wealth index accounting for 92.9 percent while the richest households accounting for 83 percent. Membership under the NHIF scheme from the period 2013 to 2017 has increased by 13.2 percent (Kenya National Bureau of Statistics (KNBS), 2019). Membership from the formal sector increased by 4.3 percent while the informal increased by 23.3 percent in 2017, partly due to increased efforts through the UHC program. Membership from formal sector accounts for 53 percent compared to informal sector whose membership is 47 percent. However, comparing these numbers with employment statistics where the informal sector employed 83.6 percent 2017, clearly points to a significant number of the informal sector excluded from NHIF.

Health insurance substantially lowers health expenditure especially the OOP expenditures. In Kenya, coverage of health insurance is still low, with approximately 17.1 percent of households with a form of health insurance (KHHEUS, 2013). Majority of those with health insurance are the rich households, about 42 percent while poor households' coverage stands at 3 percent. Health insurance adoption is higher in urban regions than rural regions, urban coverage stands at 27 percent while rural coverage stands at 12 percent. About 88.4 percent of households with health insurance are covered by NHIF, and contributing about 5 percent of THE in 2012/13, while the balance of 9.4 percent and 1.3 percent was covered by PHI and CBHI respectively.<sup>1</sup>

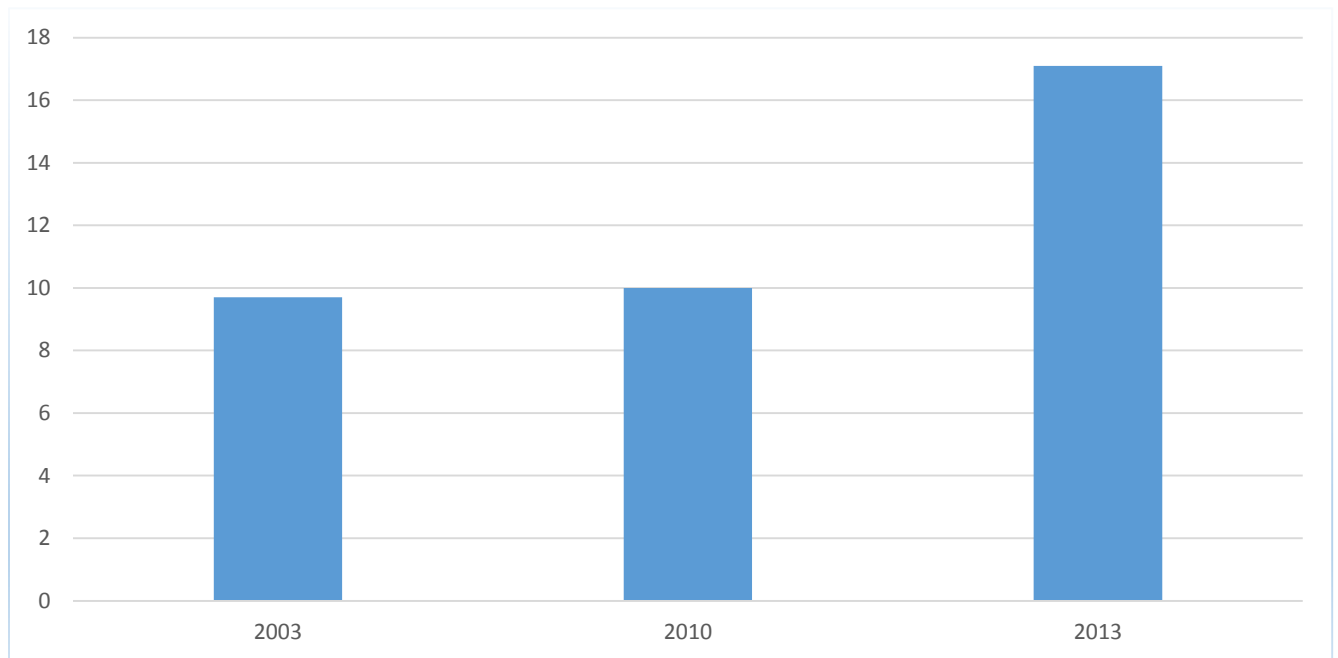
Insurance coverage in Kenya has substantially improved, from about 9.7 percent in 2003 to 17.1 percent in 2013 (Figure 3). This improvement is partly attributable to NHIF taking initiative to insure the informal sector on voluntary basis. However, the bulk of those insured, irrespective of income group, are covered by the NHIF. CBHI covered largely the middle-income households at 2.8 percent, while PHI mostly covered the richest households at 17 percent.

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<sup>1</sup> According to the 2014 annual reports from National Hospital Insurance and Association of Kenya Insurers



**Figure 3: Health Insurance Coverage Trend**



*Source: Kenya Household Health Expenditure and Utilization Survey 2013*

#### **1.4.Problem Statement**

In Kenya, health insurance coverage is low with approximately 17 percent of the country's population with a form of prepayment health cover. Health insurance coverage has largely remained an urban phenomenon with rural households excluded from the health insurance coverage. Only 12 percent of household living in rural areas have health insurance against 27 percent of urban households (KHHEUS, 2013). Low health insurance coverage implies majority of rural households still rely on OOP to finance health. The high OOP expenditure coupled with low health insurance coverage acts as an impediment to access to healthcare and likely to lead into catastrophic spending and ultimately push households into the poverty. According to KHHEUS (2013), 21.4 percent of households were unable to access healthcare as a result of high cost, despite being ill and about 6.2 percent of the households consuming healthcare experienced catastrophic spending. In absence of health insurance cover, catastrophic spending and the number of individuals who cannot access healthcare are likely to increase, amid increased cases of non-communicable diseases, accounting for 50 percent of healthcare and 55 percent of total death (Juma *et.al*, 2017).

To increase health insurance coverage it is critical to understand the factors that determine the decision to insure and decision for uptake of a particular health insurance plan at the household level. There exist limited literature in Kenya that have analyzed the determinants of choice of health insurance plan among rural households. Existing studies have largely emphasized on the determinants of decision to insure or not to insure (Owando, 2006; Matheuri *et al*, 2008; Kimani *et.al*, 2014; Muketha 2016).

### **1.5.Objectives of the Study.**

Broadly this study estimated the determinants of health insurance choice among households living the rural areas. The study specifically focused on the following:

1. To estimate the social-economic factors that determine the decision to insure or not among rural households in Kenya.
2. To estimate the effect of social-economic factors on the choice of health insurance plan among rural residents in Kenya.
3. To estimate behavioural effects on the health insurance choice among rural households in Kenya.
4. To formulate and recommend policy options based on the research findings.

### **1.6.Justification of the Study**

Globally, countries are moving towards ensuring UHC for all through sustainable health financing<sup>2</sup>. Kenyan government is currently piloting UHC and health insurance is one of the ways to attain such a goal. Achieving UHC means, substantial reduction of healthcare costs incurred through OOP and cover against financial risk. Currently, health insurance coverage among households in rural areas is quite low and hence understanding the factors behind the low uptake is critical to scale up the demand for health insurance. This study is meant extend existing academic knowledge in understanding the household choice of health insurance in the rural areas. More importantly, the study provides evidence to policy makers and health planners to design and

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<sup>2</sup> WHO (2015). "Sustainable health financing, universal coverage and social health insurance. Geneva: World Health Organization."

policies that are meant to increase the number of health insurance coverage among rural households in Kenya. This study is also valuable to inform private health insurance providers to tailor products fit for rural households currently excluded in health insurance market.

### **1.7.Organization of the Study**

The remaining part of the study unfolds as follows; the next chapter discusses both theoretical and empirical literature in relation to the choice of health insurance. The methodology follows up detailing the theoretical and econometric approach used to estimate the determinant of health insurance choice among rural areas. The empirical results are presented in chapter four and we wrap up with conclusions and policy implications.

## CHAPTER TWO

### LITERATURE REVIEW

This chapter critically examines previous literature on health insurance demand and choice. The first part of this chapter outlines the theoretical literature and the second section discusses empirical literature and wraps up with an overview of the literature.

#### 2.1 Theoretical Literature

Healthcare demand is a derived demand generated from the demand for health (Grossman, 1972). Consumer demand health for consumption and investment purposes. Health is a consumer good and its consumption generates utility. Similarly, health is an investment good as it improves the efficiency of individual and enhances his/her lifetime earning capacity. Demand for health insurance is also a derived from demand for health services (Besley, 1989). Individual typically maximizes utility from consuming a given vector of goods, health insurance is one of the goods consumed. Besley (1989) investing in health related goods (i.e. health insurance) generates a utility gain and an investment gain as improved health as a result of health insurance increases lifetime earnings.

##### 2.1.1 Expected Utility Theory

The theory has traditionally assumed that individuals optimize their utility function when faced with uncertain outcomes (Von Neumann and Morgenstern 1944; Friedman and Savage, 1948). Under the expected utility framework, risk aversion incentivizes consumers to purchase health insurance as to avoid unexpected health expenditure (Cleeton and Zellner, 1993; Thomas, 1994). A risk averse individual chooses to fully insure against illness if insurance price charged is actuarially fair (Cleeton and Zellner 1993). Risk aversion suggests that an individual who dislikes risk should ideally purchase insurance as the expected pay-off is higher than without insurance.

Health insurance demand analysis has been based on the expected utility framework where individual are assumed to prefer certain losses over uncertain losses (Nyman, 2001; Arrow, 1963; Friedman and Savage 1948). The utility is a function of disposable income  $U_i = U(Y)$  and is assumed to increase with disposable income but at a decreasing rate  $U_y > 0; U_{yy} < 0$ . The

expected utility theorem assumes consumers have rational preference. Typically a rational consumer maximizes the following expected utility function:

$$E[U(Y)] = \sum_{i=1}^I P_i U(Y_i) \quad (1)$$

When a consumer is faced with risk of losing a specific amount of income or wealth, the individual chooses to insure because the expected utility is greater than without insurance (Nyman, 2006). Individual typically dislike risky situations and often like less risky situation and will purchase insurance if obtainable at actuarially fair premium. Given  $Y_i$  is the initial income and where a loss in case of illness occurs ( $\alpha_0$ ), which reduces the initial income by  $(Y_i - \alpha_0)$ , and happens with a probability of  $P$  and individuals have to spend amount of disposable income on healthcare hence the expected utility in the absence of health insurance is given as:

$$EU^{UI}(Y) = PU[Y_i - (Y_i - \alpha_0)] + (1 - P)U(Y_i) \quad (2)$$

$$EU^{UI}(Y) = PU(\alpha_0) + (1 - P)U(Y_i) \quad (3)$$

Given the expected value of income as  $Y'$  based on individual healthcare spending. The actuarially fair premium payments are given as  $(Y_i - Y')$  and expected utility of insurance that covers loss in the event of illness is given as follows:

$$EU^I(Y) = PU[Y_i - (Y_i - \alpha_0) + (Y_i - \alpha_0) - (Y_i - Y')] + (1 - P)U[Y_i - (Y_i - Y')] \quad (4)$$

$$EU^I(Y) = PU(Y') + (1 - P)U(Y') \quad (5)$$

Following Arrow (1965) and Pratt (1964) where the utility function takes the standard concave form such that  $U''(Y) < 0 < U'(Y)$  then health insurance yields higher expected utility than without cover. Therefore, any consumer maximizing the expected utility chooses to purchase health insurance, with the welfare gain being attributed to efficiency derived from certainty over uncertainty (Friedman and Savage 1948).

Consumers purchase is determined by willingness to pay, and a consumer makes a purchase if the willingness to pay exceeds the price, hence generating a consumer surplus (consumer welfare). Health insurance demand is the difference between equation (3) and (5), which is given as follows:

$$EU^I(Y) - EU^{UI}(Y) = P[U(Y') - U(\alpha_0)] + (1 - P)[U(Y') - U(Y_i)] \quad (6)$$

The net welfare gain derived from health insurance is utility gained as a result of income transferred when ill and net utility lost when individual remains healthy with health insurance cover (Nyman, 2006).

Critiques of expected utility propose that individuals make decision based on gains and losses and not necessarily maximizing expected utility. This is founded on the prospects theory developed from collective empirical works of Kahneman and Tversky (1979) and Tversky and Kahneman (1991). The theory suggests that from a given reference point individual will value gains and losses differently using a value function. The value function portrays a concave curve for gains and while portraying a convex curve for losses. According to the theory, individual typically weight losses and gains asymmetrically. The curvature of losses is steeper than that of gains, implying individuals are willing to take additional risk to avoid losses, Tversky and Kahneman (1991) terms this as the loss aversion. Loss aversion explains relative disutility of losses against the similar sum of gains. In health insurance market gains are the benefits individual enjoy in case of illness and losses are premiums individual pay (the loss is felt if individual doesn't fall ill). The reference point is the level of wealth when health insurance is not purchase (Hwang, 2016). Loss aversion distorts the decision to insure, with loss-averse individuals expressing lower willingness to pay for health insurance products, which translates to lower ownership rate of PHI and public health insurance (Barberis, *et.al*, 2001; Barberis, 2013).

## 2.2 Empirical Literature

The determinants of uptake of health insurance are categorized as either economic factors, social-demographic factor, or behavioural factors. Several empirical studies that have estimated the effect of these factors on the choice of a several health insurance plans and are discussed below:

Most of the studies associate economic factors such as wealth, income, and employment with choice of health insurance. Evidence on income effect is somehow mixed with some studies arguing income increases the probability of insuring against illness (Cameron *et.al*, 1988; Propper, 1989; Seccombe and Beeghley, 1992; Hopkins and Kidd, 1996; Kirigia *et.al*, 2005; Kimani *et.al*, 2014). Other empirical studies have argued that increases in income significantly reduce the risk

aversion which ultimately decreases the demand for health insurance, given risk aversion incentives individuals to purchase insurance (Feldstein, 1973; Arrow 1974). Contrary to this, health insurance covers against loss that in turn increases income and makes insurance more attractive as income increase regardless of individual risk aversion (Pauly, 1978). Moreover, Thomas (1994) found the decision to insure decreases with income among low income households and increases once income is above the poverty threshold. Marquis and Holmer (1996) found that under certain circumstance income neither increases nor decreases the demand for a particular health insurance plan due to individual valuing of gains and losses asymmetrically. Similarly, Marquis and Long (1995) establish that the decision to insure neither rises nor declines with increase in income due to households' constant absolute risk aversion.

Additionally, studies have found employment increases the probability of health insurance ownership (Kimani *et.al*, 2014; Owando, 2006). Contrary, Kirigia *et.al*, 2005 found that being employed significantly decreases the likelihood of health insurance uptake. Kiplagat *et.al* (2013) found that household head who are employed are more likely to own CBHI and public health insurance and less likely to purchase PHI. Bourne and Kerr-Campbell (2010) found wealthier households are more likely to own PHI than less fortunate households. In Kenya, some of the studies have used wealth on choice and found that wealth significantly increases the probability of owning of PHI and NHIF (Kiplagat *et.al*, 2013; Orayo, 2014; Muketha, 2016).

Considerable body of empirical studies document relationships between health insurance ownership and socio-demographic factors such as education, gender, age and marital status. Particularly, a substantial amount of studies have found being a women significantly reduces the likelihood of insuring against illness with both PHI and public health insurance, this is despite women having higher expected demand for medical care compared to men (Finn and Harmon, 2006; Bourne and Kerr-Campbell, 2010). Seccombe and Beeghley (1992) found that gender difference existence in the employed-based health insurance with women less likely to receive health insurance from employers than men. On the contrary, Muketha (2016) Kimani *et.al*, (2014) and Kiplagat *et.al*, (2013) found that men are less likely to insure with public and CBHI suggesting men are relatively risk-loving. Being married significantly increases the likelihood of insuring against illness (Hopkins and Kidd 1996; Bourne and Kerr-Campbell, 2010; Kimani *et.al*, 2014; Finn and Harmon, 2006; Owando, 2006).

Similarly, individual age is positively related to health insurance ownership (Kimani *et.al*, 2014; Orayo, 2014; Jutting, 2001). Kiplagat *et.al*, (2013) found additional years of age increases the likelihood of purchasing NHIF and PHI though not with CBHI health insurance. Furthermore, Kirigia *et.al*, (2005) established a downward concave relationship between age and the decision to insure among south African women, that the likelihood increases with additional age but reaches an certain point and the likelihood to insure decreases thereafter. Muketha (2016) argues that increase in age significantly reduce the probability of public health insurance ownership. Moreover, Bourne and Kerr-Campbell (2010) found that young individual are less likely to insure with PHI due to perceived low health risk, however after a certain age the decision to insure increases with age. Hopkins and Kidd (1996) argues that young people are usually not well-off as wealth takes time to accumulate and are less likely to insure against health risk.

Additionally, higher education is associated with higher insurance coverage compared with other lower levels of educations due to educated head of households understanding the benefits of health insurance (Muketha, 2016; Orayo, 2014; Bourne and Kerr-Campbell, 2010; Nketiah, 2009; Finn and Harmon, 2006; Owando, 2006; Hopkins and Kidd, 1996). Kiplagat *et.al*, (2013) found that education is more responsive to CBHI than PHI and public health insurance. The positive effect of education is in support with the idea education increases production of health efficiency (Grossman, 1972). Well-educated individual are not only capable of understanding health information, but also make rational health-related decisions and therefore choose to insure against risk.

The area of residence affects the decision to insure, with rural residents less likely to insure compared to urban counterparts. This could be due to either economic or knowledge constrains. Empirical studies done by (Kimani *et.al*, 2014; Hopkins and Kidd, 1992) found that households living in rural areas less likely to purchase insurance as compared to households living in urban areas. Kiplagat *et.al*, (2013) found that rural households are more likely to purchase CBHI and NHIF. The study also found that urban residents are more likely to be insured by PHI. Muketha (2016) investigates the factors that affect the uptake of NHIF in Kenya and confirm that rural residents are more likely to be insured by NHIF scheme than the urban residents.



Health insurance uptake is also as a result of behavioral factors. Most studies proxy behavioral factors whether an individual indulges in smoking or not. Kirigia *et al.*, (2005), and Owando (2006) using smoking as a proxy of expected health consumption, found that individual who smoke are more likely to own health insurance. These findings support the information asymmetry problem in health insurance market, where risky individuals purchase health insurance. Information asymmetry in the insurance market is well documented in several other studies (Akerlof, 1970; Rothschild and Stiglitz, 1976) where highly risky individuals purchase health insurance as they are more aware of their health status. As Kirigia *et al.*, (2005) noted smoking is as a result of *ex ante* moral hazard were individual with health insurance under-invest in preventative care and engage more in risky health behavior. In contrast, Muketha (2016) found that smoking reduces the probability of purchasing public health insurance among informal workers.

Health insurance uptake is also influenced by available information to the household, with information indicating increased likelihood to insure. Essentially all studies that have investigated the role of information confirm information and knowledge significantly increase likelihood of purchasing health insurance (Nketiah, 2009). In Kenya, Muketha (2016), and Kiplagat *et.al.*, (2013) found access to information i.e. television, radio and newspaper increases the chances of purchasing PHI, the social security cover and national health insurance, while reduces the likelihood of purchasing CBHI cover. This result is due to most insurance products are advertised through the print, television and radio.

Some studies associate the size of the household with the decision to insure. However, the findings of the effect of household size on the decision to insure significantly differ. Bhat and Jain (2006) found that the household size as measure by the number of individuals in a particular household significantly increases the likelihood of health insurance ownership. On the contrary, studies by (Muketha, 2016; Kirigia *et al.*, 2005; Oraya, 2014) have found household size to significantly reduce the likelihood of purchasing health insurance cover. Specifically in Kenya, Kiplagat *et.al.*, (2013) found large families are more likely to enroll for CBHI and NHIF while the small families are more likely to own PHI.

### **2.3 Overview of the Literature**

From the reviewed studies it is evidently clear that income, social-demographic factors, gender, health status, and social status to be the major factors influencing the decision to insure against illness. Most of the studies done, have estimated these factors based on the decision to insure or not to insure. Additionally, several studies suggest rural households are less to insure than urban households. However, seemingly limited are studies that explicitly focus on factors that affect the choice of a health insurance plans among rural households. This study extends the existing literature in two-folds, first the study employs a multiple choice of health insurance plan as opposed to the binary choice and specifically focuses on rural households where most studies have not explicitly focused on.

## CHAPETR THREE

### METHODOLOGY

This chapter discusses the methodology the study employed in estimating the determinants of health insurance choice of health among rural households. This section outlines the theoretical model, model specification, description of variables and the data source.

#### 3.1.Theoretical Model

The decision to insure is often modeled as a discrete choice where the consumer chooses from a set of alternatives. Health insurance purchase involves consumer comparing the expected utility with insurance and with no insurance (Finn and Harmon, 2006; Propper 2000; Besley *et al.* 1999). In this study, we consider choice of multiple health insurance plan i.e. NHIF, PHI, and CBHI as well as decision not to insure. Consumer makes choice from the given set of alternatives and the choices are mutually exclusive and exhaustive.

The study employs discrete model derived from the random utility model (RUM) described by Manski (1977). Random utility function which assumes consumer maximize utility in line with the consumer theory. Under the RUM, the researcher does not have full information about individual utility and is hence treated as a random variable (Petrin and Train, 2003). The researcher can only observe the part that provides greater utility from the set of alternatives (Greene, 2011). Therefore the utility function is composed of observable vector of characteristics and unobservable characteristics. The utility is formulated as a linear form as follows:

$$U_{ik} = V_{ik} + \varepsilon_{ik} \quad (7)$$

Where  $U_{ik}$  is the latent utility of individual  $i$  for alternative  $k$ ,  $V_{ik}$  represents the systemic component of utility and  $\varepsilon_{ik}$  represents the random component of utility for individual  $i$  for alternative  $k$ . The systemic component of the utility is made up of two components one is vector of observable characteristics i.e. income, gender, age, education, marital status, behavioral factors, household size etc. and the other is the health insurance features i.e. premiums paid. The systemic component is represented as follows:

$$V_{ik} = X_i' \beta_k + Z_i' \delta_k \quad (8)$$

Where  $X'_i$  is the vector of specific observable characteristics and  $Z'_i$  is the product features. The utility function is now given as follows:

$$U_{ik} = X'_i\beta_k + Z'_i\delta_k + \varepsilon_{ik} \quad (9)$$

Therefore a consumer maximizing expected utility chooses to purchase health insurance plan, which generates higher expected utility. The probability that an individual chooses alternative  $k$  over any other alternative is given by

$$\begin{aligned} Prob(Y_i = k/X) &= Prob(U_{ik} > U_{il}) \\ &= Prob(V_{ik} + \varepsilon_{ik} > V_{il} + \varepsilon_{il}) \\ &= Prob(V_{ik} - V_{il} > \varepsilon_{il} - \varepsilon_{ik}) \text{ for all } k \neq l \end{aligned} \quad (10)$$

If the  $\varepsilon_{il} - \varepsilon_{ik}$  term (residuals) is independent and identically distributed then equation (10) yields the multinomial logit model (Greene, 2011).

### 3.2. Model Specification

This study estimates the multinomial logit model given the dependent variable is a categorical variable taking four categories that is: PHI ownership; CBHI; NHIF and no insurance. The multinomial is most appropriate given the dependent variable takes unordered outcomes (Greene, 2003).

Given that  $Y_{ik}$  represents choice of health insurance plan which is observable for individual  $i$ , and 4 alternatives to choose from taking on the values  $\{k = 0,1,2,3.\}$ . Hence the latent variable  $Y_{ik}^*$  is related to  $Y_{ik}$  in the following manner:

$$Y_{ik} = \begin{cases} Y_{ik} = 1 & \text{if } Y_{ik}^* > Y_{il}^* \text{ for all } k \neq l \\ Y_{ik} = 0 & \text{otherwise} \end{cases}$$

Since  $Y_{ik}^*$  is latent variable and is unobservable, it is defined in a linear form as follows:

$$Y_{ik}^* = g(X_i\beta_k) + \mu_{ik}, \quad k = 0,1,2,3. \quad i = 1,2,3, \dots, n \quad (10)$$

Where  $n$  is the observations,  $X$  is a set of explanatory variables that have an effect on the response probability and  $g$  is the logistic cumulative distribution function (Greene, 2003).

If the error term is independent and identically distributed (iid) of the explanatory variables, then the above equation yields a multinomial logit model and is represented as follows:

$$Prob(Y_i = k/X) = \frac{\exp(\beta_k' X_i)}{\sum_{h=0}^K \exp(\beta_h' X_i)}, \quad k = 0,1,2,3. \quad (11)$$

$\beta$  represents the parameters estimated using the e maximum likelihood method and  $X$  vector of the explanatory variables. The equation above is estimated by maximizing the following log likelihood function (Greene, 2003).

$$\ln L = \sum_{i=1}^n \sum_{k=0}^3 Y_{ik} \ln Prob(Y_i = k). \quad (12)$$

The maximum likelihood estimates (MLE) of  $\beta$  denoted as  $\hat{\beta}$  also referred to as the logit estimators are maximized by the above equation (12). MLE technique yields consistent and efficient estimates of  $\beta_k$  (Greene, 2003)

From equation (10), the specific econometric model of choice of health insurance among rural households is given as follows;

*Health Insurance Plan*

$$\begin{aligned} &= \beta_0 + \beta_1 Income + \beta_2 employmentstatus + \beta_3 age - \beta_4 age2 \\ &+ \beta_5 education + \beta_6 Wealthindex - \beta_7 Gender + \beta_8 Information access \\ &- \beta_9 behavioural factors + \beta_{10} maritalstatus + \mu \end{aligned}$$

### **3.3. Definition and Measure of Variables**

The table below represents the variables (dependent and explanatory variables) that were used to estimate the determinants of choice of health insurance plan among rural households. The tables presents variable definition and measurement and the expected sign to on the dependent variable.

**Table 3. 1: Measurement of Variables**

		Dependent Variables			
		Health insurance choice plan (0=No insurance, 1=private, 2=community-based insurance, 3=NHIF)			
		Expected signs			
Explanatory Variable	Definition and Measurement	PHI	CBHI	NHIF	Decision to insure(1=insured; 0 otherwise
Household income	A continuous variable proxied of total household expenditure	+	+	+	+
Employment status	1 if working; 0 otherwise	+	+	+	+
Wealth Index	Captured in the following categories (1=poorest, 2=second poorest, 3=middle, 4=fourth richest, 5=Richest	+	+	+	+
Gender	1 if the head of household is a woman; 0 otherwise	-	-	-	-
Education	Captured in the following categories 1=primary, 2= secondary, 3=tertiary; 0 otherwise	+	+	+	+
Age	Head of the household age (years)	-	-	-	-
Age Square	The square of age	+	+	+	+
Marital status	1 if head of household is married; 0 otherwise.	+	+	+	+
Smoking status	Captures risk aversion, 1 if household head smokes; 0 otherwise.	+	+	+	+
Access to information	1 if household has access to TV, radio and newspaper; 0 otherwise	+	+	+	+

### **3.4.Data Sources**

The study used the national household dataset from KNBS dubbed “Kenya Household Health Expenditure and Utilization Survey 2013. The dataset contains health related information at the household level. More specifically, the survey provides information on health expenditure and health insurance coverage at the household level. The 2013 survey covers information at both national and county level. The total sample size is 33,675 and out of it 20,350 are households living in the rural areas. The survey contains information on choice of health insurance plan, where households are either covered by PHI, CBHI or NHIF. The survey contains household demographic, economic and behavior information that were used in this study to estimate the determinants choice of health insurance among rural households.

### **3.5.Diagnostic Tests**

The main drawback of estimating the multinomial logit model is the restrictive assumption of independence of irrelevant alternatives (IIA) property based on the idea that the error term is independent and homoscedastic (Greene, 2011). The underlying assumption of IIA in multinomial model implies from a given set of alternatives, the odds of individual choosing alternative  $k$  over  $j$  is not altered by an introduction of another alternative. Violation of the assumption renders the results of the model biased and inconsistent. Hausman test was completed to ensure IIA property is upheld.

## CHAPTER FOUR

### RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the descriptive statistics of the study, the correlation matrix and discusses research findings from the analysis.

#### 4.1. Descriptive Statistics

This section presents the descriptive statistics used to study the determinants of health insurance choice among rural households in Kenya. Descriptive statistics is important as it gives an overview of the data used for analysis. The table below presents the descriptive statistics:

**Table 4. 1: Summary Statistics**

Variables	Mean	Std. Dev.	Minimum	Maximum
Health insurance status (1=Insured, 0=not insured)	0.1366	0.3433	0	1
Health insurance choice (1=NHIF, 2=CBHI, 3=PHI)	0.1507	0.4087	0	3
Household income (transformed in log form)	9.3959	0.7642	5.6092	12.8854
Wealth index	2.3887	1.2093	1	5
Employment status(1= Working, 0=not working )	0.8394	0.3672	0	1
Gender (1=female, 0=male)	0.3033	0.4597	0	1
Household's head age (years)	47.22	16.0787	16	105
Marital Status (1=married, 0=otherwise)	0.7248	0.4466	0	1
Head's education level (1=Primary, 2=Secondary, 3=Tertiary, 0=otherwise)	1.2648	0.5806	0	3
Smoking status (1= smoking and 0=not smoking)	0.2246	0.4173	0	1
Access to information (1=owns a radio/TV or read newspaper = otherwise)	0.6093	0.4879	0	1
Observations	11127	11127	11127	11127

From the results above, the only 13 percent of the rural households had a form of health insurance. The average household income was ksh 12,036, the maximum income was ksh 394,510 and the minimum income was ksh 272. Most of the household were poor representing 53 percent, 27



percent of household were middle income and 20 percent were rich. On average, 83 percent of household head were either working in the informal or informal sector. Female headed households were 30 percent while 70 percent of the households were headed by male. The average age was 47 years, with a maximum age of 105 and a minimum age of 16 years. 72 percent of the households were married while 28 percent were either single, divorced or separated. Majority of the household head had primary education representing 76 percent. Only 22 percent of the respondents reported being smokers. 60 percent of the households had access to information were they heard or read about insurance products.

#### 4.2. Choice of Health Insurance Uptake

The table below summaries the uptake of different forms of health insurance. Majority of those insured were insured by NHIF representing 12 percent. Only 0.4 percent of the households had CBHI and 0.5 percent of the respondents had PHI. 86 percent of the respondents had no form of health insurance.

**Table 4. 2: Choice of Health Insurance Plan**

<b>Health insurance alternatives</b>	<b>No. of people insured</b>	<b>Percentage</b>	<b>Cumulative percentage</b>
NHIF	1417	12.73	12.73
CBHI	43	0.39	13.12
Private Health Insurance	58	0.52	13.64
No Insurance	9609	86.36	100

#### 4.3. Correlation Analysis

The correlation coefficient statistically measures the strength of association between two variables and ranges from negative one to positive one. Values approaching one indicate a strong correlation while those approaching zero indicate a weak correlation and zero indicate no correlation. The correlation matrix is represented in the table below:

**Table 4. 3: Correlation Matrix of the Variables**

	Health insurance choice	Ln income	Wealth index	HH age	Marital status	Smoking status	Employment status	Access to info	HH education	HH gender
Ln income	0.2705 (0.0000)	1.0000								
Wealth index	0.3583 (0.0000)	0.3540 (0.0000)	1.0000							
HH age	-0.0440 (0.0000)	-0.0713 (0.0000)	0.0061 (0.5180)	1.0000						
Marital status	0.0652 (0.0000)	0.2455 (0.0000)	-0.0133 (0.1612)	-0.1666 (0.0000)	1.0000					
Smoking status	-0.0731 (0.0000)	-0.0831 (0.0000)	-0.0962 (0.0000)	-0.0196 (0.0386)	0.0866 (0.000)	1.0000				
Employment status	0.0984 (0.0000)	0.1926 (0.0000)	0.1108 (0.0000)	-0.1162 (0.0000)	0.1191 (0.000)	0.0072 (0.4426)	1.0000			
Access to info	0.2180 (0.0000)	0.2942 (0.0000)	0.4091 (0.0000)	-0.0303 (0.0014)	0.1030 (0.000)	-0.0467 (0.0000)	0.1911 (0.000)	1.0000		
HH education level	0.3580 (0.0000)	0.3007 (0.0000)	0.3818 (0.0000)c	-0.1455 (0.0000)	0.0872 (0.000)	-0.0363 (0.0000)	0.0975 (0.000)	0.2563 (0.000)	1.0000	
HH gender	-0.0324 (0.0005)	-0.1474 (0.0000)	0.0170 (0.0752)	0.1199 (0.0000)	-0.5158 (0.0000)	-0.2388 (0.0000)	-0.1725 (0.000)	-0.1092 (0.000)	-0.0921 (0.0000)	1.0000

From the results in table 4.3, the key findings is that access to information is significantly correlated with wealth index and household income at 0.41 and 0.40 respectively. Also wealth index is significantly correlated with health insurance choice and household income at 0.36 and 0.35 respectively. Household income is significantly correlated with choice of health insurance at 0.27. Household head’s education level is significantly correlated with health insurance choice, household income and wealth index at 0.36, 0.30 and 0.38 respectively. Household gender is negatively to health insurance choice at 0.032. The correlation coefficient only indicates the relationship between variables, hence we proceed to estimate the multinomial logit to determine the effect of the variables on health insurance choice.

#### 4.4. Estimation of Results and Discussions

To clearly understand the determinants health insurance choice, the study did a two-step analysis. First step, the logit model is estimated to aid understand the determinants of the decision to insure or not. The second step, the multinomial model is estimated to determine the factors that affect the choice of health insurance plan. Since the multinomial model assumes independence of irrelevant

alternatives (IIA), we test if this assumption still holds using the Hausman test. Violation of this assumption renders the results inconsistent and biased. The Hausman test confirm that the IIA is not violated, hence the multinomial results are consistent and unbiased. The table below presents both the logit and multinomial model results.

Variables	NHIF	CBHI	PHI	Insurance Status (1=insured, 0=not insured)
Ln income	0.4464*** (0.0550)	0.4997** (0.2384)	0.9574*** (0.2011)	0.4691*** (0.05332)
Wealth index	0.7356*** (0.0352)	0.3073** (0.1516)	0.5220*** (0.1365)	0.7073*** (0.0339)
Employment status	0.4613*** (0.1254)	13.9298 (339.7634)	1.3851* (0.7306)	0.5315*** (0.1229)
HH Age	0.0272* (0.0143)	0.1161 (0.0722)	-0.0405 (0.0483)	0.02511* (0.0137)
HH Age Square	-0.00032** (0.000143)	-0.00094 (0.00069)	0.00038 (0.00047)	-0.00029** (0.00014)
Married status	0.4630*** (0.0989)	-0.1781 (0.4143)	-0.4551 (0.3474)	0.3846*** (0.0976)
Smoking status	-0.4646*** (0.09458)	-0.6296 (0.4954)	-0.2519 (0.3801)	-0.4555*** (0.0916)
Access to info	0.6926*** (0.1018)	0.6555 (0.4404)	1.1520** (0.4864)	0.7042*** (0.0977)
HH education level				
Primary	0.5015 (0.4682)	-1.4569* (0.7577)	-0.5261 (1.0357)	0.1478 (0.3786)
Secondary	0.6523*** (0.2355)	-0.3629 (0.4011)	-0.0320 (0.5301)	0.4698** (0.1910)
Tertiary	0.7993*** (0.1590)	-0.1588 (0.3077)	0.0829 (0.3680)	0.6643*** (0.1298)
HH gender	0.0369 (0.0900)	0.4856 (0.4009)	0.05664 (0.3492)	0.05923 (0.0874)
Constant	-10.9793*** (0.7328)	-27.1542 (399.77)	-16.3089 (2.3814)	-10.6657*** (0.6663)
Observations	11127	11127	11127	11127
Log Likelihood= -3511.5491 LR chi <sup>2</sup> (36) = 2723.68 Pr > chi <sup>2</sup> = 0.0000 McFadden's R <sup>2</sup> = 0.2794				Log Likelihood = -3112.3135 LR chi <sup>2</sup> (12) =2649.19 Pr > chi <sup>2</sup> = 0.0000 McFadden's R <sup>2</sup> = 0.299
Test for independence of irrelevant alternatives	1=Hausman test IIA chi <sup>2</sup> =0.383 Pr > chi <sup>2</sup> =0.944	2=Hausman test IIA chi <sup>2</sup> =-2.951 Pr > chi <sup>2</sup> =.	3=Hausman test IIA chi <sup>2</sup> =0.000 Pr > chi <sup>2</sup> =0.998	0=Hausman test IIA chi <sup>2</sup> =1.178 Pr > chi <sup>2</sup> =1.000

Notes: \*, \*\*, \*\*\* 10%, 5%, 1% significance levels, respectively  
Standard errors are represented in parentheses

**Table 4. 4: Multinomial Logit Model Estimates**

The multinomial and logit model are estimated by the maximizing the log likelihood function since the probability lies between zero and one. Hence, the log likelihood is negative for both multinomial logit and logit model -3511 and -3112 respectively. The chi-square statistic is highly significant at 1 percent for both models, implying that the explanatory variables are correctly specified in comparison with the model with only the constant variable.

The results for both the logit and multinomial model are reported as coefficient, thus their coefficients were transformed to the power of exponential for ease of interpretation (relative risk ratios and odds ratios). The relative risk ratios are computed for multinomial logit while the odds ratio for logit model and are reported in the table below.

Variables	NHIF	CBHI	Private Health Insurance	Insurance Status (1=insured, 0=not insured)
Ln income	1.5627*** (0.0860)	1.6482** (0.3929)	2.6049*** (0.5238)	1.5985*** (0.0852)
Wealth index	2.0867*** (0.0735)	1.3597** (0.2061)	1.6855*** (0.2301)	2.0285*** (0.0687)
Employment status	1.5861*** (0.1989)	1.221040 (448000)	3.9953* (2.9191)	1.7015*** (0.2091)
HH Age	1.0276* (0.0147)	1.1231 (0.0810)	0.9603 (0.0464)	1.0254* (0.0141)
HH Age Square	0.9997** (0.000143)	0.9991 (0.00069)	1.0004 (0.00046)	0.9997** (0.00014)
Married status	1.5889*** (0.1571)	0.8369 (0.3467)	0.6344 (0.2204)	1.4690*** (0.1392)
Smoking status	0.6284*** (0.0594)	0.5328 (0.2639)	0.7773 (0.2955)	0.6341*** (0.0581)
Access to info	1.9990*** (0.2035)	1.9260 (0.8483)	3.1648** (1.539)	2.0222*** (0.1977)
HH education level				
Primary	1.6512 (0.7730)	0.2330* (0.6957)	0.5909 (0.6120)	1.1593 (0.4389)
Secondary	1.9199*** (0.4521)	0.6957 (0.2790)	0.9685 (0.5133)	1.600** (0.3456)
Tertiary	2.2241*** (0.3536)	0.8531 (0.2625)	1.0864 (0.3997)	1.9443*** (0.2523)
HH gender	1.0376 (0.0934)	1.6252 (0.6515)	1.0580 (0.3695)	1.0610 (0.0926)

Notes: \*, \*\*, \*\*\* 10%, 5%, 1% significance levels, respectively  
Standard errors are represented in parentheses

#### **Table 4. 5: Relative Risk Ratios and Odds Ratio Estimates**

From the results household income has a positive coefficient indicating a positive effect on the decision to insure. Additional household income significantly increases the odds of insuring against illness by 1.60 times. Also, income has a positive effect on health insurance choice. Households with higher income are more likely to insure with PHI. The results indicate that income significantly increases the odds of insuring against illness with private health insurance relative to not insuring by 2.60 times and increases the odds of insuring with CBHI and NHIF relative to not insuring by 1.65 times and 1.57 times respectively. This result is consistent with other studies (Cameron *et.al*, 1988; Propper, 1989; Seccombe and Beeghley, 1992; Hopkins and Kidd, 1996; Kirigia *et.al*, 2005; Kimani *et.al*, 2014) that found income increases the probability of insuring against illness. The decision to choose health insurance is voluntary and represents a trade-off between purchasing insurance and consuming other goods (Levy and DeLeire, 2008). Similarly, health insurance covers against loss which in turn increases household income and ultimately makes insurance more attractive as income increases (Pauly, 1978). Hence, additional income increases the likelihood of purchasing either form of health insurance. This result implies health insurance is a normal good and demand increases with additional income.

The result indicate wealth index has a positive effect on the decision to insure. Being wealthier increases the odds of purchasing health insurance by 2.03 times. Rise of household wealth significantly increases the chance of choosing the three type of health insurance. Rise in the wealth index increases the odds of insuring against illness with PHI, CBHI and NHIF relative to not insuring by 1.68 times, 1.36 times and 2.10 times respectively. Wealthier households are more likely to purchase public health insurance and PHI than less fortunate households. Other empirical studies have found a similar result that wealth significantly increases the probability of owning of PHI and public health insurance (Bourne and Kerr-Campbell, 2010; Kiplagat *et.al*, 2013; Orayo, 2014; Muketha, 2016).

Similarly, employment status positively affects the decision to insure. Those who are working are more likely to purchase insurance than those who are not working. The logit model indicates that being employed increases the odds of insuring against illness by 1.70 times. Also, being employed increases the odds of choosing the three forms of health insurance. However, the coefficient for CBHI is not significant at 10 percent. For those employed the odds of choosing private health

insurance and NHIF relative to not insuring is 3.97 times and 1.58 times respectively. The result for PHI is significant at 10 percent while for NHIF is significant at 1 percent. Those employed are four times more likely to insure with PHI than the unemployed due to the fact that employer have to insure their workers against illness. Similar results have being documented by Kimani *et.al*, (2014) and Owando, (2006) that the employed are more likely to insure against illness.

Additionally, the effect of household head's age on the decision to insure is positive. Theory predicts age depreciates an individual health stock at an increasing rate, hence increasing investment in healthcare (i.e. health insurance purchase) to offset the health stock depreciation (Grossmann, 1972; Besley, 1989). Additional years increases the odds of insuring against illness. For every additional year the odds of choosing to insure relative to not insuring increases by 1.03 times. The effect of age on the decision to purchase PHI is negative although the coefficient is statistically insignificant at 10 percent. Bourne and Kerr-Campbell (2010) found a similar result and argue that young individual are less likely to insure with PHI due to perceived low health risk, however after a certain age the decision to insure increases with additional years. Age positively affects the decision to choose CBHI although the coefficient is statistically insignificant at 10 percent. Additional years increases the odds of insuring with NHIF relative to not insuring by 1.03 times at 10 percent significance level. Age squared has a negatively affects the decision to insure and is statistically significant at 5 percent. This result suggests presence of downward concavity between age and the decision to insure, in that additional years increase the odds of insuring against illness until a certain point where the odds start decreasing. This might be due to the fact that older people have higher expected health consumption which increases their risk profile and premiums paid for insurance. Similar results are documented by Kirigia *et.al*, (2005) among South African women, that the likelihood increases with additional age but reaches a certain point and the likelihood to insure decreases thereafter.

The effect of marital status on the decision to insure is positive. The coefficient for married status is statistically significant and has a positive effect on the decision to insure. Being married significantly increases the odds of insuring against illness by 1.46 times. Similarly, being married significantly increases the odds of insuring with NHIF relative to not insuring by 1.58 times. Couples are more likely to insure due to risk aversion brought by the need to protect their family and also as a result of increased combined income (Harmon and Nolan, 2001). This result is

consistent with other studies that have found married individual are more likely to insure than those who are not married (Hopkins and Kidd 1996; Bourne and Kerr-Campbell, 2010; Kimani *et.al*, 2014; Finn and Harmon, 2006; Owando, 2006). The coefficient for marital status on the decision to insure with CBHI and PHI is negative, suggesting married individual are less likely to insure with this two schemes. However, the coefficients are statistically insignificant.

Behavioural factors largely affect the decision to insure. Using smoking as a proxy of individual risk aversion, we find that individual who indulge in smoke are less likely to insure against illness. Smoking significantly decreases the odds of insuring against illness by 0.63 times. Additionally, smoking significantly decreases the odds of purchasing NHIF relative to not purchasing health insurance by 0.63 times. The effect of smoking on PHI and CBHI is negative although the coefficients are not statistically significant. This result suggest that those who smoke are either risk loving or health insurance market is able to screen such behaviour and mitigate it with higher premium prices. Smoking increases the likelihood of developing respiratory diseases (i.e. tuberculosis, throat cancer and lung cancer), hence risk averse individual would ideally insure due to higher expected health consumption. Hopkins and Kidd (1996) found a similar result that individual who smoke are risk loving and less likely to purchase PHI. Other studies Kirigia *et al.*, (2005) and Owando (2006) using smoking as a proxy of expected health consumption (as opposed to measuring risk aversion) found that individual who smoke are more likely to own health insurance. This indicates the presence of information asymmetry problem in health insurance market, where risky individuals purchase health insurance.

Access to information positively affects the household decision to insure against illness. The coefficient for access to information is positive and statistically significant. Access to information (either through visual, audio or read) increases the odds of purchasing health insurance by 2.01 times. Similarly, access to information increases the odds of purchasing NHIF relative to not purchasing health insurance by 1.99 times. Access to information seems to have a higher effect of choosing PHI relative to not insuring by 3.16 times. The positive effect of access to information on the uptake of health insurance is as a result of most insurance products are advertised through the print, television and radio. This result is consistent with the findings of Nketiah (2009), Muketha (2016), and Kiplagat *et.al*, (2013).

Education level positively affects the decision to insure, with higher education level associated with ownership of health insurance. Primary, secondary and tertiary education increases the odds of insuring against illness. Having secondary and tertiary education significantly increases the odds of insuring by 1.60 times and 1.93 times respectively. The coefficient for primary education is statistically insignificant. Additionally, secondary and tertiary education significantly increases the chances of insuring with NHIF relative to not insuring by 1.92 and 2.23 times respectively. Education positive effect on the decision to insure against illness is based on the premise that well-educated individuals are able to understand the expected benefits of health insurance and role of health insurance in reducing catastrophic expenditures. The positive effect of education is also grounded on the idea that education increases production of health efficiency (Grossman, 1972). This result is consistent with other studies that found higher education increases the likelihood of purchasing health insurance (Muketha, 2016; Orayo, 2014; Bourne and Kerr-Campbell, 2010; Nketiah, 2009; Finn and Harmon, 2006; Owando, 2006; Hopkins and Kidd, 1996; Kiplagat *et.al*, (2013).

Gender variable suggests that households headed by women are more likely to insure against illness than those headed men. Being a woman increases the chances of insuring with all forms of health insurance. This result might be due to female headed households being relatively risk-averse compared to male headed households. However, the gender coefficient is statistically insignificant for all forms of health insurance. Muketha (2016) Kimani *et.al*, (2014) and Kiplagat *et.al*, (2013) found similar result that women are more likely to insure against illness compared to men.



## CHAPTER FIVE

### SUMMARY, CONCLUSION AND POLICY RECOMMENDATION

The chapter presents the summary of the main research findings, conclusion, discusses policy options from the research findings and wraps up with the research limitations and areas of further studies.

#### 5.1. Summary and Conclusion

The data points to low health insurance coverage among households in rural areas relative to the urban areas. Low health insurance coverage implies households rely on OOP to finance health consumption, which acts as an impediment to access to healthcare and likely to lead into catastrophic spending. This study sought to understand the determinants of health insurance choice among rural households. The study uses KHHEUS (2013) dataset and employs multinomial logit model. To ensure the results are consistent and unbiased, the study tested the assumption of independence of irrelevant alternatives (IIA) using the Hausman test. The test confirm that the IIA is not violated, hence the multinomial results are consistent and unbiased.

The results indicate that economic factors i.e. household income, wealth index and employment status positively affect the decision to insure and choosing either of the health insurance plans. Being employed, higher income and rise in wealth index and significantly increases the likelihood of owing health insurance.

The results indicate social-demographic i.e. age, age squared, education, marital status and gender affect the decision to insure. Age positively affects the choice of the three types of health insurance. From a theoretical perspective, increase in age depreciates individual health stock, which induces health investment through purchase of health insurance purchase. Age squared has a negative coefficient indicating presence of downward concavity between household head's age and choice of health insurance. Similarly, education positively affects the decision to insure against illness and this result confirms the hypothesis that well- educated individuals are able to understand the expected benefits of health insurance and role of health insurance in reducing catastrophic expenditures. Additionally, being married increases the likelihood of insuring against illness. The study reveals that couples invest more in health insurance partly due to risk aversion and increased

combined household income. Female headed households are more likely to insure against illness compared to male headed households. This is due to the fact that households headed by women are relatively risk-averse compared to men.

Information plays a critical role in understanding the uptake of health insurance. The results find that access to information has a higher effect of choosing PHI relative to the other forms of health insurance. The general positive effect of access to information on the uptake of health insurance is as a result of most insurance products are advertised through the print, television and radio.

By and large behavioural factors affect the decision to insure. The study used smoking as a proxy of risk aversion, we find that those who indulge in smoke are less likely to insure against illness. This result seems to imply that those who smoke are either risk loving or health insurance market is able to screen and solve the adverse selection problem. Smoking increases the likelihood of developing respiratory diseases and risk averse individual would ideally insure due to higher expected health consumption. Smoker not insuring against illness implies risk loving behaviour.

Generally, health insurance uptake and choice largely depends on economic, social-demographic, behavioural factors and information. The results suggest economic factors and information play a central role in explaining the uptake and choice of health insurance.

## **5.2 Policy Recommendation**

The research findings proffers a number of policy options that could scale up the uptake of health insurance among rural households. First, it is evident that economic factors (household income, employment and wealth) are significant explanatory variables of health insurance uptake. Focusing on economic factors can potentially increase the uptake of health insurance by two-folds. Hence, the government should pay attention to development programme that target to: elevate households from poverty; improve household income of the low income households who mostly depend on OOP to finance healthcare; and reducing unemployment, in so doing it will improve the living standards and will enhance access to health insurance. This should be coupled with creating a competitive environment that incentivizes the private players to develop affordable health insurance schemes for the rural households.

Additionally, it is critical to develop policies that ensure majority of individuals have access to secondary education. Education increases production of health efficiency and hence increases the likelihood of health insurance uptake.

Information plays a critical role in the uptake of health insurance. The research results underscores the significance of information. It is important for the government and health insurance providers to create awareness on the benefits of health insurance and the risk reduction health insurance offers, this programmes should particularly targeted to men and smokers. Smokers have a higher expected health consumption due to the higher risk of contracting respiratory diseases.

### **5.3 Limitation of the Study**

The main limitation of the study is related to the nature of data used. First, the data did not contain information that accurately captures individual risk aversion which is key factor in explaining health insurance uptake. Second, the data used did not capture specific health insurance information (i.e. exact premiums paid, the nature of health insurance benefits and health facility prescribed in different health insurance types). Not including the key predictors might lead to omitted variable bias.

### **5.4. Areas of Further Research**

In light of this study, there is need for further studies in understanding the willingness of rural households to pay for private and public health insurance covers. This will help the government and PHI providers provide more affordable health insurance products accessible to the rural households.

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