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AN EXPLORATION OF FACTORS THAT INFLUENCE HEALTH INSURANCE PARTICIPATION BY URBAN HIGH-DENSITY HOUSEHOLDS IN ZIMBABWE: CASE OF BUDIRIRO 1

BY

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DECLARATION

I, the undersigned, do hereby declare that this Dissertation is a result of my own original research and that no part of it has been presented for examination in any other University.

Signed_____ Date_____

Archford Gandidzanwa

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DEDICATION

This piece of work is dedicated to my late mother, Ruth. May your dear soul continue to rest in eternal peace. You are always in my mind in everything I do. I also dedicate this to my wife, Shelter, for her unwavering support.

ACKNOWLEDGEMENTS

ABSTRACT

The purpose of this study was to investigate factors that influence the decision to participate in health insurance by urban high density households in Zimbabwe using primary data from Budiriro 1 suburb in Harare. This came in the wake of deteriorating health standards and non-participation in health insurance schemes on the part of most Zimbabweans. Specifically, the study investigated the major drivers causing majority of healthcare users to rely on out-of-pocket expenditure rather than purchasing medical insurance and examined the influence of socioeconomic and demographic factors such as household income, education level, employment status, religion and gender of household head on the probability of health insurance participation. From the target population, a sample of 120 households were randomly selected and interviewed. A self-administered questionnaire was used to collect data between February and March 2018. Given the discrete nature of health insurance participation, data presentation and analysis was done using both descriptive statistics and the probit model. The study established that the motives for households' reliance on out-of-pocket were lack of awareness, chronic illness and the existence of tariff impasse between medical insurance schemes and healthcare providers. Probit regression results show that the household head's level of education, household income, employment status, and religion positively affect health insurance participation whereas gender was found to negatively influence participation in health insurance. Age and health insurance participation were found to have a quadratic relationship of a concave form. To improve participation in health insurance, the study argues for the health insurance industry to claim greater involvement in the nation's educational achievements and productivity stimulating endeavours. The study also recommends educating all healthcare users, regardless of religion or age on the importance of being insured so as to increase coverage across all age groups as well as on apostolic health care users.

Table of Contents

TABLE OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

AHFoZ	Association of Health Funders of Zimbabwe
AIDS	Acquired Immune Deficiency Syndrome
CBHI	Community Based Health Insurance
CDF	Cumulative Distribution Function
ESAP	Economic Structural Adjustment Programme
EU	Expected Utility
HIV	Human Immunodeficiency Virus
LPM	Linear Probability Model
LR	Likelihood Ratio
MAS	Medical Aid Scheme
MLE	Maximum Likelihood Estimation
MoHCC	Ministry of Health and Child Care
Natpharm	National pharmaceuticals
OLS	Ordinary Least Squares
OOP	Out Of Pocket payments
PHC	Primary Health Care
PHI	Private Health Insurance
PSMAS	Premier Services Medical Aid Society
SDG	Sustainable Development Goal
SSA	Sub Saharan Africa
STERP	Short Term Economic Recovery Programme
USA	United States of America
ZIM-ASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMSTAT	Zimbabwe National Statistics Agency

CHAPTER ONE
INTRODUCTION AND BACKGROUND

1.0 Introduction

Good health systems respond to people's expectations and ensure that health consumers are protected from the financial consequences of illness and death, or at least from the financial consequences associated with the use of medical care (WHO, 2017). A healthy nation, thus a healthy workforce is unquestionably a significant factor to the wellbeing of an economy. The deterioration of health standards and health status indicators should be worrisome to any nation. As far as this is concerned, there is need for support to facilities that would assure access to health care to the general population of a country. One way of assuring access to health care services is through health insurance coverage. Under health insurance schemes, individuals apply for membership and will be paying monthly premiums. In the event that a member falls sick, the costs of health care services are borne by the health insurer.

According to WHO (2016), in developing countries, health insurance is being increasingly looked upon as a method of providing quality health care services to the people and also protecting them against financial risk of illness. However, health insurance has not made much progress in terms of membership in Zimbabwe with a current proportion of 9.1% of the population being covered by the different health insurance schemes (AHFoZ, 2016). It is against this background, coupled with insufficient public health expenditure that the Zimbabwean health system heavily relies on Out-Of-Pocket payments[1] (OOP) and donor funding as a source of finance as noted by Makochekanwa and Mapani (2016).

Large OOPs are both a burden and an impediment in acquiring health care services and in general, OOP results in catastrophic health expenditures[2] and impoverishment (Santerre & Neun, 2010). Due to the catastrophic nature of OOPs, households are either discouraged to seek

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[1] Out-Of-Pocket payments are payments that are paid upfront before accessing health care services. They are paid by consumers which are not covered by any medical health scheme.
[2] Catastrophic health expenditure refers to any expenditure for medical treatment that can pose as a threat towards a household's financial ability to maintain its subsistence needs. It occurs when medical cost is equal or exceeding 40% of a household's non-subsistence income.

treatment when ill or they defer accessing health care services. Since the cost of accessing health care services is identified to be a major barrier to demand for health care as noted by Morris (2016), health insurance is emerging as a solution for enhancing access to health care services (World Health Organisation, 2013).

According to Gottret & Schieber (2006), health insurance helps households in setting aside financial resources to pay for medical care in case of illness, additionally, it also allows for risk pooling[3] thus guaranteeing financial protection among households. Buntin *et al.* (2004) note that the survival of health insurance depends on policy intervention on both demand side and supply side factors. The demand side factors consist of health insurance participation as well as the willingness and ability to pay for health insurance. In view of the above context, it is of high significance for credible policy intervention to ascertain the factors that determine health insurance coverage which is the purpose of this study.

1.1 Background of the study

The healthcare services sector is among the most regulated and supervised sectors in Zimbabwe, with the Ministry of Health and Child Care (MoHCC) being the custodian of the sector's stability. Zimbabwe's health care delivery system is provided in four different stages which are primary, secondary, tertiary and quaternary levels of health care. The quaternary level consists of central hospitals which are meant to function as a referral chain (ZIMSTAT, 2015). The primary level is the critical level of health systems where most households first visit for health care attention. It includes clinic and hospitals and other health facilities mostly in rural areas such as home based care and rural midwifery centers. This level of health system is the one that caters for a large population in Zimbabwe. As of 2016, there were 1118 primary health care facilities which constitute 78% of the total health facilities in the country (AHFoZ, 2016).

Accessibility to primary health care services is therefore a critical issue as this level is the first port of call since the health delivery system is graded into hierarchies of care, with each lower level referring difficult cases to the next higher level. The healthcare services sector directly and

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[3]Risk pooling refers to the spreading of financial risks evenly among a large number of contributors to the insurance scheme. Risk is transferred from individuals who cannot bear a possible unplanned financial catastrophe to the health insurance markets, which can bear them easily.

indirectly contributes to the welfare of the country but this contribution can be compromised by the dependence on OOP as a source of finance.

In Zimbabwe, the largest provider of healthcare services is the public health system, which is complimented by the private health system, mission hospitals and healthcare delivered by non-governmental organizations (Kanyenze *et al.,* 2012). Within the public health system, a number of main players exist, and among them are doctors, pharmacists, nurses and paramedics, through which preventive and therapeutic services are managed, distributed and consumed, however the private health system is dominant in the urban areas where numerous surgeries, private clinics, medical specialists and registered general practitioners are scattered throughout the high density suburbs as well as the central business district. In the year 2008, a number of public health facilities shut down their outpatient department, or in some instances provided partial services and had deficiency of health commodities for treatment (Osika *et al.,* 2013). During that time period, health service was provided by the mission hospitals and private clinics with private clinics dominating in urban areas and mission hospitals in rural areas (Munyuki & Jasi, 2009).

1.1.1 Post-independence Zimbabwean health care system performance
Zimbabwe made remarkable progress during the first decade post-independence, which is 1980 to 1990 in improving access to health care services. The implementation of the Primary Health Care[4] (PHC) program enabled access to basic health care services to about 85% of the population (MoHCC, 2016). As a result of investment in primary health and preventive health by the government, tremendous progress was realised in the health sector with infant mortality rate dropping from 90 deaths per thousand in 1980 to 53 deaths per thousand in 1988 and child immunisation coverage rose from 25% to 80% in the same period, this led to the Zimbabwean health care system being hailed as one of the most efficient and comprehensive health systems in sub-Saharan Africa (Kanyenze *et al*., 2012) and (Kadenge *et al., 1992)*. Health insurance coverage was very low in the first decade covering a mere 3 % of mainly the urban population by 1989. According to Osika *et al.* (2013), the low level of insurance coverage cannot be a surprise

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[4] Primary health Care (PHC) refers to essential health care that is based on scientifically sound and socially acceptable methods and technology, which make universal health care accessible to all individuals and families in a community.

during that period, the government introduced free health care services for those whose monthly income was below the threshold of Z$150 which was equivalent to US$187.50.

Kawewe & Dibie (2000) posit that, the Economic Structural Adjustment Programme period[5] (ESAP) that is 1991-1996, came with cost recovery policies with health expenditure declining from 6.2 % in 1990 to 4.2 % in 1996 and this reflected that fewer resources, in relative terms were being channelled to the health sector. Due to the continued decline in public resources to finance health, the government directed all public health services providers to charge user fees, by this the government was anticipating to improve morale of health professionals in the public sector and raise revenue to procure medical supplies and other inputs that were increasingly in short supply (Kanyenze *et al.,* 2012). During the ESAP period, Zimbabwe witnessed a sharp decline in public health spending compounded by a combination of financial austerity[6], inflation and increased burden of disease attributed to the devastating effects of the HIV and AIDS pandemic. According to Osika *et al.* (2013), the public health system faced crippling service delivery but the private sector remained viable although it was confined to serving the urban population.

During the crisis period of 1997 to 2008, Zimbabwe deteriorated progressively into macroeconomic and social crisis with hyperinflation eroding salaries of workers and drugs became unaffordable for the generality of the population. Shortages of foreign currency made it difficult to import drugs and hospital equipment in the year 2008, a number of health facilities had shut down their outpatient department, or in some instances provide partial services and had deficiency of health commodities for treatment (Cuneo *et al.*, 2017). Shortage of skilled professionals due to brain drain, eroded health infrastructure with ill equipped hospitals and lack of basic medicines and commodities all caused Zimbabwe's health care service delivery to fall drastically resulting in the system failing to sustain the progress it achieved soon after independence. These challenges contributed significantly to decline in utilisation of health care facilities (Osika *et al*., 2013).

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[5] Zimbabwe's Economic Structural Adjustment Programme (ESAP), launched in 1990, was meant to herald a new era of modernised, competitive, export-led industrialisation

[6] Financial Austerity is as a set of economic policies a government implements to control public sector debt. Austerity measures are the response of a government whose public debt is so large that the risk of default, or the inability to service the required payments on its debt obligations, becomes a real possibility.

From the transitional period of 2009-2010, the Short Term Economic Recovery Programme (STERP) was introduced identifying health as a priority focusing on the objectives of the Millennium Development Goals (MDGs) that is reducing infant, child and maternal mortality. According to AHFoZ (2016), from this period, Zimbabwe was said to be on the recovery path with the health system steadily recovering from the effects of hyperinflation as evidenced by the capacitation of National Pharmaceuticals (Natpharm), the government pharmaceutical agency which supply the public health sector with drugs and other pharmaceutical products. However increases in user fees remained the norm in public health facilities and by 2016, general ward fee per day was $10, maternity ward fee was $10 per day, intensive care unit fee per day was $20 and $10 being charged for consultation. According to AHFoZ (2016), health insurance coverage was on the fall since 2013 when it reached its peak covering 14% of the population dropping to 9.1% by 2016 despite the effort put by insurance companies to increase membership as evidenced by the introduction of the individual plan by Cimas medical aid scheme and Premier Service Medical Aid Society (PSMAS)[7]. This seems to be paradoxical because an increase in user fees should have increased membership in health insurance coverage since the two are substitutes in the eyes of health care consumers.

1.1.2 Health Care Financing In Zimbabwe

The Zimbabwean health system financing is broadly divided into private and public health financing. For public health financing, the government allocates funds through the national budget to the MoHCC whilst private health insurance, out-of-pocket spending by households and donor funds constitute private health financing. According to the 2017 Zimbabwe Health and Child Care Budget brief, from the total funds allocated to the health sector, employment costs took the largest proportion 60.5% therefore crowding out capital expenditure and other current expenditures for programs and service provision which accounted for 8% and 32% respectively. This is reflected by the pie chart in Figure 1.

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[7] The individual plan and the shield plan are the cheapest health insurance plans designed by CIMAS and PSMAS respectively to cater for the low income group and those in the informal sector.

Figure 1: Consumption of Health Care Expenditure in 2016
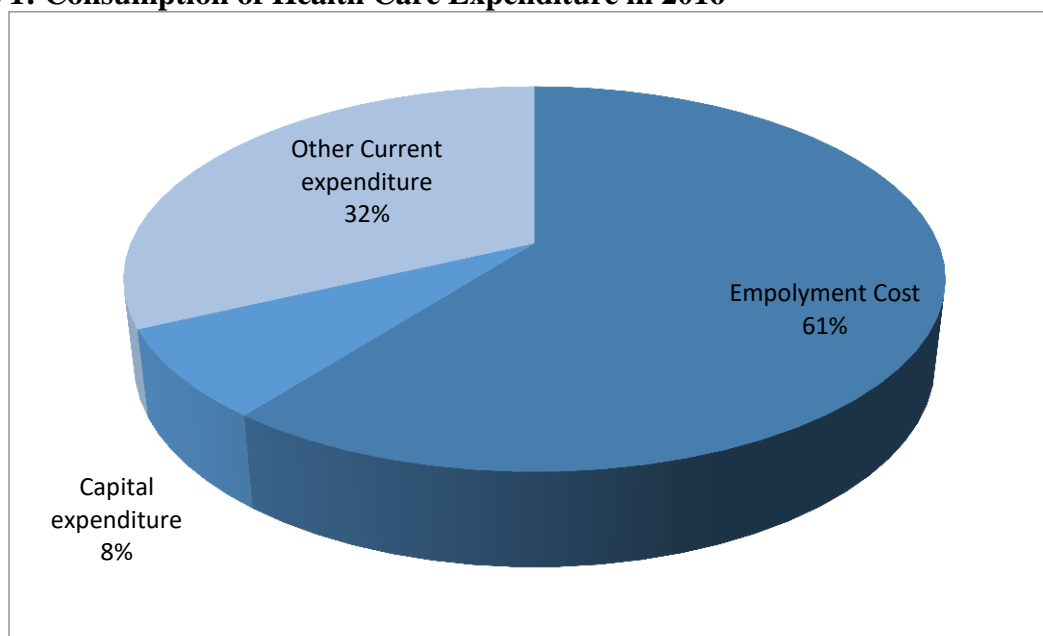
Source: *MoHCC (2017)*

Since the greater chunk of government health expenditure goes to employment costs, the Zimbabwean health system heavily relies on donor funding and from individual households through OOP. In 2016, government funds only accounted for 19% whilst the largest source was OOP which accounted for 54% and development partners contributing 22% (MoHCC, 2017). Figure 2 illustrates the health expenditure sources in 2016. From the diagram, it is evident that amongst the sources of health expenditures, OOP contributes much of the funds with a 54% share in the total expenditure. Surprisingly health insurance contributes a mere 2% to the total funds which shows poor health coverage among health care consumers. Total donations accounted for 25% of the total funds, whilst funds from the central government were 19% of the total health expenditure in 2016.

Figure 2: Sources of Health Expenditure in 2016
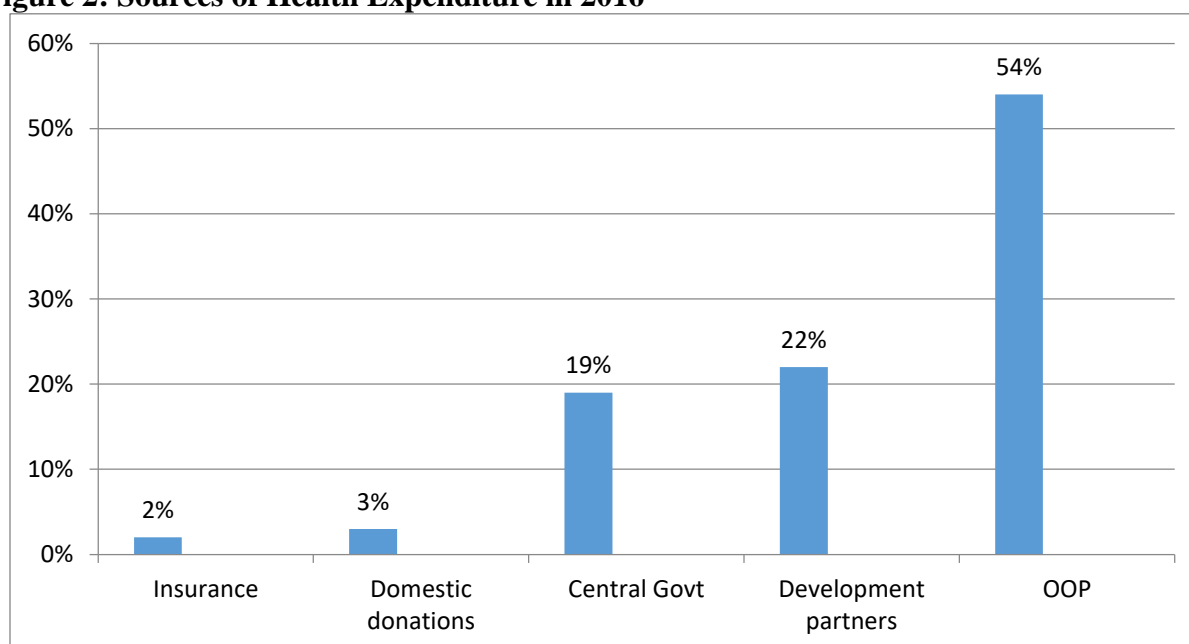
Source: *AHFoZ (2016)*

1.1.3 Trends in Health Insurance Coverage

Health insurance coverage in Zimbabwe was on a decreasing trend from 2005 to 2016. The percentage of the insured population (which mainly comprised of urban residents) fell from 15% in 2005 to 7% in 2010 (ZIMSTAT, 2015). This was attributed to the economic meltdown of 1997 to 2008 which adversely affected health care financing and the hyperinflation during this period eroded the purchasing power of households' incomes (Kanyenze *et al.,* 2011). From 2010 to 2015 health insurance coverage increased from 7% to 12% although it was subject to fluctuations as it reached its peak in 2013 with an estimated coverage of 14% of the total population (ZIMSTAT, 2015). According to AHFoZ (2016), health insurance coverage further fell from 12% in 2015 to 9.1% in 2016 despite the efforts made by Medical Aid Schemes (MAS) in providing less costly packages which were meant for the low income earners. Figure 3 shows the trends in the insured population in the period 2005 to 2016.

Figure 3: Trends in health insurance coverage from 2005 to 2016
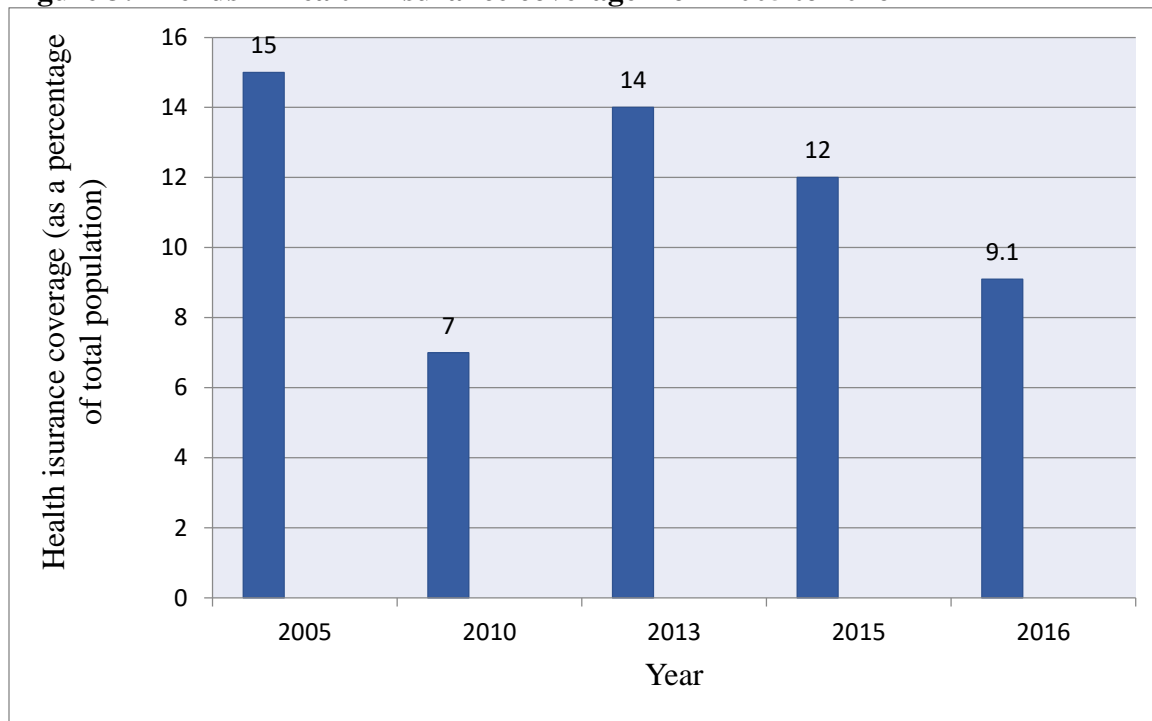
Source: *AHFoZ (2016)*

It is against this background that one can conclude that the Zimbabwean health system is highly dependent on OOP and donor funding which is unsustainable and increase inequalities in the accessibility of health care services. Financing health systems through OOP often results in catastrophic expenses in the event of acute illness. It follows that low income earners especially those in urban high density areas (where there is no exemption of user fee payments in accessing treatment coupled with high prevalence of communicable diseases due to overcrowding and dumping of refuse on undesignated areas) become more vulnerable to the financial burden of OOP.

Notably Budiriro high-density suburb in Harare came under the spotlight of both the government and non-governmental organisations in the health sector due to its vulnerability to epidemics such as cholera, typhoid and malaria since 2008 (Osika *et al.*, 2013). With a total population of approximately 24000 people[8], women constituting 59% of the total population whilst 41% are

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[8] The total population of Budiriro 1 could not be established. However, information gathered from the local authority revealed that there are approximately 2000 residential houses in Budiriro 1. (ZIMSTAT, 2012) also revealed that, in urban Harare, the average number of households per house is 3 and the average number of

men, the area is served by 1 poly clinic, 2 private clinics and 8 registered medical practitioners (ZIMSTAT, 2015). Despite high prevalence of communicable diseases in Budiriro, demand for both health insurance and health care services is quite low as individuals do not seek or postpone seeking treatment due to high cost of medication. In some instances individuals use some unorthodox health care facilities including religious faith healers and traditional healers. In support of this, Morris (2016) found cost of health care as the most cited reason for not acquiring health care when ill; this resulted in a paradox since the increase in medical costs coupled with the introduction of a more affordable health insurance plan should have increased health insurance coverage.

An analysis of Zimbabwean health performance since independence, sources and composition of healthcare expenditure and trends in health insurance coverage raises questions about the factors affecting the uptake of health insurance. If these factors can be determined empirically, it would be more interesting to explore such factors in Budiriro 1, a high-density suburb which is vulnerable to catastrophic health expenditure due to frequent outbreaks of communicable diseases.

1.2 Problem Statement

The problem under focus relates to the apparent global increase in the cost of drugs and other pharmaceutical products that is posing a challenge in acquiring health care services in developing countries. The Zimbabwean health system is not spared as evidenced by a general increase in medical costs for example consultation fees in public health facilities rose from $5 in 2010 to $8 in 2013 and $10 in 2016 (AHFoZ, 2016). Despite the increase in user fees in the health sector, rising levels of unemployment and falling health insurance coverage has resulted in the health system relying on OOP thus posing a high risk of catastrophic expenditures and impoverishment to low income households such as those in high-density suburbs and slum areas who are more prone to communicable diseases[9]. This has posed a controversy in the sense that the increase in user fees should have caused an increase in health insurance participation since

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household members is 4. This gives us an estimated household population of 6000 and total population of 24000 in Budiriro 1.

[9] The urban poor who resides in high-density suburbs live in overcrowded and unhygienic conditions without sanitary facilities, clean water, solid waste collection or proper drainage because of rapid and unplanned urbanization (Manjengwa *et al.,* 2016).

the two are substitutes (Santerre & Neun, 2010). If not solved, this problem can compromise the attainment of the Sustainable Development Goal (SDG) 3 which targets good health and well-being for all by 2030 and the attainment of the objectives of Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIM-ASSET)[10] is also compromised since catastrophic health expenditure have negative effects on social services and poverty eradication, which is one of the four strategic clusters ZIM-ASSET is built around.

Responding to the falling levels of health insurance coverage, in 2015 two major medical society schemes in the country that is Cimas and PSMAS medical aid schemes introduced the individual plan and the shield plan respectively that is meant for the low income and those in the informal sector (AHFoZ, 2016). However, regardless of these efforts by medical aid societies to increase health insurance coverage, health insurance participation continues to fall thus it becomes paradoxical since the conventional theories including the expected utility model predicts that, an increase in the cost of health care should increase risk pooling mechanisms such as health insurance coverage (Santerre & Neun, 2010). In order to solve this paradox; an understanding of the factors that affect the participation of health insurance is of paramount importance.

Although the current Zimbabwean situation needs attention as far as risk pooling mechanisms to avoid financial risk associated with illness, literature remains sparse with only a few researches done. Among the few is Mhere (2013) who focused on the socio-demographic determinants of the demand for health insurance in Gweru urban. However, the major weakness of the study is that the researcher assumed homogeneity in both the need for health care and burden of catastrophic health expenditure among citizens which is not always the case. The need for health insurance and the burden of catastrophic OOP differ between the households in high density suburbs and their low density counterparts, in contrast to those in low density suburbs, households in high density suburbs require more health care services and are more prone to catastrophic expenditures. It is therefore, against this background that there is dire need for an exploration of the factors that affect health insurance coverage among urban high-density

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[10]ZIM-ASSET is a blueprint crafted by the Zimbabwean government to achieve sustainable development and social equity anchored on indigenization, empowerment and employment creation. The four clusters include food Security and Nutrition; Social Services and Poverty Eradication; Infrastructure and Utilities; and Value Addition and Beneficiation.

residents in Zimbabwe taking the case of Budiriro 1 high-density suburb in Harare due to its high incidence of communicable diseases and also due to the fact that the area has been the epicentre of cholera and typhoid epidemics since 2008 up to date claiming a total of 5369 deaths, 98585 reported cases and a fatality rate of 6.8 % which was referred to as Africa's worst cholera outbreak for the past 20 years (Cuneo *et al.*, 2017).

1.3 Research Objectives

The general objective of this study is to investigate the factors that influence the demand for health insurance in Zimbabwe using household data from Budiriro 1 high-density suburb.
The study focuses on the following specific objective:

i. To investigate the major drivers causing majority of healthcare users to rely on out-of-pocket expenditure rather than purchasing medical insurance.

ii. To assess the effect of household socio-economic and demographic factors on the household's choice on health insurance participation.

1.4 Research questions

In relation to the stated objective, the study seeks to answer the following question:

i. Why the majority of healthcare users are relying on out-of-pocket expenditures rather than utilizing medical aid?

ii. What is the impact of household socio-economic and demographic factors on the household's decision on whether or not to participate in health insurance?

1.5 Research Hypotheses

With regards to the formulated research objectives and questions, the following hypotheses were formulated:

i. The majority of healthcare users are insured.

ii. Household socio-economic and demographic characteristics have no effect on the household's decision on health insurance participation.

1.6 Justification of the Study

In Zimbabwe, there are significant unmet health needs. Health care organizations, governments and providers require a good understanding on why people choose one against the other available

health care services. Health care management requires authorities to ascertain the factors that influence health care utilization. Increasing health care utilization is a challenge in Zimbabwe as people tend to rely on OOP in the presence of increasing costs of medication which have led them to use multiple health care services like non-conventional health care services in a bid to evade costs. Understanding why people choose or do not choose to be insured becomes central to increasing health care utility and efficacy

Empirical studies on health insurance participation which includes Jütting (2003), Bennefield (2010), Kirui (2012), Mhere (2013) as well as Kettlewell *et al.* (2018) have mixed results. Although different researchers have tried using a quite range of methodologies in analysing the factors influencing health insurance, many studies failed to employ data at micro level. This indicates a limitation of a model's dependence upon macro data as opposed to micro data, which can help in determining the factors influencing the decision to participate in health insurance by households in specific areas. In addition, macro data masks suburb, or area heterogeneity, which may also bias the estimates. Our study seeks to fill this void in literature by analyzing these factors on a micro level, focusing on Zimbabwe and taking high-density suburb residents as the target population. Thus the research will add to the existing body of knowledge on health insurance.

Furthermore, an understanding of the factors that determine health insurance participation in Zimbabwe is also very important for policy formulation especially with regards to health care utilization and improving service delivery in the health sector. According to Buntin *et al.* (2004), the efficacy of the a health care system depends on policy interventions on demand side factors of which health insurance is among the key components. Thus for viable policy interventions, it is critical to identify the factors which influence the decision by households to participate in health insurance schemes. When these factors are established, the stakeholders in the health insurance market and the health sector at large would be well acquainted, resulting in informed policy implementation which might boost the demand for health insurance as well as the demand for health care and this will ultimately lead to a healthy nation.

1.7 Outline of the rest of the Study

The remainder of the study is organised as follows. Chapter two provides theoretical and empirical literature. The third Chapter provides the research methodology which encompasses data collection and analysis procedures. Chapter four encompasses interpretation of results and analysis. Lastly, Chapter five concludes and summarizes the study findings as well as giving some policy recommendations and suggestions on areas for further study.

CHAPTER 2
LITERATURE REVIEW

2.0 Introduction

In this chapter, the study reviews literature on the factors determining health insurance participation (theoretical and empirical literature). However, even though the prime purpose of this study is exploring the determinants of health insurance, this chapter also reviews theories of demand for health care since health insurance is also perceived to be derived from demand for health care. Firstly, theory of consumer choice under uncertainty is reviewed to come up with the variables affecting choice under risk and uncertainty under which health insurance falls. Theory of demand for health is also reviewed to bring up additional variables since health insurance demand is double derived in the sense that it is derived from demand for health care which is derived from demand for health (Besley, 1988). To this end, we review the Expected Utility (EU) theory, the prospect theory and the theory of reimbursement insurance together with the famous Grossman Model. Additionally this chapter reviews the empirical literature in order to increase our understanding of the factors affecting the uptake of private health insurance in the Zimbabwean urban health sector. Both theoretical and empirical literature reviewed in this chapter give a conceptual structure for the study through identification of private health insurance determinants which are relevant to this study, and therefore enable appropriate empirical model specification.

2.1 Theoretical Literature Review

2.1.1 Theories of choice under uncertainty

The decision to participate in any risk pooling mechanism is attributed to the theoretical underpinnings of the theories of decision making under uncertainty which regards the risk attitude and socio-economic factors inherent to the individual as the key factors in decision making (Santerre & Neun, 2010). The variables drawn from these theories are regarded as the core variables influencing the decision to buy private health insurance since according to Nyman (2006), the decision to purchase health insurance arises due to uncertainty about the future health status.

The expected utility theory

The theory can be traced back to Bernoulli's 1738 study (cited in Gravelle & Rees, 2004) who suggested the concepts of utility and diminishing marginal utility in a bid to solve the St Petersburg's paradox[11] and it was formally developed by Von Neumann and Morgenstern in 1944 (cited in Eisenhauer, 2017) by building a mathematical foundation and setting up a set of axioms for a utility function to exist . The theory relies heavily on the belief that given a set of alternatives, individuals will always choose the one that yields the highest expected utility, additionally individuals are also assumed to be risk averse. Figure 4 shows the expected utility model.

Figure 4: The expected utility model
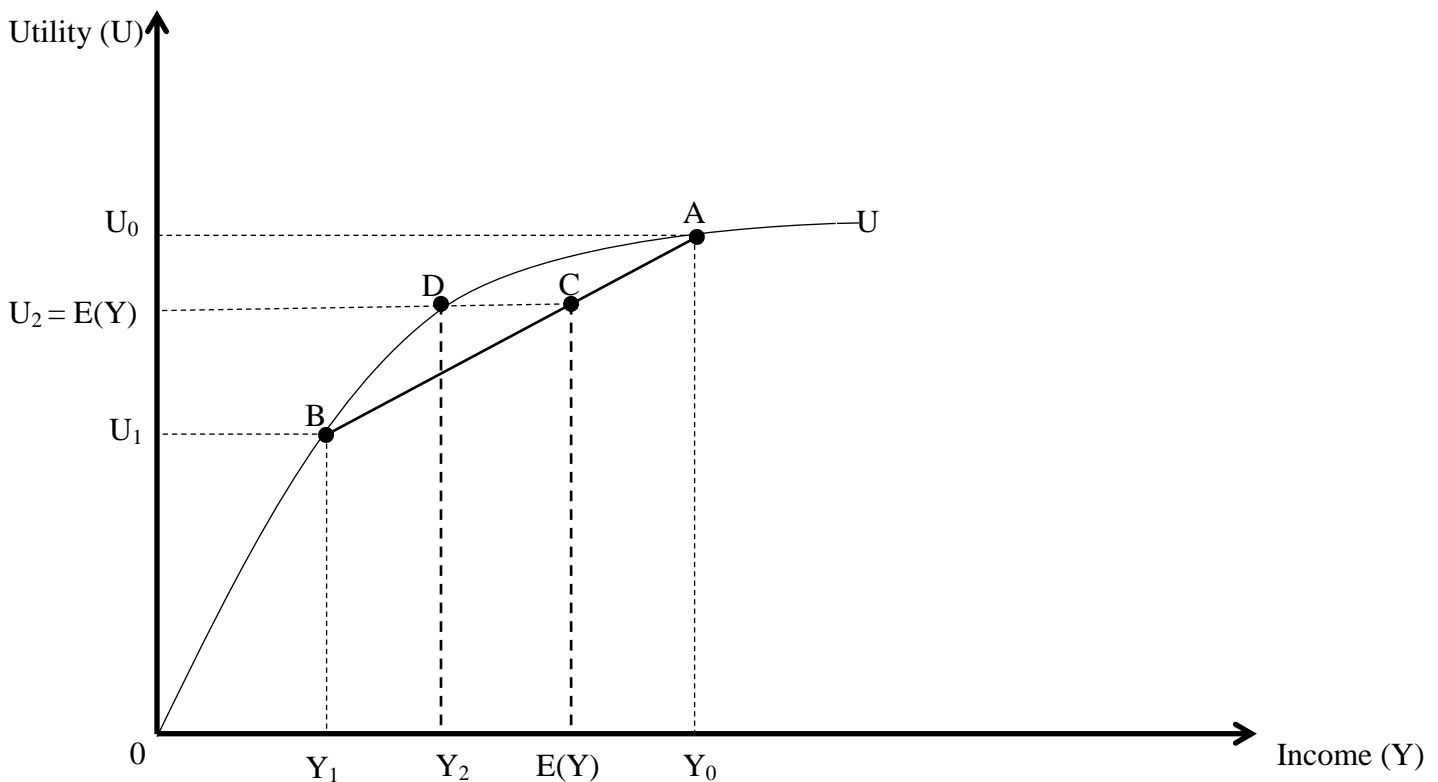
Adapted from Santerre & Neun (2010, pp 148)

Figure 4 shows the actual utility as a function of income for a representative consumer/individual. Formally, given that Y_0 is the individual's income level and $Y_0 - Y_1$ is the

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[11] The Saint Petersburg's paradox, is a theoretical game used in economics, to represent a classical example were, by taking into account only the expected value as the only decision criterion, the decision maker will be misguided into an irrational decision.

medical cost in the event of illness which occurs with a probability of π. The expected utility without insurance will be therefore given by:

$$Eu^u = \pi u[Y_0 - (Y_0 - Y_1)] + (1 - \pi)u(Y_0) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$
$$= \pi u(Y_1) + (1 - \pi)u(Y_0) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Given this healthcare spending, if the individual becomes insured and Y^* is the expected income value such that $Y_0 - Y^*$ will be the actuarially fair premium payment, the expected utility when the individual is insured is:

$$Eu^i = \pi u[Y_0 - (Y_0 - Y_1) + (Y_0 - Y_1) - (Y_0 - Y^*)] + (1 - \pi)u[Y_0 - (Y_0 - Y^*)] \quad \dots\dots\dots\dots (3)$$
$$Eu^i = \pi u(Y^*) + (1 - \pi)u(Y^*) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$
$$= u(Y^*) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

Since the individual is assumed to be risk averse, his /her utility function will exhibit a standard concave form and under such circumstances, insurance coverage produces or yields a higher expected utility as contrasted to remaining uninsured. Accordingly, the theory postulates that consumers maximise their expected utility and they will choose insurance coverage over no insurance. Hence:

$$u(Y^*) > \pi u(Y_1) + (1 - \pi)u(Y_0)$$

A very important insight of this theory is that the expected utility varies with different probabilities of illness and the expected utility decrease with increasing probability of illness. Santerre & Neun (2010) posit that individuals use a personal estimate when attaching the probability of illness and this estimate depends on factors such as age, lifestyle and the individual's stock of health. The expected utility theory implies that the health insurance participation is actually a demand for certainty; alternatively the demand for health insurance participation is seen as a demand to avoid risk. Furthermore, as an implication of the theory, the key motivator in the decision to purchase health insurance is the probability of illness that individuals attach to themselves and as noted earlier this depends on age, health stock and lifestyle of the individual.

However this theory is criticized due to the fact that it is silent about the level of consumers' income and its impact on the insurance choice (Schneider, 2004). Studies have suggested that the model's prediction of individuals' decision making behaviour is poor hence some additional factors have to be included. These factors may include the societal context about provident behaviour or regret considerations (Schoemaker, 1982). Moreover, Individuals' decisions on health insurance participation may not only be influenced by risk aversion but also by the *access motive*[12] of insurance. The access motive reflects the benefits from pooling resources, this might include the availability of health care services that may somewhat be unaffordable for the poor. Gaining higher access to health care services when insured may result in increased health insurance participation by the poor who face challenges in obtaining needed health care when uninsured. When not insured, the poor would lack enough funds and time to save for an expensive health care procedure, furthermore, institutions which lend money may be reluctant to offer advances when the ability to repay of the patient is limited (Nyman, 2006). Regardless of its critiques, the EU theory remains the most commonly used in modeling decision-making under risk (Marquis & Holmer, 1996).

The theory of reimbursement insurance

Phelps (1973) developed the theory of reimbursement insurance by extending the conventional theory of health insurance to take into consideration the reimbursement nature of health insurance. The theory assumes a utility function of an individual in the form of $U = U(X, H)$, where X is a market basket of consumer goods and H representing a flow of healthy days. The individual is assumed to occasionally become ill therefore H is subject to random loss(λ). Since the individual derives utility from healthy days, he or she seeks medical care (h) which is priced at p_h . The theory further suggests a production function $g(h)$ which shows the relationship between the amount of h purchased and the amount of health days (H) obtained. At any given time, the individual's health consumption is given by:

$$H = H_0 - \lambda + g(h) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

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[12] This suggests that health insurance is also demanded because it represents a mechanism for gaining access to health care that would otherwise be unaffordable.

where λ is the random variable, H_0 is the initial stock of health and $g(h)$ is a technological function which transforms medical care into healthy days. The individual's budget line is given by:

$$I = p_X X + p_h h \quad \text{...} \quad (7)$$

where I is the individual's income, and p_X is the consumer price index and p_h is the medical care price. Since individuals derive utility from H and not from h the budget line is transformed into an iso-budget line in X and H by inverting equation 6 to get:

$$h = g^{-1}(H - H_0 + \lambda) \text{...} \quad (8)$$

Equation 8 now represents the derived demand for h given H_0 and λ therefore the individual's budget line becomes:

$$I = p_X X + p_h g^{-1}(H - H_0 + \lambda) \quad \text{..} \quad (9)$$

According to the theory, individuals are rational and they are risk averse hence, individuals do not like the randomness of H. In trying to avoid risk, the individual purchase health insurance and pays a premium (R) and $R = R(C, \theta, \delta)$ where θ is the loading charge on the insurance, C is the co-payment rate by the agreed and δ is a vector of parameters that systematically influences the premium that is age, family size, occupation, among others. After purchasing the insurance policy, the individual's budget line becomes:

$$I - R = p_X + C p_h g^{-1}(H - H_0 + \lambda) \text{...} \quad (10)$$

The rational individual will therefore maximise utility subject to the budget line. After setting the partial derivatives to zero to maximise utility, the model obtains the demand functions for X and h of the following general form:

$$X = X(p_X, p_h, W, C, I, R, H_O, \lambda, \psi, \Gamma) \quad \text{...} \quad (11)$$
$$h = h(p_X, p_h, W, C, I, R, H_O, \lambda, \psi, \Gamma) \text{...} \quad (12)$$

where, ψ is a vector of parameters of the utility function, Γ is a vector of parameters that influence $g(h)$ which include age, occupational characteristics and risk attitude. The model stresses that h depends not only on its market price$(p_{h)}$ and individual income (I) but also upon the loss(λ), the initial level of health (H_0) and the insurance parameters chosen. W is the wage rate and it is included in the model due to the fact that the model treats income as obtained from market labour participation.

The prospect theory

In developing the theory, Kahneman & Tversky (1979) conducted numerous controlled experiments and found that most people usually violate the basic axioms of the expected utility theory when making decisions at least some of the time. By relaxing the assumption of risk aversion and instead propose loss aversion as the main assumption, the prospect theory states individuals make choices basing on prospects of gains or losses, rather than basing on the level of uncertainty (Schneider, 2004). Individuals assume an optimal risk level for every expected gain or loss. The point from which an individual perceives gains and losses to occur may influence the choice; and gambles are judged in terms of their deviations from this optimal risk level (Kahneman & Tversky, 1979). Applied to the insurance context, prospect theory implies that individuals insure from a gain perspective and not because of the fact that insurance reduces uncertainty. Given a premium level, people will first assess their individual health risk level and the eventual deviation from it (for example, my health is bad and it could get worse). Individuals may decide to remain uninsured because of a gain prospect: that is if they expect to pay less for their health risk than the deviation from it. This is a risk because the deviation may be greater than expected and will cause a loss. Hence, the prospect theory suggests that, with respect to losses, individuals prefer risk. Following from this, individuals will only insure if the loss will occur with certainty, and not because they are risk averse as suggested by EU theory (Kahneman & Tversky, 1979).

2.1.2 Theory of demand for health

The Grossman Model

Besley (1988) postulated that only health is believed to be what yield utility directly (in other words both healthcare and health insurance have no direct independent effect on utility). In order for an individual to enhance his/her health status, he/she demands health care, however, individuals' health status is subject to random shocks due to occurrence of illness which is uncertain and to this end, health insurance coverage matters. Health insurance is doubly derived; initially healthcare demand is derived from the demand for health and finally the demand for health insurance is derived from the demand for healthcare. Grossman (1972) formally developed this model basing on the concept of health capital. The model had been applied by many studies to determine optimal quantity of investment in human at any age. Basing on the

idea that health capital is different from other forms of human capital, Grossman established how resources are allocated by individuals to produce health and the model entails that individuals are producers of health and it capitalises on the issue of investing in human capital through education and health to improve productivity (market and non-market). According to the model, while the stock of knowledge and other factors determine market (work) and nonmarket (household) individual productivity, it is the stock of health that affects the amount of time spent on producing commodities and money earnings.

The Grossman's model is based on a number of assumptions. The model assumes that consumers demand health basically for two reasons: as a consumption commodity and as an investment commodity. In addition, the model also assumes that gross investment in health capital enters in household production function which depends on some environmental variables such as education of health producer and the individual health level is endogenous as it depends on resources put to its production.

According to the Grossman model, the consumption effects as an element of health demand implies that health is a source of utility and it enters directly into the utility function. The consumer's preferences can be presented by the following inter temporal utility function:

$$U = U(\Phi_0 H_0, \ldots., \Phi_i H_i, \ldots., Z_0, \ldots., Z_i) \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (13)$$

where, H_0 is the stock of health inherited, H_i is the stock of health at time i, $h = \Phi_i H_i$ is the total consumption of health services, Φ_i is the service flow per unit stock and Z_i is the consumption of other commodities in period i. Grossman modelled health as a capital good using the following model:

$$H_i = H_{i-1} - \delta_i H_i + I_i \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . (14)$$

The model postulates that the amount of health stock (H_i) at period i depends on how an individual invest in his/her health (I_i) and the rate of depreciation (δ_i). Depreciation is the amount of health stock that lost through injuries, age, carelessness and diseases.

The theoretical predictions of the Grossman's model are based on age, education and wages. In both variants of the model, age is inversely related to health demand. This means that the

demand for health and hence demand for private health insurance coverage decreases when people grow old because age reduces payoffs from investment in health. Older people are less efficient at turning health investment in health stock. If age increases, the marginal cost of holding an additional unit of health stock also increase. Thus, age reduces demand for health in both the consumption and investment variants. However, the model predicts that health stock decreases with age and people are expected to demand more health care as they grow. Education in the model is positively related to demand for health stock in both variants. The implication of education in the model is that those individuals with more number of school years are likely to effectively utilize resources to produce health.

Grossman's model of health stock is very important because it gives important factors which influence demand for health, health care and private health insurance. As demand for health increases, the demand for health care services also increase which in turn should increase the demand for health insurance hence health insurance is a double derived demand. An individual may determine his optimal stock of health capital by the choice he or she makes. From this model, the decision to participate in private health insurance can be seen as choice decision by individuals who demand and produce health. In summary, demand for the uptake of health insurance is hypothesized in the theory to depend on age, education and income.

2.2 Empirical Literature Review

Since the Von Neumann-Morgenstern utility theorem, a lot of studies regarding private health insurance participation have been carried out around the world. Yamada *et al.* (2014) carried out a study to evaluate the effects of socio-economic characteristics of individuals on demand for private health insurance and hospitalization. The study was done on both Japan and the USA, the Japanese household data were obtained from the National survey of life insurance for the fiscal year 2000 and on the other hand data for the USA from the community tracking household survey 1996-1997 were used. Using each country's data, the study estimated two models: a bivariate probit model and a Heckman Probit model and the results from the Japanese data using both models revealed that the coefficients of income and wealth have a positive effect and were statistically significant. Sex of household head and his/her age were found to have no impact on the decision to buy private health insurance. The study also found that household education level

and income were the main driving factors for the demand for private health insurance in the USA. These results were in line with the theoretical predictions of both the Grossman model and the Von Neumann-Morgenstern utility theorem. Although the study was quite strong in analyzing the effects of socio-economic characteristics, the major weakness of this study is that it used macro data thereby neglecting the impact of these factors on a more specific micro scale. This might result in generalised results which might not apply to specific areas. Therefore, this study tries to solve this problem by targeting households in high-density areas.

According to Jütting (2003), household income, religion, village characteristics and ethnicity exerted the strongest influence on the probability of participation in community based health insurance schemes in rural Senegal. Employing a probit model, the study used cross sectional data. The model was specified as:

$$P(HI = 1/X) = \beta_0 + \beta_1 gender + \beta_2 hsize + \beta_3 Religion + \beta_4 Income + \beta_5 VCharacteristics + \mu_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (15)$$

The study noted that whilst the schemes reached the poor in general, the poorest of the poor within the villages found participation financially difficult. Additionally, the study found the persistence of social exclusion due to religion or ethnic groups. The study was well articulated in determining the factors affecting health insurance participation and it was far reaching as it tried to capture a variety of factors including religion. Just like Jütting (2003), our study employed the same probit model and some additional variables were added.

In exploring the effects of household assets on health insurance in India, Chakrabarti & Shankar (2015) used cross sectional data of 2006. The study employed a probit model in estimating the relationship between household wealth, exposure to media, age and ethnicity and the probability of current enrolment in health insurance. For both rural and urban samples, the marginal effects revealed significant positive association between a household's wealth and the probability of being enrolled in private health insurance. Age was found to have insignificant effect on the probability of use of health insurance. The results correspond with the existing literature on privately purchased health insurance schemes as postulated by Besley (1988) as well as Yamada *et al.* (2014). However, this is contrary to what was found for Vietnam by Wagstaff *et al.* (2015) where enrolment in non-contributory social health insurance schemes was found to be higher if

the household head was aged. Regardless of the fact that the study was well articulated and a suitable model was applied, the study left out important factors including education and household income level as explained by both the Grossman model and the theory of reimbursement insurance. Additionally, had it used current data, the study would have been more powerful. This is because parameters may change with shifts in the policy regime hence basing on 2006 data to make policy recommendations in 2015 would be less relevant.

In the same vein, Kettlewell *et al.* (2018) empirically investigated the impact of private health insurance subsidy on the demand for Private Health Insurance (PHI) on Australia. Using monthly data of January 2006 to December 2009, a standard parametric regression discontinuity model was employed and the model was specified as:

$$PHI_i = \alpha_1 + \alpha_2.f(dage_i) + \beta_1.D(dage_i > 0) + \beta_2.f(dage_i).D(dage_i > 0) + \varepsilon_i \quad ......(16)$$

The study found that private health insurance premium subsidies have no effect on the uptake of private health insurance. Our study draws some of its control variables from their findings for instance, the study found that Australians with PHI tend to be higher income earners, better educated and in better health than those without PHI. This further conforms to the theoretical predictions of both the Grossman model and the theory of reimbursement insurance. However, to increase the quality of the results, the study should also have considered using a more recent data set.

Kebede *et al.* (2014) conducted a study to assess the willingness to pay for Community Based Health Insurance (CBHI) and associated factors in Ethiopia. A multi-stage sampling technique was used on cross sectional data and a Double Bounded Dichotomous Choice variant of the Contingent Valuation method in assessing the maximum willingness to pay for the scheme. The study also employed a log-linear multiple linear regression analysis to answer how much one is willing to pay once one decides to enroll in the scheme. The model estimated was presented in the form:

$$\ln(Y_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots \beta_n X_{ni} + \varepsilon_i \quad ....(17)$$

Sex of household head and his/her occupation were found to be the key factors influencing the willingness to pay for CBHI. However, the contingent valuation method used does not test

consumer effective demand hence the question remains: will the consumers really pay the amount premium they said for the study? Instead of estimating the willingness to pay, the researcher opted to find the motivation behind relying on OOP

In examining the effect of socio-demographic factors on private health insurance enrollment in Iran, Javan-noughabi *et al.*(2017) used cross sectional data for the year 2015 and the open ended questionnaire design was used. A multivariate regression analysis using Ordinary Least Squares was then applied to examine the effect of socio-demographic factors on the willingness to pay. Household monthly income was identified to be the key determinant for the willingness to pay. This study supported the findings of Gustafsson *et al.* (2016) who empirically investigated the willingness to pay for private health insurance in Namibia using a double bounded contingent valuation method. The study revealed that 87 % of the uninsured were willing to join health insurance scheme and on average, respondents were willing to pay US$4.8 per month per person. The only significant factor was found to be income which positively affected the decision to enroll in a private health insurance scheme. Although the study by Javan-noughabi *et al.* (2017) can be used to draw some important explanatory variables, the study overlooked the discrete nature of health insurance and continued in using the OLS method which is best suited when the dependent variable is continuous. The researchers should have considered employing discrete models such as the probit, logit and linear probability models.

In a bid to identify the factors affecting implementation and uptake of health insurance in Sub Saharan African countries (SSA) with focus on Nigeria, Odeyemi (2014) carried out a literature survey using PubMed and EconLit[13] to review studies. The review found that voluntary health insurance schemes with a variety of designs have been introduced in SSA but with generally disappointing results so far, two exceptions being Ghana and Rwanda both of which have introduced schemes with effective government subsidisation and control coupled with intensive implementation programs. Odeyemi, (2014) concluded that among other factors subsidisation and awareness of voluntary health insurance schemes are the significant factors in determining the uptake of private health insurance. On the contrary, Wagstaff *et al.* (2015) found that subsidies

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[13] PubMed and Econlit are academic literature abstracting database services published by the United States National Library of Medicine and the American Economic Association. The services focus on literature in the field of health economics.

and information exacerbate the problem of adverse selection by improving enrollment rates among the less healthy. Wagstaff *et al.* (2015) empirically investigated the impact of information and subsidies on voluntary health enrollment using a cluster randomized experiment in Vietnam.

Danis *et al.* (2007) carried out a study to determine the causes of low health insurance coverage in India. Although this was the major objective of the study, it also attempted to examine the demand for both the private health insurance and micro-health insurance schemes in that country. Both primary and secondary data were used in this study. Primary data were taken from surveys in both private health insurance and micro-health insurance clients whereas secondary data were taken from the providers of these schemes. Data collection was carried out in August to December 2004. Both descriptive and econometric methods were used in this study. The results of the study showed that the determinants for health insurance can be divided into enabling and motivating factors. Enabling factors included income level, regularity in income receipt and education while motivating factors were age, health risk and household size. The household size was emphasized in this study in that the joint family system was regarded as a kind of informal insurance system for its members. From this study, it can be inferred that a large family will not likely to be enlisted into health insurance plan since the family, for example, will cushion the risk of getting ill, and this is economically rational since a large household entails higher insurance costs.

Sanhueza & Ruiz-Tagle (2002) investigated the determinants of the demand for private health insurance over public health insurance in Chile. Using data from the Chilean National Characterisation Survey of 1996, the co-authors used multiple regression analysis upon which the explanatory variables included income, age and sex. They found out that the probability of buying a private health plan is positively correlated with income and proximity of private health care providers. Also, commenting on age and sex variables, the authors were of the view that health insurance premiums discriminate among age and gender groups. This may be illustrated by the view that elderly people and women of fertile age may pay a higher premium than young people and men when they enroll in health insurance because they would be expected to generate higher medical expenses due to their inherent higher health care demand.

A research carried out by Bennefield (2010) on the dynamics of economic well-being suggested that young adults ranging between 18 and 24 years of age were the most likely of any age group to lack insurance in South Africa. Employing a logit model, the study found out that work experience had a significant effect on health insurance coverage. In this regard, 86.5% of people who worked continuously, and on a full time basis for the period studied, had continuous health insurance coverage. This is unlike part time workers and individuals who had one or two job interruptions over the period. Those who were poor and the near poor were less likely to have continuous health insurance coverage than others. He found out that health insurance coverage was associated with other life circumstances like employment and retirement. Participation was thus bound to change over time. Women were also more likely to have health insurance coverage as compared to their male counterparts, and this, he attributed to their economic status. Other key determinants from his study included the type of residence and religion, level of education, as well as employment status. This is one of the few studies that recognized that African people consult traditional and spiritual healers as an alternative to the conventional medical services.

In a study carried out by Liyne & Zhu (2012), a multi-level analysis was carried out on the determinants of social insurance participation in some of China's cities. It came out that at times participation is affected by social policies of the cities and the effects were seen to be significant. Enterprise characteristics were seen to have a relatively vague impact on participation and without obvious regularity on social insurance participation. It is also possible that participation may be determined by a combination of family level pre disposing, perceived need and enabling or disabling factors, as came out of a study by (Kincheloe *et al.,* 2007). In addition to such factors they also underline the key role played by country level enabling or disabling factors, and from their study the strongest predictors of participation in California's Medicaid and SCHIP programs were immigration status, ethnicity, income, age, number of hours a parent worked, and urban residents.

Some interesting insights may be drawn from Gonzalez (2014) who carried out a three part analysis of the impact of acculturation, self-rated health, and years of US residency on Latino's take up of health insurance. He established that Latinos often lack Health insurance coverage as a result of the industries in which they work, type of occupations they hold, type of employment

status they are granted. From his study it came out that some of the major industries that provide significant employment opportunities for US Latino labour force include agriculture, manufacturing, construction and services. These industries are less likely to provide health insurance coverage and other employer sponsored benefits for their employees. They are less likely to employ on a full time basis, and they are more likely to provide minimal wages, seasonal employment and day labour type of employment arrangements. His study thus conforms that some types of employment arrangements impede the likelihood of certain classes of people to obtain health insurance coverage compared to other classes.

In Zimbabwe, Mhere (2013) carried out a study on the determinants of health insurance focusing on Gweru urban area as the case study. The main thrust of the research was to come up with factors, which determine demand for private health insurance. Mhere (2013) used cross sectional data which was collected using questionnaires and employed the probit model, the results from this analysis showed that the household head's level of education, household income, age, family size and chronic illness are significant predictors of participation in private health insurance schemes. For example, it is shown that the more educated the family head is, the greater the probability that the family would be enrolled to a private health scheme. Much as the study tried to accommodate most of the factors that influence demand for health insurance, it however did not take into account the impact of religious and spiritual perspective among health care users, a phenomenon across all Africa (Tembon & Tembon, 2016). Hence, religion in Africa cannot be ignored as a factor that determines health care seeking behaviour.

On the contrary, Kura *et al.* (2012) identified five factors that affected the growth of private health insurance and these were formalities bottlenecks, agent-related problems, coverage issues, awareness and negative feedback. The study examined factors affecting the demand for health insurance, emphasizing on awareness, in the region of Punjab in India. Cross sectional data was used and the data were collected using structured questionnaires and factor analysis and chi-square statistic of association were applied. The study reflected that only 11.5% of the respondents were aware of health insurance, nonetheless, the study ignored socio-demographic factors as contributing factors to the demand for health insurance. Unlike most studies done

27

along this area, this is one of the few that recognized supply side factors such as agent related problems to influence health insurance participation.

2.3 Conclusion

From both theoretical and empirical literature analysed in this chapter, one cannot come up with a universal set of factors that determine the demand for private health insurance. Empirical literature even in one country give mixed results meaning that there is no single choice of theory that exactly tallies to reality and support for every conceivable normative position. With only a few studies done with regards to the determinants of demand for health insurance in Zimbabwe, this study is undertaken to empirically explore the factors effecting the uptake of private health insurance among urban households and provide research-based policy suggestions to the stakeholders in the Zimbabwean health sector.

Despite the contradictions in literature regarding the determinants of demand for health insurance, the study borrows much of its scope from the theory of reimbursement insurance, the Grossman model as well as from the expected utility model. Related empirical literature assists on the choice of control variables which affect welfare of consumers as well as a pool of estimation techniques from which the study chooses and modify own empirical model. The methodology section in the next chapter outlines the detailed features of the methodology.

CHAPTER THREE
METHODOLOGY

3.0 Introduction

Guided by the literature discussed in Chapter Two, this chapter mainly describes the methods used in trying to test the hypotheses and to achieve the objectives of this study mentioned earlier in Chapter One. Therefore, this chapter outlines the research design and the study and sample population for this study. This chapter also presents the theoretical model, empirical model, definition and justification of variables and data sources used in this study as well as diagnostic tests carried out.

3.1 Theoretical model and justification

To explore the factors influencing the demand for health insurance among urban households in Zimbabwe, Phelps' (1973) theory of reimbursement insurance was used because of its significant empirical robustness and explanatory power. In earlier studies, the model had been extensively used for estimation of willingness to pay for health insurance, for analysing the factors determining the purchase of CBHI and also for exploring the determinants of demand for private health insurance. According to Phelps (1973) an individual has a utility function in the form of $U = U(X, H)$, where X is a market basket of consumer goods and H representing a flow of healthy days. The individual is assumed to occasionally become ill therefore H is subject to random loss(λ). Since the individual derives utility from healthy days, he or she seeks medical care (h) which is priced at p_h. The model further assumes a production function $g(h)$ which specifies the relationship between the amount of h purchased and the amount of health days (H) obtained. The model further assumes rational consumers who are risk averse and does not like the randomness of H. In trying to avoid risk, the individual purchase health insurance and pays a premium (R) and $R = R(C, \theta, \delta)$ where θ is the loading charge on the insurance, C is the co-payment rate by the agreed and δ is a vector of parameters that systematically influences the premium that is age, family size, occupation, among others.

The rational individual will therefore maximise utility subject to the budget line. After setting the partial derivatives to zero to maximise utility, the model obtains the following demand functions for X and h of the following general form:

$$X = X(p_X, p_h, W, C, I, R, H_O, \lambda, \psi, \Gamma) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (18)$$

$$h = h(p_X, p_h, W, C, I, R, H_O, \lambda, \psi, \Gamma) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (19)$$

where, ψ is a vector of parameters of the utility function, Γ is a vector of parameters that influence $g(h)$ which include age, occupational characteristics and risk attitude, p_X and p_h are the prices of the consumer goods and medical care respectively. C is the co-payment rate agreed and R is the premium. The model stresses that h depends not only on its market price and individual income (I) but also upon the loss λ and the initial level of health (H_0) and the insurance parameters chosen. W is the wage rate and it is included in the model due to the fact that the model treats income as obtained from market labour participation.

3.2 Empirical model specification

The study seeks to model factors that influence the uptake of health insurance by urban high-density households in Zimbabwe. In this case, a household has two options at his/her disposal: whether to buy private health insurance or otherwise. If the household decide to buy private health insurance, he/she will get covered by a medical insurance scheme and the scheme will pay the household's medical expenses and if the household decide otherwise, he/she will have to pay for all his/her medical expenses through OOP/user fees. Given that the household's decision follows a probability model (whether to purchase private health insurance or use OOP), qualitative responses models are most suitable to apply in this study. The study therefore has a choice to use Linear Probability Model (LPM), the logit model or the probit model.

Despite the fact that the LPM is simple to use, it is nested with many problems such as heteroscedasticity of error term μ_i, non-normality of μ_i, possibility of violation of the probability rule that is: predicted values may lie outside the 0-1 probability range $(0 \leq E(Y_i) \leq 1)$ and the generally lower R^2 which is of limited use, hence this study could not apply the LPM. Furthermore, when using a Linear Probability Model, one cannot compute marginal effect with respect to a dummy variable (Wooldridge, 2004). To this end, the study has only two options at its disposal: the logit model and the probit model.

The logit model follows the logistic distribution while the probit model follows the normal distribution. According to Gujarati (2004), the probit and logit models are quite similar. The main difference is that the logistic distribution is flatter than the normal distribution, implying that the conditional probability approaches zero or one at a slower rate in the case of logit than of probit. Therefore, there is no compelling reason to choose between the models. Hence, this study chooses to apply the probit model.

3.2.1 The Probit Model

The probit model assumes that the disturbances follow normal distribution function. The probit model is presented based on the utility theory or rational choice perspective on behaviour. The choice or decision one makes on whether or not to buy health insurance for instance, depends on a latent variable I_i which is an unobservable utility index determined by explanatory variables. The index I_i is modelled as:

$$I_i = \beta_0 + \beta_i X_i \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (20)$$

where, X_i is a vector of explanatory variables. Let $Y = 1$ if a household is insured and $Y = 0$ if otherwise, then:

$$P_i = P(Y = 1/X) = P(I_i^* \leq I_i) = P(Z_i \leq \beta_0 + \beta_i X_i) = F(\beta_0 + \beta_i X_i) \ \dots\dots\dots \quad (21)$$

where I_i^* is the critical or threshold level of the utility index such that if it is less than I_i then the household will be insured, $P(Y = 1/X)$ is the probability of occurrence of an event given explanatory variables and Z_i is the standard normal variable. F represents standard normal cumulative distribution function (CDF) which can be presented as:

$$F(I_i) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{I_i} e^{-\frac{z^2}{2}} \, dz$$

$$= \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\beta_0 + \beta_i X_i} e^{\frac{z^2}{2}} \, dz \dots\dots\dots\dots\dots\dots\dots \quad (22)$$

Given that P measures the probability of an event occurring, the probability of buying private health insurance is measured by the area the standard normal curve from $-\infty$ to I_i. To find information on I_i (the utility index), we find the inverse of equation 4. The probit model assumes that the error terms are independent and normally distributed and the parameters will be estimated using the Maximum Likelihood Estimation (MLE) method.

31

There is a quite number of studies that has dealt with similar issues of health insurance participation and this study borrows much from authorities such as Jütting (2003), and Mhere (2013), who used the probit model in their researches. Adopting almost the same probit model which was used by Jütting (2003), this study augments the model by employing additional variables which include religion, gender, age and age square which the researcher according to the expected utility theory felt that were among the key variables. The model can then be specified as:

$$HI = f(Age, Agesqr, Gender, Hsize, Edu, Relig, Mstatus, Employ, Hinc \dots\dots\dots \quad (23)$$

Or equivalently;

$$P(HI = 1/X) = \beta_0 + \beta_1 age + \beta_2 agesqr + \beta_3 gender + \beta_4 edu + \beta_5 mstatus + \beta_6 hsize$$
$$+ \beta_7 relig + \beta_8 hinc + \beta_9 employ + \mu_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (24)$$

where, $P(HI = I/X)$ is the probability that a household is insured through any medical insurance scheme, given the vector of observable socio- demographic and economic characteristics;

β_0 is a constant;

Age is age of household head;

$Agesqr$ is age squared of household head;

$Gender$ is sex of household head;

Edu is household head education;

$Mstatus$ is marital status of household head;

$Hsize$ is the size of the household;

$Relig$ is the religion of the household;

$Hinc$ is the monthly income of the household;

$Employ$ is the employment status of the household head;

μ_i is an error term.

3.3 Definition and Justification of Variables

Drawing from both the theoretical models and empirical literature reviewed demand for health insurance is likely to be influenced by socioeconomic and demographic factors. The variables include gender of household head, age of household head, household income, level of education attained, household size, household head marital status, household head employment status, as well as religion.

3.3.1 Dependent variable

Health Insurance ownership *(Hip)*

The study used a binary dependent variable, taking the value of one when the household is health insured and zero assigned in case of no health insurance. A binary dependent variable model has been used by numerous scholars to find the determinants of health insurance.

3.3.2 Independent variables

Gender of household head *(Gender)*

The sex of household head is defined as a dummy variable. A value of one and zero will be assigned to a male and female household heads respectively. This variable intends to establish if there is a relationship between sex of a household head and the demand for health insurance by a household. Most studies expect to find the likelihood of being insured to be higher in female headed households than in male headed households. The argument is that females by nature are risk averse and they prefer household members to be attended to by health professionals during illness. However, the influence of gender on private health insurance has remained inconclusive in the empirical literature since some studies found that male headed households have a higher probability of being insured. Therefore, the priori expectation of this variable is ambiguous.

Age of the household head *(Age)* **and age squared** *(Agesqr)*

This variable is continuous, capturing the age of the consumer in years. As age increases, the eligibility and coverage rates for employer based health benefits generally increase as well. This is so because of the high degree of illness among the elderly. However, according to Besley (1988), age is expected to show a non-linear relationship to health insurance. The study adds age squared so that together age and age squared can describe a monotonic relationship with one

inflection point. This is because the Grossman model predicts that as an individual grows production of health increases however, the individual will reach a certain age when health production starts to fall. Thus younger and older household heads are less likely to be insured.

Marital status *(Mstatus)*

According to Boateng & Awunyor-Vitor (2013), marriage comes with responsibility and married individuals are more risk averse as compared to their single counterparts. Marriage can also increase family income due to combined incomes in the case where both spouses are employed and this will make health insurance more affordable. This variable is treated as a dummy and it takes the value of 1 for married individuals and 0 for those who are single or divorced or widowed. The study expects a higher probability of being insured to be associated to married individuals.

Educational level as measured by the number of years of schooling *(Edu)*

Educational level in this research, refers to the highest level of education (in years) attained by the household head at the time at which the research was undertaken. Individuals with the highest level of education are expected to be employed in better paying jobs and in a better position within the company they are working with or for. In this regard, they are expected to earn higher incomes, relative to their peers with low educational levels and this means that the opportunity cost of being ill is high and they try to counter this by getting insured as to avoid the associated risk. In support of this, Joe & Mishra, (2009) also found that higher educational level attracts higher income. The researcher therefore anticipates a high probability of being insured when a respondent has a high level of education.

Employment status *(Employ)*

Engaging in paid employment affects the decision to purchase health insurance in two ways: Firstly, it acts as a prerequisite for one's own employment-related coverage and secondly it provides a steady and convenient income stream which makes it easier to join a medical scheme and pay premiums than those who are unemployed. Treated as a dummy in this study, employment status takes a value of 1 for employed individuals and 0 for those who are not

employed and the priori expectation is that the probability of being insured increases in the case of employed individuals and a low probability of being insured for the unemployed ones.

Household Income *(Hinc)*

Household income in this study captures the economic status of the household. It was captured as the monthly income of a household after tax deductions. The higher the level of household income, the higher probability that the individual is going to be insured. This is because the premium will account for only a small portion of the income. Income is expected to positively affect health insurance participation.

Household size *(Hsize)*

Household size in this study is the total number of people living together. As opposed to other studies that categorized this variable, no categories will be used to capture this variable but rather it will be captured as a continuous variable, where respondents will state the number of the individuals whom they stay together with. In a study by Boateng & Awunyor-Vitor (2013), it was concluded that small households, on average, have high per capita expenditures to cater for both health care services and consumption of other market goods relative to households with more number of people. In this regard, it is expected that the larger the household size the smaller the per capita consumption. The priori expectation is that the larger the household size, the less the probability of being insured.

Religion of the respondent *(Relig)*

Religion plays a role in influencing the decision whether or not to own a health insurance policy in Zimbabwe. For example, consumers who are members of the apostolic sect religion tend to be discouraged from the use conventional medical care and are therefore have a low probability to be insured. Rather, such consumers tend to prefer self-treatment as an alternative to treatment from hospitals. The study expects lower probabilities of individuals being insured if they are members of the apostolic sect religion. The variable is a dummy and was categorised into: apostolic sect and non-apostolic sect.

3.4 Data Sources and Collection

Communicable diseases in Harare are known to hit hard in Budiriro, Kuwadzana, Epworth and Dzivarasekwa and the epicenter of these epidemics mostly is Budiriro. Budiriro experienced several health hazards, including Cholera outbreaks in 2009, 2012 and Typhoid epidemic in 2013, which led to the setting up of Cholera treatment centre in Budiriro 1 (MoHCC, 2014) The total population of Budiriro 1 could not be established. However, information gathered from the local authority revealed that there are approximately 2000 residential houses in Budiriro 1. (ZIMSTAT, 2012) also revealed that, in urban Harare, the average number of households per house is 2. This gives us an estimated household population of 4000 in Budiriro 1. Newbold (1995) argued that in most populations, $n > 30$ is enough a condition to ensure a sampling distribution is nearly normal. Using Cochran (1977) sample size determination formula, at 95% level of confidence gives a sample size of 97.65[14] and this sample size is not bigger than the researcher could manage hence there was no need for Cochran sample size correction formula. The closer the sample size is to the total population, the more reliable is the inferences drawn from it to relate to the population. This study is however going to use a sample of 120 households.

Though a probability sampling technique would have been the best in-order to avoid bias, non-probability sampling techniques were nonetheless employed. These were purposive sampling and snowballing sampling techniques. Purposive sampling relies on the judgment of the researcher to select the units of the sample. In this study, only respondents who reported having been sick within the past 12 months were included in the sample. Some of the units required to make up the sample, such as Apostolic Church members were difficult to identify, hence snowballing was also used. Non-probability sampling techniques were adopted since it was not feasible to carry out probability sampling due to limited time and resources. The researcher opted to use questionnaires ahead of other data collection methods because of their ease of administration. A pilot questionnaire was designed for testing. In the preliminary survey, 20 questionnaires were administered. This allowed the researcher to evaluate and improve the questionnaire structure and questions.

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[14]The formula is presented as: $N_0 = \frac{t^2 pq}{d^2} = \frac{2.645^2 * 0.5 * 0.5}{0.1^2} = 97.65$

3.5 Diagnostic Tests

The study will carry out the following tests:

The Pearson test

The Pearson test for goodness of fit was carried out. The test detects omitted variables and incorrect functional form of the model. The mechanics of the test is that, if non-linear combinations of the explanatory variables have any power in explaining the dependent variable, then the problem of misspecification exists. If the model can be significantly improved by artificially including powers of the predictions of the model, then the original model must have been inadequate.

Multicollinearity Test

To check linear dependence between explanatory variables, a correlation test was carried out and a correlation matrix computed. The rule of thumb is that variables will be corrected if the correlation coefficient is 0.8 or above. If explanatory variables are correlated then there is a problem of multicollinearity and this may result in biased results. To solve this problem, one of the variables is dropped

3.6 Conclusion

This chapter presented the methodology that was used to collect data and explore the factors influencing the uptake of health insurance in Zimbabwe. This includes a brief evaluation of the model specification, sample selection as well as tests carried out. Also embedded in this chapter is definition and justification of variables. The next chapter focuses on the estimation, presentation and economic interpretation and discussion of the results.

CHAPTER FOUR
ESTIMATION, PRESENTATION AND INTERPRETATION OF RESULTS

4.0 Introduction

The aim of this chapter is on the estimation, presentation as well as interpretation of the findings of the research guided by the methodological procedure outlined in the previous chapter. This chapter answers the research questions as well as testing the research hypotheses formulated in Chapter 1. Descriptive statistics will be presented first, followed by diagnostic tests and finally regression results. Since the methodology used for eliciting the factors determining health insurance participating is the probit model, multicollinearity and model specification were tested and results are presented. Heteroscedasticity was not tested since the probit model solves this problem. The chapter also provides an interpretation of the results, which form the basis for policy recommendations.

4.1 Descriptive Statistics

This section presents a summary of statistics of the cross sectional dimensions of the variables used in the model, giving a basic feature of the data used, which together with other analyses to follow, will form the quantitative analysis. The summary presented aids in appreciating the source of variation found in the data. From a sample of 120 households, 113 households responded and this shows a response rate of 94% of the intended sample.

Table 1: Distribution of households by insurance status

Health insurance status	Frequency	Percent
Insured	52	46.02
Not insured	61	53.98
Total	**113**	**100**

The descriptive statistics results show that more households are not insured representing 53.98% of the sample interviewed. Although this contradicts with the current Zimbabwean health insurance coverage of 9%, the insured population usually resides in urban areas as evidenced by literature.

Table 2: Distribution of the households by continuous variable

Variable	Observations	Mean	Std. Dev.	Min	Max
Age	113	39.73451	15.13217	19	70
Edu	113	14.41593	3.366658	7	20
Hinc	113	369.823	227.0354	125	1150
Hsize	113	4.115044	2.367006	1	10

From Table 1, on average the age of the household head was 40 years. The average household size was approximately 4.12 people which may translate to 4 members per household since a person cannot be halved. The household income per month ranged from $125 to $1150 with an average monthly income of $369.82 per household while the average education was Advanced level and this had to be measured in terms of years of schooling. For instance Advanced level would take 13 to 14 years depending on whether one attended preschool or not.

Table 3: Distribution of households by gender of household head

Gender of household head	Frequency	Percent
Male	72	63.72
Female	41	36.28
Total	**113**	**100**

Table 3 shows that out of the 113 households that were interviewed, male headed and female headed households were represented by 63.72% and 36.28%, respectively. This was in line with the findings of other studies for instance (Mhere, 2013), found that male headed households were approximately 65% of the households they interviewed.

Table 4: Distribution of households by marital status

Marital Status	Frequency	Percent
Single	53	46.90
Married	60	53.10
Total	**113**	**100**

As depicted by Table 4, more households were headed by married heads that represented 60 out of the 113 households who responded to the questionnaire. On the other hand, households whose heads were single formed 46.90% of the sample that is 53 out of the 113 households investigated.

Table 5: Distribution of households by religion

Religion	Frequency	Percent
Apostolic	55	48.67
Non-Apostolic	58	51.33
Total	**113**	**100**

Table 5 shows that out of 113 households that responded, most households were headed by heads who were non-apostolic followers. This is shown by 51.33% of households under other non-apostolic category. Apostolic sect churches were represented by a percentage distribution of 48.67%.

Table 6: Distribution of households by employment status

Employment	Frequency	Percent
Employed household heads	60	53.10
Unemployed household heads	53	46.90
Total	**113**	**100**

Out of the 113 households who responded to questionnaires, 53 household heads reported to be unemployed which represents approximately 47% of the sample while employed household heads contributed the remaining 53%.

4.1.1 Multicollinearity test

A Pearson's correlation test was carried out for all the independent variables. Variables are correlated if the correlation statistic is more than 0.8 or less than -0.8. The results of the test showed that there was low correlation among explanatory variables. Table 7 shows the correlation matrix of the independent variables used in the study.

Table 7: Correlation matrix

	Age	Mstatus	Relig	Edu	Hsize	Gender	Employ	Hinc
Age	1.0000							
Mstatus	0.3284	1.0000						
Relig	0.4544	0.4895	1.0000					
Edu	0.5604	0.4673	0.5637	1.0000				
Hsize	0.3606	0.2279	0.2777	0.4119	1.0000			
Gender	0.3789	0.2594	0.3404	0.4146	0.2165	1.0000		
Employ	0.5237	0.4330	0.5635	0.5686	0.2867	0.3972	1.0000	
Hinc	0.6274	0.3607	0.5154	0.7091	0.4646	0.3439	0.5563	1.0000

4.2 Discussion of results

In answering the first objective of why the majority of households rely on out-of-pocket payments rather than using Medical Aid, the study used descriptive statistics as shown by Figure 5.

4.2.1 Motivation for using user fees

From the survey, existing health conditions showed to be a significant reason why most households prefer to remain uninsured. Households who have at least one chronically ill member such as Diabetes Mellitus, Heart disease, Obesity and Tuberculosis believed that their condition would significantly increase their health insurance premium which might be unaffordable. These households believe that they could not get health insurance coverage even if they wanted to. Out of 113 households who responded, 73 reported to have at least one chronically ill member and this represented 64.6% of the sample.

As depicted by Figure 5, out of the 61 households who reported to have no medical insurance cover, 47 of them reported not to be aware of health services they can benefit if they decide to be insured. These households chose to entirely rely on out of pocket payments because they were

not aware of their prospective health plans if insured; these include co-insurance[15], deductibles[16] and co-payments as they are part of a formula for determining the share of medical cost responsibility between the Medical Scheme and the customer.

Figure 5: Motivation for using out-of-pocket
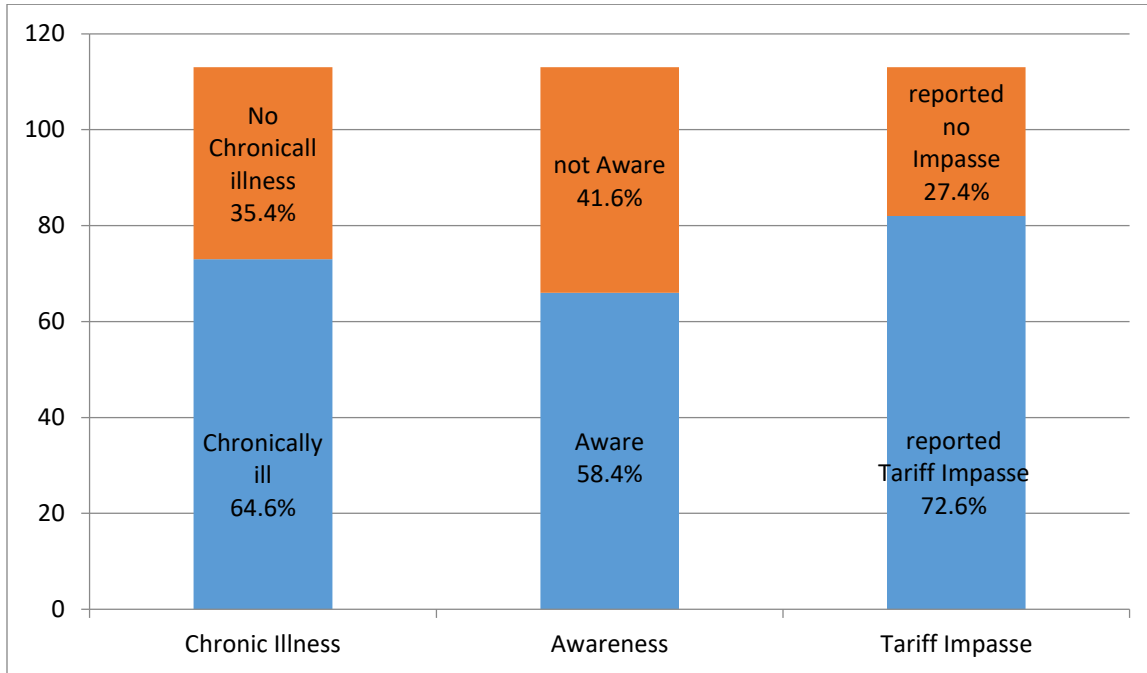
From the survey, one of the major reasons why the majority of households rely on user fees is the existence of tariff impasse between health insurance schemes and healthcare providers. 80 out of 113 households who responded believed that tariff impasse existed. These households confirmed that medical insurance schemes are failing to pay healthcare providers to the extent that providers still demand user fees regardless of whether one is insured or not. As a result, some of the households who were once insured withdrew from their schemes to rely on out of pocket payments because of cost concerns.

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[15] A coinsurance is the money that an individual is required to pay for healthcare services, after a deductible has been paid, and often specified by a percentage of the total charges for the health services.

[16] A deductible is the total amount of money a healthcare user pays for health expenditures before their insurance plan starts to pay for them to acquire healthcare services

4.2.2 Unrestricted probit model

The results of the estimated unrestricted probit model showed that marital status of household head and household size were insignificant at all the conventional significance levels of 1%, 5% and 10%. These variables were therefore dropped one by one and another regression (restricted model) was estimated. The restricted regression showed that education of household head, household income, age of household head, gender of household head, religion and awareness of health insurance payment plans were significant variables in the study[17].

4.2.3 Presentation of the restricted probit results

Table 8 summarises the probit results after dropping insignificant variables in the first estimation. All the variables in the restricted model are significant either at 1%, 5% or 10% level of significance.

Table 8: Probit model (restricted)

					Number of obs	=	113
					LR chi2 (7)	=	129.97
					Prob > chi2	=	0.0000
Log likelihood = -12.981879					Pseudo R2	=	0.4335

Hip	Coef.	Std. Err	Z	$P > |Z|$	[95% Conf. Interval]	
Gender	-1.558381**	.7836496	-1.99	0.047	-3.094306	-.0224558
Age	.3881158**	.1946634	1.99	0.046	.0065826	.7696491
Edu	.3420114***	.1309497	2.61	0.009	.0853547	.598668
Hinc	.0027328*	.001464	1.87	0.062	-.0001366	.0056021
Chroilnes	1.677953**	.7214657	2.33	0.020	.2639063	3.092
Agesqr	-.0043575*	.0022837	-1.91	0.056	-.0088335	.0001184
Relig	1.838323***	.6954447	2.64	0.008	.4752767	3.20137
_cons	-14.97078***	4.845752	-3.09	0.002	-24.46828	-5.473278

***Significant at 1% level of significance. **Significant at 5% level of significance. *Significant at 10% level of significance

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[17] Refer to Appendix E for the unrestricted probit model results

Number of observations

This is the number of observations used in the probit model regression. This study used 113 observations as indicated in Table 8.

Log likelihood

This is the log likelihood of the fitted model. It is used in the Likelihood Ratio Chi-Square test of whether all predictor's regression coefficients in the model used are simultaneously zero.

The results show that the model converged and iterations stopped where the Log likelihood was equivalent to -12.981879 which is close to 0. This shows that the model is appropriate for the study.

LR chi2 (7)

This is the likelihood ratio (LR) chi-square test that at least one of the predictor's regression coefficients is not equal to zero. The model has a chi-square statistic of 129.97 with number in parenthesis indicating the number of degrees of freedom. In this model they are seven predictors and therefore there are seven degrees of freedom.

Pseudo R2

This is McFadden's pseudo R-squared which measures the model's goodness of fit and it was found to be 0.4335. This is high and this means that the model correctly predicts each observation.

4.4 Marginal Effects

The marginal effects were computed to give the magnitude of the effects of changes in the explanatory variables on the dependent variable. The results are summarised in the Table 9.

Table 9: Marginal Effects

	dy/dx	Std. Err.	Z	P>|z|	[95% Conf. Interval]	
Age	.1539636	.076844	2.00	0.045	.0033523	.304575
Relig	.7292538	.2712688	2.69	0.007	.1975768	1.260931
Gender	-.618202	.3131294	-1.97	0.048	-1.231924	-.0044796
Edu	.1356742	.0518019	2.62	0.009	.0341444	.2372041
Agesqr	-.0017286	.0009014	-1.92	0.055	-.0034953	.000038
Chroilnes	.6656358	.2901989	2.29	0.022	.0968564	1.234415
Hinc	.0010841	.0005618	1.93	0.054	-.000017	.0021852

(*) dy/dx is for discrete change of dummy variable from 0 to 1

The variable *age* as suggested in the model affects health insurance participation in a quadratic form. When graphed, a concave shape is observed with 45 years being the point of inflection and this means that chances of participating in health insurance increases as a person gets older up to until one is 45 years old[18]. For households who are below the age of 45, marginal effects results shows that a year increase in their age increases the probability of health insurance participation by 0.1539636. However, as one is above 45 years, each additional year reduces the household's probability of participating in health insurance by 0.0017286 as predicted by the marginal effect result of age squared. This can be explained by the fact that as people become older, health insurance participation might decline as they tend to become dependents of their children who may include them as beneficiaries to their medical insurance plans. The results are in sync with the findings by Danis *et al.* (2007), Mhere (2013) and Yamada *et al.*, (2014) who found a quadratic relationship between age and health insurance participation of a concave nature. Furthermore the results also conform to the views of the Grossman model and that of Besley (1988), who expected age to show a non-linear relationship to health insurance. This is due to the fact that production of health increases as an individual grows, however, the individual will reach a certain age when health production starts to fall.

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[18] Calculations show that the inflection point is 44.53 years which is approximately equal to 45 years. refer to appendix D for calculations

The coefficient of the variable *relig* is statistically significant at the 0.01 level. The results show an unsurprising positive relationship between a non-apostolic household and health insurance participation. The relationship shows that households who belong to the apostolic sect have a lower probability of participating in a health insurance scheme than those who are non-apostolic. This is quite not surprising since in Zimbabwe, most apostolic sects have been infamous for discouraging their members from seeking health services from public and private formal providers, but encourages them to consults spiritual/religious healers in their sect. The marginal effects results show that being a non-apostolic sect member increases the probability of being insured by 0.7292538. As shown by the strength of the marginal effect, religion is a very important factor in determining health insurance participation.

From the results in Table 9, gender of the household head has an impact on the household's decision in health insurance ownership. The coefficient of the variable has a p-value of 0.04 and it is negatively related to the demand for health insurance as shown by the negative sign. Being a male household head decreases the probability of health insurance participation by 0.618202. The results conform the findings of Sanhueza & Ruiz-Tagle (2002) and Javan-noughabi *et al.* (2017) whose findings were that female headed households were more willing to pay for and participate in health insurance schemes, the argument being that females by nature are risk averse and they prefer household members to be attended to by health professionals during illness.

The variable, *edu* was found to positively affect health insurance participation. The coefficient of this variable was statistically significant at the 0.01 level. The sign of the coefficient shows that there is a positive relationship between education level of the household head and health insurance participation. It could well be that as people get more educated, they get better enlightened regarding most aspects penitent to the well-being of their families. More so people may tend to look at their efforts in education as some kind of investment for their families, and so getting reckless with their lives and taking chances when it comes to health matters may not be plausible. It may again be the case that as part of their learning, some may have included in their programs some aspects of health care, and possibly health insurance too. The results

47

conform to the predictions of Grossman's model in which education is found to positively influence the demand for health and health care hence demand for health insurance. The results could be also explained by the evidence from empirical literature that better schooling or education of the household head has a potential to improve understanding and appreciation of benefits of being insured. The marginal effects results show that an increase in the education of the household head by one year increases the probability of participating in health insurance by 0.1356742.

Employment status as a determinant of health insurance participation has a positive impact with its coefficient being significant at the 0.05 level. The marginal effects analysis shows that being employed increases the probability of health insurance participation by 0.6656358. This is in line with the findings of Kebede *et al*. (2014), who found out that both employment status and job type are key determinants of willingness to pay for health insurance in Ethiopia. Engaging in paid employment affects the decision to purchase health insurance in two ways: Firstly, it acts as a prerequisite for one's own employment-related coverage and secondly it provides a steady and convenient income stream which makes it easier to join a medical scheme and pay premiums than those who are unemployed (Kebede *et al.*, 2014).

The coefficient of this variable *hinc* was statistically significant at 10% level of significance. The results show that monthly household income has a positive relationship with health insurance participation. The marginal results show that a dollar increase in household's monthly income increases the probability of participating in health insurance schemes by 0.0010841. The study conformed to the positive influence of income on health care demand as predicted by Grossman (1972). According to Besley (1988), number of studies also found similar results (Kesterton *et al*., 2010;   Mufunda *et al.,* 2012 and Tapera, 2014) the level of household income is a major determinant of health insurance. Household in high density suburbs, rural households and those in slum areas are usually constrained by low levels of income to participate in health insurance as access to such services includes both direct and indirect costs.

4.5 Conclusion

The results from the empirical investigation on the factors that influence the uptake of health insurance among urban high density households shows that marital status and household size had

no significant impact whilst education, employment status and income had significant impact. The coefficient of Education and employment status were significant at the 1% and 5% levels of significance respectively, both of them having a positive impact on uptake of health insurance. In the same vein household income was found to have a positive impact on health insurance demand and its coefficient being significant at the 1% level of significance. Furthermore, results from empirical investigation show that members of the apostolic sect have low probability of being insured than non-apostolic members. This was expected given that prior to the year 2015; they did not use health facilities until the government intervened. Though the government has intervened, their uptake of health facilities is still low. Age and religion were found to be significant in explaining the reasons why people are not insured. The coefficients of these variables were significant at 5% and 1% respectively.

CHAPTER FIVE
CONCLUSION AND POLICY RECOMMENDATIONS

5.0 Introduction

This chapter presents a summary and conclusion of the study's findings. The chapter also provides policy implications and recommendations derived from the findings. Limitations of the study and areas for further research will be discussed in the last section of the chapter.

5.1 Summary of the key findings and conclusions of the study

The study investigated factors that determine the decision on health insurance participation by urban high density households in Zimbabwe. The study was stimulated by the desire to identify how socioeconomic factors influence the demand for health insurance. This is because utilisation of health insurance has remained low despite the efforts by medical insurance schemes to improve health insurance coverage (AHFoZ, 2016).

Cross sectional data collected from Budiriro high density suburb in March 2018 was used for the study. The study used binary dependent variable and a value of one was assigned if a household is insured and zero if not. A set of socioeconomic factors were used as independent variables. These variables were; gender of household head, education level, household size, employment status of the household head, age of household head, marital status of household head, religion and household income. A probit model was then used to identify factors that would result in a household participating in a health insurance scheme or relying on out of pocket payments whenever accessing health care services.

The regression results revealed that household size and marital status have no significant impact on the choice to participate in health insurance. Education level, gender of household head, religion, age of household head, household income and employment status were found to have a significant statistical relationship with health insurance participation. Educational level, employment status and household income have a positive impact. An important conclusion drawn from the results is that better education level may allow healthcare users to have greater consumption levels of health insurance, this follows from the logic that better educated people

tend to get better paying jobs and ultimately earning higher relative to their uneducated peers thus health insurance tend to be more affordable to them.

Importantly, the probit regression points out that age and religion as well as gender of household head have an impact on the choice of whether or not to be insured. Members of the apostolic sect have a lower probability of being insured relative to non-apostolic, which was attributed to their former practice of not utilizing health services or facilities. Unsurprisingly, age of the household head and health insurance participation are related in a quadratic manner with age increasing health insurance participation until the age of 45 years, beyond that increase in age reduces participation in health insurance. Female headed households have a higher probability of being insured as compared to their male headed counterparts and this can be attributed to the fact that females are generally risk averse and they are more willing to seek medical attention in case of sickness relative to males.

5.2 Policy Implications

Most Governments have, as part of their macroeconomic policy objectives, the desire to realise stable and sustainable economic growth and development, as well as increasing the productivity of the nation's resources. These may feature as some of the most important policy objectives, and yet their attainment largely depends on the quality of the nation's factors of production including the labour force. It thus becomes key, that as many nationals as possible are accorded access to health care facilities. It is in this light that factors affecting health insurance participation should be seen as intermediate targets in the pursuit of the objective to have a healthy labour force needed for sustainable economic growth and development.

Since the coefficient of education was found to be significant with a positive effect on health insurance participation, policies may be crafted and implemented to ensure that education is promoted and supported, as a way of getting a wider health insurance coverage and hence a healthy nation and labour force. The Zimbabwean Government has played a significant role in ensuring access to education by the generality of the Zimbabwean population. This, it has achieved with a lot of support from various sectors of the economy and the international community by way of donor funds channeled towards the education system. The health

insurance sector in Zimbabwe may want to take a more involved position in this regard. This may not be only because directing its corporate responsibility initiatives towards education compliments government's efforts in boosting the nation's productive capacity, but most importantly because this paves way to a prosperous future of the health insurance sector in terms of its own viability.

Income was found to be positively related to the probability of a household participating in health insurance schemes. This may be seen to have obvious policy implications. For instance income is in most cases explained by productivity. There are various ways of enhancing productivity of the labour force, and players in the health insurance market may be interested in exploring them as a way of getting at higher incomes for their potential clients. The positive relationship that obtains between household income and the household's chances of enrolling for a health insurance scheme should hint on the health insurance market's perception of medical aid. The market sees this product as a normal good. For instance, with higher incomes households opt for more comprehensive medical aid packages. It is in this regard that the thrust on the part of health insurance providers should be to get involved in productivity stimulating endeavours.

Moreover, results obtained show that members of the apostolic sect have a low probability of being insured. Therefore, the policy implication of this finding is that, the policy makers should encourage healthcare funders to target the gap in religion. In addition, in line with universal health coverage that is being aimed at, policy makers should educate all healthcare users, regardless of religion, on the importance of being insured. Lastly, the study found that age increased the probability of participating in health insurance. In this regard, policies that promote longevity should aim at educating the younger population on the importance of being health insured, which come with positive externalities. Some members of the younger population may not be aware of the benefits to be accrued from being a member of a medical aid scheme, which may entail among other things, reduction of financial burden when one of the members falls ill

5.3 Limitations and Areas of further study

The main weakness of the study is that the data did not contain insurance specific attributes such as benefits covered and the type of health facility where individuals insured under various forms of health insurance sought cover. Thus, important explanatory variables were left out of the estimated results. This situation may lead to biased results. Furthermore, the study investigated the demand side determinants of health insurance and found that the household income, age, gender, education, religion of household head and awareness were important determinants thus the gap in supply side determinants of health insurance exist. There is need therefore for research studies that include the supply side factors in particular the attributes of the various health insurance schemes. An understanding of the effect of various forms of health insurance on demand for health care is thus necessary.

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Appendix A: Survey questionnaire

Survey questionnaire

Date of data collection……………..   **Questionnaire Number…………**

UNIVERSITY OF ZIMBABWE

DEPARTMENT OF ECONOMICS

Good morning/ afternoon/ evening, my name is **Archford Gandidzanwa** a final year student at the University of Zimbabwe pursuing a **Master of Science Degree in Economics**. I am carrying out a research which is in partial fulfilment of the above mentioned programme and the focus of the research is on the factors that determine the demand for private health insurance among urban households (Case of Budiriro 1).

I would be glad if you spare your time and complete the questionnaire below. Your participation is greatly appreciated as it can help in understanding the driving factors and eliciting the impact of these factors on private health insurance participation so as to aid in policy making.

Kindly note that participation in completing the questionnaire is on a voluntary basis, the study is conducted to aid in policy formulation and not for personal use. Your responses will be used for academic purposes only and the information provided is treated with utmost confidentiality. (***Please do not write your name, cell phone number or address, it remains anonymous***).

Kindly give your responses either by stating your answer on the given space or by ticking the appropriate box where applicable as in the example shown below.

Marital status (if single)	Single	✓
	Married	
Where do you stay? (if you stay in Budiriro 1)	Budiriro 1 --------------------	

SECTION 1: HOUSEHOLD SOCIO – DEMOGRAPHIC CHARACTERISTICS

NO	Question	Response	*Tick where applicable*
1.1	What is the gender of the household head?	Male	
		Female	
1.2	What is the age of the household head?	.... years	
1.3	What is the marital status of the household head?	Married	
		Single	
1.4	What is the household size? (What is the number of people in the household?)	-------------------	
1.5	What is the number of people below 16 years of age in the household?	-------------------	
1.6	What is the number of people above 65 years of age in the household?	-------------------	

Please give the response to the following question on the level of education which the household head attained by stating the exact level e.g.: grade 7 if respondent attained complete primary level, form 2 if respondent attained ZJC and so on.

NO	Question	Response	Tick
1.7	What is the highest level of education attained by the respondent?	---------------------------	

SECTION 2: HOUSEHOLD ECONOMIC CHARACTERISTICS

NO	Question	Response	Tick
2.1	Are you employed?	Yes	
		No	
2.2	If yes to the above question, what is your job type?	Blue collar	
		White collar	
2.3	How many people are economically active in the		

	household?	-------------------------	
2.4	What is your monthly household income?	$-------------------------	

SECTION 3: *HEALTH CARE SEEKING BEHAVIOUR AND SERVICE UTILISATION*

3.1	Is the household head aware of health insurance schemes?	Yes	
		No	
3.2	Is the household head insured? (Do you have any medical insurance policy?)	Yes	
		No	
3.3	If **Yes** to the above which Medical scheme does She/he use?	----------------------------	
3.4	How many household members have an independent health insurance policy?	-------------------------	
3.5	Does the household pay any out of pocket payments in accessing health care?	Yes	
		No	
3.6	If yes to the above how much on average per month do you pay out of pocket to access health care?	$-------------------------	
3.7	Is there any household member with chronic illness?	Yes	
		No	
3.8	What is the religion of the household?	Apostolic	
		Non-Apostolic	
3.9	What is your view about the existence of tariff impasse between health funders and health providers	It exists	
		It does not exist	

Appendix B: Correlation matrices

```
. correlate Age Mstatus Relig Edu Hsize Gender Employ Hinc
(obs=113)
```

	Age	Mstatus	Relig	Edu	Hsize	Gender	Employ	Hinc
Age	1.0000							
Mstatus	0.3284	1.0000						
Relig	0.4544	0.4895	1.0000					
Edu	0.5604	0.4673	0.5637	1.0000				
Hsize	0.3606	0.2279	0.2777	0.4119	1.0000			
Gender	0.3789	0.2594	0.3404	0.4146	0.2165	1.0000		
Employ	0.5237	0.4330	0.5635	0.5686	0.2867	0.3972	1.0000	
Hinc	0.6274	0.3607	0.5154	0.7091	0.4646	0.3439	0.5563	1.0000

Appendix C: Descriptive statistics for 113 households
Distribution of 113 households by continuous variables

```
. summarize Hinc Age Edu Hsize
```

Variable	Obs	Mean	Std. Dev.	Min	Max
Hinc	113	739.646	454.0707	250	2300
Age	113	39.73451	15.13217	19	70
Edu	113	13.86726	3.413483	7	20
Hsize	113	4.115044	2.367006	1	10

Distribution of 113 households by gender of household head

```
. tabulate Gender
```

Gender	Freq.	Percent	Cum.
0	41	36.28	36.28
1	72	63.72	100.00
Total	113	100.00	

Distribution of 113 households by insurance participation

. tabulate Hip

Hip	Freq.	Percent	Cum.
0	61	53.98	53.98
1	52	46.02	100.00
Total	113	100.00	

Distribution of 113 households by religion

. tabulate Relig

Relig	Freq.	Percent	Cum.
0	60	53.10	53.10
1	53	46.90	100.00
Total	113	100.00	

Distribution of 113 households by employment status

. tabulate Employ

Employ	Freq.	Percent	Cum.
0	53	46.90	46.90
1	60	53.10	100.00
Total	113	100.00	

Appendix D: Calculation of the point of inflexion of variable *Age*

Since both the coefficients of *Age* and *Agesqr* were significant with values of 0.3881158 and

-0.0043575 respectively, the turning point is calculated as follows;

$$Hip = 0.3881158 Age - 0.0043575 Age^2$$

$$\frac{\partial Hip}{\partial Age} = 0.3881158 - 2(0.0043575) Age = 0 \ (we \ equate \ to \ zero \ to \ get \ the \ maximum)$$

$$0.3881158 = 0.008715 Age$$

$$\frac{0.3881158}{0.008715} = Age = 44.53$$

$$\cong 45 \ years$$

Appendix E: Estimation of Unrestricted Probit results (STATA 13 print out)

```
. probit $ylist $xlist

Iteration 0:   log likelihood = -77.966844
Iteration 1:   log likelihood =  -15.21868
Iteration 2:   log likelihood = -11.475513
Iteration 3:   log likelihood = -9.9974457
Iteration 4:   log likelihood = -9.6025732
Iteration 5:   log likelihood =  -9.586358
Iteration 6:   log likelihood = -9.5863517
Iteration 7:   log likelihood = -9.5863517
```

```
Probit regression                               Number of obs   =        113
                                                LR chi2(9)      =     136.76
                                                Prob > chi2     =     0.0000
Log likelihood = -9.5863517                     Pseudo R2       =     0.8770
```

Hip	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Age	1.08622	.6504723	1.67	0.095	-.1886822	2.361122
Mstatus	.9073435	.8348271	1.09	0.277	-.7288876	2.543575
Relig	3.478235	1.88773	1.84	0.065	-.2216489	7.178118
Gender	-3.664456	2.185458	-1.68	0.094	-7.947876	.618963
Edu	.5547387	.2866447	1.94	0.053	-.0070747	1.116552
Hsize	-.8401993	.553866	-1.52	0.129	-1.925757	.245358
Agesqr	-.0124167	.0074265	-1.67	0.095	-.0269723	.0021388
Employ	2.917301	1.529613	1.91	0.056	-.0806847	5.915286
Hinc	.0108294	.0064759	1.67	0.094	-.0018632	.023522
_cons	-33.50494	17.88291	-1.87	0.061	-68.55479	1.544909

Appendix F: Marginal Effects Results

```
. quietly probit $ylist $xlist

.

. margins, dydx(*) atmeans

Conditional marginal effects                    Number of obs   =        113
Model VCE    : OIM

Expression   : Pr(Hip), predict()
dy/dx w.r.t. : Age Mstatus Relig Gender Edu Hsize Agesqr Employ Hinc
at           : Age          =    39.73451 (mean)
               Mstatus      =    .5132743 (mean)
               Relig        =    .4690265 (mean)
               Gender       =    .6371681 (mean)
               Edu          =    13.86726 (mean)
               Hsize        =    4.115044 (mean)
               Agesqr       =    1805.788 (mean)
               Employ       =    .5309735 (mean)
               Hinc         =     739.646 (mean)
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
Age	.3172089	.1510404	2.10	0.036	.0211751	.6132427
Mstatus	.2649715	.3340664	0.79	0.428	-.3897867	.9197297
Relig	1.015749	.4481643	2.27	0.023	.1373629	1.894135
Gender	-1.070131	.6187455	-1.73	0.084	-2.28285	.1425877
Edu	.1620003	.0720451	2.25	0.025	.0207946	.3032061
Hsize	-.2453634	.1040802	-2.36	0.018	-.4493569	-.0413699
Agesqr	-.0036261	.0017344	-2.09	0.037	-.0070255	-.0002266
Employ	.8519394	.5440822	1.57	0.117	-.2144422	1.918321
Hinc	.0031625	.0010712	2.95	0.003	.0010631	.0052619

Appendix G: Predicted Probabilities

```
. estat classification

Probit model for Hip

                    ─────── True ───────
Classified  │          D          ~D    │       Total
────────────┼───────────────────────────┼─────────────
     +      │         50           1    │          51
     -      │          2          60    │          62
────────────┼───────────────────────────┼─────────────
   Total    │         52          61    │         113

Classified + if predicted Pr(D) >= .5
True D defined as Hip != 0
─────────────────────────────────────────────────────
Sensitivity                      Pr( +| D)    96.15%
Specificity                      Pr( -|~D)    98.36%
Positive predictive value        Pr( D| +)    98.04%
Negative predictive value        Pr(~D| -)    96.77%
─────────────────────────────────────────────────────
False + rate for true ~D         Pr( +|~D)     1.64%
False - rate for true D          Pr( -| D)     3.85%
False + rate for classified +    Pr(~D| +)     1.96%
False - rate for classified -    Pr( D| -)     3.23%
─────────────────────────────────────────────────────
Correctly classified                          97.35%
─────────────────────────────────────────────────────
```