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MASTER OF SCIENCE ECONOMICS (HEALTH SPECIALISATION)



**“FACTORS AFFECTING HEALTH INSURANCE UPTAKE AMONG
INFORMAL-SECTOR WORKERS IN ZIMBABWE: A CASE OF BINDURA
DISTRICT”**

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Dedication

I dedicate this research to my wife Lorraine and children Jamaal and Jaymie-Valentine.

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I would like to thank The Lord, Almighty for helping me complete this project.

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Abstract

The study assesses the factors that affect health insurance uptake among informal sector workers in Zimbabwe using primary data from Bindura, Mashonaland Central. This comes in the wake of high rate of non- participation in Health Insurance which is one of the most important ways to achieve Universal Health Coverage. Specifically the study sort to determine the factors that influence one's decision to participate in health insurance and to determine the impact of those factors. The study also sort to measure Health Insurance Participation among Informal sector workers. 134 Participants were drawn through multi-stage sampling and a structured questionnaire was used to collect data. The study was utilised a cross-sectional research design. Stata was used to analyze the data. Logit regression results show that the level of education, income, age, gender, household size, cost of health insurance, awareness of health insurance and presence of chronic illness, are all significant predictors of participation in health insurance schemes among informal sector workers. Household size, and cost of health insurance were found to have a negative association with health insurance participation. To improve health insurance participation, the study recommends Health Insurance industry to develop schemes that appeal to informal sector workers and to improve education and communication about Health insurance among these workers. The industry should also endeavor to stimulate productivity among informal sector workers. The study also argues for Government and private health sector to improve quality of health services to attract uptake of health insurance and achieve Universal Health Coverage.

Key words: health insurance; informal sector; health insurance demand; Zimbabwe

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List of acronyms

AHFoZ	Association of Health Funders of Zimbabwe
AIDS	Acquired Immune Deficiency Syndrome
CBHI	Community Based Health Insurance
CDF	Cumulative Distribution Function
CIMAS	Commercial and Industrial Medical Aid Society
ESAP	Economic Structural Adjustment Program
EUT	Expected Utility Theory
HI	Health Insurance
HIP	Health Insurance Participation
HIV	Human Immunodeficiency Virus
ISW	Informal Sector Workers
LPM	Linear Probability Model
LR	Likelihood Ratio
MAS	Medical Aid Scheme
MLE	Maximum Likelihood Estimation
MoHCC	Ministry of Health and Child Care
OLS	Ordinary Least Squares
PHC	Primary Health Care
PHI	Private Health Insurance
PSMAS	Premier Services Medical Aid Society
SSA	Sub Saharan Africa
STERP	Short Term Economic Recovery Program
USA	United States of America
WHO	World Health Organisation
ZIM-ASSET	Zimbabwe Agenda for Sustainable Socio-Economic Transformation
ZIMSTAT	Zimbabwe National Statistics Agency

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CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction

World Health Organization (WHO) final health systems goals include health outcomes equity, efficiency and fairness in finance contribution. Fairness in financial contribution for health occurs when healthcare expenditures of households are distributed in accordance with the ability to pay rather than the cost incurred as a result of illness. (Carrin, 2003).

There is growing international consensus on the importance of extending social protection in health to the whole population (ILO, 2001a), in order to reduce financial barriers to health care services for the needy and to avoid catastrophic health expenditures (Kawabata et al., 2002). Health insurance schemes have been increasingly recognized as preferable strategies to finance health care and move towards universal health coverage. However, despite substantial efforts made by many countries, health insurance coverage remains low in most countries. (Hooley et al, 2022).

Health insurance in Zimbabwe caters for about 10% of the population, and membership in these schemes has been biased in favor of the formally employed (MOHCC, 2017). According to International Labor Organization (2018), 85.8% of total employment in Sub-Saharan Africa occurred in the informal sector.

Chipunza and Nhamo (2023) explored potential for demand for a proposed National health Insurance scheme for Zimbabwe among informal sector workers in Harare and found that the key determinants were household size, respondent's education level, income, and health insurance scheme perception. Mhere (2019) analyzed the determinants of health insurance participation in Gweru, an urban district of Zimbabwe. Results showed that, household head's level of education,

household income, family size, age and presence of chronic illnesses are all predictors of participation in health insurance schemes.

1.2 Health Financing in Zimbabwe

The health system in Zimbabwe is financed through a mix of public and private sources. According to Zimbabwe National Health Strategy (2021), the main sources of health care financing are tax-based government budget allocations, Local Authority funds, out-of-pocket expenditure, private health insurance and foreign aid. Private Health Insurance (PHI) is characterized by several employment-based and voluntary medical insurance schemes. Coverage is based on the ability to pay and not need, making the current system inequitable.

Zimbabwe has no developed systems for social health insurance or community based health insurance. The Government has proposed the establishment of a National Health Insurance (NHI) by 2025. This scheme is intended to provide Universal health coverage for all Zimbabweans regardless of their income or employment status. However, this type of health insurance requires a relatively large working population in order to subsidize the unemployed, a challenge given the current unemployment rates. Expanding health insurance to those who are out of formal employment seems plausible and this paper seeks to explore the factors that affect such enrollment of non formal sector workers into Health Insurance.

1.3 Zimbabwe Private Health Insurance Industry

Health Insurance participation in Zimbabwe is skewed towards those who are in formal employment. This leaves the majority of the population uncovered and exposed to catastrophic health spending in the event of an illness. If universal health coverage is to be attained, it is apparent that, efforts to include this proportion of the population into health insurance should be made.

Insurance participation in Zimbabwe is not mandatory. The voluntary nature of such coverage means the markets are potentially exposed to problems of adverse selection. This introduces inefficiency and failure of health markets. According to Mhazo and Maponga (2022), forty Private Health Insurance (PHI) organizations are registered to operate in Zimbabwe. The biggest market share is held by Premier Service Medical Aid Society (PSMAS), Commercial and Industrial Medical Aid Society (CIMAS), First Mutual Health, BonVie Medical Aid, Cellmed Health Medical Fund and Ultramed Health. These societies provide coverage for over 90% of all people with medical insurance in Zimbabwe. Other insurers include Alliance Health, FLIMAS, MAISHA Health , and Healthcare Benefits Consulting.

PSMAS is the largest medical insurer in the country, with a 60% market share. It has a physical presence in 17 cities and towns. (PSMAS, 2018).CIMAS is the second largest health insurance organization, mainly preferred by the private companies. CIMAS commands a 20% market share.

Health insurance participation was on a downward trend between 2005 and 2010. According to ZIMSTAT (2015), in 2005 it was 15 % and went down to 7 % in 2010). This period coincided with hyperinflation and a general economic slowdown in Zimbabwe. Thereafter Health insurance coverage increased steadily to 14 % in 2013 (ZIMSTA, 2015). This was during a period of new political arrangements in Zimbabwe which saw the economy greatly recover. After this period, insurance coverage plummeted down to 9.1 % in 2016 (AHFoZ, 2016)

1.4 Statement of the problem

As reflected in the background to the study, Zimbabwe's population is largely in the informal sector which presents barriers to informal sector workers in participating in health insurance which is largely provided in formal sector jobs. The background also shows that health insurance is an indispensable tool in achieving universal health coverage and offering financial protection in the event of illness yet rates of health insurance enrollment among the informal sector workers remains low. 94% of Zimbabweans are not covered by health insurance. (ZDHS, 2011). Using time-series data, Phelps (1973) identifies a positive relationship between insurance demand, and user fee levels however according to AHFoZ (2016), this expected increase in risk pooling mechanisms has not been evident in Zimbabwe instead; insurance participation has continued to fall.

1.5 Research Objectives

The main objective of this study is to investigate the factors that influence the demand for health insurance among informal sector workers in Zimbabwe using data from Bindura District.

Specific objective of the study are:

- Determine Health Insurance participation level among informal sector workers
- Determine factors that influence Health Insurance participation
- To determine the effect of socio-economic and demographic factors on the decision to participate in Health Insurance
- Draw relevant policy recommendations to improve health insurance uptake among informal sector employees in Zimbabwe.

1.6 Research Questions

The study intended to answer the following questions:

- What is Health Insurance participation level among informal sector workers?
- What factors influence Health Insurance Participation?
- What effect do socio-economic and demographic factors have on health insurance uptake?
- What are the policy implications of the findings from this study?

1.7 Research Hypotheses

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

H₀: Socio-economic factors have no effect on the one's decision to participate in health insurance among Zimbabwe's Informal sector workers.

H₀: Demographic factors have no effect on the one's decision to participate in health insurance among Zimbabwe's Informal sector workers.

H₁: Socio-economic factors have an effect on the one's decision to participate in health insurance among Zimbabwe's Informal sector workers.

H₁: Demographic factors have an effect on the one's decision to participate in health insurance among Zimbabwe's Informal sector workers.

1.8 Delimitation

Geographically, the study was confined to Bindura, Mashonaland Central, Zimbabwe. The district includes urban and peri-urban areas which are dominated by mining and agricultural activities. Bindura Town is the administrative capital of the Province. It is located about 89 Km from the National Capital- Harare. There are 10 private health centers, one public hospital and 10 local authority clinics in Bindura District.

Methodologically, the study utilizes a cross-sectional survey with 400 participants drawn from key Informal sector activities in Bindura District.

Theoretically, this paper is confined to the following decision-making theories:

- Consumer Theory,
- Expected Utility Theory and
- Prospect Theory.

1.9 Justification of the Study

Whilst Health insurance has been recognized as a direct way of achieving Universal Health Coverage, Health insurance participation remains low among some key populations such as informal sector workers. This has resulted in proliferation of unmet health needs in these populations. Health insurance industry and Government authorities therefore require an in-depth understanding of the factors that influence one's decision to participate in health insurance and the magnitude of the effects of such factors on Health insurance uptake. This understating will help improve policy formulation and improve utilization of healthcare.

Empirical studies on Health insurance participation in Zimbabwe are few and have varying results. Mhere (2013) studied the determinants of health on Gweru Urban households. Chipunza (2023) studied Potential demand for National Health Insurance using primary data from Mbare and Glenview. The concept under study was a novel concept for majority Zimbabweans at the time.

This current study utilizes a cross-sectional study design on both urban and rural participants. Furthermore a wide variety of participants from key informal sector groups are included in the study. This paper seeks to fill a void in literature and contribute to the existing body of knowledge on health insurance among informal sector workers.

1.10 Limitations of the study

The study was confined to Bindura District which is only one of Zimbabwe's 64 districts which may affect generalization of the findings to the rest of the Zimbabwe. However the researcher reviewed extensive literature from Zimbabwe to provide a solid basis for comparison with other researches from Zimbabwe.

Probability sampling could not be applied to all clusters as some participants had no fixed place of work. The use of probability sampling is in line with the best practice for stated preference studies.

1.11Chapter summary

This chapter provided a comprehensive background to the study in which research gaps were identified. The chapter also provided a statement of the problem, the research objectives and the research questions the study sought to ultimately answer. Furthermore, the chapter discussed the significance of the study, the delimitation of the study and the limitations of the study. The next chapter reviews literature related to the study and discusses the theoretical concept guiding the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews literature that has been produced related to the research variables of this study. The chapter first discusses the theoretical framework guiding the study. Several ideas and concepts have developed around health insurance, whose primary objective is to increase and protect access to health services among workers in the informal sector (Besley, 1988). To understand why people choose to enroll or not in health insurance, we draw insights from economic and social theories on decision-making. Empirical findings on insurance demand are reviewed drawing from global, regional and local literature. The chapter establishes research gaps and relates the concepts discussed in the chapter to the current study.

Theoretical Literature Review

2.1 Consumer Theory

Consumer theory studies how consumers make choices about goods and services they consume. Lancaster, (1966) provided foundations for this theory. According to Benfield (2010), if consumers are perfectly informed, they maximize their utility as a function of consuming various goods, subject to prices, their income and preferences. Consumers derive utility from consuming a good or service subject to their budget constraint. Changes in prices and income influence how much of different goods rational consumers will buy. Health insurance is expected to be a normal good with a positive income elasticity of demand, implying that the poor are less likely to insure and as income increases so will demand for health insurance. Consumer theory assumes that consumers

are perfectly informed and are rational and this is not always the case in healthcare. Cameron et al. (1988) posit that, due to uncertainty about the unknown future health state, insurance choice is not made based on utility alone but also on consumers' expectation about factors such as their current health status and expected future consumption of healthcare services.

2.2 Expected Utility (EUT).

Expected Utility Theory can be traced back to Bernoulli's 1738 study which was formally developed by Von Neumann and Morgenstern in 1944 (Eisenhauer, 2017). Bernoulli argued that, people make decisions based on the expected utility of each option. Expected Utility Theory posits that when faced with an array of risky decisions, an individual will choose the course of action that maximizes utility by comparing the expected utility values of the options. These are the weighted sums obtained by adding the utility values of outcomes multiplied by their respective probabilities (Davis et al, 1997).

Manning and Marquis (1999), argue that insurance demand is a choice between an uncertain loss that occurs with a probability when uninsured, and a certain loss like paying a premium. Individuals will purchase health insurance if the expected utility of doing so is greater than expected utility of not purchasing insurance. In other words, demand for insurance is demand for certainty. EUT assumes that people are risk averse. Nyman (2001), however points that empirical studies show that individuals actually prefer uncertain losses to actuarially equivalent certain ones and suggests that insurance is demanded to obtain an income payoff in the in the event of illness and has nothing to do with demand for certainty.

2.3Prospect Theory

This is a behavioral economics theory which describes how people make decisions under uncertainty. Proponents of this theory, Kahneman and Tversky (1979) posit that choices among risky prospects exhibit several pervasive effects that are inconsistent with the basic tenets of utility

theory making the utility theory an inadequate descriptive model. Choices are not dependent on utility and uncertainty alone but also loss aversion.

The prospect theory states individuals make choices basing on prospects of gains or losses, rather than basing on the level of uncertainty (Schneider, 2004). The theory is based on key concepts of Reference Point and Loss Aversion. Individuals insure not because they are risk averse but seek gain in the event of bad state. They compare their current state and the risk of deviating from it with the prospect of gaining or losing income by way of paying a premium. If a loss of income will occur with certainty, an individual is unlikely to insure. If a gain is expected from paying the premium, then the individual will insure.

Hwang (2019) tested the prospect theory's reference point and risk aversion concepts on insurance demand. The results were consistent with assumptions of prospect theory that risk aversion may decrease insurance demand if an individual's reference point is "wealth before purchasing insurance."

2.4 State-dependent Utility Theory

Fishburn (1970) is considered to be the father of state- dependent utility theory. This theory suggests that consumers' utility level and tastes are influenced by their state, such as their health or socio-economic status. Accordingly, people may have different degrees of risk aversion, which could influence their insurance decision and the magnitude of their expected insurance pay-off. Most people insure when they are healthy. A healthy person might optimistically expect to remain healthy in the near future, which has implications on the insurance choice. The resulting insurance coverage may be below full loss coverage, if the anticipated insurance pay-off is below the real loss in case of illness. Hence, the anticipated need for medical care given the current state, and the magnitude of the related insurance pay-off in case of sickness will affect individuals' insurance demand (Phelps 1973).

2.5 The Grossman Model

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.

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

2.6 Empirical Literature

Chipunza and Nhamo (2023) explored potential for demand for a proposed National health Insurance scheme for Zimbabwe and Willingness To Pay (WTP), among informal sector workers in Harare. They employed a cross-sectional survey with 388 participants. The results showed that the key determinants were household size, respondent's education level, income, and health insurance scheme perception. However their study focused on a National health insurance scheme that is not yet in existence, in Zimbabwe and is a concept unfamiliar to some informal sector workers.

Mhere (2019) analyzed the determinants of health insurance participation in Gweru, an urban district of Zimbabwe. They used a structured questionnaire distributed to 1200 participants and 703 responded. A PROBIT model was adopted. Regression results showed that the household head's level of education, household income, age, family size, and chronic illnesses, are all significant predictors of participation in health insurance schemes. The study argues for the health insurance industry to claim greater involvement in the nation's educational achievements and productivity stimulating endeavors.

Mathauer et al., (2006) analyzed the demand for social health insurance among informal sector workers of Kenya. They assessed the perceptions, knowledge and concerns of informal sector workers regarding health insurance and the National Health Insurance (NHIF). They employed focus group discussions backed up by a structured standard questionnaire. They found that the lack of knowledge and awareness about health Insurance schemes was a barrier to enrolment among informal sector workers. The study also found that inability to pay was put forward as a determining factor in enrolment. Accordingly, the study recommended policies focusing on raising awareness and information, improvement of insurance design features and setting differentiated and affordable contribution rates.

Kirigia et al. (2005) explored determinants of health insurance ownership among South African women. The objective of this study was to examine the relationship between health insurance

ownership and the demographic, economic and educational characteristics of South African women. They used data from a cross-sectional national household sample derived from the South African Health Inequalities Survey (SANHIS). The sample size was 3,489 women aged between 16 and 64. The results established that insurance quality has a positive effect on private insurance uptake among South African women.

Awiti (2014) conducted a research on poverty and healthcare demand in Kenya, a multinomial probit model using data from a survey that was carried out in 2005-2006. The aim was to find the effects of poverty on healthcare demand. The results showed that, in all age groups, the predictors of poverty included large household sizes and longer distances to the nearest health facility. The study concluded that low uptake of private health insurance is spearheaded by poverty being the main reason.

Marital status is also a determining factor of private health insurance uptake; married people are more likely to take private health insurance as compared to the unmarried hence the significant role of marital status in health insurance uptake. Spouses may benefit from medical insurance from their spouses' employers. In Ghana, Nketiah-Amposah (2009) used primary data from a survey conducted in three districts in Ghana between October 2007 and January 2008. Employing the binary logit model, the study found that women aged over 40 years were more likely to participate in health insurance. Income and marital status variables had positive and significant relationship with enrolling in public health insurance, however, household size and religion showed negative and weak statistical significance.

One's employment status is a determining factor of private health insurance uptake; the employed are more likely to participate in health insurance as compared to the unemployed who are likely to have limited disposable income.

Kiplagat (2013), in Kenya carried out a research with aim of finding the determinants of health insurance choice among Kenyans using the 2008-2009 Kenya Demographic Health Survey (KDHS) data. The results from that study showed, that is wealth index, employment status, and education level and household size determine the uptake of private health insurance.

Raymond (2015), carried a study in rural China with aim of determining the determinants of private health insurance in the area of Gansu. Results indicated that price and distance played significant roles in choice of private health insurance uptake, age and the attributes of sickness were also considered as the determinants for health insurance uptake.

Hopkins and Kidd (1996), established that higher educational level, attract higher incomes thereby increasing the possibility of demanding health insurance cover. More so, the educated people has the capacity to not only to acquire skills and knowledge but also to make informed choices on health-related matters amongst them in their decision towards purchasing health insurance so as to avoid catastrophic health expenditures. In addition tertiary education, that is diplomas, undergraduate degrees and post graduate qualifications students are exposed to health cover information and as such they participate in health insurance and these individuals tend to have stable and high salary paying jobs that allow them to part with some of their income on private health insurance, unlike the people with lower level of education.

Hopkins and Kidd (1996) also pointed out that high insurance quality increased the demand for private health insurance uptake among the educated individuals. The same study pointed out that urban residents are most likely to partake in health insurance as compared to rural residents, due to the reason that they can afford it and they are conveniently located to the service providers and have access to health insurance offices. Orayo (2014) pointed out that urban dwellers are more likely to demand as well as having private health insurance cover. In the Zimbabwean context, the urban dwellers are in proximity with the insurance offices or agents for example PSMAS, Maisha and CIMAS which are situated in the towns and cities and as such they are easily accessible. A few of these have branches in non-urban areas.

Nketiah-Amponsah (2009) in Ghana as well as Bhat and Jain (2006) in Gujarat pointed out that awareness as well as knowledge about health insurance was the explanatory determinants of health insurance uptake. On the same note, Mathuer et al. (2008) pointed out that lack of information was a major barrier for private health insurance uptake and as such access to information becomes a vital component in enhancing private health insurance uptake.

Through picking the major variables which significantly determine the uptake of private health insurance cover, there is need for insurance companies as well as the government to come up with health insurance packages as well as policies which fit the diverse beliefs of the people from different faiths and this enables them to consider purchasing health insurance (Bhat et al, 2006)

According to Moris (2007), insurance quality in which higher quality of service in form of early reimbursements, emergency hospitalization and no need for cash when needing service were found to increase uptake of private health insurance. Health insurance firms are encouraged to have easier ways of paying premiums e.g. through mobile transfers so that paying premiums is simpler. Electronic capturing of claims by health service providers improves convenience. This form of convenience enables higher participation in private health insurance (Phelp, 1997).

According to Bhat et al (2007) staying in an urban area increases probability to demand private health insurance, insurance firms should therefore strive to reach the marginalized communities and being accessible to non-urban populations.

According to Akokuwebe and Idemudia (2022), occupation, income, wealth and education are important for health insurance demand. Salari et al., (2019) also posit that, socio-demographic characteristics such as age, gender, place of residency (rural vs. urban) are significant factors for health insurance enrollment.

2.7 Research Gap

There is paucity of literature around the topic of health insurance among informal sector workers in Zimbabwe. Majority of studies on the topic come from East Africa and Asian countries. Empirical studies on Health insurance participation among informal sector workers in Zimbabwe are few yet majority of Zimbabwe's population is involved in informal sector activities. Furthermore, the few published local papers focused on urban ISW who operated in Local Authority- designated areas. Other ISW with no fixed operating places and rural communities are largely excluded from these studies. This paper seeks to fill that void in literature by contributing to existing body of knowledge

2.8 Conceptual Framework

This section presents the Conceptual Framework used in the study. This section shows the key concepts, variables and relationships between the variables used in the study. This framework guided the study to generate questions and hypotheses. It also helped in interpreting the results.

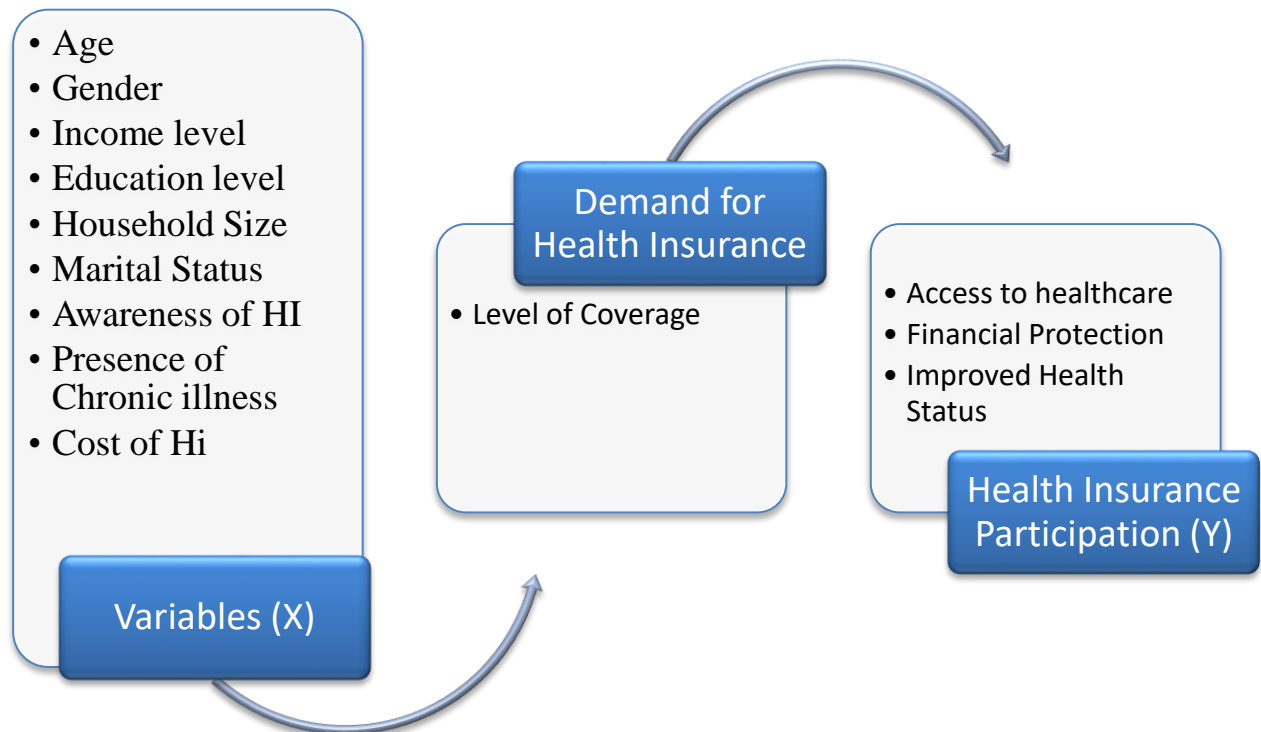


Figure 1: Conceptual Framework

Source: Author's own construction

2.9 Chapter Summary

This chapter discussed economic and social theories guiding decisions to participate in health insurance. Empirical evidence from around the world, regional and local contexts has been reviewed. Through this extensive review of literature, research gaps have been established. This chapter has put forward a conceptual framework which guided the study. The next chapter discusses the research design and methodology used in the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter outlines the methodology used in this study to achieve the research objectives including study design, sample selection, data collection methods and ethical considerations made. It highlights the theoretical and econometric models used in the study and defines the variables used and diagnostic tests performed

3.1 Theoretical Model Framework

This study will adopt the Expected Utility Theory as a decision- making theory in participating in health insurance. This theory has its criticisms but it has proved superior among other decision-making theories. Decisions to consume any set of goods are dependent on priorities and budget restrictions. An individual aims to maximize their expected utility when faced with consumption choices under uncertainty. This theory also assumes that rational individuals are normally risk-averse and they will favor risk reduction when faced with risky alternatives (Pindyck & Rubinfeld, 2005).

In the event of deviating from a healthy state to an unhealthy one, the expected utility with health insurance, $E(U)1$ is compared to the expected utility without insurance, $E(U)2$. When $E(U)1 > E(U)2$, individuals prefer to join an insurance scheme and when $E(U)1 < E(U)2$ individuals will opt not to participate in an insurance scheme.

3.1.1 Model Specification

The decision to purchase health insurance or not to, follows a probability model. Therefore this study had a choice between Linear Probability Model, Logit and Probit models.

Linear probability model (LPM) could not be used due to the following inherent problems:

- Heteroscedasticity of the error term.
- Expected value of the Y variable can be below 0 or above 1, violating the probability rule.
This is a fundamental problem with LPM and cannot be fixed.
-

3.1.2 General Econometric Model

This can be written as

$$Y = X_i \beta + \epsilon \quad (1)$$

3.1.3 Logit and Probit Models

Logit and probit models are both types of regression analysis commonly used in predicting of binary outcomes. There is little difference between Logit and Probit models according to Gujarati (2004). The logit model follows the logistic distribution of errors while the probit model follows the normal distribution of the residuals. Logit model allows reporting and interpretation of odds ratios, is easier to interpret and has been widely used in literature. For these reasons, this study adopted the Logit model.

The probit model can be represented using the following formula:

$$P_i(Y = 1/X) = \Phi(Z) \quad (2)$$

The logit model can be written as follows:

$$\text{Log } [y/ (1-y)] = Z \quad (3)$$

or

$$\text{Log } [y/ (1-y)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots + \beta_n X_n \quad (4)$$

Where,

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \dots + \beta_n X_n \quad (5)$$

Z is the linear combination of independent variables (X)

Y = dependent variable and represents the probability of an event occurring (hence Y=1) given the variables X

P = probability

Φ = cumulative distribution function (CDF) of the normal distribution

β = vector of unknown parameters, estimated using Maximum Likelihood Effects.

β_0 = intercept

X = vector of known regressors

ϵ = error term

In this, study Health Insurance Participation (Hip) can be presented as a function of a number of variables such as Income level, Education level, Age, Household size, Gender, Marital status, Health Insurance Membership, Health Status, Chronic illness, Quality of Health Services, Health Insurance Awareness(Information) and Cost of HI

This can be shown as: $\text{Hip} = f(\text{Inc, Edu, Age, Age}^2, \text{Hhs, Gen, Mstat, Chr, Cst, Aware} \dots)$ (6)

And as:

$$\text{Log} [y / (1-y)] = \beta_0 + \beta_1 \text{inc} + \beta_2 \text{edu} + \beta_3 \text{age} + \beta_4 \text{age}^2 + \beta_5 \text{hhs} + \beta_6 \text{gen} + \beta_7 \text{mstat} + \beta_8 \text{chr} + \beta_9 \text{cst} + \beta_{10} \text{aware} + \epsilon \quad (7)$$

Where:

Hip: Health Insurance Participation

Inc: Income Level

Edu: Education Level

Age: Age of Participant

*Age*² : Age as the participant grows older

Hhs: Household Size

Gen: Gender

Mstat: Marital Status

Chr: Chronic illness

Cst : Cost of HI

Aware: Awareness about HI

3.2 Definition of Variables and Expected Outcomes

Variable	Explanation	Measurement	Prior relationship with Hip
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Hip	Health Insurance ownership	Discreet Dependant variable 1 Yes 0 No	
Income	Average monthly income from informal sector activities	Continuous (USD)	Positive According to Mhere (2013), Chipunza&Nhamo (2023)
Education	Number of years of education	Continuous (number)	Positive according to Mhere (2013), Chipunza&Nhamo (2023)
Age	Respondent's age	Continuous (years)	Positive according to Mhere (2013) Negative According to Chipunza&Nhamo (2023)
Age squared	Square of respondent's age	Continuous (years)	Negative according to Mhere (2013)
Household size	Number of members living in the same household	Continuous (number)	Negative according to Boateng&Awunyor-Victor, (2013), Mhere (2013)
Gender	Whether he respondent is male or female	1 male 0 female	Negative According to Chipunza&Nhamo (2023),
Marital status	Marital Status	1 Married 0 Otherwise	Positive Chipunza&Nhamo (2023),

			Boateng&Awunyor-Victor(2013)
Chronic Illness	Presence of a household member with a chronic illness	1 Yes 0 No	Positive according to Mhere (2013)
Cost of HI	Cost of HI as respondent perceives it	1 Affordable 0 Otherwise	Negative
Awareness	Whether respondent has received educational Information about HI	1 Yes 0 No	Positive

Table 1: Definition of Variables and Expected Outcomes

Source: Author's construction

3.3 Study Design and Setting

A cross-sectional study was conducted from in November 2023 In Bindura District, which is in Mashonaland Central province of Zimbabwe. The district includes urban and peri- urban areas which are dominated by mining and agricultural activities. Bindura Town is the administrative capital of the Province. It is located about 89 Km from the National Capital- Harare. There are 10 private health centers, one public hospital and 10 local authority clinics in Bindura District.

Various sampling techniques were employed to draw a sample of 134 participants. Purposeful sampling was used to select the key centers with Informal sector activities. This was done because of time and cost constraints but allowed the researcher to gain a wide variety of respondents. Random sampling use of Lottery method was applied only to Farmers Market and Bindura Home Industry traders. This method is easy to apply on these clusters as they are clearly defined stalls given by The Local Authority and each stall has one trader. According to the Bindura Municipality,

the total number of stalls allocated to Famers Market is 98 and those to Home Industry are 124. Random sampling improves representativeness and credibility of research. Systematic sampling was applied to the Light Industrial area, Chiwaridzo 1 Shopping Centre and Chiwaridzo 2 Shopping Centre. In these three clusters, the first business was randomly selected and thereafter every 3rd premise was given a questionnaire. For vendors with no fixed stalls (Bindura CBD) and in areas that are difficult to reach such as small scale mines (Magarati and mining centers), convenience sampling was used.

A structured questionnaire was distributed to respondents by the researcher. The researcher opted to use questionnaires due to their ease of administration, cost effectiveness and they maintain respondent anonymity. To ensure that the survey questions were well-understood by respondents (minimizing measurement bias), survey pre-testing was done with 20 respondents drawn from Bindura Home Industry, one of the clusters for the main survey.

According to ZIMSTAT (2020), the population of Bindura is 43 058 and the percentage of people in the informal sector is 85%.

Based on Raosoft, the minimum sample size to achieve a 5 % margin of error, 95% Confidence interval was 105. This was well within what the researcher could manage and thus a sample of 134 was used. This large, representative sample was chosen to ensure credibility of the results.

3.4. Ethical Considerations

Research that involves human subjects or participants raises unique, complex ethical, legal, social and political issues. Gelo et al (2016) argue that research ethics are specifically interested in the analysis of ethical issues that are raised when people are involved as participants in research. Krippendorff and Bock (2008) suggest that there are three objectives in research ethics. The first and broadest objective is to protect human participants. The second objective is to ensure that research is conducted in a way that serves interests of individuals, groups and/or society as a whole. Finally, the third objective is to examine specific research activities and projects for their ethical

soundness, looking at issues such as the management of risk, protection of confidentiality and the process of informed consent.

3.4.1 Institutional Authorization

Written ethics approvals were sort from Bindura University of Science Education Ethics Committee. Permission to carry out research was sort from Ministry of Health & Child Care-Zimbabwe, Bindura Municipality, Bindura Rural District Council and Village heads of selected villages.

3.4.2 Informed Consent

Participation was voluntary and a signed informed consent from respondents was sought before completing the questionnaire. The respondents were informed of the nature and purpose of the research to the extent that that their participation would be voluntary.

3.4.3 Confidentiality and Anonymity

Participants were assured of anonymity and the researcher kept the identities of respondents anonymous and confidential. Gelo et al (2016) suggest that it is absolutely imperative that researchers keep respondents' identities confidential. Saunders (2014) posits that to ensure confidentiality, researchers should not link respondents' identifiers to their survey responses when using data. Common identifiers include names, social security numbers, addresses, and telephone numbers.

3.4.4 Non plagiarism

The researcher also ensured that literature attributed to other scholars was dully acknowledged as such to avoid plagiarism. Saunders (2014) suggests that researchers have an ethical obligation to produce authentic and original work even when duplicating the steps of a subject that has already been researched

3.5 Diagnostic Tests

3.5.1 Multicollinearity Test

Multicollinearity occurs when independent variables in a regression model have a strong linear relationship and therefore have a joint effect on the dependent variable. Precision of the regression coefficients will be reduced and consequently statistical power of the regression model weakened.

Multicollenearity was tested by generating a Correlation Index.

3.5.2 Pearson's Test

Pearson's Chi- Squared test (X^2) was used to test the goodness of the fit. It helps to understand if the observed data differs significantly from the expected data. According to Saunders (2014), Pearson's chi-square tests use the following formula to calculate the chi-square (X^2):

$$X^2 = \sum \frac{(O - E)^2}{E}$$

Where:

- X^2 is the chi-square test statistic

- Σ is the summation operator
- O is the observed frequencies
- E is the expected frequencies

The larger the difference between the observations and the expectations ($O - E$ in the equation), the bigger the chi-square will be.

3.6 Chapter Summary

Chapter Three presented the research methodology used to collect data and explore factors affecting health insurance uptake among informal sector workers in Zimbabwe. This included model specification and research design. The chapter described the sampling procedure, which was used to recruit a representative sample of participants from the target population. The chapter also described the data collection instrument, a self-report questionnaire that measured the key variables of interest. Finally, the chapter described the data analysis plan, which was used to test the research hypotheses and answer the research questions.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

The aim of this chapter is to present the findings and analysis of the study guided by the methodology highlighted in Chapter 3. Research questions will be answered. This chapter will give the descriptive statistics and the regression output of the study. It will go on to interpret the meaning of the results which forms the basis of the following Chapter.

4.2 Descriptive Statistics

Descriptive statistics for the variables used for estimating factors that explain enrolment of the informal sector employees into health insurance is presented in Table 4.1. At this exploratory stage, we conduct a comparison of frequencies of respondents that participate in Health Insurance to those that do not.

4.2.1 Distribution by Hip

Variable	Categories	Counts	Frequencies	%
Hip	0	97	97	71.324
	1	39	39	28.676

Table 2: Distribution by Hip

Table 4.1 above shows that among informal sector workers who participated in the study, 71% are not covered by health insurance and only about 29% are covered. This is shows a departure from literature which shows that only about 10% of the Zimbabwe population in general is covered by health insurance.

4.2.2 Distribution by Continuous variable

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. dev
Inc	136	0	136	30.000	3000.000	297.206	316.240
Education	136	0	136	5.000	15.000	10.559	1.869
Age	136	0	136	18.000	51.000	29.765	6.787
Age Squared	136	0	136	324.000	2601.000	931.662	442.145
Hhs	136	0	136	1.000	10.000	3.956	2.003

Table 3: Distribution by Continuous variable

Table 4.2 above shows that on average monthly income of respondents was \$297, number of years of education was 11 which is secondary school level. Average age was 30 and the average household had 4 members.

4.2.3 Distribution by Gender

Gender	Frequency	Percent
Male	98	73
Female	36	27
Total	136	100

Table 4: Distribution by Gender

Table 4.3 above shows that of those who participated in the study 73% were male and 27% were females.

4.3 Multicollinearity test

	Age	Marriage status	Gender	Chronic Illness	Education	Household Size	Income
Age	1.000						
Marriage status	0.5584	1.000					
Gender	0.6844	0.6195	1.000				
Chronic Illness	0.5904	0.6973	0.6937	1.000			
Education	0.5906	0.4579	0.5077	0.6419	1.000		
Household Size	0.6089	0.4894	0.5704	0.6446	0.4465	1.000	
Awareness	0.5537	0.6630	0.4935	0.3986	0.5167	0.6272	0.3445
Income	0.8574	0.5907	0.7454	0.3391	0.6946	0.5739	1.000

Table 5: Correlation Matrix

4.3.1 Correlation Matrix

A Pearson's multicollinearity 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 5 shows the correlation matrix of the independent variables used in the study. A correlation of -1.0 indicates a perfect negative correlation and a correlation of 1.0 indicates a perfect positive correlation. No variables were discarded as there was no high correlation among the variables.

Logit Model results

Table 4.4 summarizes the logit results of the estimation.

Table 6; Logistic Model

Logistic regression

Number of obs = 136
 LR chi2(9) = 41.46
 Prob> chi2 = 0.0000
 Pseudo R2 = 0.429

Log likelihood = -13.25875

HIP	COEF.	STD. ERR.	Z	P> Z	[95% CONF. INTERVAL]
AGE	1.4181**	1.0136	1.39	0.027	-2.8642 0.2075
CHRONIC ILLNESS	0.0179 **	0.4247	0.04	0.027	0.2365 0.9996
AGESQR	1.4257*	0.3609	3.94	0.083	1.0835 1.8287
INCOME	0.1683***	0.2314	0.72	0.005	0.2931 0.2356
EDUCATION	0.05720**	0.9514	0.06	0.063	0.0777 3.322
HOUSEHOLD SIZE	-0.1786*	0.2322	-0.76	0.003	-0.4465 0.2301
GENDER	-0.0213**	0.4724	-0.04	0.013	-0.3531 0.8573

MARITAL STATUS	0.9851	0.2435	4.04	0.340	0.2453	0.9943
COST OF HI	-0.0137**	0.7143	-2.86	0.0232	-0.4567	0.3456
INFORMATI ON ABOUT HI	0.5230**	0.9624	0.548	0.0156	0.7775	3.563
_CONS	-14.7408	0.5907	0.7454	0.939	-24.2382	-5.2432

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

Table 6: Logistic regression

The calculated logistic model's findings demonstrated that marital status were unimportant at all conventional significance levels at 1%, 5%, and 10%.

Number of observations

This is the number of observations used in the logit model regression. This study had 134 observations

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 -13.25875 which is close to 0. This shows that the model is appropriate for the study.

Pseudo R Square

The R-squared which measures the model's goodness of fit and it was found to be 0.429. This is high. The immediate implication is that the relationship seen between HIP and the explanatory variables cannot be attributed to chance, but indeed these factors influence 42% of health insurance participation.

4.4 Marginal Effects

Table 7 Marginal Effects

Variable	dy/dx	Std. Err.	Z	P> z	[95% Conf. Interval]	
Age	0.3839	0.3068	1.23	0.075	0.2333	0.5345
Hhs	-0.5592	0.5012	1.92	0.007	-0.5727	1.4909
Gen	-0.3882	0.5431	-0.74	0.027	-1.0019	-0.39-57
MStat	0.2322	0.3789	0.31	0.293	0.2239	0.2522
Edu	0.3656	0.7480	0.85	0.023	0.2641	0.4672
Cst	-0.2282	0.2309	-1.69	0.028	-0.4150	0.2300
Chr	0.8956	0.5201	1.52	0.025	1.1985	1.4644
Inc	0.2310	0.2305	1.16	0.028	0.2295	0.2322
Aware	0.2123	0.2156	1.19	0.006	0.2031	0.2249

Table 7: Marginal Effects

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

In light of the regression results above the estimated model for health insurance can be written as

$$\text{Log } [y / (1-y)] = -14.74 + 0.2310inc + 0.3656edu + 0.3839age - 0.5592hhs - 0.3832gen + 0.8956chr - 0.2282cst + 0.2123Aware + \epsilon$$

4.5 Discussion of results

The model's suggested variable age has a quadratic form on health insurance participation; when graphed, a concave shape is observed, with 45 years as the point of inflection, meaning that chances of participating in health insurance increase as one gets older. For households under 45, the marginal effects result of age squared predicts that a year's increase in age increases the probability of health insurance participation by 0.275; however, as one gets older, the marginal effect result of age squared predicts that each additional year lowers the household's probability of participating in health insurance by 0.3839. This can be explained by the fact that as people age, their tendency to become reliant on their children, who may designate them as beneficiaries under their medical insurance plans, may cause a drop in their involvement in health insurance. The findings are consistent with those of Danis et al. (2007), Mhere (2013), and Yamada et al. (2014), who discovered a concave quadratic association between age and health insurance participation. Additionally, the findings support the expectations of Besley (1988) and the Grossman (1972) model, which predicted that age would have a non-linear relationship with health insurance. This is because of the fact that health output rises with personal growth, however the person will eventually a specific age at which health

At the 0.01 level, the coefficient of the variable household size is statistically significant. The findings indicate a positive, albeit predictable, correlation between health insurance participation and households with more numbers.

The gender influences the decision to own health insurance, according to Table 4.4 results. The variable's coefficient has a p-value of 0.027 and a negative sign, indicating a negative relationship with the demand for health insurance. Participation in health insurance is less likely in households headed by men by about 28%.

It was shown that participation in health insurance was positively impacted by the variable awareness of health insurance information. At the 0.01 level, this variable's coefficient was statistically significant.

Variable *Edu* was statistically significant at 5%, and had a positive relationship with *Hip*. The level of education could enhance comprehension and appreciation of advantages of having insurance. Results from the marginal effects indicate that a rise in the level of education of the likelihood that the head of the home will enroll in health insurance increases by 0.0363.

At the 5% significance level, the coefficient of this variable, *Inc* was statistically significant. The findings indicate a positive correlation between monthly household income and health insurance enrollment. According to the marginal results, there is a 0.2310 rise in the likelihood of a household enrolling in health insurance plans for every \$1 increase in monthly income. The study supported Grossman's (1972) prediction that income has a beneficial impact on the demand for health care. Low income levels typically place restrictions on households in slum areas, rural areas, and high density suburbs.

The relationship between marital status and health insurance participation is positive however not statistically significant. We do not interpret results that are not statistically significant.

Variable *Chr* positively impacted *Hip* and was significant at 5% level. The presence of a chronic illness in the family increased the likelihood of health insurance participation by 0.8956. This is in agreement with Mhere (2013) who also found out that presence of chronic illness in the family increases likelihood of health insurance participation.

Variable *Cos* had a negative relationship with *Hip* at 5% level of significance. This means cost of health insurance reduces the likelihood of health insurance participation. This is in agreement with literature as found out by Mathauer et al., (2006) that high cost of insurance is a barrier to enrollment.

4.6 Chapter Summary

This chapter presented and analysed results of the study. Marital status was found not to be significantly associated with health insurance participation. Household size, male gender and cost of health insurance were had negative relationships with health insurance participation. Education level, monthly income, awareness about health insurance and presence of chronic illness in the family were found to have positive relationships with health insurance participation. Age was found to have a quadratic relationship with health insurance participation.

CHAPTER FIVE

CONCLUSIONS, RECOMMENDATIONS AND AREAS FOR FURTHER STUDY

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 Key findings

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

Cross-sectional data from Bindura, collected in November 2023 was used. The study used binary dependent variable and a value of one was assigned if a respondent is insured and zero if not. A set of socioeconomic factors were used as independent variables. These variables were; age, gender, education level, marital status, household size, cost of health insurance, presence of chronic illness in the family, monthly income and awareness about health insurance. A logistic model was then used to identify factors that would result in a household participating in a health insurance.

The study showed that only 28% of informal sector workers participate in health insurance. Regression results revealed that marital status had no significant impact on the choice to participate in health insurance. Household size, male gender and cost of health insurance had negative relationships with health insurance participation. Education level, monthly income, awareness

about health insurance and presence of chronic illness in the family were found to have positive relationships with health insurance participation. Age was found to have a quadratic relationship with health insurance participation.

5.3 Recommendations

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, development and also achieving universal health coverage.

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, as a way of getting wider health insurance coverage.

Income was found to be positively related to the probability of a household participating in health insurance schemes. Income is in most cases is increased by increased 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 between income and the one's chances of enrolling for a health insurance scheme should inform the health insurance industry to target informal sector workers. Furthermore this positive relationship should provide a hint to health insurance industry to get involved in productivity stimulating endeavors. This will improve health insurance uptake

Awareness about Health insurance was seen to be significantly associated with increase in health insurance participation. Health insurance industry should craft strategies that improve awareness about their products particularly targeting males. Male gender was found to be negatively associated with health insurance participation.

Cost of Health Insurance was found to be negatively associated with health insurance participation. Health Insurance Industry needs to craft products that are affordable and flexible to informal sector workers.

5.4 Limitations Areas of further study

The study investigated the demand side determinants of health insurance however 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.

The study was limited to Bindura District only which one of 59 districts in Zimbabwe. There is need to study wider populations to better achieve generalisability of results.

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Appendices

Appendix 1

Questionnaire

Department of Economics
Bindura University of Science Education
P. O. Box 1020 Bindura
Contact phone numbers: 0719964631
Email address: ndoczim@gmail.com

Dear respondent

Welcome to this survey.

My name is Nura Isala. I am a final year student at the Bindura University of Science Education undertaking a Master's of Science Economics (Health specialization) Degree. I am conducting a research on "Factors affecting enrollment into Health Insurance in Zimbabwe." I kindly invite you to go through and complete this questionnaire. The information that you provide will be used strictly for this academic research purpose and will remain private and confidential. Your participation is voluntary and your responses shall enable me to fully understand this topical issue. The information you provide will be held in a high degree of confidentiality. There is neither right nor wrong answers. The identities of participants shall remain and anonymous. Please pick your answers by way of ticking. Your participation in sincerely filling out all the questions on this questionnaire is greatly appreciated and I hope you will find the exercise to be enjoyable.

Thank you for your help.

Regards

Nura Isala,

MSc Econ Student.

Section 1: Socio-demographics.

Tick where appropriate

1.1	Are you an Informal-Sector Worker	Yes					
		No					
1.2	If yes to above question, which sector do you work in	Mining					
		Farming					
		Hardware					
		Timber and furniture					
		Vendor					
		Clothes/shoe sales					
		Metal Business					
		Other					
1.3	What is your gender	Male					
		female					
1.4	What is your ageyears					
1.5	What is your marital status	Married	Single	Widowed	Divorced	Separated	Widowed

Please give the response to the following question on the level of education which you attained by stating the exact level e.g.: grade 5, grade 7, form 1, form 3, etc. If you went to college, indicate the number of years spent at college e.g. 2 years at college.

1.6	What is the highest level of education you attained
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Section 2 Household characteristics

2.1	How many people are in your household	
2.2	Is there anyone with a chronic illness in the household	yes	
		no	

Section 3: Household economics

3.1	What is your monthly estimated Income from Informal sector activities	\$.....USD
3.2	What were your estimated expenses on healthcare in the last 3 months? (if any)	\$.....USD

Section 4: Health Seeking Behavior and Service utilization

4.1	Have you visited a health facility in the last 1 months	Yes	
		No	
4.2	If yes to above question, What was the quality of service you received	Poor	
		Good	
		Excellent	

4.3	Are you aware of any health insurance schemes (Medical Aid)	Yes	
		No	
4.5	Do you own any Health Insurance (Medical Aid Policy)	Yes	
		No	
4.6	What is your view about cost of paying for medical aid	Affordable	
		Expensive	
		Unaffordable	
4.7	Have you received any educative information about Medical Aid	Yes	
		NO	

	Age	Marriage status	Gender	Chronic Illness	Education	Household Size	Income
Age	1.000						
Marriage status	0.5584	1.000					
Gender	0.6844	0.6195	1.000				
Chronic Illness	0.5904	0.6973	0.6937	1.000			
Education	0.5906	0.4579	0.5077	0.6419	1.000		
Household Size	0.6089	0.4894	0.5704	0.6446	0.4465	1.000	
Awareness	0.5537	0.6630	0.4935	0.3986	0.5167	0.6272	0.3445
Income	0.8574	0.5907	0.7454	0.3391	0.6946	0.5739	1.000

Appendix 2: Correlation Matrix

Appendix 3

Distribution by Continuous variable

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. dev
Inc	136	0	136	30.000	3000.000	297.206	316.240
Education	136	0	136	5.000	15.000	10.559	1.869
Age	136	0	136	18.000	51.000	29.765	6.787
Age Squared	136	0	136	324.000	2601.000	931.662	442.145
Hhs	136	0	136	1.000	10.000	3.956	2.003

Appendix 4

Logistic regression

Number of obs = 134
 LR chi2(5) = 41.46
 Prob> chi2 = 0.0000
 Pseudo R2 = 0.429

Log likelihood = -13.25875

HIP	COEF.	STD. ERR.	Z	P> Z	[95% CONF. INTERVAL]	
AGE	1.4181**	1.0136	0.031	0.027	-2.8642	0.2075 HINC
CHRONIC ILLNESS	0.0179 **	0.4247	2.22	0.027	0.2365	0.9996
AGESQR	1.4257*	0.3609	2.84	0.083	1.0835	0.8287
INCOME	0.1683***	0.2314	2.1	0.005	0.2299	0.2356
EDUCATION	0.05720***	0.9514	-1.68	0.063	0.9775	3.322
HOUSEHOLD SIZE	-0.1786*	0.2322	2.87	0.003	0.4465	0.2301
GENDER	-0.0213**	0.4724	2.41	0.013	0.3531	0.8573
MARITAL STATUS	0.9851**	0.2435	2.35	0.340	0.2453	0.2432
COST OF HI	-0.0137**	0.7143	-2.86	0.0232	0.4567	0.3456 1.000
INFORMATI ON ABOUT HI	0.5230***	0.9624	-1.48	0.0156	0.7775	3.563

_CONS	-	0.5907	0.7454	0.939	-24.2382	-5.2432	0.7863
	14.7408***						

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

Appendix 5

Marginal Effects

Variable	dy/dx	Std. Err.	Z	P> z	[95% Conf. Interval]	
Age	0.3839	0.3068	2.23	0.075	0.2333	0.5345
Hhs	-0.5592	0.5012	2.92	0.007	0.4275	1.4909
Gen	-0.3882	0.5431	-1.74	0.027	-1.0019	-0.3257
MStat	0.2322	0.3789	2.31	0.293	0.2239	0.2522
Edu	0.3656	0.7480	2.85	0.023	0.2641	0.4672
Cst	-0.2282	0.2309	-1.69	0.028	0.9150	0.2300
Chr	0.8956	0.5201	2.52	0.025	1.1985	1.4644
Inc	0.2310	0.2305	2.16	0.028	0.2295	0.2322
Aware	0.2123	0.2156	2.19	0.006	0.2431	0.2249

