

**UNIVERSITY OF GHANA
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**DEMAND AND BENEFIT INCIDENCE OF HEALTHCARE
SERVICES IN GHANA**

BY:

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DECLARATION

I, ADU OWUSU SARKODIE, hereby declare that this thesis, except for references to other literature which have been duly acknowledged, is the result of my effort and that it has neither in whole or in part been presented elsewhere for the award of a degree.

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ABSTRACT

This thesis investigates the factors that determine demand for healthcare in Ghana by placing emphasis on price, income, and opportunity cost (the price of time). The study uses data from the sixth round of Ghana Living Standards Survey (GLSS 6) conducted in 2012/2013.

The thesis is organized in a paper-based approach. The first paper aims at finding the sensitivity of demand for healthcare services to price and income, as well as finding the benefit incidence of the payment for healthcare services in Ghana. The paper estimates how changes in price and income of the consumer affect their demand for a particular healthcare provider – public, private and alternative healthcare, and concludes that overall, demand for healthcare is found to be price and income inelastic. That is, price and income elasticities of overall healthcare provider were estimated to be -0.016 and 0.01 respectively, indicating that demand for healthcare is less sensitive to changes in both price and income. The three types of healthcare – public, private, and alternative healthcare services are all price and income inelastic, though the coefficient of alternative healthcare is not statistically significant. A concentration index of 0.119 shows that payment of healthcare services in Ghana fall on the rich more than the poor.

Based on the findings that there exist inequality and inequity in demand for healthcare measured by healthcare payment, it is recommended to policymakers to restructure the health system in such a way that such inequalities and inequities are removed or reduced substantially. Unlike the traditional Price Theory where demand for a commodity is largely determined by price and income, demand for healthcare in Ghana is found to be less sensitive to changes in price and income after controlling for the National Health Insurance Scheme. This suggests that in an attempt to find the determinants of demand for healthcare services, more attention should be given to other influential factors such as health insurance.

Following from the conclusions of the first paper, the second paper then investigates the effect of the National Health Insurance Scheme on demand for healthcare. The finding is that enrolment onto the National Health Insurance Scheme (NHIS) increases healthcare utilization. Using Propensity Score Matching, the predicted probability of the effect of NHIS on healthcare utilization is 0.243 but decreases no care by the same magnitude (-0.243). In terms of where the individual seeks healthcare, the predicted probabilities for visiting public, private, and alternative healthcare providers are 0.231, 0.014, and -0.002 respectively. This means that NHIS increases public and private healthcare but decreases alternative healthcare utilization. People who sought healthcare did so for the purposes of treating illness, injury, check-up and follow-up, childbirth-related issues (prenatal, delivery, and antenatal), and vaccination. The Propensity Score Matching (PSM) predicted probability for treating illness, injury, check-up, childbirth-related issues, and vaccination purposes are 0.022, -0.001, 0.009, 0.002, and -0.032 respectively. The interpretation is that enrolling in NHIS increases healthcare utilization to treat illness, check-up, and childbirth-related purposes, but decreases utilization for injury and vaccination purposes. The PSM predicted probability of the effect of NHIS on out-of-pocket payment is -6.309. This means that NHIS decreases out-of-pocket payment by 6.309. The findings, therefore, suggest the importance of improving the National Health Insurance Scheme to increase access to healthcare.

The National Health Insurance Scheme was established in 2003 with the aim of reducing the cost of healthcare provision and increase access to healthcare. However, the paper finds that even when the price is assumed to be “zero”, there still remain some economic costs for choosing a particular healthcare provider over the other. This is called the price of time or opportunity cost. In analyzing the effect of the price of time on choice of healthcare provider, the study finds that travel time and waiting time have a significant effect on the choice of

healthcare provider, but not travel cost. An hour increase in the time taken to travel to the healthcare facility is likely to decrease the probability of seeking healthcare from public modern, private modern, and chemical shop by 3.1, 0.5, and 3.6 percentage points. The effect of the time spent at the healthcare facility on the choice of a particular healthcare provider is also significant. For instance, if waiting time increases by 1 hour, the effect on visiting public modern and traditional health centers will increase by 6.0 percentage points and 1.3 percentage points respectively. However, the effect on private modern and chemical store will be a decrease in probabilities by 5.0 and 2.8 percentage points respectively.

Based on the findings of the study, it is recommended to policymakers to institute measures aimed at reducing the cost of providing healthcare, increasing access to healthcare especially to the poor, and also raising incomes of consumers. Health insurance is found to significantly increase healthcare utilization and decrease out-of-pocket payment. Therefore, the National Health Insurance scheme should be well resourced in order to provide quality services to subscribers, and also encourage the poor to enroll. It is also recommended to policymakers to make effort to decrease travel time and waiting time at the health facilities in the country to improve healthcare delivery.

DEDICATION

I dedicate this thesis to my parents, siblings, and Hon. Dr. Kwabena Duffuor, a former Governor of Bank of Ghana, and also a former Minister of Finance of the Republic of Ghana.

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Table of Contents

DECLARATION	i
ABSTRACT.....	ii
Table of Contents.....	vii
CHAPTER ONE	1
1. INTRODUCTION	1
1.1 Background	1
1.2 Healthcare as a Derived-Demand.....	2
1.2.1 Healthcare as an Economic Commodity.....	3
1.3 Statement of the Research Problem	7
1.4 Objectives.....	11
1.5 Hypotheses testing.....	11
1.6 Organization of the thesis.....	12
CHAPTER TWO	15
2. OVERVIEW OF GHANA’S HEALTH SECTOR.....	15
2.1 Introduction	15

2.2	Disease Profile.....	19
2.3	The Health System	21
2.4	Background of Health Insurance in Ghana	26
2.4.1	Management.....	26
2.4.2	Healthcare Service Providers, Utilization, and Claims Payment.....	29
2.4.3	Membership and Enrolment.....	31
2.4.4	Challenges.....	35
2.4.5	Remedy measures	37
2.5	Healthcare Facilities	38
2.6	Political Economy of the Health System.....	43
CHAPTER THREE		46
3.	LITERATURE REVIEW	46
3.1	The effect of price and income on demand for healthcare as well as benefit incidence of healthcare	46
3.1.1	Theoretical Literature: Derived-demand for Healthcare.....	46
3.1.2	Empirical Literature	49
3.2	Benefit incidence of healthcare services	56

3.3	The effect of the National Health Insurance Scheme on healthcare utilization and out-of-pocket payment	59
3.3.1	Theoretical framework.....	59
3.3.2	Empirical Literature	65
3.4	The effect of the price of time on demand for healthcare.	74
3.4.1	Theoretical Literature.....	74
3.4.2	Empirical Literature	78
3.5	Conceptual Framework of access to healthcare	85
CHAPTER FOUR.....		91
4.	DEMAND ELASTICITY AND BENEFIT INCIDENCE OF HEALTHCARE	91
4.1	Introduction	91
4.1.1	Description of Elasticity Measures	94
4.1.2	Benefit Incidence of Healthcare Services	95
4.2	Methodology	99
4.2.1	Data Source	99
4.2.2	Econometric Model – Elasticity of Demand.....	101
4.2.3	Econometric Model – Concentration Index.....	103

4.2.4	Estimation Methods	106
4.3	The extent to which price and income influence demand for healthcare as well as the benefit incidence of healthcare.	107
4.3.1	Health conditions in the two weeks preceding the interview.	107
4.3.2	The Health status and the Socio-economic profile of household members.	110
4.3.3	Summary Statistics.....	113
4.3.4	The elasticity of Demand for Healthcare Services	116
4.3.5	Benefit Incidence of the Payment of Healthcare Services	121
4.4	Summary	131
5.	THE EFFECT OF NATIONAL HEALTH INSURANCE SCHEME ON HEALTHCARE UTILIZATION AND OUT-OF-POCKET PAYMENT	135
5.1	Introduction	135
5.2	Methodology	137
5.2.1	Data Source	137
5.2.2	Estimation technique.....	137
5.2.3	The model	138

5.3	Effect of the National Health Insurance Scheme (NHIS) on demand for healthcare	145
5.3.1	Enrolment onto the National Health Insurance Scheme (NHIS).....	149
5.3.2	The Effect of the National Health Insurance Scheme (NHIS) on healthcare utilization.	155
5.3.3	The Effect of the National Health Insurance Scheme (NHIS) on healthcare utilization: Logistic regression.....	160
5.3.4	Effect of NHIS on healthcare Utilization: Propensity Score Matching (PSM)	163
5.3.5	Effect of National Health Insurance Scheme on Out-of-Pocket Payment.....	168
5.3.6	Financial Implication of NHIS.....	169
5.3.7	Summary	170
CHAPTER SIX.....		172
6.	CHOICE OF HEALTHCARE PROVIDER IN GHANA: EFFECT OF PRICE OF TIME	172
6.1	Introduction	172
6.2	Methodology	174
6.2.1	Data Description	174
6.2.2	Estimation Technique	174

6.2.3	Variable Description	177
6.3	Results And Discussion.....	181
6.3.1	Descriptive Statistics.....	181
6.3.2	Determinants of Healthcare Provider: Cross Tabulation	184
6.3.3	Determinants of Healthcare Provider: Multivariate Analysis.....	188
6.4	Summary	197
CHAPTER SEVEN		199
7.	SUMMARY, CONCLUSION, AND POLICY RECOMMENDATIONS	199
7.1	Summary	199
7.2	Conclusion and Policy Recommendations	203
References.....		208
Appendices.....		222

List of figures

Figure 2.1: Total fertility rate in Ghana, 1998-2014.....	16
Figure 2.2: Life Expectancy at birth, Under-Five Mortality Rate, and Infant Mortality Rate in Ghana (2000-2015)	17
Figure 2.3: Top ten causes of deaths in Ghana, 2013	19
Figure 2.4: Source of central government’s revenue for health, 2013.....	25
Figure 2.5: Distribution of expenditure, 2013	25
Figure 2.6: Trend of active membership.....	33
Figure 2.7: Population and Enrolment Distribution, 2013.....	34
Figure 2.8: Categories of ownership of healthcare facilities: by region	41
Figure 3.1: A concave utility function for a risk averse person.....	62
Figure 3.2: A convex utility function for a risk lover person	63
Figure 3.3: Budget Constraints and optimal consumption bundles for individuals with different health status.	75
Figure 3.4: Conceptualization of Access to Healthcare.....	86
Figure 3.5: Conceptualization of demand for healthcare.....	89

Figure 4.1: Lorenz curve for healthcare payment: the general case and the sub-group case – insurance status, place of residence, and gender.....	123
Figure 4.2: Generalized-Lorenz dominance of healthcare payment among sub-groups - insurance status, place of residence, and gender.....	125
Figure 4.3: Concentration curves for the payment of all types of healthcare services– public, private, and alternative healthcare services	127
Figure 5.1: Health Insurance enrolment in 2005/2006 and 2012/2013	149
Figure 5.2: National Health Insurance Enrolment in 2012/2013.....	151
Figure 5.3: Effect of NHIS on general Healthcare Utilization.	156
Figure 5.4: Effect of NHIS on No care Utilization.....	157
Figure 5.5: Effect of NHIS on Public Healthcare Utilization.....	157
Figure 5.6: Effect of NHIS on Private Healthcare Utilization.....	158
Figure 5.7: Effect of NHIS on Alternative Healthcare Utilization	158
Figure 6.1: Categories of healthcare service providers.....	178

List of Tables

Table 2.1: Trend of Health Expenditure as a Percentage of Gross Domestic Product (GDP) in Ghana (2000 – 2013)	24
Table 2.2: Health Facilities by type and ownership, 2015.....	39
Table 2.3 Classification of healthcare facilities based on ownership, type, and service.	41
Table 2.4: Place of Consultations from GLSS 6 (2012/2013).....	42
Table 4.1: Demographics of the Ghana Living Standard Surveys (GLSS 4, GLSS 5, and GLSS 6)	100
Table 4.2: Reasons for consulting a physician.....	108
Table 4.3: Type of facility consulted	109
Table 4.4: Who Paid for Medical Expenses?.....	110
Table 4.5: Percentage of population who fell ill and consulted a physician (1998/1999-2012/2013).....	111
Table 4.6: Percentage of population who suffered from illness, injury or both (1998/1999-2012/2013), by sub-groups.	112
Table 4.7: Summary statistics of the dependent and independent variables.....	114
Table 4.8: Price and Income elasticities of demand for healthcare: The General case	117

Table 4.9: Price and Income elasticities of demand for healthcare: types of healthcare services with no care as the reference category.....	119
Table 4.10: Concentration indexes of healthcare services by sub-populations: the general case	129
Table 4.11: Concentration Index of healthcare services payment by sub-populations: the specific case	130
Table 5.1: Summary statistics of the dependent variables and background characteristics of the total sample (uninsured and insured groups combined).....	145
Table 5.2: Summary statistics of the dependent variables and background characteristics for the uninsured and insured groups.	147
Table 5.3: Dominance of health insurance coverage by the background characteristics	152
Table 5.4: Dominance of health insurance by reasons for consultation	159
Table 5.5: Effect of NHIS on Healthcare utilization: Logistic regression (marginal effects).....	161
Table 5.6: Probit regression results of the Likelihood of enrolment on NHIS	164
Table 5.7: Estimated propensity score in percentiles.....	165
Table 5.8: The Number of Blocks in Propensity Score	166
Table 5.9: Propensity Score Matching of the Effect of NHIS on Healthcare Utilization.....	167
Table 5.10: Financial Implications of Increased Size of Enrolment.....	169

Table 6.1: Variable Description: categorical and continuous variables	179
Table 6.2: Summary statistics of the dependent and independent variables.....	181
Table 6.3: Cross Tabulation of the predictors and the dependent variable.....	184
Table 6.4: Effect of time price on choice of type of healthcare providers: No care is the reference group. (Without controls).....	191
Table 6.5: Effect of time price on choice of type of healthcare providers: no care is the reference group. (With price and other controls).....	193
Table 6.6: Effect of time price on choice of type of healthcare providers (without price): no care as the reference group.	195

LIST OF ABBREVIATIONS

ACA	Affordable Care Act
AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
ATT	Average Treatment effect on the Treated
CAM	Complementary and Alternative Medicine
CBHIS	Community-Based Health Insurance Scheme
CFR	Case Fatality Rate
CHPS	Community-Based Health Planning and Services
CI	Concentration Index
CIA	Conditional Independence Assumption
DMHIS	District Mutual Health Insurance Scheme
EAs	Enumeration Areas
ECI	Extended Concentration Index
GDHS	Ghana Demographic and Health Survey
GDP	Gross Domestic Product
GHS	Ghana Health Service
GLSS	Ghana Living Standards Survey
GoG	Government of Ghana
GSS	Ghana Statistical Service
HIE	Health Insurance Experiment
HIV	Human Immunodeficiency Virus
HPP	Health and Population Project
ID	Identification

IGF	Internally Generated Fund
IIA	Independent of Irrelevant Alternative
iMMR	Institutional Maternal Mortality Rate
JHS	Junior High School
LEAP	Livelihood Empowerment Against Poverty
MB	Marginal Benefit
MC	Marginal Cost
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MHIS	Mutual Health Insurance Scheme
MoH	Ministry of Health
MRS	Marginal Rate of Substitution
MTHS	Medium Term Health Strategy
NDC	National Democratic Congress
NDPC	National Development Planning Commission
NGO	Non-Governmental Agency
NHIA	National Health Insurance Authority
NHIC	National Health Insurance Council
NHIF	National Health Insurance Fund
NHIL	National Health Insurance Levy
NHIS	National Health Insurance Scheme
NPP	New Patriotic Party
OLS	Ordinary Least Square
OPD	Out-Patient Department

OPP	Out-of-Pocket Payment
PHI	Private Health Insurance
PPP	Purchasing Power Parity
PPS	Proportional to Population Size
PS	Propensity Score
PSM	Propensity Score Matching
PSU	Primary Sampling Unit
SADA	Savannah Accelerated Development Authority
SCI	Symmetric Concentration Index
SHI	Statutory Health Insurance
SHS	Senior High School
SID	Supply-Induced Demand
SSNIT	Social Security and National Insurance Trust
SSU	Secondary Sampling Unit
TB	Tuberculosis
UKAID	United Kingdom Aid
UNDP	United Nations Development Programme
USA	United States of America
VAT	Value Added Tax
WHO	World Health Organization
WHSa	Women's Health Survey of Accra

CHAPTER ONE

1. INTRODUCTION

1.1 Background

While health may be defined as a good state of the body and mind, healthcare refers to the tangible and intangible medical and non-medical facilities purposely used to prevent or cure illness (Grossman, 1972). Healthcare services are either for preventive or curative purposes. Preventive and curative healthcare services can also be in the form of in-patient, out-patient, promotive and rehabilitative services. These healthcare facilities could be provided by the government, private religious, private non-religious, and traditional/spiritualist.

In Price Theory, price and income have been identified as good determinants of demand for a particular commodity (Nicholson and Snyder, 2007). Therefore, this thesis estimates the extent to which demand for healthcare responds to changes in price and income. Demand for healthcare is one of the scopes of health economics. The scope of demand for healthcare covers the influence of some economic and non-economic factors on demand for healthcare, barriers to, as well as the effect of demand for healthcare (Zweifel et al., 1997; Collins et al., 2014). While the government and the private sector are doing their best to provide health infrastructure to revamp the health sector, certain factors impede individuals' utilization of these healthcare facilities.

This thesis focuses on demand for healthcare by identifying the factors that are most influential in determining healthcare utilization and also estimates the benefit incidence of the payment of healthcare services. It entails estimating how healthcare responds to changes in price, income, health insurance, and time price (which is the opportunity cost of seeking healthcare). The

thesis also estimates the progressivity of the payment of healthcare services. That, is on whom does the payment of healthcare services fall – is it the rich or the poor? This is very important because the thesis focuses on demand for healthcare such that if the payment (measured by out-of-pocket payment) falls on the rich, then it is assumed that it is the rich who demands more of healthcare services than the poor, and vice versa. While it makes sense for the government and the private sector to supply healthcare services, it is imperative to investigate who actually demands healthcare. This is done through the benefit incidence analysis of the payment of healthcare services. Given the findings, quality recommendations are given as to how to redirect the targetted healthcare policies to ensure that all have access to healthcare, whether rich or poor.

1.2 Healthcare as a Derived-Demand

Healthcare is not demanded for its own sake but for the sake of demand for health. In the Grossman (1972) model on human capital and demand for health, demand for healthcare is determined by a number of factors – client, environmental, resource, and location factors. Demand for healthcare is determined by clients' factors which includes consumers' income, education, gender, severity of illness, belief system, etc. Environmental factors such as physical structure, landscapes, the presence of water bodies, mountainous places, sanitation, among others also affect a person's demand for healthcare. Demand for healthcare also depends on the resources available. Resource factors play a key role in determining demand for healthcare since one cannot demand something that is not in existence. Demand for healthcare will require the provision of such resources (Wedig, 1988). Improving access to healthcare is key to increasing its demand. The location factors which comprise location of residence (rural or

urban), physician to population ratio and opportunity cost of seeking treatment are key determinants of demand for healthcare. It must be emphasized that these factors are by no means exhaustive.

1.2.1 Healthcare as an Economic Commodity

Healthcare encompasses any good or service aimed at improving health status or preventing deterioration in health (Zweifel et al., 1997). People demand healthcare in order to reduce sick days, feel healthy again, and be able to carry out their usual activities. The demand for healthcare is justified by its effect on productivity of workers and the overall impact on economic growth. The existing literature reveals that demand for healthcare is determined by economic and non-economic factors (Zweifel et al., 1997).

Healthcare is different from other economic commodities. Healthcare as an economic good does not behave in the exact manner as other economic commodities behave. Healthcare is characterized by the following features which make it distinct from any other economic commodities (Zweifel et al., 1997). The private sector also provides a significant number of healthcare services in the country (GHS, 2015). However, if the provision of healthcare is left in the hands of the private sector alone, the market may fail due to the non-excludability and non-rivalness in the consumption of health information (Anaman, 2006). The market may fail again because of the level of uncertainty surrounding the occurrence of illnesses, accidents, the type, and effectiveness of healthcare. Externalities of healthcare like immunization, clean up exercise, reckless lifestyle/behaviour, etc will cause the market to fail, because it is likely to change the private cost and private benefit. The prominence of health insurance with its consequence of induced-utilization of healthcare, care for the vulnerable, non-profit objective

of some service providers also causes market failure. Imperfect information about healthcare between the physician and the sick is likely to lead to much influence of the physician on an individual's demand for healthcare. The health insurance scheme has its own problems of moral hazard and adverse selection. Government intervention in the health sector is crucial for the provision and distribution of healthcare to the poor and vulnerable.

Given the limited resources of government, it is expected that the healthcare sector operates in a mixed economy. It fits perfectly into the center-right ideology of Adam Smith. The private provision of healthcare, community-based healthcare, private health insurance schemes, and even community health insurance scheme all play major roles in increasing access to healthcare, especially in the event that government fails. Under these circumstances, the healthcare market can no longer be described as a perfectly competitive market. Since there are few sellers but many buyers, homogenous but slightly different health services, some market power enjoyed by firms due to licensure and interdependence of firms, the market for healthcare is regarded as an oligopoly market (Anaman, 2006).

The amount of healthcare demanded can be influenced by the choice of provider, the quantity of services such as in-patient and out-patient utilization, the number of visits, as well as the number of days hospitalized (Nketiah-Amponsah and Sarkodie, 2014). The price paid depends on the presence of insurance, coinsurance, and out-of-pocket payment. The price of time also have a significant effect on demand for healthcare. Travel time and waiting time which are normally referred to as opportunity cost are very important determinants of demand for healthcare services. Travel time refers to the time it takes for the patient to travel to and from the health facility. In developing economies, patients usually spend more time to travel to and from a particular healthcare facility, especially if it is far from their residence. Waiting time

refers to the time it takes to wait to obtain an appointment and the time spent at the physician's office (Ringel et al., 2001).

As stated earlier, demand for any commodity is determined by many factors including the price of the commodity in question, the price of other commodities, the income of the consumer, and demographic factors. The consumer is assumed to be rational. Given his income and the market price, he plans his spending to maximise the highest possible satisfaction. The willingness to buy and the ability to pay for these medical facilities is what is termed as demand for healthcare. Michael Grossman (1972) provides two reasons why people demand health: for utility (happiness) and investment (to do other things). In the Grossman model (1972), health can be seen as both a consumption good and an investment good. Health is a consumption good because of the happiness or the satisfaction the individual enjoys for being healthy. Health becomes an investment good because being healthy enables the individual to decrease the number of sick days, increase work days and productivity in order to earn more income.

The mode of repayment for healthcare has been found in the literature to negatively affect healthcare utilization. The repayment factors may include community or national health insurance schemes, as well as co-payments, coinsurance rates, and out-of-pocket payment (Ringel et al., 2001). In demand for healthcare, the situation may be different because healthcare is normally consumed in a prescribed manner¹. However, just like any other economic commodity, the law of demand refers to the negative relationship between price and quantity of the commodity, all things being equal. In this regard, demand for healthcare measures the relationship between price and quantity of healthcare. In the literature, there are

¹ For example, a patient may be asked to take a tablet of paracetamol (one in the morning, one in the afternoon, and one in the evening)

different measures of price which includes out-of-pocket payment, insurance, coinsurance rate, etc. In the same way, researchers measure quantity differently. In most cases, researchers use utilization, number of visits, length of stay in the hospital bed, the probability of choosing a physician as a measure of quantity (Ringel et al, 2001). For the purpose of this thesis, the probability of seeking healthcare is used as a proxy for the quantity of healthcare while price is measured by out-of-pocket payment. The study goes further to find out the source of healthcare (provider of care) which is also used as a proxy for the demand according to the source (where providers are categorized into various groups).

Due to the presence of various characteristics describing healthcare as an economic commodity, the demand curve for healthcare can differ in slopes (especially with insurance and physician-induced demand). Health is an essential commodity. It is sometimes a matter of life and death. That is why all things being equal, the law of demand for healthcare may not behave exactly as any other economic commodity. Therefore, the relationship between price and quantity may not necessarily be negative. But one must exercise caution in this kind of relationship as what matters to the patient is to get well and may not care so much about the price, especially when the illness is so severe that the health of the patient becomes a priority and nothing else matters (Einam and Finkelstein, 2018). Healthcare is deemed effective when it cures illness and replenishes health stock. Therefore, is it not necessarily true that more of healthcare is preferred to less. Again, healthcare is distinguished from other commodities due to the presence of supply-induced- demand (Zweifel et al., 1997).

For a typical demand curve for healthcare, the price is measured on the vertical axis while quantity is measured on the horizontal axis. The presence of health insurance reduces price and results in a higher quantity demanded. This clearly demonstrates the importance of health insurance in increasing access to healthcare (Einam and Finkelstein, 2018).

In this study, the price is measured by out-of-pocket payment (money price paid out of pocket to receive treatment). Quantity is measured by the probability of seeking healthcare when sick. Other determinants of demand for healthcare are health insurance and opportunity cost which is the price of time (traveling cost, traveling time and waiting time).

1.3 Statement of the Research Problem

Universal health coverage aims at ensuring that all people obtain the health services they need without any difficulty in paying for them. Access to healthcare is more than just the use of healthcare. Access to healthcare is the opportunity to have healthcare needs fulfilled (Levesque, 2013). Increasing access to healthcare does not only require the supply side but also the demand side. While the supply side focuses on the provision of healthcare through infrastructure and health professional development, the demand side must be given equal attention by looking at the economic, social and cultural factors that can affect healthcare utilization. This is to ensure that individuals have access to healthcare as and when they need it to replenish the health stock which has dwindled due to illness. Good health is essential in the sense that it helps to increase productivity and Gross Domestic Product (GDP) of Ghanaians.

However, the current state of healthcare utilization is not close to achieving universal health coverage. For example, out of the people who had reported to have suffered from illness or injury or both in the two weeks preceding the interview in 2012/2013, only about 66.2% consulted a physician. Again, more than 50% of those who consulted a physician paid a greater part of the medical expenses (GSS, 2013). Since Ghana's independence in 1957, user-fee was paid to access healthcare but it has served as an impediment to access to healthcare.

The Ghanaian economy was one of the fastest growing economies in the world by the year 2011 (MoFEP, 2018). Ghana is currently a middle-income country with a per capita income of \$2,074 (UNDP, 2018). With this status on the international scene, the country's health sector also needs significant improvement to commensurate its current status. The introduction of the National Health Insurance Scheme (NHIS) in 2004 seemed to have improved access to healthcare, but only partially (Blanchet et al., 2012). According to the data from the Ghana Living Standards Survey Six (GLSS 6), only about 56.7% of the Ghanaian population is insured (GSS, 2013). This is significantly low compared to Rwanda's 96% coverage (Wang et al., 2017).

Ghana has chalked some successes in achieving health goals by improving the health indicators on mortality, morbidity, and disease burdens. Ghana was committed to the tenets and the full implementation of the Millennium Development Goals (2001 – 2015) and now the Sustainable Development Goals (2016 – 2030). According to the NDPC report on Ghana in 2015, it was realized that Ghana has made substantial progress in reducing HIV prevalence, but slow progress has been made on reducing under-five mortality, infant mortality, and maternal mortality. For example, the National HIV and AIDS prevalence fell from 3.6 percent in 2007 to 1.3 percent in 2013. The under-five mortality rate improved from 122 per 1,000 live births in 1990 to 82 per 1,000 live births in 2012. Infant mortality fell marginally from 57 to 53 per 1,000 live births in the same period. The institutional maternal mortality decreased from 215 per 100,000 live birth to 144 per 100,000 live births in 2014. Malaria remains a leading cause of mortality and morbidity in Ghana. It is found to be a major cause of low productivity and poverty in Ghana (NDPC, 2015).

Despite these successes, Ghana was still not able to meet the Millennium Development Goals four and five (MDGs 4 & 5) by the end of 2015 (NDPC, 2015). The unfinished business of the

MDGs will be addressed in the context of SDGs. For instance, the Sustainable Development Goal three (3) which emphasizes good health and well-being also aims at improving the health of the citizens of nations. The country may not still be able to meet the health goals of the Sustainable Development Goals unless they scale up sustained child survival interventions to contribute immensely to the current improvement (NDPC, 2015). Some of the key challenges include unsustained funding to support activities for access to healthcare and demand-side factors which impede an individual's access to healthcare.

One of the direct ways of improving the health status of citizens of a country is to invest in health. For this reason, policymakers across the globe have been advised to increase their public expenditure on health (Grossman, 1972). Donor communities are requested to offer sufficient support to achieve increased access to healthcare (Einam and Finkelstein, 2018). The Abuja Declaration (2001) entreats every African country to spend at least 15% of the total expenditure on health. This is to place resources at the disposal of health professionals and health managers in the discharge of their duties to increase access to healthcare. In response, government of Ghana, on the average spends 7% of total expenditure. For example, the government of Ghana spent about 3.6% of GDP on health in the year 2015. This was lower than the amount spent in 2010 which stood at 5.2% of GDP. By the end of the year, 2015, Ghana's per capita health expenditure was estimated at \$145 (constant 2011 PPP international) (World Bank, 2015). This was woefully inadequate. If there is any lesson to learn all, then Rwanda's commitment to improving the health status of its citizens is an example. The Rwandan government has made healthcare their priority and committed about 6.5% of the country's GDP on health in 2012. Again, the government has made it compulsory for all citizens to enroll in their national health insurance scheme (Wang et al., 2017).

Governments all over the world are making efforts to increase access to healthcare with the primary objective of attaining universal health coverage. However, there are certain economic, social, and cultural factors that impede the smooth access to healthcare. The need to investigate these factors that undermine demand for a particular healthcare cannot be overemphasized. This is what this study seeks to achieve. The results guides policymakers to effectively have ample knowledge about the health system, types of healthcare available and how these healthcare are funded and utilized. Developing and implementing a well-planned public policy on the health system should be context-specific and address all issues regarding inequality in access to healthcare be it income, price, age, education, location, or gender.

It is also imperative to increase access to healthcare, especially by the poor, in order to reduce the inequality as well as inequity in healthcare access. The distribution of healthcare payment across the population and income groups is also essential to understand the extent to which healthcare payment falls on the poor. If it falls more on the poor, then it is progressive.

A number of studies have estimated the demand for healthcare (Einam and Finkelstein, 2018; Nketiah-Amponsah, 2009; Nketiah-Amponsah and Sarkodie, 2014; Owoo and Lambon-Quayefio, 2013; Ringel *et al.*, 2001; Gaddah, 2011; Mwabu *et al.*, 1993; Anyanwu, 2007; Blanchet *et al.*, 2012). However, the reviewed papers reveal that researchers concentrated on looking at specific parts of the country and also specific reasons for healthcare use. The study fills in the gap by comprehensively investigating the economic and non-economic factors that affect a person's demand for healthcare. The study considers the effect of income, and the price of time on demand for healthcare as well as the benefit incidence of healthcare payment, something most of the reviewed papers did not give maximum attention to. The study uses a more recent nationally representative data (Ghana Living Standards Survey 6) so that its conclusion is relevant in contemporary times and inferred on every Ghanaian.

1.4 Objectives

The import of this study is to estimate the demand for healthcare by investigating the various economic, and non-economic factors that influence an individual's demand for healthcare, and progressivity of the payment of healthcare services in Ghana. The findings of this study are meaningful for developing a strategic health policy aimed at achieving equality in improved health status.

The **specific objectives** are as follows:

1. Estimating the extent to which demand for healthcare will be influenced by the price of the provider and the income of the consumer.
2. Investigating the benefit incidence of healthcare payment to ascertain the extent to which healthcare payment is distributed among the various income groups.
3. Examining how the introduction of NHIS has impacted on healthcare utilization and out-of-pocket payment.
4. Investigating whether or not opportunity cost decreases utilization of healthcare even if healthcare is provided at no cost to the consumer. This is the effect of the price of time.

1.5 Hypotheses testing

The hypotheses to be tested include the following.

- Price and income do not have any significant effect on demand for healthcare.
- Enrolment onto the National Health Insurance Scheme (NHIS) does not increase the utilization of healthcare.
- Payment for healthcare services are distributed proportionately.

- Time price of healthcare does not affect demand for healthcare.

1.6 Organization of the thesis

The source of data for this thesis is the 6th round of the Ghana Living Standards Survey (GLSS 6). This round of GLSS was conducted by the Ghana Statistical Service, and they are nationally representative. There is a special Part in the data set that is designated for household members to report on their health conditions in the last two weeks prior to the survey. The study uses different methods in the estimation depending on the chapter under consideration. For instance, the study uses multinomial probit and concentration index for the first paper. It uses propensity score matching for the second paper and employs multinomial probit regression for the third paper.

The thesis is organized as follows: Chapter one introduces the entire thesis. This chapter defines the key terms used in the paper – demand for health, demand for healthcare, demand, utilization, price, quantity, among others. The chapter goes on to give the problem statement of the thesis, objectives, hypotheses, and source of data used for the whole thesis.

Chapter Two gives a general overview of Ghana's Health sector. It talks about the health system that existed in the colonial times as well as in the contemporary times. The chapter contains information about the disease profile, the number of health facilities and the type of health facilities available in the country. The current body of knowledge about demand for healthcare is assessed in the third chapter. This is done in line with the four main objectives of the thesis. The idea is to make a case for the objectives by investigating what has been done, the gap left, and how this thesis fills the gap. Chapter three analyses both the theoretical and

empirical literature as well as the theoretical foundation of the thesis, making reference to the famous Human Capital Model developed by Michael Grossman in 1972. The importance of the literature review is to indicate the existence of current research papers that have attempted to estimate demand for healthcare so that after reviewing literature, the author identifies the loopholes in the current body of knowledge. This then gives a clear justification of the thesis which seeks to fill in the gap.

There are two styles of writing a thesis – monograph and collection of papers. The style of writing this thesis is that of a collection of papers. For this reason, the rest of the chapters are organized in such a way that each of the remaining chapters deals with one paper. Each paper has its own introduction, methodology, discussion of results, and summary. In the fourth chapter which is the first paper, the actual demand for healthcare is estimated. It continues the estimation of the impact of price and income on demand for healthcare. Chapter four further considers the extent to which demand for healthcare responds to changes in price and income. This is called elasticity of demand for healthcare. The second part of chapter four also investigates the benefit incidence of healthcare payments. Increasing access to healthcare is one thing and ensuring that healthcare reaches the poor is another. The benefit incidence aspect of the chapter attempts to find out where the benefit incidence of healthcare payment falls. Does it fall on the rich or the poor? It investigates the existence of inequality and inequity in demand for healthcare.

Health insurance has been identified to reduce user-fees and encourages healthcare utilization. The main objective of the second paper in chapter five is to find out the effect of the National Health Insurance Scheme on healthcare utilization and out-of-pocket payment (Einam and Finkelstein, 2018).

Health insurance pools resources, shares risk, reduces user-fees, and increases utilization (Einam and Finkelstein, 2018). But increasing access to healthcare is still not that automatic. The presence of certain costs (opportunity cost) may impede the smooth utilization of healthcare even if healthcare service is provided at zero cost. Therefore, the third paper which is the sixth chapter tries to find answers to what may still impede utilization even if price is assumed to be 'zero'.

The thesis ends with a general summary, conclusion and policy recommendation based on the findings of each paper. This is contained in the seventh chapter.

CHAPTER TWO

2. OVERVIEW OF GHANA'S HEALTH SECTOR

2.1 Introduction

The Ghanaian economy was described as one of the fastest growing economies in the world with real GDP growth of 15% in 2011 due to the production of crude oil in commercial quantities. However, in 2014, the Ghanaian economy grew at 4.2% and declined further to 3.5% in 2015 because of the reduction in the growth of industry and service sectors in the midst of energy crises. The real GDP growth of 3.2% recorded in 2016 is the lowest growth rate in 22 years (Mofep, 2018). The real GDP growth of the Ghanaian economy slowed between 2013 and 2016 due to tight monetary and fiscal policies, low commodity prices, among others. Fortunately, the real GDP growth picked up at 8.5% by the end of 2017 and projections in the medium term look good.

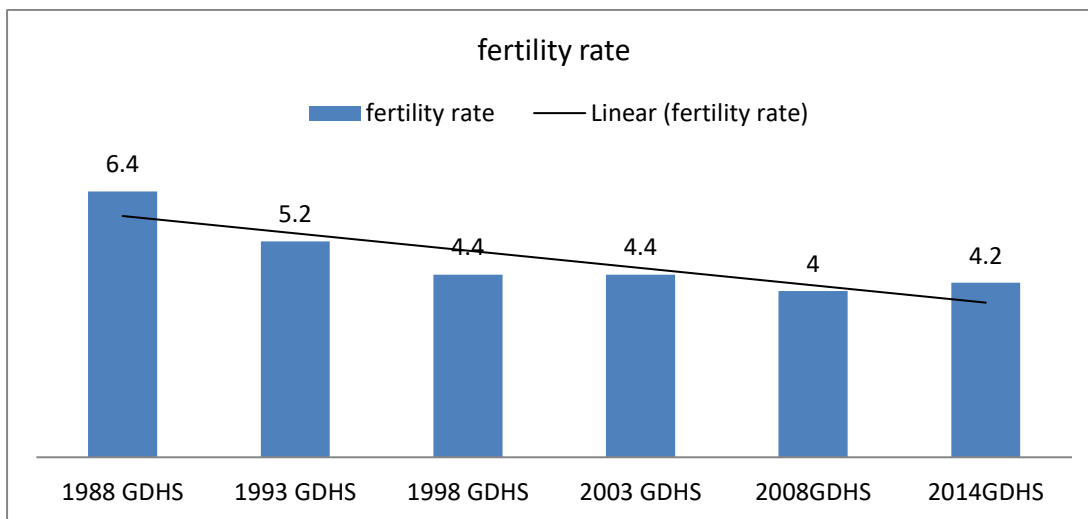
The Ghanaian economy since the year 2017 has made some strides in macroeconomic stability and fiscal consolidation compared to the year 2016. In April 2018, Ghana ended the International Monetary Fund's (IMF) Extended Credit Facility (ECF) programme which started in 2015. The IMF's ECF programme was anchored on fiscal consolidation and for policy credibility. For the country to have sustainable growth that can create the necessary jobs, it must focus on growing the real sector with an average of about 5.0% in the long run, since the World Bank has even projected that the existing fields of Ghana's oil production will cease entirely by 2036 (World Bank, 2017).

The real GDP of the country as at the end of 2014 stood at a cedi equivalent of US\$ 11.3 billion (a nominal GDP of US\$ 38 billion), with a per capita income of US\$1,864 (Mofep, 2015). The nominal GDP increased to over GH¢ 175 billion (\$42 billion) in 2016 before increasing to

GH¢ 250 billion by the end of 2017 (Mofep, 2018). Ghana spent 5.2% of GDP on health as at the end of 2013 but fell to 3.6% in 2015. The per capita healthcare expenditure was \$41 in 2013, but with a PPP estimate of \$106 (constant 2005 international) and \$145 in 2015 (2011 PPP international prices) (World Bank, 2015).

The life expectancy at birth of the country as of 2013 stood at 66 years. In the same year, the adult literacy rate stood at 71.5%, while the birth and death rates are estimated at 31.4 per 1,000 populations, and 7.37 deaths per 1,000 population respectively. The fertility rate has declined by 34.4 percentage points from 6.4 in 1988 to 4.2 children per woman in 2014 (GDHS, 2014).

Figure 2.1: Total fertility rate in Ghana, 1998-2014



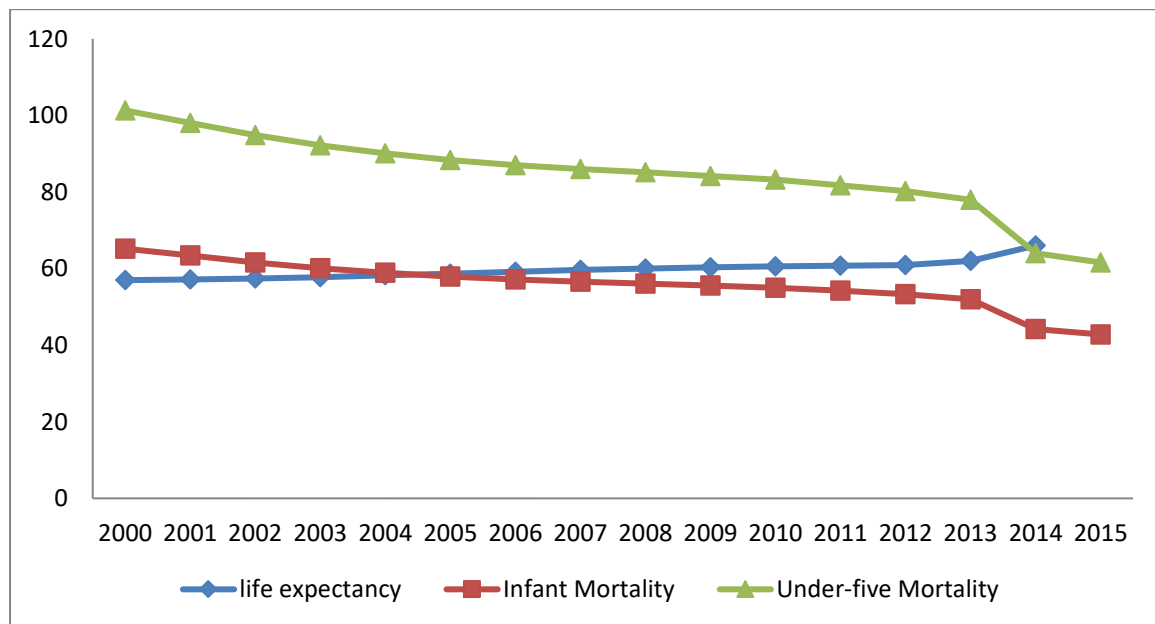
Source: GDHS, 2014

The contraceptive prevalence rate was 19.5% by the end of 2013. Over 78% of women in Ghana used modern or traditional contraceptives, mostly for preventing pregnancy and sexually transmitted diseases. The most commonly used contraceptive methods are pills, condoms, male and female sterilization, injectable, rhythm, withdrawal, etc. Contraceptive prevalence among all women aged 15-49 was 21.9%. Women of 25-29 years had the highest

prevalence (31%) compared with 6.5% for women aged between 15 and 19. While rural forest dwellers use contraceptive more, those in rural savannah have the least prevalence. The use of contraceptive is high among unmarried people than married. The use of contraceptives increases with education (GSS, 2013).

Ghana recorded some successes in her quest to reduce mortality rates. Malaria case fatality rate (CFR) among under-five-year-olds reduced marginally from 0.9 percent in half-year 2012 to 0.8 percent in June 2013. Ghana has improved on its rank of under-five mortality rate from 36th, out of 197 countries, in 2013 to 28th by April 2015. Ghana's Under-five mortality rate decreased from 155 to 60 per 1,000 live births in the periods between 1988 and 2014. The under-five mortality rate is still higher than the MDG target of 39.9 per 1000 live births by 2015. Infant mortality rate declined from 77 in 1988 to 57 in 1998, increased to 64 in 2003 before reducing to 41 per 1,000 live births in 2014 (NDPC, 2015) (see Figure 2.2).

Figure 2.2: Life Expectancy at birth, Under-Five Mortality Rate, and Infant Mortality Rate in Ghana (2000-2015)



Source: Author's computation using data from the World Bank (2015)

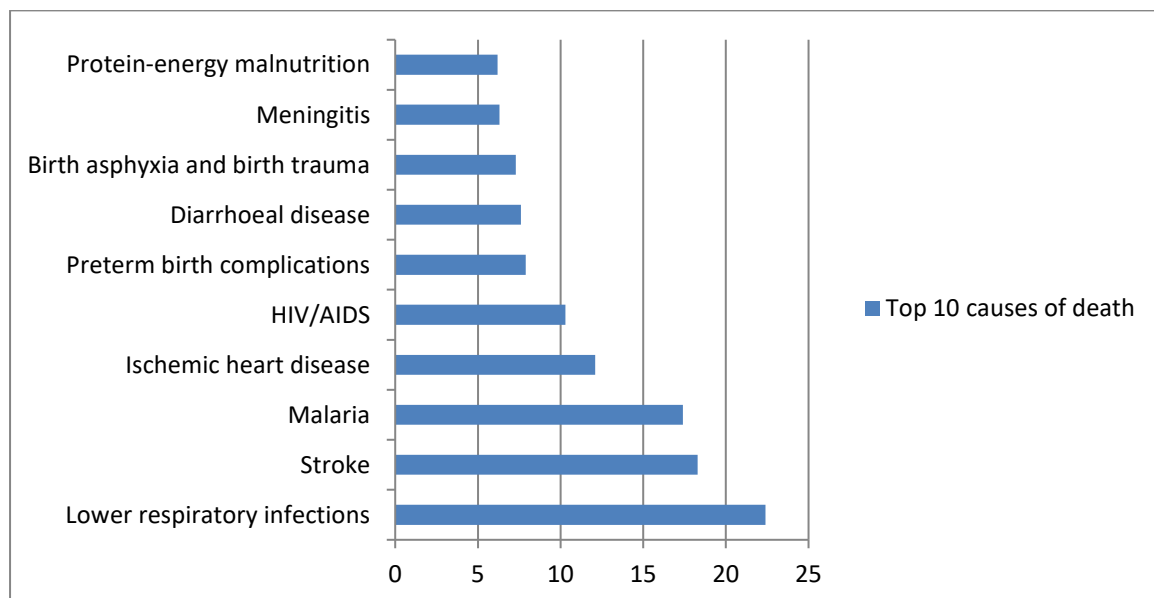
Institutional Maternal Mortality (iMMR) dropped significantly from 155 maternal deaths per 100,000 live births in 2012 to 150 in 2013 and declined further to 144 per 100,000 live births in 2014, against an MDG target of 54 per 100,000 live births by end of the year 2015. Evidence suggests that our progress towards reducing maternal mortality rates have slowed and efforts must be scaled up in order to achieve the SDG targets by the year 2030. Antenatal care (ANC) from skilled personnel is important for improving the status of pregnant women. About 97% of women had once sought ANC from a skilled provider in the five years between 2009 and 2014 (GDHS, 2014).

Private health facilities have played important roles in achieving such successes. Private health providers account for about 50% of all health facilities in the country. In 2014, the total private health expenditure as a percentage of GDP stood at 1.5% (World Bank, 2015). However, the nature of healthcare is such that if left in the hands of the market, there will be underutilization and misappropriation of resources to benefit the rich at the expense of the poor (Einam and Finkelstein, 2018). There is, therefore, the need for government intervention in the health sector. The National Health Insurance Scheme (NHIS) was established to increase access to healthcare, especially by the poor. Again, Government of Ghana has made far-reaching investments in the health sector. For instance, there is the construction of two new Teaching Hospitals namely University of Ghana and Tamale Teaching Hospitals, regional hospitals, district hospitals, CHPS (Community Health and Planning Services) compounds, etc. However, this health spending concentrated on the supply side leaving the demand side unattended to. Maximum attention should be paid to the demand side if quality health status is to be achieved in an equitable manner.

2.2 Disease Profile

Deaths in the pre-independence era were largely caused by the coexistence of infectious and communicable diseases and chronic noncommunicable diseases. This was followed by diseases in infancy, respiratory systems, digestive system, nervous system, old age, and the rest. The post-independence era saw infectious and parasitic diseases, diseases of early infancy, and digestive system as the top three leading causes of death in the 1960s. The situation changed as deaths in the 1990s-2000s was caused by circulatory infectious, parasitic diseases, and respiratory diseases (Agyei-Mensah and de-Graft Aikins, 2010). In 2008, the top causes of deaths recorded by all hospitals except the teaching hospitals were malaria, HIV/AIDS-related conditions, and anaemia. Malaria and anaemia continued to be the top causes of deaths among children in the same period. Currently, the top leading causes of death in Ghana are lower respiratory infection, stroke, and malaria (WHO, 2013) (see Figure 2.3).

Figure 2.3: Top ten causes of deaths in Ghana, 2013



Source: WHO (2013)

In a study to estimate the epidemiological transition and double burden of diseases in Accra, Ghana, Agyei-Mensah and de-Graft Aikins (2010) presented evidence to illustrate the nature and speed of the epidemiological transition in Accra. In the study, they found that Accra's epidemiological transition fits the protracted polarized model developed by Frenk et al. (1989), with a protracted coexistence of infectious and chronic diseases as the leading causes of morbidity and mortality, and a polarizing effect of the double burden of diseases across all socioeconomic statuses in Accra. The 1980s saw a re-emergence of smallpox which was believed to have spread due to migration, congestion, and unsanitary slum settlements. Three factors in the protracted polarized model were identified as the causes of diseases transition in Accra. These are urbanization due to migration, urban poverty which limited access to healthcare, and globalization because of the diffusion of technology, culture, and economies.

Tuberculosis (TB) is a communicable disease caused by a bacterium which mostly attacks the lungs and other organs of the body. According to the World Health Organization (WHO), in 2011 there were approximately 20,000 new TB cases diagnosed but only 78% were treated. In 2014, there were about 286 cases per every 100,000 people in Ghana. The TB mortality rate was 7.5 per every 1,000 infected and the prevalence was 264 per 100,000 in general population. The TB success rate has improved slightly from 50% in the year 2000 to 86.2% in 2014 (successfully above WHO target of 85%). In the year 2016 alone, a total amount of over GH¢ 80 million (USD \$20 million dollars) was needed to fight TB. There were no cases of guinea worm detected in 2013 and for this reason, Ghana was declared a Guinea Worm Free Country.

Malaria is the leading cause of child deaths accounting for 20% of child mortality, followed by prematurity (14%), and acute respiratory infection (13%) (WHO, 2013). In Ghana, over 3.5 million people contract malaria every year. Approximately 20,000 children die from malaria every year. In other words, about 25% of under-five mortality rates in Ghana is caused by

Malaria. Even if the child does not die, the consequence of malaria on the child is severe health-wise, as it can cause convulsions or brain dysfunction which can hamper long-term development and schooling. The cost of malaria to Ghana stands at between 1% and 2% of Gross Domestic Product (WHO, 2013).

The prevalence of HIV/AIDS epidemic has serious economic and social consequences on the lives of Ghanaians. Mortality rates amongst adults and children increased significantly. For example, in 1999, over 33,000 people died from AIDS leaving over 100,000 children under fifteen years as orphans. Overall, 6.2% of Ghanaians do not know that a healthy person can have HIV. HIV prevalence among pregnant women aged 15-24 dropped to 1.2%. The number of people who went for voluntary testing and counselling decreased by almost 20% for adults (GDHS, 2014).

While efforts were made to provide quality healthcare services to Ghanaians, additional resources were also needed to fight epidemic diseases. These developments posed a serious threat to the self-sustainability of the health sector. The Ministry of Health (MoH) has been providing preventive and curative health measures which include immunization, and family planning.

2.3 The Health System

It is very important to have a clear overview of the Ghanaian health sector in order to guide policymakers, both national and international, in their efforts to improve the health delivery system in the country. In the 16th century, people sought healthcare from traditional herbalist. Though traditional herbalists were very successful in their healthcare delivery in Ghana, the

premier traditional healers stressed the need to combine herbs with modern medicine to offer healthcare. Sooner than later, it was not until the 18th century when missionaries to the then Gold Coast established modern health facilities to deliver healthcare services to the citizens. Until now, missionary hospitals and health centres are still very relevant in healthcare delivery (Agyei-Mensah and de-Graft Aikins, 2010).

Ghana's health system is one of the most advanced health systems in Africa. Government of Ghana (GoG) adopted the primary healthcare strategy in the 1970s to achieve "Health for All" by the year 2000. In the early 1980s, Ghana experienced an economic downturn, which resulted in reduced public spending on health and eventually deteriorated the health sector. In the 1990s, GoG embarked on a Medium-Term Health Strategy (MTHS) which aimed at promoting greater equity in access to healthcare. The vehicles to achieve these set of targets were based on strengthening districts health services, promoting community involvement in health service delivery, redistributing health resources to meet the needs of Ghanaians. By the end of the 1990s, the health sector had chalked some success: mortalities rates had dropped while life expectancy at birth was on the rise (Agyei-Mensah and de-Graft Aikins, 2010).

The health sector in Ghana is managed by the Ministry of Health (MoH) through the Ghana Health Services (GHS), with branches all over the country at regional and district levels. While the Ministry of health has oversight responsibility of the health sector, Ghana Health Service was established as a semi-autonomous agency to regulate, monitor and oversee activities in the health sector. MoH is responsible for budget preparation, budget allocation, and implementation of intervention policies. In 2015, Government announced a freeze on employment into all sectors of the public service excluding education and health sectors. This shows how essential the health sector is to the government. There are other health agencies operating under the supervision of the Ghana Health Service that performs specific tasks.

Examples are the National Health Insurance Authority (NHIA), and Ghana AIDS commission. In addition, there are a number of non-governmental organizations (NGOs) which are actively involved in the health sector.

The Ghana health sector has five main objectives. The first objective is to strengthen the district health system with a particular emphasis on primary healthcare. A strategic plan has been developed to implement the policy. Increasing availability and efficiency in human resource for health is an important objective of the health sector. Second, to strengthen the regulatory and inter-sector collaboration for governing the health sector, and also to orient the district health directorate to operate in accordance with LI 1961. Third, increase access to safe blood transfusion to those who need it, like the expectant mothers and newborns. Forth, improve upon prevention, detection and case management of communicable diseases, and non-communicable diseases. Fifth, ensure quality in the provision and utilization of mental health facilities (GHS, 2015).

Government of Ghana spends a considerable amount of GDP on health. Government's expenditure on health could be estimated using per capita health expenditure, public health expenditure, and public health expenditure as a percentage of government expenditure. Government of Ghana spent \$82 per person on healthcare in the year 2000. This amount increased by 70% to \$132 in 2004. It increased again to \$134 in 2008 before reaching \$214 in 2013. The per capita health expenditure stood at \$161 in 2015. As a percentage of total expenditure, Government of Ghana (GoG) allocated 7.9% of public expenditure to finance healthcare in 2000. By the year 2004, it had increased to 12.58%. Government of Ghana (GoG) increased it by about 0.57 percentage points to 13.15% in 2008 but decreased to 10.56% by the end of 2013 (World Bank, 2015). This is still less than the Abuja Declaration, where African countries pledged to spend 15% of their total expenditure on health (see Table 2.1).

Table 2.1: Trend of Health Expenditure as a Percentage of Gross Domestic Product (GDP) in Ghana (2000 – 2013)

Year	Per capita health expenditure, \$ PPP (2011 constant)	Private health expenditure (% of GDP)	Public health expenditure (% of GDP)	Total health expenditure (% of GDP)	Public health expenditure (% of government expenditure)
2000	82	1.5	1.5	3.0	7.9
2001	102	1.5	2.0	3.6	9.3
2002	91	1.5	1.5	3.0	8.5
2003	98	1.5	1.6	3.1	8.3
2004	132	1.6	2.4	4.0	12.6
2005	161	1.6	2.9	4.5	15.1
2006	111	1.6	3.0	4.6	14.0
2007	136	1.6	3.7	5.3	16.2
2008	134	1.6	3.2	4.9	13.2
2009	146	1.5	3.7	5.2	16.5
2010	160	1.5	3.8	5.3	14.9
2011	166	1.2	3.6	4.8	14.0
2012	195	1.7	3.6	5.2	10.6
2013	214	2.1	3.7	5.4	10.6

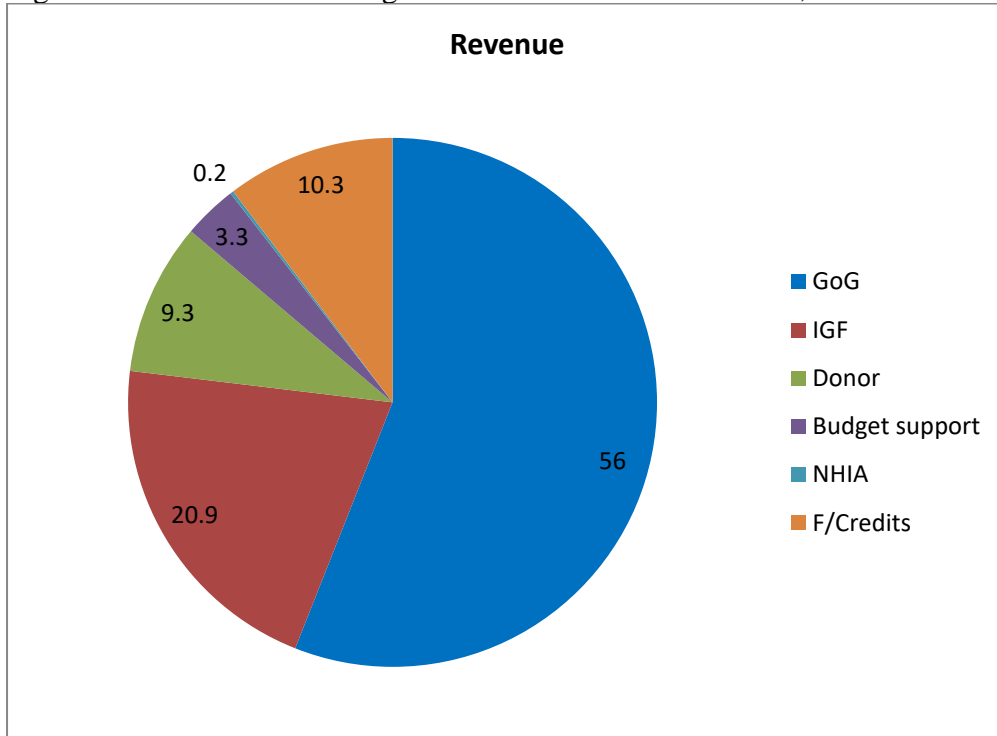
Source: World Bank (2015)

Between the years 2012 and 2013, the Ministry of Health indicated that the donor contribution to the health sector increased by 28.7% from GH¢ 266 million to GH¢ 342 million. Internally Generated Funds (IGF) increased by 28.7% from GH¢ 442 to GH¢ 569 million. Government of Ghana's (GoG) contribution fell short by 13.1% from GH¢ 1,759 million to GH¢ 1,521 million. GoG and IGF contributed 79.9% to the overall budget, whereas donor contribution increased from 10.0 % to 12.6% (see Figure 2.4).

The health sector spends its resources on paying for employee contribution. The health sector also spends huge sums of money on goods and services which might include vehicles, computers, air-conditioners, stationery, office complex, refreshments during functions, and others. The NHIA audited report states that some of these health workers are sponsored to study abroad. In the year 2013, more than half of the total expenditure was on employee

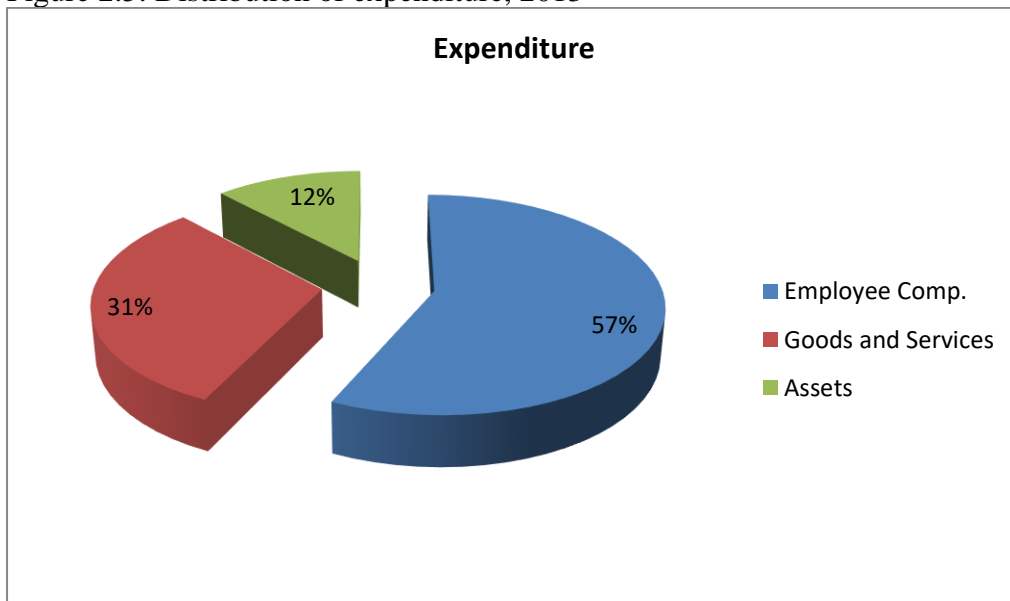
compensation (which includes salaries, allowances, and transfers) (NHIA, 2013) (see Figure 2.5).

Figure 2.4: Source of central government's revenue for health, 2013.



Source: MoH (2013)

Figure 2.5: Distribution of expenditure, 2013



Source: MoH (2013)

2.4 Background of Health Insurance in Ghana

2.4.1 Management

In the pre-independence era, healthcare was virtually free since it was funded by the tax system. However, this was financially unsustainable in the times when the country was facing serious economic challenges, especially in the 1970s and 1980s. Public spending on health declined. Between 1980 and 1990, government sought to find alternative ways of improving health financing by contracting credit facilities from the donor community. For instance, in 1986, Ghana government contracted an amount of \$15 million from the World Bank. In 1990, another \$27 million credit facility was approved for Ghana by the World Bank under the Second Health and Population Project (HPP). The reason for these funds was to help develop the health sector (Boakye, 2016).

While this financial intervention was needed, it could still not solve the health financing problem. This situation was unbearable because it led to a shortage of laboratory equipment, medicine, and physicians. Ghana, among other developing countries, adopted the Structural Adjustment Program in 1983. Ghanaians were then responsible for their own healthcare cost. Government raised the user fees for public healthcare services resulting in a purely out-of-pocket payment system well known as the "cash and carry" system. This system marginalized the poor in terms of healthcare utilization. It was a "cash down and get medical attention, or better leave it" situation. Many poor people who could not afford the medical expenses were left to their own fate. Thus, they were left at the mercy of nature: continued suffering or died at worse. Those who were fortunate enough to receive treatment but could pay were detained, and were forced to do menial work, and or plan to escape. This was quite problematic. Healthcare utilization declined. The government became unpopular and had to seek alternative ways of financing healthcare.

The Non-Governmental Organization (NGO)-initiated Community-Based Health Insurance Schemes (CBHIS) which was launched in 1990. By 2003, there were about 168 mutual Health Organizations, which covered only 1% of the population. Unfortunately, this scheme failed to address the primary objectives for its establishment. It did not ensure enough government support in order to cater for the poor (Gobah and Ziang, 2011).

Recognizing the financial burden the “cash and carry” system put on Ghanaians, the New Patriotic Party (NPP) which was an opposition party at that time used it as a major campaign message to introduce a National Health Insurance Scheme when voted into power. Upon winning the December 2000 general elections, the new government (NPP) set up an inter-ministerial task force to harness ideas from all stakeholders (Boakye, 2016). Based on the task force’s recommendation, an Act of Parliament was passed in 2003 (Act 650) leading to the establishment of the National Health Insurance Scheme (NHIS). It is administered by the National Health Insurance Authority (NHIA) which was also established under the same Act. However, in the year 2012, NHIA succeeded in replacing the National Health Insurance Act, 2003 (Act 650) with the National Health Insurance Act, 2012 (Act 852). The purpose for this was to integrate all hitherto semi-autonomous District-wide Mutual Health Insurance Schemes into a Single Payer System (NHIA, 2013). The main objective of the health insurance is to provide social health insurance for all residents of Ghana by making sure that individuals access healthcare without difficulties, ensuring patient satisfaction and improved health status, thereby trying to achieve the universal health insurance coverage.

The National Health Insurance Fund (NHIF) was set by Act 650 with the main objective of providing funds to subsidize the health cost of members of the district mutual health insurance scheme. Instead of subsidizing the health cost of members of under the district mutual health

insurance scheme, the NHIF was reprogrammed to pay for the healthcare cost of members of the NHIS.

According to Boakye (2016), the sources of finance include the following:

- a) The National Health Insurance Levy (NHIL). This is 2.5% VAT on all goods and services.
- b) 2.5% of workers' contribution to the basic Social Security and National Insurance Trust (SSNIT).
- c) Monies that are allocated by parliament to the Fund.
- d) Returns on investment by the Fund.
- e) Grants, donations, gifts from donor communities and volunteers.
- f) Fees charged by the National Health Insurance Authority (NHIA) in discharging its duties.
- g) Premiums paid by members to the scheme.
- h) Money accruing under section 198 of the Insurance Act, 2006 (Act 742), which is a percentage of the emergency motor insurance premium.

The National Health Insurance Levy of 2.5% VAT together with the 2.5% of each person's contribution to the National Basic Social Security Scheme constitute earmarked funds and account for more than 90% of revenue to the Fund. The National Insurance Levy which constitutes 2.5 VAT is the largest source of funding of the scheme accounting for 70 of the revenue (Blanchet et al., 2012). Funds accrued by the NHIF is to pay for claims made by healthcare providers for providing healthcare to members of the scheme. The NHIF is also to pay for administrative expenses of NHIA. In 2005, an amount of GH¢ 98.5 million was transferred to the NHIF. This amount was increased to GH¢ 351 million in 2010, and then to

as much as GH¢ 1,132 million in 2015, representing 3.9% of government's total revenue and grants for the year (Boakye, 2016).

The NHIF was first managed by the National Health Insurance Council (NHIC) but was later replaced by the National Health Insurance Authority. The newly established National Health Insurance Authority (NHIA) was commissioned to ensure the smooth implementation of the scheme, that is, to improve access to healthcare. NHIA oversees the licensure, regulation, accreditation, provision, determination of premiums of the insurance scheme. The ultimate aim of the scheme is to ensure increased access to healthcare services and attain universal health insurance coverage to all persons living in Ghana, and to those not resident but are on a regular visit to Ghana. NHIA is also responsible for registering and supervising private health insurance schemes and make other proposals to the Ministry of Health for the formulation and implementation of health policies. The NHIA is governed by a Board consisting of a chairperson and 16 other members appointed by the President in accordance with article 70 of the 1992 constitution. The day-to-day activities of the scheme are run by the Chief Executive Officer, assisted by three (3) deputies for (a) Finance and Investment (b) administration and human resource, and (c) Operations (NHIA, 2013).

2.4.2 Healthcare Service Providers, Utilization, and Claims Payment

The National Health Insurance Scheme Act, 2003 (Act 650) recommended the establishment of the Autonomous District Mutual Health Insurance Schemes (DMHIS) as companies limited by guarantee. As at 2009, there were 145 DMHIS duly licensed by NHIA to operate in the country. An NHIA report revealed that between 2009 and 2013, a total of 3, 943 facilities had applied for credentialing, out of which 3, 822 representing 96.9% qualified and were fully

credentialed. About 45 facilities were given provisional credentialing, 121 facilities failed to meet the minimum requirement (NHIA, 2013). Most of the facilities were credentialed with Grade C (1,632), followed by Grade D (1,148), and Grade B (856). Ten (10) had Grade A+ whilst 131 were with Grade A. Out of the total 3,822 facilities credentialed, 1,197 were CHPS compound representing 31.3%. This is followed by 2,075 public facilities (54.3), 1,511 private facilities (39.5%). Others included mission (5%) and quasi-government ownership (1%). Ashanti Region has the highest number of credentialed facilities accounting for 619 representing 16.2%. This is followed by Eastern Region with 514 (13.4%), Western Region and Greater Accra Regions have 460 (12.0%) and 440 (11.5%) facilities credentialed respectively. Upper West has the lowest credentialed facilities of 5.1% (NHIA, 2013).

The scheme was supposed to pay the full cost of treatment of subscribers, including medical bills and referrals of over 90% of all diseases that afflict Ghanaians and are covered under the scheme. However, uninsured patients pay the full cost of treatment. NHIA reported that out-patient utilization has increased by 46 times from 0.6 million in 2005 to 27.4 million in 2013 (Boakye, 2016). The situation is not different from the in-patient utilization which also increased by about 56 times from 28,906 in 2005 to 1.6 million in 2013. Just as healthcare utilization has increased, so are claims payments. Claims payment increased by some 103 times from GH¢ 7.60 million in 2005 to GH¢ 785.6 million in 2013. NHIA has admitted that the major challenges of the scheme are financial sustainability, as well as demand-side and supply-side moral hazard. To help solve this particular problem, NHIA proposed what is referred to as Capitation Policy. In this policy, healthcare providers will be given an amount proportional to the number of subscribers who have chosen those providers (Boakye, 2016). The capitation policy was only piloted in the Ashanti region and was never fully implemented across the country.

The scheme has chalked some successes. In just three years, the proportion of skilled healthcare providers increased from 45% in 2005 to 62% in 2008 because of increased NHIS coverage (NDPC, 2015). In addition, about 50% of babies were delivered by skilled personnel in 2005. This figure increased to 72% in 2008. This suggests that NHIS has significantly increased access to healthcare by pregnant women. Free Maternal Healthcare was introduced in 2008 to offer free healthcare services to pregnant women. This was in line with efforts to achieve the Millennium Development Goal four (MDG 4). Registration of pregnant women doubled from 383,246 in 2009 to 774,009 in 2013 (NDPC, 2015).

2.4.3 Membership and Enrolment

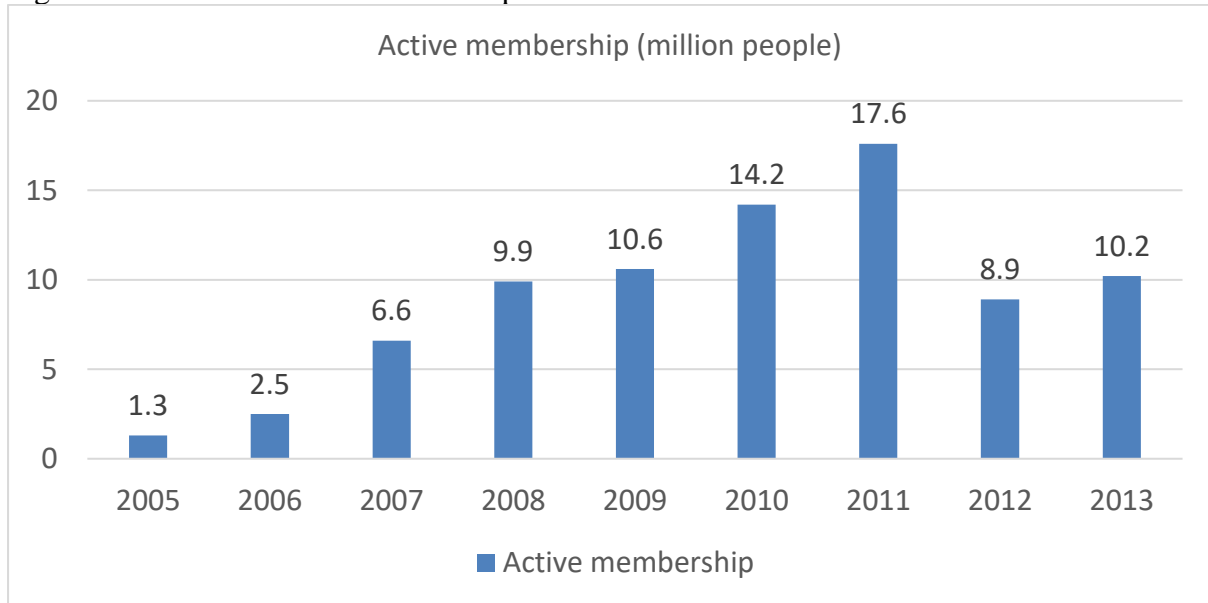
All resident and non-resident visiting members are eligible to enroll. Membership is not automatic. An individual must go in person to the district NHIS office, complete a registration form, and pay the registration fee and the premium. When duly registered, one is expected to carry a valid ID card in order to be allowed to access healthcare at any healthcare facility. The NHIS packages include payment of health expenses. Currently, there is no co-payment or coinsurance. The scheme exempts certain people from paying the premium: people aged 70+, children under 18 years, all pregnant women, children in orphanages, beneficiaries of the Livelihood Empowerment Against Poverty (LEAP), persons with disability, mental patients, and leprosaria, among others. NHIA identified some social intervention programmes and registered their beneficiaries to one million indigents.

Although Act 650 makes it mandatory for every Ghanaian to register under the scheme, there is no penalty for deciding not to enroll. It is estimated that enrolling onto the scheme would cost households 5.9% of their expenditure (Boakye, 2016). The National Health Insurance

Scheme planned to institute the one-time premium payment for the informal sector in 2010 to encourage enrolment but this faced some challenges and never materialized.

The National Health Insurance Fund continues to provide expanded coverage for the National Health Insurance Scheme. According to the National Health Insurance Authority, active membership increased by about 8 times from 1.3 million people in 2005 to 10.2 million people in 2013. Active membership increased from 1.3 million in 2005 to 17.6 in 2011, dropped to 8.9 in 2012 before rising to 10.2 in 2013. Between 2011 and 2012, active membership decreased by 50% (see Figure 2.6 below). This is because some benevolent individuals who registered some people and paid their premiums, did not renew it for them any longer. The active membership rate is 38% of the population, which is a huge improvement over the 1% enrolment rate before the introduction of NHIS in 2003 (NHIA, 2013). By the end of the year 2013, 10.2 million people were enrolled onto the scheme, out of which 5.64 million were renewals, while the remaining 3.24 million represents the new members. NHIS subscription is dominated by young people under 18 years (46.5%), informal sector employees (33.6%), indigents (12.1%), 70+ years (3.8%), SSNIT contributors (3.6%), Military (0.2%), and SSNIT pensioners (0.2%) (NHIA, 2013).

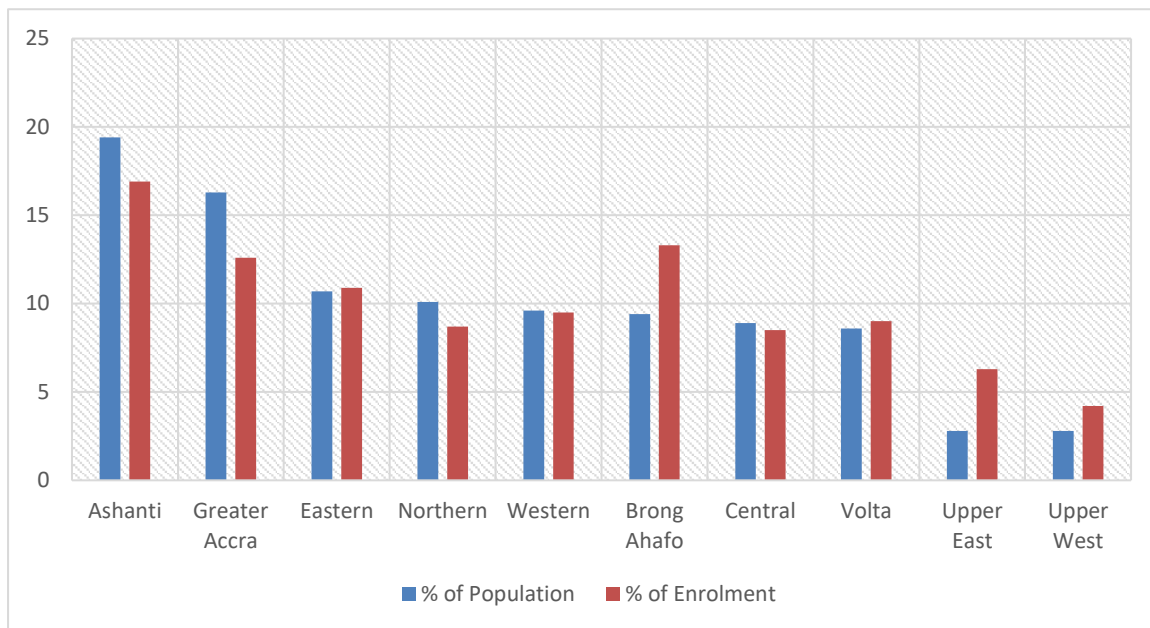
Figure 2.6: Trend of active membership



Source: Author's computation based on (NHIA, 2013)

According to the Ghana Living Standards Survey 5 (2005/2006), only 16.5% of Ghanaians were covered under the health insurance. About 0.3 percent of that figure was registered but stopped enrolling, while 15.5% were still covered under the district mutual/NHIS scheme. Private health insurance enrolment stood at 0.6%, but the figure dropped to 0.5% in 2012/2013. The report of the Ghana Living Standards Survey Six (GLSS 6) indicated that enrolment onto the scheme increased to 67.6% in 2013, out of which 10.7% had stopped enrolling citing their inability to pay the premium and mistrust in the scheme as reasons.

Figure 2.7: Population and Enrolment Distribution, 2013



Source: NHIA, 2013

Figure 2.7 illustrates that as of 2013, Ashanti region is the most populated region taking 19.4% of the total population. They are followed by Greater Accra (16.3%), Eastern (10.7%), Northern (10.1%), Western (9.6%) and Brong Ahafo (9.4%). Central and Volta regions have 8.9% and 8.6% respectively. Upper East was 4.2% while that of Upper West had the least population with 2.8%. The National Health Insurance Scheme coverage is also not fairly distributed just like the total population. Ashanti Region has the lion's share of 16.9%. This is followed by Brong Ahafo and Greater Accra with 13.3% and 12.6% respectively. The rest are Eastern (10.9%), Western (9.5%), Volta (9.0%), Northern (8.7%) and Central (8.5%). Upper East and Upper West have 6.3% and 4.2% respectively (NHIA, 2013).

What is interesting is that Brong Ahafo, Upper East and Upper West have enrolment distribution greater than their share of population distribution. In other words, these three regions have the highest insurance coverage. The plausible reasons could be that they are

poorer regions and are risk-averse. The remaining regions have their shares of the population greater than that of enrolment.

2.4.4 Challenges

The National Health Insurance Scheme has made some gains since its inception in 2003. However, despite these gains, the scheme faces some serious financial and management challenges. These challenges really threaten the sustainability of the Fund and the Scheme. The rapid utilization by out-patients and in-patients had put enormous pressure on the Fund. Premiums remain very low due to the Scheme's social interventionist orientation. The National Health Insurance Levy and the contribution to the Basic National Social Security Scheme, which do not vary with the size of enrolment constitute about 90% of the total revenue. Health insurance premiums and registration fees account for just less than 5% of revenue (Boakye, 2016).

In addition to the problem of limited funds for the scheme, there exists fraudulent activities on the part of healthcare providers. Audit reports of the Authority reveal several of such activities. For instance, it was revealed that some healthcare providers use names of subscribers in good standing, forge claims, and submit them for payment. Audits have also found several claims by providers for subscribers visiting two or more health facilities at the same time. Some providers also inflate their claims. This is evident in cases where information on hospital date shows that claims do not tally with hospital folders. These fraudulent activities have persisted since the beginning of the Scheme, but the Authority seems incapable of rectifying the situation. The various measures instituted by the NHIA to curb the problem of the scheme like the establishment of Claims Processing Centres, Consolidated Premium Account, and

strengthening of clinical and internal audit divisions are not enough. Audits have also found that monitoring of healthcare providers by NHIA is done on an ad hoc basis (Boakye, 2016).

Another major challenge is the management of claims to healthcare providers. Payment of claims to healthcare providers unduly delays. Payment normally delays due to management's inability to finish vetting claims on time. Audit reports have revealed that some providers lack the requisite skills to furnish the Authority with their claims. Even those who submit delay in doing so. The delay in payment has created additional problems to the scheme because some providers like the pharmacies hesitate to accept NHIS card as a means of accessing their services. Those who accept the cards provide poor services. To receive better services, subscribers are made to pay what is referred to as "illegal fees" (Boakye, 2016).

Perhaps, one major problem the scheme has been facing since its establishment in 2003 is political interference. In the first place, health insurance was used as a campaign message by the two major political parties in the country – NPP and NDC. For instance, NPP which was in opposition in the year 2000, used it as a key campaign message in the run up to the 2000 general elections. Upon winning the elections, the party (NPP) fulfilled its promise by establishing the National Health Insurance Scheme. Whereas one party (in power) introduced the Free Maternal Healthcare in the heat of 2008 elections, the other party which was in opposition promised a one-time premium payment for NHIS subscribers. It is an undeniable fact that these policies could be of benefit to the poor, but their untargeted nature and their use as campaign message clearly make them political tools other than achieving economic efficiency.

2.4.5 Remedy measures

The National Health Insurance Authority (NHIA) has outlined a number of measures to help solve these challenges. As one of the measures to solve the financial problems facing the scheme, the Authority has implemented what is called the ‘Capitation’. In this policy, subscribers are mandated to choose a particular healthcare provider, which is normally referred to as the preferred primary healthcare provider (NHIA, 2013). The NHIA compiles data on all subscribers and their chosen primary healthcare provider and then submits this data to all providers indicating who has chosen which provider. Based on the per capita cost of providing primary healthcare to the provider, NHIA gives frontload funds to the chosen primary healthcare providers. The per capita is then multiplied by the total number of subscribers and then the total amount is given to the providers (NHIA, 2013).

The capitation policy makes room for subscribers to change their chosen providers. Subscribers may decide to change providers due to change of location. For example, when people marry or complete their education and relocate, they can always change their providers. A subscriber is permitted to choose just one provider at a time. The Authority can advise a subscriber to choose a particular provider based on the type of treatment. Capitation is supposed to pay for only services; it does not pay for medicine. Healthcare providers submit claim for payment for all medicines. All outpatient treatment is covered under capitation. However, if one provider cannot treat a particular illness, the subscriber is given a referral letter and then seek treatment from another authorized healthcare provider, which has the specialty. The capitation policy has not yet been fully implemented in the country. The programme was just piloted in Ashanti region and was left unattended to till now (NHIA, 2013).

2.5 Healthcare Facilities

As has already been mentioned in the introduction of this paper, Ghana inherited a purely curative public health system from Britain in 1957. This system was limited to controlling the outbreak of smallpox and yellow fever. The Nkrumah government aimed to improve the general health status of Ghanaians. As a matter of urgency, the University of Ghana Medical School was established in 1962 to train health professionals in Ghana. Several other government regional hospitals, polyclinics, and private hospitals were also established to speed up the process of health improvement (Agyei-Mensah and de-Graft Aikins, 2010).

The total number of nurses was 24,533 in 2013, 28,437 in 2014 and increased by 34.4% to 38,228 in 2015. The country's doctor and nurse population ratios were 10, 452 per doctor and 1,084 per nurse in 2013 against WHO's target of 1 nurse to 1,000 population. The nurse to population ratio improved from 935 in 2014 to 739 in 2015. This is a significant achievement over the WHO threshold of 1:1,000 persons for developing countries (GHS, 2015).

The average workload of a midwife improved from 1:132 per year in 2014 to 1:112 in 2015, thereby exceeding the WHO threshold of 1:170 deliveries per year. The total number of doctors was estimated at 2,615 in 2013. The number increased to 3,016 in 2014, before increasing again by about 4.8% to 3,160 in 2015. A similar success story could be told about the doctor to population ratio. It was reported that the doctor to population ratio also saw an improvement from 1:9,043 in 2014 to 1:8,953 in 2015. This is woefully inadequate as it falls short of WHO's threshold of 1: 1,320. A greater number of the doctors and nurses are located in the Greater Accra and Ashanti regions. About 53% of all doctors reside in the Greater Accra region alone. Whereas 48% of this number (664) are fully qualified, about 52% (719) are house officers.

Greater Accra has the lowest doctor to person ratio with 1:3,186, while upper west has the highest doctor to population ratio (NDPC, 2015).

There are also health centres, district hospitals, and tertiary hospitals established in the country. The country can boast of some Teaching Hospitals which are fully functioning and others under construction. In addition to the public health service, there are also private missionary and non-missionary, traditional, and spiritual healer facilities. In most cases, Government of Ghana provides subsidies to these public providers (NDPC, 2015).

Table 2.2: Health Facilities by type and ownership, 2015

Region	CHPS	Clinic	District Hospital	Health Center	Hospital	Midwife/ Maternity	Mines	Polyclinic	Psychiatric Hospital
Ashanti	906	116	25	141	94	71	0	0	0
Brong Ahafo	423	107	18	83	13	41	0	4	0
Central	219	67	12	64	15	35	0	2	1
Eastern	477	112	14	84	16	25	0	2	0
Greater Accra	176	277	6	20	70	86	0	12	2
Northern	185	57	15	83	12	9	0	4	0
Upper East	233	48	6	44	1	2	0	0	0
Upper West	176	15	3	68	6	5	0	5	0
Volta	273	39	17	146	11	16	0	2	0
Western	267	144	18	59	20	36	3	1	0
National	3,335	982	134	792	258	326	3	32	3

Source: GHS (2015)

By the year 2015, the number of health facilities in the country totalled 5,865. Majority of the health facilities in Ghana were CHPS compound totalling 3,335. This was followed by 982 clinics, 792 health centres, and 326 midwife/maternity. The rest were 258 hospitals, 134 district hospitals, 32 polyclinics, and 3 mines and 3 psychiatric hospitals.

In the 2015 budget, it was stated that Government of Ghana had started construction work on the University of Health and Allied Sciences at Ho, to be added to the number of Universities training medical professionals. By the end of 2017, the University of Health and Allied Sciences at Ho had commenced and admitted students. This is to add to the numerous health professional training centres in the country.

The National Health Insurance Scheme under the supervision of the National Health Insurance Authority has implemented a number of policies aimed at providing equitable healthcare access to all NHIA subscribers. In order to carry out this mandate, the NHIA had to credential a number of healthcare facilities. The NHIA mapped up credentialed facilities on an approved template. By December 2013, a total of 3,943 facilities had applied for credentialing, and about 3,822 representing 96.9% were given full credentials, while 45 had partial credentialing. About 121 facilities (0.03%) failed to meet the minimum requirement. Among the credentialed healthcare facilities, CHPS Zones (1,197) appeared to be the highest type of facility to receive credentialing. The most populated region, Ashanti region, had the highest number of credentialed facilities accounting for 619 (16.2%) facilities, followed by Eastern with 514 (13.4%), 460 (12.0%) in Western, and 440 (11.5%) in Greater Accra. The rest are Brong Ahafo with 376, Central with 334, and Northern with 352 facilities. Volta region had 321, Upper East and Upper West had 211 and 195 credentialed facilities respectively (NHIA, 2013).

By June 2017, Ghana had a total of 3,370 healthcare facilities, comprised of 1,811 public facilities, 1,355 private healthcare facilities, and 204 mission healthcare facilities owned by a religious organization such as Christians. This classification is based on ownership. In terms of services provided, 2,485 healthcare facilities engage in general services, accounting for 73.7%, while the remaining 885 healthcare facilities (26.3%) provide specialized services.

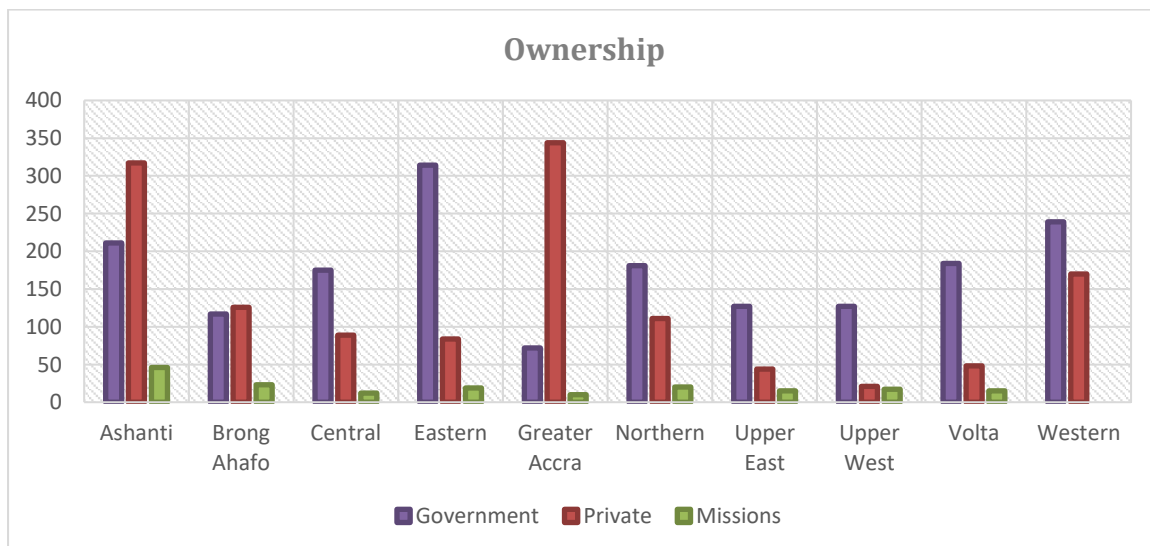
Table 2.3 Classification of healthcare facilities based on ownership, type, and service.

OWNERSHIP	Number	TYPE	Number	SERVICE	Number
Government	1811	Hospitals	2447	General	2485
Private	1355	Pharmacy	556	Pharmacy	556
Mission	204	Diagnostic centre	8	Surgery	25
		Laboratory	96	Ultra Sound Scan	61
		Ultrasound scan	17	Laboratory	135
		Dental	14	Dental	23
		Eye clinic	14	ECG Services	90
		Maternity home	216	Eye Services	90
				Skin	0
				Antenatal	239
				Pediatric	29

Source: Ghana Health Service (2017)

By type of health facilities in the year 2017, there were 2,447 hospitals, 523 pharmacies, and 17 ultrasound scans and 17 dental health centres. Other precise hospitals focus on the provision of specialized fields of medicine. For instance, there are about 30 hospitals specialized in gynaecology, 19 paediatric, 20 surgeons, 11 urology, 17 dentists, 13 eye specialist, 7 dermatology, and 23 physicians (GHS, 2017).

Figure 2.8: Categories of ownership of healthcare facilities: by region



Source: Ghana Health Service (2015)

In Figure 2.8, there were more healthcare facilities in Ashanti in the year 2015. This was, followed by Greater Accra, Eastern, and Western regions. This was not surprising at all since these were the four most populated regions in the country. There were more government healthcare facilities in the Eastern region, Western region, and Ashanti. The least number of government facilities were in Brong Ahafo and Greater Accra. A greater number of private healthcare facilities were concentrated in Greater Accra (perhaps to make up for the loss in public hospital), followed Ashanti region, and western region. Mission healthcare facilities were found in the Ashanti region, Brong Ahafo, Eastern and Northern region (GHS, 2015). In the GLSS 6 data, it was reported that majority of consultations took place at the district hospitals, chemical store, and health centres, with only a few going to homeopathy and traditional healer (see Table 2.4).

Table 2.4: Place of Consultations from GLSS 6 (2012/2013)

Private Place of consultation	No.	%	Public Place of consultation	No.	%
Hospital	596	7.9	Teaching hospital	103	1.4
Clinic	969	12.8	Regional hospital	225	3.0
Maternity home	17	0.2	District hospital	1,308	17.3
Chemical store	1,296	17.1	Other public hospital	311	4.1
Medical practitioners home	21	0.3	Polyclinic	145	1.9
Patients home	17	0.2	Health centers	1,208	16.0
Mission hospital	238	3.1	CHPS	389	5.1
Pharmacy	287	3.	MCH clinic	146	1.9
Other	100	1.3	Maternity home	10	0.1
Homoeopathy	6	0.1	Other	16	0.2
Traditional healers home	142	1.9			
Other	22	0.3	Total observations	7,572	100

Source: Author's computation using GLSS 6

Having studied the provision of healthcare facilities, it is also necessary to take a look at their utilization. Out-Patient-Department (OPD) per capita was 1.16 in 2013. Over 80% of them were NHIS card holders. Northern region has the lowest OPD per capita of 0.8. OPD continues to drop in Ashanti region but is on the increase in Upper East region (GHS, 2015).

2.6 Political Economy of the Health System

The over the hundred-year colonial period was characterized by missionaries providing basic education and health facilities. Christian Missionaries especially the Swiss-German Basel Missionaries, Methodist Missionaries and Catholic Missionaries as well as other religious missionaries including several Muslim Missions were the main providers of health facilities in the country. Even in the pre-independence era until now, healthcare is still provided by the government, the individual private sector, and religious organizations. The quest for wealth creation also emphasizes good health status as the healthy are able to work for longer hours and earn more income. This phenomenon establishes some interrelationship between wealth and health. In fact, several health economics literature have established these relationships. On one hand, wealthier people are more likely to afford medical bills. On the other hand, improved health status leads to decreased sick days, increase productivity and income of workers (Anaman, 2014).

John Locke and Adam Smith suggested a set of powers and control within separate structures (Anaman, 2014). The basic question is: should the provision of healthcare be left in the hands of the state or individuals. The market for the provision of healthcare just like any other market may fail due to the presence of some features – public good, uncertainty, externalities, among others. The market for the provision of healthcare suffers from the public good feature because information about health is normally disseminated to the general public and it is non-exclusive and non-rival. The high level of imperfect information about the healthcare between the physician and the patient may result in what is called Supply-Induced Demand. Many countries institute health insurance with the aim of pooling resources together, sharing the risk of sickness, reducing user fees and increase utilization. The community-Based Healthcare and even Community Health Insurance Scheme play major roles in increasing access to healthcare,

especially in the event that the government fails. However, the Health Insurance Scheme has its own problems of moral hazard and adverse selection. Government intervention in the health sector is crucial for the provision and distribution of healthcare to the poor and vulnerable. Given the limited resources of government, it is expected that the healthcare sector operates in a mixed economy, where the private sector is allowed to participate. This might fit perfectly into Center-right ideology of Adam Smith. The above-mentioned characteristics break down the existence of a perfect competitive market for healthcare. Since there are few sellers but many buyers, homogenous but slightly different products, some market power enjoyed by firms due to licensure, the interdependence of firms, the market for healthcare is regarded as an oligopoly market.

The structuralism theory deals with how classes and interest groups shape and determine dominant economic structures of society, as well as economic and social outcomes. Closely related to this theory is the dependency theory which puts wealthy people at the center and poor people at the periphery (Anaman, 2006). This creates inequality in access to healthcare in many countries including Ghana. In fact, this is the reason for the progressivity analysis part of this thesis.

Veblen's conspicuous consumption for Health-related day celebrations may be regarded as a good tool to explain why an increase in health expenditure does not necessarily lead to improved health outcome (Anaman, 2006). In order to establish a conclusive statement about this, a relationship between healthcare expenditure and health outcome can be studied. Some researchers have estimated this using cross-sectional, time series or panel data. Whereas empirical evidence exists about this relationship be it positive or negative, other researchers have found no effect of healthcare spending on health status. On the global front, it can be

evaluated based on the trend analysis of health expenditure and life expectancy in various countries.

In most developing countries, public expenditure increases during the health-related day celebrations like Malaria Day celebrations, AIDS day celebration, etc where huge sums of money are spent on purchasing cars, sitting allowances, refreshments, t-shirts, etc. The worrying situation is that these expenditures do not directly impact on health outcomes. At the micro level, many Ghanaians spend so much on social gatherings such as funerals at the expense of healthcare. A better way out is to reallocate resources from some of these social functions to healthcare expenditure. It must be noted this type of increase in public health expenditure does not necessarily lead to improvements in health status (Nketiah-Amponsah and Sarkodie, 2014).

With reference to the Institutionalism theory, Ghana has a number of governing bodies that guide the production and distribution of healthcare to the population. Notable among these are the World Health Organization (office in Ghana), Ministry of Health, Ghana Health Service, Ghana AIDS Commission, National Health Insurance Authority, Health Institutions, and Facilities Act, Act 829, 2011, Health Professions and Regulatory Act, Act 857, 2012, etc (Anaman, 2006).

CHAPTER THREE

3. LITERATURE REVIEW

The focus of the thesis is to estimate the determinants of demand for healthcare services in Ghana. As discussed under section 1.4, the specific objectives are to (1) Estimate the extent to which price and income affect demand for healthcare. (2) Estimate the benefit incidence of healthcare payment. (3) Identify how enrolment onto the National Health Insurance Scheme (NHIS) affects healthcare utilization and out-of-pocket payment (4) Investigate the effect of time price on demand for healthcare even if money price is assumed to be zero.

This chapter reviews the existing literature both theoretical and empirical. The essence is to investigate the current state of knowledge, identify the gap and fill in the gap in the literature. The literature review is organized alongside the four main objectives of the thesis for easy assessment.

3.1 The effect of price and income on demand for healthcare as well as benefit incidence of healthcare

3.1.1 Theoretical Literature: Derived-demand for Healthcare

As stated earlier, the World Health Organization (WHO) defines health as not the mere absence of sickness, but a state of complete physical, mental and social well-being. Michael Grossman (1972) is credited with the theoretical foundation of demand for health. The Grossman Human Capital model (1972) identifies some reasons why individuals demand health: Health stock diminishes due to illness and bad habits and must, therefore, be augmented; the individual is a

producer of health; stock of health will produce overtime a stream of health; individuals derive utility from health, etc. Returns to investment in health is the added labour income and wealth to the individual. Health is seen as a commodity that is not valued per se but only for its impact on labour productivity/wealth. This is known as the pure investment variants of the Grossman model.

According to the model, an individual is born with an initial health stock. This health stock depreciates because of sickness and hazardous lifestyle. The stock of health can be augmented by investment in health. Consumption of healthcare is one of the ways of investing in health. When health stock depreciates because of sickness, healthcare is consumed to replenish it. This study focuses on demand for healthcare by identifying the factors that would affect the decision to seek healthcare when ill.

Healthcare is just one of the many determinants of health, and in Health Economics, it is simply an input into the production function, with health as the output. Demand for healthcare is a derived-demand because it is not consumed for their direct utility generating properties but consumed to produce health. In fact, healthcare itself is often a bad commodity due to the disutility associated with its consumption. Many people cry or run away or frown their faces when being injected or asked to swallow a pill or being operated upon. The theatre room in hospitals is not a place that most people will feel happy to visit. As stated above, demand for healthcare is therefore derived from the demand for health. Following the works of Grossman (1972), assume that the consumer's utility (U), as specified, is a function of health status (H) and all non-health consumption goods (Z);

$$U = U(H, Z) \dots\dots\dots(3.1)$$

The health status is a function of healthcare (M) and other non-healthcare determinants (E);

$$H=H(M, E) \dots\dots\dots(3.2)$$

Putting (3.1) into (3.2), the utility becomes a function of healthcare, non-healthcare consumption goods, and all non-health consumption goods;

$$U = U[H(M, E), Z] \dots\dots\dots(3.3)$$

There are two qualities that are of interest here - the relationship between healthcare and utility/welfare and the relationship between healthcare and health

The model assumes that;

$$\frac{\partial U}{\partial H} > 0; \quad \frac{\partial U}{\partial M} < 0; \quad \frac{\partial H}{\partial M} > 0$$

But that;

$$\frac{\partial^2 U}{\partial M^2} < 0; \quad \frac{\partial^2 H}{\partial M^2} < 0$$

The term $\frac{\partial H}{\partial M}$ represents the direct impact of healthcare on health status.

The effect of healthcare $\frac{\partial U}{\partial M}$ on utility occurs through two channels:

1. Effect of healthcare on health $\frac{\partial H}{\partial M} > 0$, also called the marginal productivity of healthcare in producing health
2. Effect of health on utility. $\frac{\partial U}{\partial H} > 0$, also called the marginal contribution of improvements in health to utility.

For healthcare to improve health status, its marginal contribution must be positive. To the extent that healthcare is consumed to improve health through the production process, technical and cost-effectiveness efficiencies are relevant. Because healthcare also impacts on utility on the demand side, allocative efficiency is also relevant.

3.1.2 Empirical Literature

The elasticity of demand measures the sensitivity of demand for healthcare to price and income. By implication, the price elasticity of demand is the sensitivity of demand for healthcare to price, while income elasticity of demand for healthcare is the sensitivity of demand for healthcare to income. The measure of the quantity of healthcare demanded can be in various forms like the decision to seek treatment, the number of physician visits, outpatient and inpatient utilization, etc. The price component can also be measured by total medical expenditure, out-of-pocket payment, coinsurance rate, copayment, etc. Different methods and datasets have been used to estimate the price elasticity of demand for healthcare services and researchers have found the price elasticity of healthcare services to be less than unit, which is inelastic (Gaddah, 2011; Newhouse et al., 1993; O'Brien, 1989). Though most of the cited literature are from developed countries, the result is not different from that of developing countries like the one found by Mwabu (1993) in Kenya and Bitran (1988) in Latin America. However, the fact still remains that most of the reviewed literature are outdated.

According to Ringel et al. (2001), the price elasticity of demand for healthcare is usually estimated to be -0.17. This is low because the probability of finding an alternative for seeking healthcare is very low. It is even less elastic at lower levels of cost sharing. Whereas price elasticity of demand is generally low to healthcare services, preventive and primary healthcare

services have high price elasticities, making them very sensitive to changes in price. This may be due to the availability of substitutes for preventive and primary healthcare. Consumers can easily shift from preventive and primary healthcare towards substitutes like improving nutrition, exercising, going to the gym, among others. Another reason is that since the opportunity cost for preventive healthcare is much higher than when the individual is sick, its benefits are usually discounted into the future. Again, most preventive and primary healthcare services are not covered by health insurance, making it more price sensitive.

In the same paper by Ringel et al. (2001), the income elasticity of demand for healthcare services was also found to be fairly inelastic and positive ranging from 0 to 0.2. The positive sign indicates that healthcare is a normal good such that any increase in income will result in a higher demand for healthcare. This might be explained that a rise in income increases the purchasing power of the patient and therefore can afford their medical bills. The magnitude of the elasticity is very low indicating how less sensitive demand for healthcare is to changes in income.

Perhaps Feldstein's (1971) estimation of elasticity of demand for healthcare in 1971 is among the earliest works found in the literature. The data for the study was taken from the American Hospital Association Survey of Hospitals between 1958 and 1967. Feldstein (1971) estimated the sensitivity of mean length of stay for hospitalized patients to the price of hospital stays, coinsurance rates, and proportion of population insured across the various states in the United States of America. Employing the observational method of time series regression, Feldstein found the price elasticity of demand for healthcare in the United States to be -0.5. This is interpreted as a 1% increase in price will lead to a 0.5% decrease in the mean hospital stay. This makes the demand elasticity relatively inelastic since it is less than unit (1). Fuchs and Kramer (1972) found a rather low price elasticity of demand for healthcare in the USA, they

used an observational method and employed instrumental variable analysis for the study. The source of data for the study was the state-level IRS tabulation data and estimated the price elasticity of demand for healthcare to be between -0.15 and -0.20.

Rosett and Huang (1973) used an individual level data from the 1960 Survey of Consumer Expenditure and observational method of estimation for their research. The idea was to estimate how sensitive medical expenditure would be to out-of-pocket payments in the United States of America. The estimated price elasticity of demand was between -0.35 and -1.5 (at higher out-of-pocket payment). Using data on insurance plans from United States, Canada, and the United Kingdom, Phelps and Newhouse (1974) found that low levels of cost sharing would lead to a relatively smaller change in demand for healthcare. Specifically, they estimated the price elasticity of demand for healthcare across ranges of coinsurance rates. If the coinsurance rate is between 20 to 25 percent, the elasticity is estimated to be around -0.12. When the rate decreases to between 15 and 20 percent, elasticity was estimated at -0.07. Finally, if the coinsurance rate is ranged from 10 to 15 percent, the price elasticity of demand will be -0.04.

Newhouse et al. (1993) used the RAND Health Insurance Experiment (HIE) which ran from 1974 to 1982, and randomized families in six sites into different insurance plans. The study estimated the sensitivity of medical expenditure to coinsurance rates across plans to be between -0.17 and -0.22 in the USA. In the same study, at coinsurance rates between 0 and 25 percent, the price elasticity of medical expenditures was -0.17. In the HIE, coinsurance rates ranging 25 and 95 percent yielded price elasticity of -0.22. Consistent with other studies, the magnitude of the elasticity falls at lower rates of coinsurance. Eichner (1998) used data from insurance claims for those covered through a large employer and used the method of observation to estimate the sensitivity of demand for healthcare to price. The Tobit regression estimated the price elasticity of demand for healthcare to be between 0.62 and 0.75, making it price inelastic.

Using the method of natural experiment, Scitovsky and Snyder (1972) estimated the sensitivity of physician visits to coinsurance rates. The study used data from the Palo Alto Group Health Plan (1966-1968). The price elasticity was estimated at -0.14. This means that if coinsurance increases by 1%, physician visits will decrease by 0.14%. This is relatively price inelastic, with a very small magnitude. About two years later, Scitovsky and McCall (1977) used the Palo Alto Group Health Plan (1968-1972) and employed the same natural experiment. The result yielded a price elasticity of demand for healthcare to be -0.29. This means a 1 percent increase in coinsurance rates decreases the number of physician visits by 0.29 percent.

Cherkin et al. (1989) also used the method of a natural experiment to estimate the price elasticity of demand for healthcare in the United States. This work was an improvement over the previous one undertaken in the 1970s because it included a comparison group, which did not receive any policy change. The study used data from Group Health Cooperative of Puget Sound. The evolution of patterns before and after the policy led to an estimated price elasticity of demand for healthcare of 0.04.

Using the same natural experiment, Beck (1974) used data from a Sample of low-income people in Saskatchewan in Canada. Similarly, this study focused on the sensitivity of physician visits to coinsurance rates. The estimated price elasticity of demand for healthcare was -0.07. The conclusion was that a 1 percent increase in coinsurance rate yielded a 0.07 decrease in physician visits.

Theoretical literature confirms that in addition to price and health insurance, the income of the patient also determines the amount or kind of healthcare demanded. For this reason, many researchers have investigated the effect of income on demand and the extent to which income can influence demand for healthcare. Empirical estimates of income elasticities are consistent

with the theory. Under health insurance, the income elasticity of demand for healthcare is expected to be very low. That is, if services are provided at low or zero cost, income is expected to have minimal effect on demand for healthcare. Phelps (1992) estimated the income elasticity of demand for healthcare to be generally 0.2 or less. This means that a 1% increase in income will yield a 0.2% increase in demand for healthcare services. The real income of people is estimated to increase the demand for new medical technologies. Income elasticities calculated with time series data are often higher due to changes in technology over time. It is estimated around 0.5 and 0.8 (Feldstein, 1971; McLaughlin, 1987; DiMatteo, 1998)

Different types of medical services are also found to have different price elasticities. For instance, Newhouse and Phelps (1976) used data from the Center for Health Administration Studies Survey in 1963 and employed the method of observation. They calculated the sensitivity of the probabilities of inpatient and outpatient visits to coinsurance rates to be -0.17 and -0.11 respectively. However, when Newhouse conducted a similar analysis using the same data and the same method in 1974, the results were different. The result indicated that when the coinsurance rate is increased by 1%, it will result in the same 0.1% reduction in inpatient and outpatient healthcare utilization. The difference in the two results is emanating from the differences in time of the study. The former is certainly older than the later.

Newhouse et al. (1993) used the RAND HIE data for their experimental method of analysis. They found the price elasticity of demand for inpatient to be between -0.14 and -0.17. The same analysis also resulted in outpatient elasticity of -0.17 to -0.32. This clearly shows that any increase in the coinsurance rate will decrease outpatient utilization more than inpatient utilization. Again, the same analysis yielded price elasticity of demand for healthcare to be different for preventive and curative services. The study estimated the sensitivity of medical

expenditures to coinsurance rates for preventive healthcare to be between -0.17 and -0.43, but that of curative is from -0.17 to -0.32.

Employing the method of natural experiment on the data from prescription drug use in the United Kingdom, O'Brien (1989) was interested in finding the extent of the effect of copayments on a number of prescriptions. The study found the price elasticity of demand to be -0.33. This is interpreted as a 1% increase in copayment will lead to a 0.3% reduction in the number of prescriptions.

Harris et al. (1990) conducted a natural experiment to estimate the sensitivity of the number of prescriptions to copayment. The paper used data from the Group Health Cooperative of Puget Sound and estimated the price elasticity of demand for healthcare to decrease by 10.7% after \$1.50 copayment was initiated. Smith (1993) was rather interested in the extent to which the coinsurance rate would affect the number of prescriptions. The study used data from the National Prescription Drug Card Services and conducted an observational method of analysis. The results indicated that the price elasticity of demand for healthcare is -0.10. This means that when coinsurance rate increases by 1% it will decrease the number of prescriptions by 0.1%.

Many studies have been done on the effect of income and price on demand for healthcare, especially on the African continent. Generally, public healthcare providers have low price elasticities in most African countries than private healthcare providers. This is may be due to the subsidized price charged by the public providers. Mwabu et al (1993) found the price elasticity of demand for public and private healthcare providers in Kenya to be between at 0.1 and 1.57. Lavy and Quigley (1993) found the price elasticity of demand in Ghana to be -1.82 and -0.25 for both inpatient and outpatient visits respectively.

Since the aim of demanding healthcare is to improve health status and eventually increase productivity and income, other studies have also concentrated on the effect of health on productivity and economic growth. For instance, Koopman et al. (2002) found out ill health does not only encourage absenteeism, but it also reduces the productivity level of individual workers by reducing the normal work quality, a situation he calls presenteeism. Goetzel et al. (2003) concluded that in the US, absence and disability losses due to physical and mental health conditions of 374, 799 persons constituted 29% of the total health and productivity related expenditures for physical conditions and 47% for mental health conditions. Strauss (1995) examined the roles played by households and families in choosing to invest in the human capital of their members. It was concluded that investments in education and health will enhance productivity. Fisk (2000) contributes to the existing knowledge and estimated that in the US, potential annual gains from savings and productivity gains are \$6 to \$14 billion from reduced respiratory diseases, \$1 to \$4 billion from reduced allergies and asthma, \$10 to \$30 billion from reduced sick building syndrome symptoms. In their paper that investigated the impacts of pesticide use on farmers' health and the impact of farmers' health on rice production in Philippines, Antle and Pingali (1993) concluded that insecticide use has a negative effect on farmers' health and the farmers' health has a positive impact on rice production, and that there is a social gain in from the reduction in insecticide use in Philippines rice production.

In a study to investigate the influence of health on the growth paths of ten industrialized countries over the course of 100 to 125 years, Suchit (2001) found that changes in health increased their pace of growth by 30 to 40 percent. Pitt and Rosenzweig (1984) found out that in Indonesia, food prices affect health and health interventions programmes, nutritional status and profits.

Gaddah (2011) used GLSS 5 data to estimate the price elasticity of demand for healthcare in Ghana. The study concludes that there is high health consciousness among the rich. The poor, rural dwellers, and the uneducated use public health facility the most. Surprisingly, the rich also utilizes more of public facilities. The model used was consistent with additive random utility maximization. Male-headed households, urban dwellers, the educated, the young, small household size, health insurance card holders, and Christians have a greater probability of seeking healthcare than their counterparts. Another conclusion is that a 10% increase in price will decrease public and private healthcare by 9.0% and 4.0% respectively. The cross-price elasticity was positive indicating that public and private healthcare services are substitutes. When the prices of public and private healthcare are set to zero, its utilization increases by 11.6%. and 17.6% respectively.

Based on the reviewed literature on demand for healthcare, few studies emphasized income (both in its raw state and in quintiles). This paper fills in the gap by estimating the sensitivity of demand for healthcare to income. The study also uses a more recent data for the analysis, making the findings more relevant to contemporary situations. Again, this study employs probit and predicted probability method of estimation which is different from the methods used in previous studies, like the nested logit which was used by Gaddah. Perhaps, it is an opportunity to even compare findings, and see how they differ.

3.2 Benefit incidence of healthcare services

There is prior literature on benefit incidence of public healthcare expenditure on Ghana and elsewhere. For instance, Akanzili et al. (2012) undertook a comprehensive assessment of financing and benefit incidence of health services in Ghana. The analysis used data from the

Ghana Living Standards Survey Five (GLSS 5). The paper concluded that the distribution of total health benefits from both public and private providers is pro-poor. The same conclusion was made about the public sector district-level hospital. However, the paper found that benefits of primary-level healthcare services are relatively evenly distributed. Khan (2017) conducted a search into the extent to which health benefits are distributed across socio-economic groups in Bangladesh. They used the most recent data on household income and expenditure Survey (2010) for the study. The paper found overall healthcare benefits to be pro-rich. The same conclusion was made for public and private healthcare services. The poorest socioeconomic group with 21.8% need for healthcare received only 12.7%.

Using data from two rural and two urban Local Government Areas from Enugu and Anambra States, Southeast Nigeria, Onwujekwe et al. (2012) presented evidence about the distribution of benefits of public expenditure on subsidized subset priority public sector healthcare facility. The paper found that the net benefits were significantly among rural dwellers, males and the poor compared to urban dwellers, females and the rich. Chen et al. (2015) also found that benefit incidence of healthcare in China falls more on the rich than the poor, making it regressive in nature. However, inequality in healthcare reduces among rural folks and outpatient departments. Chen et al. (2016) used a stratified household survey in rural and urban areas to investigate the benefit incidence of healthcare in China. The paper found the benefit incidence of primary healthcare facilities to be more progressive, while that of secondary and tertiary facilities are regressive. This conclusion could be as a result of the poor's ability to only afford primary healthcare facilities, while the rich can afford secondary and tertiary healthcare facilities.

Demery et al. (1995) found that in Ghana the poorest quintile gained just 12% of the public health expenditure in 1992, but Canagarajah and Ye (2001) found it to have increased to 13%

in 1998. One might think that the alternative way of fighting poverty and inequality is by reallocating resources. However, Castro-Lea et al. (2000) think that it is not enough to reallocate resources but understand the factors that affect household utilization of public services.

Gaddah (2011) used data from the Ghana Living Standards Survey Five (GLSS 5) to examine the incidence of public health subsidy. After reviewing several methodologies, the paper settled on nested logistic regression for the analysis. The nested logistic regression relaxes the assumptions of the Independence of Irrelevant Alternatives (IIA). With no care as the reference category, the model assumes that any healthcare service chosen by an individual is assumed to give the highest utility. Compared to the benchmark Lorenz curve, the concentration curve shows that both public hospitals and public clinics are progressive, but per capita regressive. The result is not different for postnatal and prenatal services, which are also per capita progressive.

Using a combination of willingness to pay and benefits incidence, Younger (1999) found in Ecuador, children's consultations are more progressive than adult's consultation. Younger (2000) found all healthcare services to be progressive but not per capita. The paper also found non-hospital healthcare services to be more progressive than hospital healthcare services. Glick and Razakamanantsoa (2005) found public healthcare services to be more progressive in Madagascar. The situation is not different for Cameroon, where Kamgnia (2008) found public healthcare services to be more progressive, but less progressive in the rural areas.

Other studies concentrated on the incidence of healthcare expenditure by government. In other words, the literature focused on who enjoys government subsidized healthcare. Since the thesis is about demand for healthcare, the novelty of this study is by estimating the benefit incidence

of healthcare payment. The paper also focuses on the computation of concentration indexes to identify the magnitude and direction of inequality, by first knowing whether or not inequity exists at all, and among the sub-groups. This study also looks at the benefit incidence of healthcare payment for the public, private, and alternative healthcare providers and, across sub-groups. The benefit incidence analysis follows from the elasticity analysis which helped estimate the sensitivity of demand for healthcare to price and income. Again, this study uses the most recent nationally representative data from GLSS 6.

3.3 The effect of the National Health Insurance Scheme on healthcare utilization and out-of-pocket payment

3.3.1 Theoretical framework

The uncertainty surrounding ill health and medical expenditure warrants the demand for health insurance. A number of observational studies have found that the demand for healthcare decreases with increases in out-of-pocket costs. The health insurance experience is to provide information on the impact of alternative cost-sharing for health on demand for healthcare, on financial risk, and on health status. The individual has two possible options: (a) save for medical expenses in event of illness (b) buy health insurance to cover medical expenses in case of illness. Their decision depends on their probability of illness, and the ability to pay to reduce risk. The insurance company pools risk – they spread risk among many consumers. Insurance companies create value by gathering large groups of people at risk, collect their money and pay indemnities when events occur.

Health insurance is a type of insurance offered by a private or public company that covers healthcare expenditure. It is a piece of contract that spells out the insured's premium to pay and

the insurer's commitment to pay the qualified medical expenses during a period, usually, one year. The customer periodically pays what is called a premium to the insurer. How much to pay as premium is determined by the expected medical expenditure, and the operating costs of the insurance company. What the insurance company pays out on behalf of the patient is known as indemnity. Where the insured pays part of the claim, it is called co-payment.

Healthcare expenditure can be financially ruinous to individuals. Health insurance transfers money from healthy people to the sick and enables them to pay for high-quality services they would otherwise not be able to afford. No matter how well an individual planned his budget, medical expenses can still be burdensome because illness usually happens unexpectedly. "The purpose of any insurance policy is to convert an uncertain, but potentially large loss into a certain small loss. Such a conversion benefits the consumer if greater losses cause progressively large declines in utility (that is if there is a diminishing marginal utility of wealth)" (Newhouse and Phelps, 1976).

Since the cost of providing healthcare rises over time, the decision is not about whether or not to obtain it, but which plan and how much coverage to purchase. Many options are available to the consumer: Private health insurance can be purchased from private insurance companies to provide coverage for healthcare expenses. It could be in the form of hospital insurance, physician insurance, and surgical insurance.

But why do people demand health insurance? To answer this question, there is the need to understand how risks and uncertainties affect demand for health insurance. The standard utility theory assumes certainty of events. The fact that some events are uncertain causes us to change our standard utility theory. In the real world, the occurrence of illness is so uncertain.

The von Neumann-Morgenstern utility function shows the decision maker's preference with respect to risk. It says the rational consumer will choose the course of action that has the highest expected utility. It indicates how we convert wealth into utility, accounting for different states individual's development (Zweifel et al., 1997). A simple form of expected utility theory assumes that a consumer's utility, U , is a function of disposable income, Y . Assuming there is a probability, p , that the consumer will become ill and spend L on medical care. Alternatively, assume a health insurance context, the consumer could purchase full insurance coverage for the actuarially fair premium of $P = pL$, for which the consumer would receive a payoff transfer, $I=L$, if sickness strikes.

Expected utility without insurance (EU) is given by,

$$EU_{oi} = (1 - p)U(Y) + pU(Y - L) \dots\dots\dots (3.4)$$

Where EU is expected utility, $(1-p)$ is the probability of not sick, p is the probability of getting sick, and $(Y-L)$ is remaining income after paying medical bills.

While expected utility (EU) with insurance is,

$$EU_i = (1 - p)U(Y - P) + pU(Y - L + I - P) \dots\dots\dots (3.5)$$

$$= U(Y - P)$$

A consumer will prefer to buy insurance if the marginal utility of income is declining, i.e. if

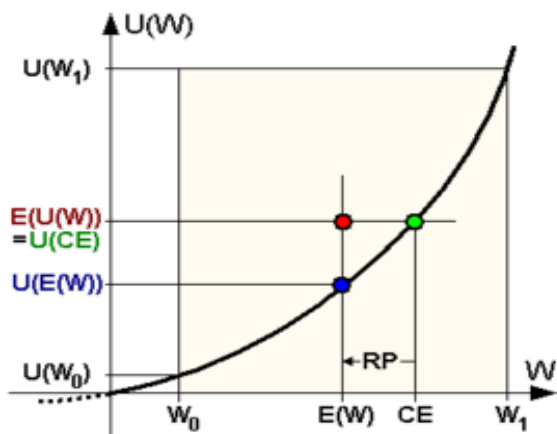
$$EU_i > EU_{oi}$$

$$U(Y - P) > (1 - p)U(Y) + pU(Y - L) \dots\dots\dots (3.6)$$

The consumer's choice is between certain losses and uncertain actuarially-equivalent losses. If the consumer buys insurance, it is as if insurance is demanded because of the certainty it

The total wealth² of the consumer, W_1 gives a utility of $U(W_1)$. When an individual falls ill and pays a medical cost of W_0 , the utility falls to $U(W_0)$. If the consumer buys an insurance policy, it will cost her $W_1 - E(W)$, where $E(W)$ is the expected income after paying the insurance premium. $E(W)$ comes with an associated expected utility of $U(E(W))$ which is the expected utility of the consumer if they buy an insurance policy. The expected utility without an insurance policy is given as $E(U(W)) = U(CE)$. Because the risk averse individual is faced with a concave utility function that exhibits a diminishing marginal utility of wealth, the expected utility with an insurance policy, $U(E(W))$ is greater than the expected utility without an insurance policy of $E(U(W)) = U(CE)$. CE is the income that is derived from the utility without insurance. The difference between total wealth (W_1) and CE is referred to the Certainty Equivalence. This amount indicates that the individual will just be indifferent to buying the policy.

Figure 3.2: A convex utility function for a risk lover person



Source: Modified by Author based on Zweifel et al (1997)

² For the purpose of this discussion, wealth and income will be used interchangeably.

The total income of the consumer is W_1 , associated utility of $U(W_1)$. When the risk lover falls ill, the medical cost will be given by W_0 , and the utility falls to $U(W_0)$. If the individual does not take any insurance policy, the expected utility will be given as $E(U(W)) = U(CE)$ and this gives an income of CE . $E(W)$ is the expected income of the consumer after paying an insurance premium so that $W_1 - E(W)$ is the cost of the insurance policy, and the associated expected utility with insurance is $U(EW)$. For a risk lover facing a convex utility function, the expected utility without insurance is greater than the expected utility with insurance.

In conclusion, a risk lover facing convex utility function has an expected utility without insurance greater than the expected utility with insurance. In contrast, the risk averse person who is faced with concave utility function gets an expected utility with insurance which is greater than the expected utility without insurance. The most prominent factors that affect demand for health insurance are the probability of illness, cost of illness, degree of risk aversion, income/wealth, and price. Other socioeconomic and cultural factors/religious factors like geographical location, social capital/networking, and access to information.

In theory, health insurance is likely to increase healthcare utilization from different points of view. First, through affordability. Because the health insurance has already collected money from the subscriber, the company pays indemnities (in this case, cost of treatment), making healthcare more affordable to individuals to utilize better healthcare services, which they would otherwise not be able to afford. Second, the presence of moral hazards leads to high utilization due to hazardous behavior of the insured. Third, the principle of adverse selection states that it is rather people with ill-health who normally self-select themselves to be insured. Since they are already the ones with bad health, they are likely to visit physicians more often than otherwise. Utilization is measured in different ways. It can be measured as a decision to seek

healthcare when ill. It can also be measured by the number of visits to the healthcare provider by patients. Another measure is the out-patient and in-patient healthcare utilization.

The concept of moral hazard is widely used to explain the notion that with the presence of health insurance, marginal cost (out-of-pocket payment) decreases and healthcare use increases. In fact, usually, the healthcare consumed may be of less value to the consumer than the cost to the insurer. Demand for healthcare will differ when the individual is faced with different levels of out-of-pocket payment, co-payment, and health insurance. Health insurance reduces an individual's unobserved effort to maintain good health. This is because health insurance covers some or part of the financial costs associated with poor health behaviours, and the insured person may have less incentive to live well. For example, they may exercise less, eat anyhow, smoke and drink alcohol, etc (Einav and Finkelstein, 2018). First-year economics teaches that demand for a commodity is inversely related to the price. So, it is only obvious that with lower price demand will be more. So if health insurance decreases the price of healthcare, it can be expected that demand for healthcare will increase. It should be remembered that demand for healthcare cannot be discussed in the same way as other economic commodities. This is because demand for healthcare is a 'need' based and the slope of the demand curve may not necessarily be negative. This is the focus of the paper: to estimate how the presence of health insurance increases utilization and decreases out-of-pocket payment.

3.3.2 Empirical Literature

The main objective of establishing the National Health Insurance Scheme is to increase access to healthcare. For this reason, researching whether or not NHIS enrolment has increased utilization is not out of place at all. This is not the first time such a study has been done. Many

studies have been done to investigate the effect of health insurance on healthcare utilization and have shown that enrolment onto health insurance can affect a person's healthcare utilization.

Lambon-Quayefio and Owoo (2017) employed probit and propensity score matching to find out whether or not active membership in the National Health Insurance Scheme (NHIS) has any influence on neonatal deaths in Ghana. Using data from the 2014 Ghana Demographic and Health Survey, the study confirmed that indeed the National Health Insurance Scheme has the potential of substantially improving the health outcomes and that neonates of mothers with valid health insurance cards are significantly less likely to die. In the model, the authors interacted health insurance coverage with place of residence and distance to a health facility. The conclusion was that even though a mother may have a valid health insurance card, residing in an urban area will still increase the risk of neonatal deaths compared to other women. The plausible explanation was that the health facility in the urban areas could be overstretched and congested. In a similar conclusion, with a valid health insurance card, neonates may still be at high risk if the distance to the nearest health facility is a problem. The paper then recommended a policy change that would reduce congestion and also reduce the distance to health facilities, particularly, urban areas.

In addition to knowing the effect of health insurance on maternal care utilization in Ghana, Owoo and Lambon-Quayefio (2013) were interested in exploring the role social influence plays in decision making. The study used village-level data from the 2008 Ghana Demographic and Health Survey to investigate the effect of health insurance and social influence on maternal care. Using GIS information and employing a spatial lag regression model in the study, the paper concluded that women who have health insurance coverage are more likely to utilize antenatal services than those who are not insured. The results also indicate a strong and positive

relationship between the intensity of antenatal care use and women's age, wealth, and access to health insurance. In addition, the intensity of antenatal visits appears to be spatially correlated among the survey villages. Though the regional effect of antenatal care use is smaller under the spatial lag model, women in Greater Accra, Brong Ahafo, Upper East and Upper West are more likely to intensify use of antenatal care, compared to women in Northern region. Women are more likely to participate in social events such as funerals, weddings, and festivals. Traditional and religious leaders can influence the use of antenatal care. There may be some social influence in the use of maternal services. This may happen because women who have benefited from maternal healthcare service are likely to pass on the information to new users. All channels of information dissemination about maternal services could play a role in this regard. Additionally, social influence is likely to be present among villages in Ghana, especially where they have similar religion, culture, and traditional values. The study also found that older women and richer women utilize maternal healthcare more intensively.

There are studies on the effect of health insurance on maternal healthcare utilization. Wang et al. (2017) were interested in establishing the effect of health insurance on maternal healthcare utilization among three countries who had been found to have high levels of health insurance coverage – Ghana, Rwanda, and Indonesia. The study adopted four measures of maternal healthcare utilization: making at least one antenatal care; making four or more antenatal care visits; initiating antenatal care within the first trimester; and giving birth in a health facility. The method of estimation for the study is the propensity score matching. Healthcare utilization varied among the three countries. Women in Ghana and Indonesia (80%) have had four or more visits than Rwanda (36%). Percentage of women covered in any form of health insurance is highest in Rwanda (73.1), followed by Ghana (40.1), and Indonesia (36.3). Although national health insurance schemes are designed to help the poor access healthcare, coverage has been

found to be high among the rich, especially Ghana and Rwanda, but less pronounced in Indonesia. Using Demographic and Health Surveys (DHS), and employing propensity score matching, the study showed that health insurance coverage increases at least two of the four measures of antenatal care utilization in each of the three countries. The overall results illustrate a positive and statistically significant effect of health insurance on maternal healthcare utilization after adjusting for systematic differences in observed characteristics of insured and uninsured women. The characteristics of health insurance schemes in the three countries also play key roles in healthcare utilization. For example, in Ghana and Indonesia, maternal visits are free, but in Rwanda, there are co-payments. The results indicate that free health insurance enrolment for the poor and income sensitive premium, as well as low or no co-payments are likely to encourage high use of maternal healthcare services.

Management of the National Health Insurance Scheme claims the bills are high and that high-risk individuals self-select into the scheme. This assertion is supported by the fact that there are more visits to health facilities creating financial problems to the scheme. It is for this reason that Duku et al. (2016) investigated the presence of adverse selection by assessing the effect of healthcare utilization and frequency of use of the National Health Insurance Scheme renewal. The study used data from 2008 to 2013 in two regions in Ghana – Greater Accra and Western regions. The result indicates that people who enroll and are likely to utilize healthcare services more frequently or within a year are more likely to renew membership. On the contrary, those who are not likely to utilize healthcare services are unlikely to renew and therefore drop out of NHIS in the following year. Employing a Pearson Chi-squared test, the study found evidence suggestive of the presence of adverse selection in the NHIS. This is because the majority of the insured who utilize healthcare renewed their membership while most of those who did not utilize healthcare dropped out. Once people enrol and utilize healthcare, those with high-risk

health conditions realize the need for future care consumption and therefore renew their membership. Even those who are not insured but realize they have chronic diseases and cannot afford medical bills tend to enrol with the hope they will be able to access healthcare with their NHIS card.

Some expectant mothers usually do home delivery which endangers their health and causes health complications. Nketiah-Amponsah and Arthur (2013) attempted to examine the extent to which expectant mothers' access to health insurance influence their choice of delivery facilities which are broadly categorized into public, private and home delivery. The study used data from the 2008 Demographic and Health Survey and employed the method of multinomial logistics regression. The result indicates that the choice of a healthcare facility is influenced by a number of demographic factors such as age, sex, and education. Particularly, the chi-squared test shows a statistically significant difference between the health insurance status of expectant mothers and the choice of delivery facility. Health insurance status proved to be an important and significant predictor of choice of delivery facility. Women with health insurance coverage are about 18 percentage points likely to deliver at a public allopathic health facility. Women with access to health insurance are more likely to deliver in modern health facilities. The result shows a low propensity of the insured to deliver at a private health facility. For instance, women with access to health insurance are about 8 and 1 percentage points more likely to utilize public and private respectively, compared to home delivery. Women in urban areas are 16 percentage points more likely to deliver at public health facilities relative to home. The results show differences in the effect of health insurance status on the choice of delivery among the ten regions in Ghana. Women in higher wealth index have the propensity to deliver in a health facility compared with home delivery.

Blanchet et al. (2012) investigated the effects of NHIS on healthcare utilization. Employing data from the Women's Health Survey of Accra (WHSa II) conducted from September 2008 to June 2009. They found that the primary objective of the NHIS of increasing access to healthcare had been achieved at least among Accra women. While other papers try to estimate the impact of health insurance on healthcare utilization, Gajate-Garrido and Ahiadeke (2012) examined how parental enrolment in national health insurance could affect healthcare utilization. Using data from 2008 Ghana Demographic and Health Survey and District Mutual Health Insurance Scheme (DMHIS) existed in 2008, they found out that parent's participation in the National Health Insurance Scheme increased the probability of seeking higher and quality prenatal services, as well as parents becoming more active users of curative and preventive care. Gajate-Garrido and Ahiadeke (2015) later found a much more interesting result about the impact of health insurance enrolment and concluded that enrolling on health insurance increases the probability of mothers seeking quality maternal care and that of curative care for their children.

Saksena et al. (2010) examined the impact of health insurance on access to healthcare in Rwanda and reported that 58.7% of Rwandans are not covered with any Mutual Health Insurance (MHI), 36.6% utilize MHIS, while the remaining 4.7% use other types of health insurance. The study found that mutual health insurance coverage is associated with a significant increase in healthcare utilization. Those who are covered with health insurance use twice of healthcare as much as those who are not enrolled in health insurance. A higher degree of financial risk (about four times) was associated with individuals without any health insurance coverage. Currently, Rwanda has the highest health insurance coverage in Sub-Saharan Africa (SSA). The impact of SHI in low and middle-income countries has been partially documented. Previous studies have focused on the impact of SHI on healthcare

utilization, or financial management and sustainability, with little emphasis on the impact of PHI. In an attempt to fill in the gap, Spaan et al. (2012) reviewed existing literature up to 2011. The study aimed at finding the impact of both Statutory Health Insurance (SHI) and Private Health Insurance (PHI) on different domains namely, resource mobilization, financial protection, healthcare utilization, healthcare quality, social inclusion, and community empowerment. Their search strategy employed a systematic review of studies on health insurance in Africa and Asia. The reviewed literature showed a positive and significant impact of SHI on financial protection, utilization, and social inclusion, but less effect on resource mobilization, quality of care, and community empowerment. Whereas some countries like Bangladesh experienced improvement in resource mobilization because of SHI, other countries such as Rwanda and Uganda recorded weak financial sustainability (Spaan et al., 2012). Dong (2011) confirmed existing knowledge on the impact of health insurance on healthcare utilization and concluded that individuals with health insurance use more healthcare. This is because healthcare has now become cheaper. However, the paper also found that having health insurance could encourage unhealthy behaviour known as moral hazards.

Existing studies have confirmed that the uninsured person has worse health outcomes. Card et al. (2012) used the onset of eligibility for the Medicare program at age 65 to estimate the impact of health insurance on healthcare utilization and health outcomes. The paper concluded that health insurance coverage increased at age 65 for 90% to 98% for the population as a whole. The rise in coverage is large for less educated compared to the more educated. The health insurance coverage fell from 20% to 5% for educated whites aged 65. The results from the commonwealth fund Biennial Health Insurance Survey (2014) indicated that the uninsured working adult population from 37 million (20%) in 2010 to 29 million (16%) in June 2014. The survey also finds that there was a decline in the reported cost-related access problems and

medical-related financial difficulties, among adults from 80 million (43%) in 2012 to 66 million (36%) in 2014. The adult population who reported problems paying medical bills decreased from 75 million in 2012 to 64 million in 2014.

After the introduction of health insurance through the Affordable Care Act (ACA), healthcare increased by a greater margin creating a shortage of health workforce. Anderson (2014) stated an estimated number of 30 million Americans are expected to enrol in health insurance through the ACA, and an obvious shortfall of health workers. This increase in healthcare utilization puts much burden on the already fragile systems. Combined with a shortage of health personnel, patients are likely to face increasing waiting times, limited access to providers and shortened time with physicians. ACA needs a major redesign of the workforce to meet the demands of Americans. The USA spends more on healthcare than any other country. Xiao (2011) investigated the effect of health insurance on healthcare spending among young adults in the United States. Using the acute discontinuity at age 19 to measure the effects of health insurance on healthcare expenditure, the paper concluded that a 9 percent decrease in insurance coverage rate among men reduces spending by 46%. However, a 4 percent decrease in insurance coverage rate among women led to an increase in spending by 24%. The net effect of losing health insurance is large and significantly negative on men but the effect on women is less and positive.

While the community-based health insurance is expected to include otherwise excluded members, it does not cover the very poor. Those covered under health insurance are more likely to access healthcare, especially modern hospitals. Mutual health insurance organized in Senegal recommends rural health insurance for the poor since it is more feasible. It is shown that access to health insurance could have a positive impact on a member's socio-economic situations. Community financing schemes have the potential to improve risk management

capacity of the rural folks. There is also the need to scale up enlargement of risks schemes (Jutting, 2001). Ibiwoye and Adeleke (2007) were interested in investigating how health insurance affects healthcare provision in developing countries. The paper reveals that health insurance makes healthcare more accessible to a wider population and helps reduce household healthcare expenditure. Sekyi and Domanban (2012) analyzed the effect of national health insurance scheme on the probability of utilizing outpatient care and its related out-of-pocket payment. They used logistic regression and linear regression for these analyses respectively. The finding was that enrolment onto health insurance increase utilization of healthcare. There was a significant difference in the average amount paid which was about GH¢ 3.5 for covered individuals compared with GH¢ 16.03 paid by uninsured persons.

A study by NDPC (2015) reveals that in Ghana, more than 80% of those with NHIS coverage are more likely to visit public and private formal providers to seek treatment for malaria. The study further finds that NHIS coverage is more likely to lead to a 65% percentage point increase in the likelihood of seeking formal medical treatment for child fever. In general, Enrolment onto the National Health Insurance Scheme is more likely to increase healthcare utilization from the public and private health centres, and regional hospitals. However, those without any insurance coverage are rather more likely to seek informal treatment to cure malaria than the insured group.

This study fills in the gap by emphasizing the importance of the National Health Insurance Scheme on access to healthcare. While other papers concentrated on the effect of the National Health Insurance Scheme on the purpose of use of healthcare (like for antenatal purposes, maternal health, etc.), this paper gives more attention to estimating how enrolment onto the National Health Insurance Scheme affects the decision to seek healthcare and also the choice of a particular type of healthcare provider. The thesis uses a more recent nationally

representative data from the GLSS 6. The study also focuses on how enrolment onto health insurance reduces out-of-pocket payment.

3.4 The effect of the price of time on demand for healthcare.

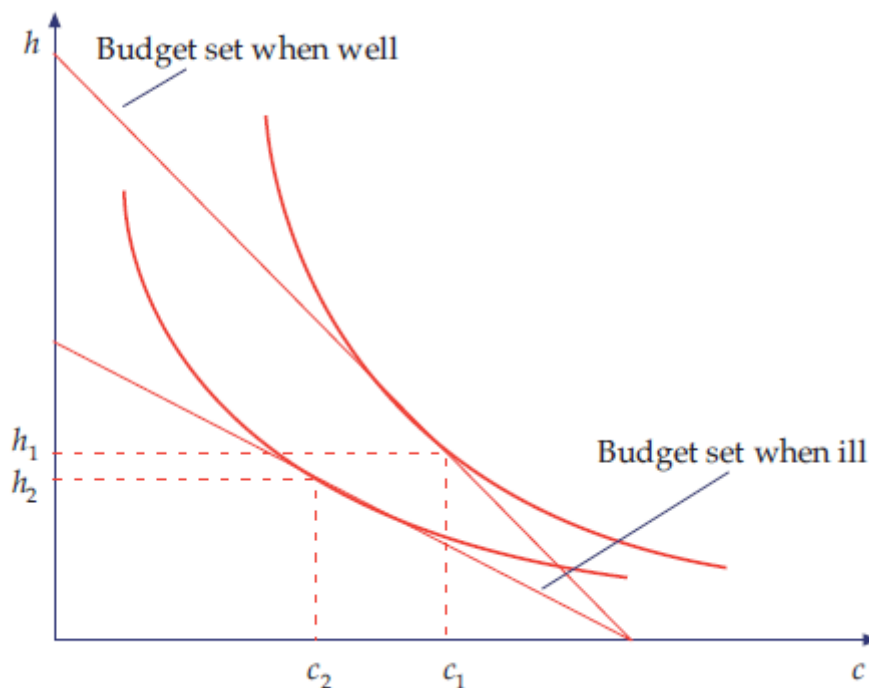
3.4.1 Theoretical Literature

In the medical world, patients make various choices: whether or not to go ahead and seek treatment when sick, go for surgery, immunize their children, go for check-ups, among others. According to Jeremy Bentham's (1748 to 1832) concept of utility, the objectives of an individual were to gain pleasure and avoid pain. A utility is a measure of the total satisfaction derived from consumption. A person's utility is affected by not only his consumption of physical commodities but also by the psychological attitudes, peer pressure, personal experience, and the environment. Economists can rank or measure utility. The sum of individuals' pleasure equals the utility of the society. Anything that gives utility is considered good and what gives disutility is bad. The utility could be measured in different components such as (1) intensity (2) duration (3) certainty and (4) nearness. A major weakness of Bentham's argument is that it neglects the consumption of externalities arising from the side effects of one's consumption. In discussing utility function, health status and consumption of goods are key. Price affects the demand for healthcare. But there is also the opportunity cost of seeking healthcare, such that even if the price is assumed to be zero, opportunity cost still affects demand for healthcare.

Assume a utility function, $u(c, h)$, where c is consumption of goods, and h is health. The assumption is that greater health and higher levels of other commodities makes the individual happy. Any combination of c and h will leave the individual indifferent provided their welfare

remain unchanged. Demand for healthcare is a derived demand, in the sense that healthcare is not demanded for its own sake but for the sake of improving health status. We also assume a very simple production function where π unit of healthcare is required to produce additional units of health. The only caveat is that the production function exhibits decreasing returns to scale so the inputs of healthcare per unit required to produce a unit of health increases at the margin. Given the set of feasible health-consumption bundles, the budget set is then given as: $c + \pi h \leq m$, where c is consumption of goods, πh is health status, and m is income. It is worth noticing that prices are assumed to be unit. When sick, π increases (same as having prices increase) and the budget line rotates inwards. Sickness makes health expensive such that a proportionate increase in prices leads to a less than proportionate decrease in demand.

Figure 3.3: Budget Constraints and optimal consumption bundles for individuals with different health status.



Source: World Bank (2015)

The indifference curve represents all alternative combinations of the health (h) and consumption (c) which makes an individual equally well off. The slope of this indifference curve (IC) is called the Marginal Rate of Substitution (MRS), and it must be diminishing for smooth convex curves. The MRS tells us the trade-off between goods that the consumer is willing to consume. When an individual falls sick, their welfare decreases (illustrated by the lower indifference curve). The degree of substitutability reveals whether the two goods are perfect substitutes or imperfect substitutes.

The necessary condition for maximizing a utility function is to assume no change in utility. If this happens, the partial derivatives of both health and consumption are equal. The first order condition helps an economic agent to find his maximum point by finding the point where utility does not respond to very small movements in any of the goods consumed- health and consumption. The activity of the economic agent should be pushed to the point where its marginal contribution to utility is zero. Any point short of that point would fail to maximize utility. Simply put, the first order condition for utility maximization ensures that the slope of the budget line and that of Indifference Curve are the same. When a consumer spends all his income on only one good, it results in a corner solution (Nicholson 2007). For instance, if a consumer spends all his income on health then he enjoys only health at the intercept of the budget line on the vertical line at a point marked, h. However, if he spends all his income on consuming other commodities then he enjoys only consumption at the intercept of the budget on the horizontal line at a point called c.

The first order condition for utility maximization is not sufficient to ensure optimization. For a local maximum, utility should be decreasing for any small change in health and consumption away from the critical point. This is so important to ensure a diminishing marginal rate of substitution in a convex indifferent curve.

In the real-life situation, utility cannot be maximized without any restrictions on the choice of goods³. In many situations, it is required that the goods consumed be positive. Choices for these health and consumption are constrained by the purchasing power available: the person's budget constraint. Because of constraints, utility cannot be attained as large as it could be. The constraint assumes that the total expenditure on the goods must be less than or equal to the maximum amount of income. While prices and income are exogenous, the quantities of the health and consumption consumed, as well as the Lagrangian multiplier are all regarded as endogenous variables.

Two very important methods help in finding the maximum quantities of the goods to be consumed, through constrained utility maximization process. These methods are the Lagrangian method and the substitution method. The Lagrangean multiplier is very important in consumer theory because it tells how much utility will change given a unit change in quantities consumed of the goods. It also indicates, at the optimal point, the ratio of marginal benefit (MB) of increasing the goods to the marginal cost (MC) of increasing the same goods should be equal. The ratio of MB and MC of the goods must be equal to the Lagrangian multiplier. The multiplier assigns a shadow price to the constraints. A high value indicates that utility can be increased substantially by relaxing the constraints because the good has a high benefit-cost ratio. A low value, on the other hand, indicates that there is not much to be gained by relaxing the constraint. A value of zero means that the constraint is not binding at all.

The probability density function shows the probability that each specific outcome will occur. This is a discrete choice model. The Binomial distribution is the most basic discrete

³ For the purpose of this study, goods refer to health and consumption

distribution. Usually, the good is assumed to take only two values, 1 and 0. The Uniform distribution assumes that the possible values of the variable occur in a defined interval and that each value is equally likely. The exponential distribution is a continuous distribution for which the probabilities decline at a smooth exponential rate as the quantities consumed of a good increase. Normal distribution stems largely from the central limit theorem, which states that the distribution of any sum of independent random variables will increasingly approximate the Normal Distribution as the number of such variables increase (Nicholson and Snyder, 2007).

The previous section discussed how important healthcare is to health and health is to the utility function. Therefore, for the consumer to maximize satisfaction, all constraints must be identified. Opportunity cost has been found to be a major constraint to healthcare seeking. Thus, understanding the effect of time price even if the market price is assumed to be zero is very essential.

3.4.2 Empirical Literature

There is a growing concern about the determinants of the choice of healthcare provider. Price, income, insurance, and demographic factors have all been found to influence the choice of healthcare provider. A growing population is likely to increase the number of health seekers because they are more likely to be associated with certain illnesses than the younger population. Men suffer more frequent health losses due to lifestyle choices such as drinking and smoking, and overeating. As more women enter the labour force and pattern themselves after men, these differences are narrowing. Women are however frequently associated with pregnancy and childbirth related sicknesses. Income is positively related to seeking treatment when ill because of affordability. Higher Education is associated with high income and awareness or

consciousness of the dangers of illness and drugs. Educated ones are better informed about medical conditions and health facilities than uneducated ones. The opportunity cost of illness to the educated and high-income earners is very high since they lose a lot of money because of reduced work days as a result of illness.

As stated in the theoretical review, medical insurance increases the demand for healthcare due to adverse selection⁴ and moral hazard⁵. Sometimes, a doctor's prescription may increase demand for that particular healthcare. This is called the principal-agent relation where the principal (patient) gives authority to the agent (physician) to make decisions on his behalf about what kind of health to demand. The problem exists when the interests of both the principal and agent diverge. In the medical practice, patients are normally not well-informed concerning alternative diagnosis and treatment, and even the dangers or side effects of the drug. Patients trust doctors to make certain decisions on their behalf. Doctors can influence the demand for some healthcare, which is often referred to as Supply-Induced Demand (SID) (Zweifel et al., 1997). When faced with two alternative treatments that are equally effective, the patient chooses the cheaper alternative and saves money.

Sarasohn-Kahn (2011) concluded that those who have higher levels of concern about their health increase the demand for health technology for check-ups. A study by Russell (2008) focused on the cost of healthcare, both direct and indirect- which plays a role in the health seeking behaviour of a particular household. The cost includes the cost of healthcare, transportation, time spent at the health facility. The study was carried out in three rural

⁴ Occurs in insurance policy where because of information asymmetry, the insurer is confronted with the probability of loss due to risk not factored in at the time of insurance.

⁵ When an insurance policy increases the probability of occurrence of a loss larger than normal.

communities of the Dangme West District in the Greater Accra region. Using bivariate analysis, the result indicated that 80% of the respondents choose the cheapest nearby health facility. About 68% have been to health facility other than what they usually visit. Almost all respondents believe that other people also patronize the same health facility they usually visit. No respondent went to traditional healers. More than half of the people walked, while others took cars to the health facility. There exists a negative relationship between the promptness of care-seeking behaviour by a health provider and healthcare seeking. There is also an inverse relationship between the direct cost and healthcare, so is the cost of transportation. Individuals wait until the illness become serious before they visit a health facility. Most of the respondents say that they are treated within the first hour. The waiting time in clinics and chemical stores are shorter than hospitals. This is because hospitals are more likely to be congested than clinics and chemical stores. Again, because severe sicknesses are usually referred to hospitals, physicians in the hospitals may want to diagnose the patient before administering treatment. Another major determinant is the perceived quality of the health provider. Education was also found to be a significant determinant.

In finding out the determinants of demand for healthcare services in the Kwabre East district in the Ashanti region of the Republic of Ghana, Osei et al. (2014) used both primary and secondary data and an ordered probit model for their analysis. The dependent variable was ordered from no visit to more than four visits to the healthcare facility. Enrolment onto the National Health Insurance Scheme and an increase in income were found to increase utilization of healthcare. Surprisingly, the coefficients of hospital cost and transportation were also positive indicating that increases in hospital and transportation costs increase utilization. This may be due to the perception of high quality associated with health facilities. When one is sick,

the only objective at that time is to get well so certain costs may not matter to the patient who is desperate to get well.

Traditional medicine plays an important complementary role in healthcare delivery, but the acceptance of Complementary and Alternative Medicine (CAM) has been slow in many countries, including Ghana. Kuunibe and Domanban (2012) investigated the factors that influence a person's decision to demand CAM in the Upper West Region (UWR). The commonly used CAM in UWR includes herbal medicine, spiritual healing, and local orthodox (bone setting) services. Just a small percentage (29%) of the respondents used CAM, whereas 70.1% of respondents did not use it. Majority of those who visited CAM did so because of illness. The frequency of illness had a positive effect on the demand for CAM. Proximity to a health facility, time spent, insured persons, all have negative significant effects on the utilization of CAM.

In her paper on 'the Aging America creates demand for healthcare workers' Dawson (2012) concluded that "The labour force is projected to get older, become racially and ethnically more diverse and show a small increase in women as a share of the total labour force. This creates an increase in demand for healthcare in the USA (Dawson, 2012). In Ghana, it was found that households with a greater number of female children and households with male heads prefer self-medication to any other form which required some form of payment (Nonvignon and Aglobitse, 2007). Baidoo (2009) concluded that the traditional healthcare system is widely used by the people of Tema municipality (in Ghana) because it is available and accessible, less expensive and with few side effects.

Nketiah-Amponsah (2009) investigated the determinants of public health insurance and found that income, age, religion and access to health information influence women's participation in

health insurance. Lower population-per-nurse and a shorter distance to the health facility are more likely to increase the demand for public health insurance. According to Mueller (2002), the dynamics for meeting the demand for healthcare are a nurse-to-patient ratio, population demographics, patient conditions, healthcare modalities, demand for health services, and nursing workforce demand. Nketiah-Amponsah and Sarkodie (2014) used data from the Ghana Living Standards Survey 6, employed multinomial logistic regression and found that in Ghana, income, education, age, ethnicity and religion significantly influence a person's choice for a particular healthcare provider. The paper did not find any gender differences in the choice of healthcare provider.

Asenso-Okeyere (1995) attributed the gap in access to healthcare between the urban and rural areas to the unequal budgetary allocation to these areas. He noted that while about 30% of the public sector health budget goes to curative healthcare in the urban areas, only about 20% goes to the rural area. The study recommended some measures to be taken to improve healthcare financing in the country, especially in rural areas. In rural areas, normally there are no qualified health practitioners and even midwives. The traditional practitioner usually takes the responsibility of providing such services. The cost of getting services from the traditional health practitioner ranges from fowls, sheep, and eggs depending on the severity of illness. They have to diagnose the (usually spiritual) cause of the illness and offer treatment. Given the important role played by the traditional healthcare system, a conscious effort must be made to standardize the system by improving hygiene and incorporating the use of modern equipment. This will help reduce the demand on orthodox health facilities and decrease the public health budget. Other ways of improving healthcare financing in Ghana would be health insurance, and the local community's contribution to provide health infrastructure. Perhaps policymakers

took this recommendation into consideration and introduced the National Health Insurance Scheme in 2004. The major concern now is the sustainability of the Scheme.

Using data from Lira district in northern Uganda to estimate the price and non-price factors that influence demand for healthcare, Odwee et al. (2006) found that demand for healthcare services in the region was negatively related to the user-fee and drug unavailability. The paper went a step further to do some simulation and concluded that any increase in medical charges will lead to a fall in demand for public health centres, increases the demand for private and self-medication. When drugs are not available, Ugandans in the region tend to shift their demand from government health facilities to private health facilities.

In April 1993, the survey of the National Institute of Statistics, entitled Social Dimension of Structural Adjustment was conducted in Cote d'Ivoire. Cisse (2011) employed multinomial logistics regression for the analysis and concluded that price of medication, travel distance, waiting, time, educational level play a critical role in healthcare utilization in Cote d'Ivoire.

Anyanwu (2007) conducted research on the demand for healthcare institution' services for malaria fever treatment in Nigeria. It was found that price, income, travel time and waiting time as major determinants of demand for health institution for malaria fever treatment. These variables affected healthcare institutions differently depending on whether the facility is public, private or pharmacy. Price was found to be generally negatively related to demand for healthcare institutions. Except for private healthcare, Income, however, is negatively related to public healthcare institutions. Higher travel time significantly affects private and pharmacy healthcare institutions. The longer the service time, the lower the demand for private and pharmacy institutions, except public. Waiting time was also found to be a significant

determinant of healthcare institutions. It negatively affects private clinics and positively affects public hospitals.

To investigate the effect of household socioeconomic factors on the choice of treatment for fever among children in Ghana, Arthur (2014) used data from the 2008 Ghana Demographic and Health Survey (GDHS). He employed the multinomial probit model and made the following conclusions. There are three major types of treatment choices: government, private and traditional/self-medication. The result suggests that household wealth, health insurance status and place of residence significantly affect treatment of childhood fever. Households with higher wealth and health insurance status are more likely to utilize government health facilities. As expected, rural dwellers are most likely to use traditional/self-medication. The age of the mother and birth order are among the significant variables that influence the choice of treatment of fever.

After reviewing the existing literature, a big gap in literature was found. First, a greater number of the reviewed papers did not use nationally representative datasets. Their datasets were either collected on specific regions or districts in Ghana and elsewhere. Second, most of these studies are so old that their findings may not be relevant in contemporary settings. A further review of the previous studies shows that they concentrated mostly on demographic factors as determinants of choice of healthcare provider in Ghana, and ignored the direct and indirect costs, hence the gap created for this study to fill. As a contribution to knowledge, this paper attempts to estimate how the direct cost (travel cost and money price) and indirect cost/opportunity cost (travel time and waiting time) affect demand for particular healthcare. These are what the author refers to as attributes of healthcare. The essence is to know how these attributes of healthcare influence demand for healthcare even if service is provided at “zero price”.

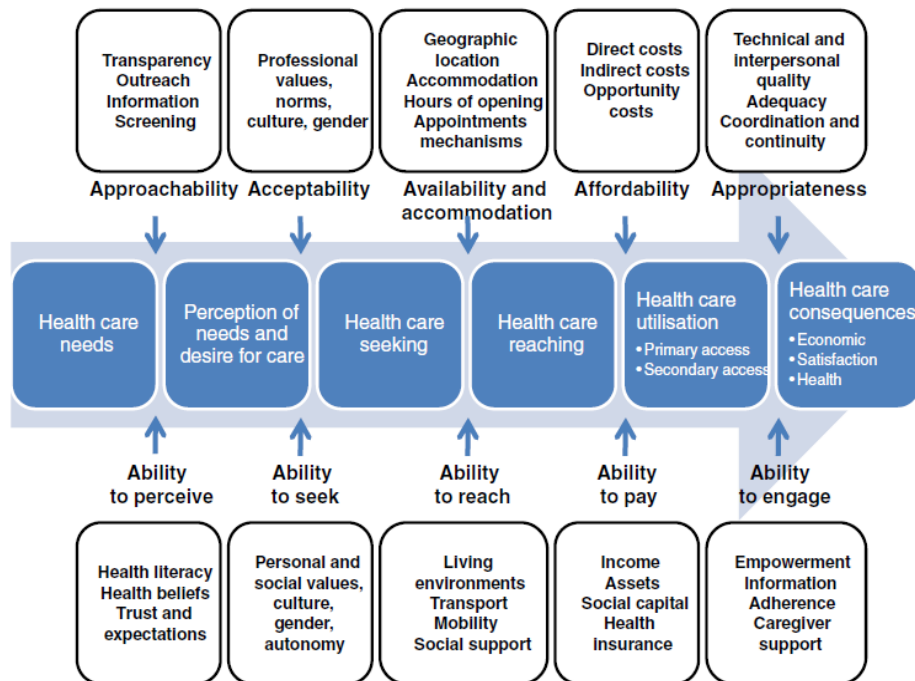
3.5 Conceptual Framework of access to healthcare

Central to the health system is access to healthcare. Access to healthcare remains a complex notion. The multimillion question is where should the emphasis be? Should it be on attributes of the provider or the attributes of the consumer or the process of delivery? Access to healthcare is defined as the use of healthcare, qualified by the need for care. It can also be seen as the use of service, provider or institution. Realized access is easy to measure than Potential access. Often utilization is used in place of realized access because it is easy to measure utilization. Access is often a product of supply factors such as location, availability, cost and quality of healthcare, and demand factors such as burden of disease, income, knowledge, attitude, etc (Levesque et al., 2013).

Following the work of Levesque et al. (2013), access is seen as the interface between the characteristics of persons, household, physical environment and the characteristics of the health system, organizations, and providers. In a broader sense, access involves the process of identifying healthcare needs and healthcare consequences, between which there are a number of steps to reach including the perception of needs and desire for care, healthcare seeking, healthcare reaching, and healthcare utilization. The factors to consider could be the supply side or demand side. Access then is defined as the opportunity to have healthcare needs fulfilled.

The conceptualization framework is based on five dimensions of accessibility of services as represented in Figure 3.4 (1) Approachability, (2) Acceptability (3) Availability and accommodation (4) Affordability (5) Appropriateness. These five dimensions of accessibility interface with five corresponding dimensions of abilities of persons which are: (1) Ability to perceive (2) Ability to seek (3) Ability to reach (4) Ability to pay (5) Ability to engage.

Figure 3.4: Conceptualization of Access to Healthcare



Source: Modified by Author based on Levesque et al. (2013)

According to Levesque et al. (2013), the approachability dimension relates to the existence of healthcare – the fact that when an individual is ill or injured, she can identify that some form of healthcare exists. Complementing approachability is the ability to perceive that a certain kind of healthcare exists. The ability to perceive the existence of healthcare service is achieved through health literacy, knowledge, the severity of illness, and disease burden. Acceptability relates to the socio-cultural factors, professional values, and norms determining the possibility of people to accept aspects of healthcare. For instance, certain religious groups in Ghana do not accept a blood transfusion. Similar examples could be found in other parts of the world where certain groups of people may not accept whole or aspects of certain kind of healthcare services. The individual’s autonomy to seek healthcare with regards to personal and social values and norms relates to acceptability.

Spatial inequality in healthcare facilities due to geographical location as well as the time it takes to seek healthcare is key to make access complete. This dimension results from characteristics of health facilities such as density, concentration, distribution, building, transportation, and individual's flexibility of working hours. Access is actually restricted if healthcare resources are unevenly distributed across the country. Ability to reach healthcare relates to personal mobility to visit a health facility. It also includes information about what exists and at which place. Restricted mobility due to old age, physical handicapped is a problem.

Perhaps, the emphasis of this thesis is on the fourth dimension which is affordability. Affordability reflects the economic capacity of individuals to spend money and time to use appropriate healthcare. It also reflects direct and indirect (opportunity) cost. The ability to pay for healthcare services depends on the person's social status, income level, assets, human capital, insurance, etc. Some studies have concentrated on economic variables like income, price, travel cost, travel time, waiting time, and health insurance, to assess access to healthcare. These models give the elasticity of various forms of healthcare services.

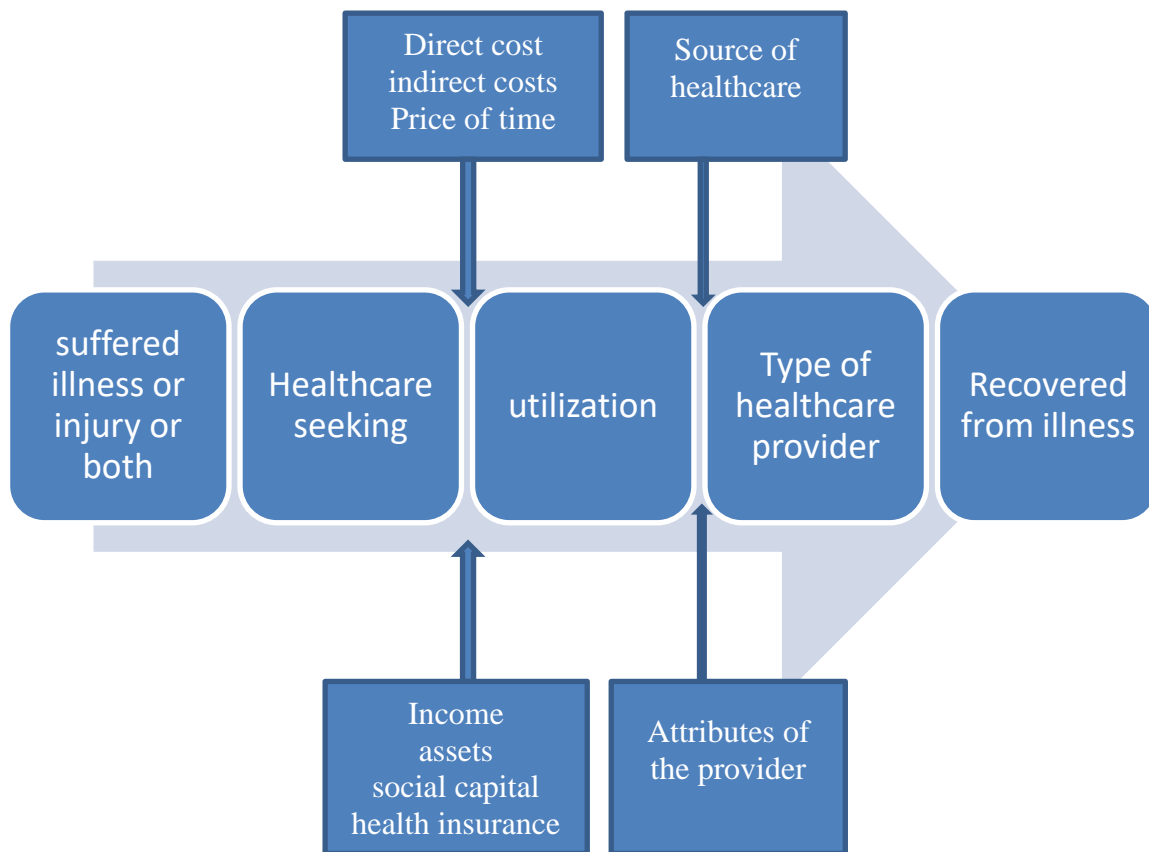
Appropriateness begins from identifying the best fit treatment that meets clients' needs, its timeliness, adequacy of care, and interpersonal quality of healthcare. This dimension could be linked to Amartya Sen's Capability Approach where the emphasis is placed on opportunities available to seek development. In his work on "Development as Freedom", Sen (1999) contests that given an individual's initial endowment and conversion factors, there must be an array of opportunities to realize her functioning (meeting healthcare needs). The opportunity to utilize the amount and type of healthcare one desires is at the centre of this fifth dimension. The opportunity to utilize only bad healthcare in itself is a restriction to access to healthcare. A person must have the array of opportunities to utilize also good quality services, with the right

amount, and delivered timely. The corresponding ability to engage in this dimension refers to the individual's participation in the decision-making process from both production and utilization ends. People should be empowered enough to be able to engage with the health suppliers and other key stakeholders in the health sector so that what they need is what is produced and at the right amount.

In conclusion, the conceptual framework of access to healthcare as proposed by Leveque et al. (2013) shows the various dimensions of the characteristics of the healthcare service as well as the abilities of the individual to meet the required healthcare with the right amount and on a timely basis, making access complete. However, the various dimensions of access identified are not completely independent constructs. They are interrelated. One dimension may influence the other dimension. The import of this framework is to help understand that access is the interface between the characteristics of healthcare services (quality, quantity, location, cost, etc) and the individual (place of residence, economic resource, and social status).

Based on Leveque et al. (2013), the author proposes this framework for the thesis.

Figure 3.5: Conceptualization of demand for healthcare



Source: Author's conceptualization

Figure 3.5 above gives a picture of the conceptualization of the thesis: demand and benefit incidence healthcare services in Ghana. The concept begins from when an individual is reported to have suffered from illness, or injury or both in the two weeks preceding the interview. The person takes a decision to either seek healthcare or not. Before the individual can utilize the healthcare, there are direct cost and indirect cost that must be paid. The direct cost includes the cost of treatment, often measured by out-of-pocket payment (amount paid for folder, diagnosis, drugs, and treatment, hospital stay, any other payment). The presence of health insurance may reduce the cost of treatment. If health insurance does not cover all the cost of treatment, then there is cost sharing and co-payment. With the presence of health insurance, even if the cost of treatment is zero, there still remain certain indirect costs that

impede utilization. This is referred to as the price of time - travel time and waiting time. The individual needs income, assets, social capital (relative or friend) and health insurance to pay the costs of treatment. Healthcare is provided by the government, private sector, and alternative healthcare (traditionalist, spiritualist, homeopathy). The decision to choose from any of these is based on the perceived attributes of the particular healthcare. These attributes may include the perceived quality of the services provided by each type. The decision to choose can also be influenced by the direct cost and indirect costs associated with each type. The decision can also be influenced by friends and relatives, or advertisement. Again, depending on the severity of illness, a particular healthcare provider is always preferred to another. That is why when certain illnesses are chronic and it is perceived that only a particular healthcare provider can cure it, then it doesn't matter the traveling time and waiting time to spend in order to seek treatment.

Finally, the individual seeks treatment to recover from the sickness. This is the derived demand for healthcare. People demand health because of utility and the ability to do other things. In other words, when a person is well, he/she is happy and is able to do other things. The objective of the third paper is to estimate the effect of the indirect costs (price of time) on healthcare utilization.

CHAPTER FOUR

4. DEMAND ELASTICITY AND BENEFIT INCIDENCE OF HEALTHCARE

4.1 Introduction

This chapter treats healthcare as one of the commodities consumed by individuals. For this reason, it is important to understand the sensitivity of demand for healthcare to changes in price and income. Each change in price and income is likely to affect the number of people accessing healthcare services, the intensity of use and cost to the patient (Ringel et al., 2001). This paper attempts to estimate how changes in price and income of the consumer affect their demand for a particular healthcare in Ghana. After estimating these elasticities, the results can be used to predict the effects of such changes on the use and cost of providing healthcare. The healthcare provider is categorized⁶ into public, private, and alternatives which are discussed under subgroups of insurance status, the location of residence, and gender. This is based on the kind of healthcare facility a respondent visited when he/she suffered from illness or injury or both in the two weeks preceding the survey.

The private healthcare service is quite different from public healthcare in various forms. Unlike public healthcare facilities which might just break-even, the main aim of the private healthcare provider is profit-making, and therefore are willing to invest more, make it attractive and target the rich and the elite in society. The private health facility is also less congested than the government ones, and it is usually patronized by the elite due to the low opportunity cost of visiting there. The private health facility is also usually found in the urban areas than the rural area. The private health facility in the country normally specializes in one or two treatments.

⁶ Details of such categorization and the sub-groupings will be discussed under methodology

For instance, some private health facilities such as Emmanuel Eye Clinic, have specialized in the treatment of only the eye. Others have concentrated on treating only the ear, bones, surgery, kidney, heart, bumps, etc. The private healthcare facilities are usually owned by individuals, religious organizations and some social associations. It is interesting to know that some public health professionals own private health facilities and usually refer their own patients to their own private health facilities. Most of the time, private sector workers enjoy health insurance funded by their employers and seek treatment from private health facilities.

However, the public health facility is usually owned by the government, financed with state resources, and are mostly operated with large administrative costs. The public health facility could be categorized into teaching hospitals, regional hospitals, district hospitals, polyclinics, clinics, and CHPS compound. Most of the time, patients are referred to 'bigger' health facility from a 'smaller' health facility especially in times of surgery and also depending on the severity of illness. People who are enrolled in health insurance schemes usually are more likely to visit a public health facility (Duku, et al., 2016). There are also certain government workers who enjoy free or subsidized healthcare services from some public health facilities. Government health facilities are generally more affordable than private health facilities. For a similar treatment, the private healthcare provider is seen to be of good quality than the public provider (Ringel et al., 2001). It is expected that differences in access to private and public healthcare services might alter their demand elasticities. The first part of this study focuses on the sensitivity of demand for healthcare services to price and income.

The second part of the paper focuses on inequality and equity in paying for healthcare in Ghana. The inequality of healthcare payment measured by the Lorenz curve (distribution according to the population distribution but not ranked). For the equity analysis, the incomes of the individuals are grouped into quintiles. Having grouped the incomes, the objective is to ascertain

whether or not individuals pay for healthcare according to their income levels. In other words, what proportion of payment for healthcare falls on the rich and on the poor - how spending on healthcare has been distributed among the various income quintile. Gaining such information is critical for policymakers to ascertain where the incidence of healthcare payment falls. The findings will inform policymakers to reorganize and readjust health policies to address concerns of healthcare inequality and healthcare equity in the country. This is likely to make them commit to reducing poverty and inequality and increasing access to healthcare by the poor and vulnerable.

While governments are making efforts to increase access to healthcare with the primary objective of attaining the universal health coverage, certain economic, social, and cultural factors impede access to healthcare. It is therefore important to uncover the socio-economic obstacles that hinder people from fully utilizing healthcare services. It is also imperative to increase access to healthcare, especially by the poor, in order to reduce the inequality in access to healthcare. Again, it is also essential to understand the extent to which healthcare payment falls on the poor. The distribution of healthcare payment among the quintiles is an important ingredient for achieving improved healthcare equity. This is necessary because it makes developing and implementing a well-planned public policy on health context-specific and addresses all issues regarding inequality and equity in healthcare services.

The general objective is to examine the sensitivity of healthcare services to price and income, and also estimate the progressivity of healthcare payment in the country. The specific objectives include:

1. Estimating the extent to which price and income affect demand for healthcare. Since the dependent variable is not continuous but rather the probability of seeking healthcare,

the analysis is then reduced to the decision to seek treatment or not when sick. The paper again estimates the source of utilization (the source of care: public, private and alternative healthcare. In other words, the type of care utilized to treat sickness).

2. Investigating how progressive or regressive payment of healthcare service is in Ghana. That is whether it is the poor or the rich who pays more for healthcare.
3. Ascertaining where payment of healthcare according to the provider of healthcare falls. Whether the public, private, or alternative healthcare payments are progressive or regressive.

4.1.1 Description of Elasticity Measures

This section takes a look at the extent to which changes in price and income will affect the demand for a particular good. The price elasticity of demand is determined by the type of healthcare. Preventive healthcare and pharmacy benefits have a large price elasticity of demand for healthcare than curative healthcare services (Ringel et al., 2001). Healthcare services that have large number of substitutes also have large price elasticities. Inpatient healthcare is likely to be less sensitive to changes in price than out-patient healthcare. The price elasticity of demand for healthcare is also influenced by the presence of health insurance. People who hold health insurance cards do not care so much about the price to pay for seeking healthcare knowing that the health insurance company will bear the cost. If a particular healthcare is demanded by health insurance subscribers, then it is likely to be less sensitive to price making it inelastic. Hospital and a pharmacy could be complementary to each other. When two healthcare are substitutes, then any increase in price of one will cause consumers to shift from the healthcare whose price has increased and have become expensive to the relatively cheaper healthcare.

There are wide ranges of medical care that are necessities like heart attack, heart surgery, and others such as cosmetic surgery are clearly luxuries. In real life, a number of healthcare services fall in between these categories - necessity and luxury (Ringel et al., 2001).

According to Ringel et al. (2001), the application of the elasticity concept is important for the analysis of how patients will respond to changes in price and income with respect to choosing a particular healthcare provider. Health insurance plays a critical role by pooling resources together, reducing the cost of healthcare services, and increasing access to healthcare by all. Elasticities measured for total costs are different from that of insurer cost. Computing the price elasticity of the healthcare product is quite complex. The price one pays for healthcare services depends on the presence of insurance, coinsurance rates or co-payments, and total out-of-pocket payment. To estimate price elasticities, one must be able to determine the price that the consumer will pay for an additional unit of health service. In estimating demand elasticities for healthcare, one should consider the effects of adverse selection and moral hazard due to the presence of health insurance (Ringel et al., 2001).

4.1.2 Benefit Incidence of Healthcare Services

The standard incidence analysis assumes the same unit cost for all observed users of public services and therefore assumes that each individual pays equally for healthcare. This measure does not account for the responsiveness of behaviours to public spending such that the poor and rich both pay equally or according to their incomes. Two approaches have deviated from this standard incidence of measuring welfare impacts of public spending and have accounted for the responsiveness of household behaviours to public spending. The two general approaches for assessing the welfare impact of public spending are a) Benefit incidence studies and b)

behavioural approaches (Yitzhaki, 1983). In this study, the approach used to assess the welfare impact of payment for healthcare shall be the benefit incidence approach. This is because that is the approach the data can support since the data is a demand-side data and not supply-side data. Again, because the study is interested in demand for healthcare, it is imperative to estimate the incidence of payment for healthcare utilization.

In this study, the Lorenz curve and concentration curve are used methods to analyze inequality and equity of healthcare payment respectively. The idea is to estimate the percentage of healthcare payment distribution among the population both ranked and unranked by income quintiles. Healthcare payment like any other economic commodity may not be equally and equitably distributed. A smaller proportion of healthcare payment may fall on a proportion of the population at different units. For example, 20 percent of the population may pay say 80 percent of healthcare payments. Some interest groups may pay more than others. This is because some of the interest groups are disadvantaged than others.

Equality gap curve shows the degree of inequality assuming all individuals earn the same income. That is the extent to which healthcare payment is distributed among a percentage of the population. The unnormalized Lorenz curve quantifies the cumulative sum of healthcare payment among the lowest percentage of the sub-groups. The sub-groups may also include insurance status, gender, and area of location. However, unlike the unnormalized, the ordinates of the generalized Lorenz curve refer to the average cumulative healthcare payment. It considers the average payment of healthcare instead of the absolute individual units of healthcare payment. The generalized Lorenz curve is usually the preferred choice because it helps to compare the averages of the sub-groups, for instance, the generalized Lorenz curve tells us how the average healthcare payment distribution is unequal for males than females. It makes it necessary for a comparison between two or more sub-groups. The absolute Lorenz

curve signifies the degree to which the generalized Lorenz curve deviates from the equality line. The absolute Lorenz curve is preferred when we are not comparing sub-groups but interested in the point of equality of the entire population (Jann, 2016).

In analyzing the demand for healthcare, it is important to examine the equity of healthcare payment according to levels of income. The concentration curve is used for this equity analysis based on income quintiles. Unlike the Lorenz curve, Concentration curve shows how healthcare payment is distributed when it is ranked by income. Ranking can be done with income quintiles as used in this study. However, other variables can be used as the ranking variable. For this study, the concentration index and concentration curve are used to analyze the distribution of healthcare payment among Ghanaians ranked by income quintiles. In other words, how healthcare payment is distributed between the poor and the rich.

The concentration curve is normally compared with the 45-degree line which is the line of equitable distribution. The position of the concentration curve vis-a-vis the 45-degree diagonal line is of greater significance. If the concentration curve lies above the perfect equitable distribution line, then healthcare payment falls on the households within the lowest income quintiles. For example, it can happen that the bottom 50% of households within the low-income quintile pay only about 20% of all healthcare services. If the concentration curve lies below the equitable distribution line, then healthcare payment falls on those in the high-income quintiles. For example, healthcare payment can be skewed toward the rich where the bottom 50% of households within the high-income quintile pay about 85% for healthcare services.

Closely related to the concentration curve is the concentration index. It is used to identify whether equity exists in the healthcare service payment and whether it is more pronounced at one point than the other. The use of concentration index fills in the gap left by the concentration

curve since concentration curve does not quantify the degree of inequity. Concentration index quantifies the magnitude of inequity and compares within and between sub-population groups. Just like the concentration curve, concentration index is also compared with the 45-degree line which is the line of perfect equity. In the extreme case where there is no inequity, the concentration index takes the value zero (0). If it lies above the line of equity, it takes a negative value, indicating that, healthcare payment falls on the poor more. If it takes a positive value then it means it lies below the 45-degree line and signifies that payment for healthcare services falls on households in the high-income quintile (Kakwani, 1980).

Following Kakwani (1980), the formal treatment of concentration index is given as:

$$CI = 1 - 2 \int_0^1 L_h(p) dp \dots\dots\dots(4.1)$$

Where CI is concentration index, L_h is the healthcare payment, p is the ranked variable (income quintile), and dp is the integration with respect to income quintile. For discrete variables, the concentration index is bounded between -1 and +1, and can be written as:

$$CI = \frac{2}{R\mu} \sum_{i=1}^R h_i f_i - 1 - \frac{1}{R} \dots\dots\dots(4.2)$$

Where h_i is healthcare payment, μ is the mean, and $f_i=i/R$ is the fractional rank of individual i in the living standards distribution, with $i=1$ for the poorest income quintile and $i=R$ is for the richest income quintile.

The concentration index depends on the relationship between healthcare payment and income quintile. The sign of the concentration index reveals the direction of the relationship between the healthcare payment and income quintile, and the magnitude indicates the strength of the relationship and degree of variability in healthcare payment.

4.2 Methodology

4.2.1 Data Source

The source of data for this study is the sixth round of the Ghana Living Standards Survey (GLSS 6). It is a nationwide household survey designed to generate information on the living conditions in the country at the individual level. GLSS 6 collects detailed information from households including, health, education, employment and time use, migration, tourism, housing, agriculture, access to finance and asset ownership.

Compared to the previous rounds of the Ghana Living Standards Survey, GLSS 6 contains additional sections on child labour and some government initiatives such as the Savannah Accelerated Development Authority (SADA). A two-stage stratified sampling design was adopted. At the first stage, 1200 enumeration areas (EAs) were selected to form the Primary Sampling Unit (PSUs). The PSUs were allocated into ten regions using probability Proportional to Population Size (PPS). A further division was made about the EAs into urban and rural localities of residence. A complete list was taken to form the secondary sampling (SSUs). At the second stage, 15 households were selected from each PSU systematically, giving a sample size of 18,000 households. Out of this number, 16,772 households were successfully interviewed. The total population of the country at that time was 26.3 million. The survey period covered twelve (12) months starting from October 2012 to October 2013.

The Ghana Living Standards Survey Six (GLSS 6) is a much improvement over the previous ones. The choice of these three data sets is informed by the comparison of the health conditions in the pre-NHIS period (GLSS 4, 1998/1999); the immediate period after the introduction of NHIS (GLSS 5, 2005/2006); and a ten-year period after NHIS (GLSS 6, 2012/2013).

Table 4.1: Demographics of the Ghana Living Standard Surveys (GLSS 4, GLSS 5, and GLSS 6)

Ghana Living Standard Survey	GLSS 4	GLSS 5	GLSS 6
Date of survey	04/1998 - 03/1999	09/2005 - 09/2006	10/2012 - 10/2013
Total country's population size	18.1m	22.2 m	26.3 m
Enumeration area	300	580	1,200
Households	5,998	8,687	16,772
Household members	25,855	37,128	72,372
Average household size	4.3	4.0	4.0
Suffered from illness or injury	26%	21%	14%
Stopped usual activities	61%	59%	62.4%
Consulted health practitioner	44.0%	60.0%	66.2%

Source: GLSS 4, 5 and 6

As contained in the report, the number of primary sampling units increased by 107 between GLSS 5 and GLSS 6. The number of households increased by about 45% from GLSS 4 to GLSS5, and 93.07% from GLSS5 to GLSS 6, with an average increase of 108%. On average, household members increased by over 177% between 1998/1990 and 2012/2013. Total population increased by 45.3% over the period under review. Table 4.1 shows that as a percentage of the total population, the number of people who suffered from illness or injury in the two weeks preceding the interview has been declining. By inspection, an explanation for the upward trend in health professionals' consultation by patients may be due to the presence of health insurance. Since the National Health Insurance Scheme was initiated in 2004, the scheme has been found to have increased utilization of healthcare services resulting in fewer people suffering from illness or injury (Blanchet et al., 2012). Not surprising though, as indicated earlier, that the number of those who consulted a physician increased from 44% in 1999 to 66.2% in 2013.

There is a special section (section 3) in the Ghana Living Standards Survey Six (GLSS 6), which contains information on the health status of respondents. The interviewers asked household members to indicate whether or not they suffered from illness or injury or both in

the two weeks prior to the survey and if they consulted a physician and the place of consultation. This dataset is preferred to that of the Ghana Demographic and Health Survey (GDHS) because it contains information on earnings from the main occupation, which cannot be found in GDHS, given that income is a critical factor to consider when estimating a demand function for healthcare.

4.2.2 Econometric Model – Elasticity of Demand

Choice models are used in many parts of our lives including transportation, dining, and healthcare, to represent the selection of one among a set of mutually exclusive alternatives. Conditional multinomial logit assumes that the alternative is chosen conditioned on the fixed quantities which do not vary when the attributes of the alternative change. Discrete-choice and random utility maximization models are well suited for studying the choices made by individuals over a number of alternatives as a function of cost and characteristics of the alternatives (Ringel et al., 2001).

The nature of the data from GLSS 6 makes it a cumbersome to use of nested logit regression, and since multinomial logistic regression suffers from the property of Independence of Irrelevant Alternative (IIA), the multinomial probit is employed for the study. These elasticities are therefore independent of the elasticities for any other alternative or pair of alternatives. In other words, the demand elasticity of particular healthcare is not independent of the other demand for other healthcare. Following William (2012), the formal treatment of demand for healthcare using the probit method can be expressed as follows. Assume the simple econometrics function for demand for healthcare given as below:

$$HC_i = \alpha_0 + \alpha_1 Price + \alpha_2 Income + \alpha' X_i + \varepsilon_i \dots\dots\dots(4.3)$$

where HC is the value for healthcare, α_i is a vector of unknown parameters, $Price$ measures the price of healthcare, $Income$ is the income of the respondent, X_i is a vector of control variables (such as age, sex, location, sethe verity of illness) and ε is the error term ($i \sim N(0, \sigma_i^2)$).

For each observation i , we define HC^* as follows:

$$HC_i^* = 0 \text{ iff } HC_i < 0 \text{ (does not seek health care) } \dots\dots\dots(4.4)$$

$$HC_i^* = 1 \text{ iff } HC_i \geq 0 \text{ (seeks health care) } \dots\dots\dots(4.5)$$

Given the above conditions (equations (4.4 and 4.5)), the elasticities for price and income can be obtained by solving for the conditional probability (P) of an individual seeking healthcare, given the background characteristics, X_i . This can be specified as follows:

$$P(HC_i^* = 1|X_i) = P(\alpha' X_i + \varepsilon_i \geq |X_i) = HC\left(\frac{\alpha' X_i}{\sigma_1}\right) \dots\dots\dots(4.6)$$

Where P is a cumulative standard normal distribution function. To obtain the elasticity of price and income, the first derivative of the conditional probability of individual seeking healthcare is taken for the respective variables (price and income).

For the price elasticity of demand, the expression can be obtained as:

$$\frac{\partial P(HC_i^* = 1|X_i)}{\partial Price_i} \cdot \frac{Price}{P(HC_i^* = 1|X_i)} = H\left(\frac{\alpha' X_i}{\sigma_1}\right) \cdot \frac{\alpha'}{P(HC_i^* = 1|X_i)\sigma_1} \dots\dots\dots(4.7)$$

The price elasticity of demand for healthcare is expected to have a negative sign signifying the inverse relationship between price and demand for healthcare. If the magnitude of the price elasticity of demand for healthcare is more than one (1), then it is elastic, meaning demand for

healthcare is very sensitive to changes in price. On the other hand, if it is less than one (1), then it is inelastic, meaning that demand for healthcare is less sensitive to changes in price. If for any reason, the sign is positive, then it indicates a positive relationship between price and demand for healthcare, making healthcare a Giffen good.

For the income elasticity of demand, the expression can be obtained as:

$$\frac{\partial P(HC_i^* = 1|X_i)}{\partial Income_i} \cdot \frac{Income}{P(HC_i^* = 1|X_i)} = H \left(\frac{\alpha' X_i}{\sigma_1} \right) \cdot \frac{\alpha'}{P(HC_i^* = 1|X_i)\sigma_1} \dots\dots\dots(4.8)$$

The sign for the income elasticity of demand for healthcare is expected to be positive, meaning that healthcare is a normal good. If the magnitude is positive and more than one (1), then demand for healthcare will be more sensitive to changes in income, making healthcare a luxurious good. If it is less one (1), then healthcare is less sensitive to changes in income, making it a normal good. However, if the sign is negative, then healthcare is found to be an inferior good.

4.2.3 Econometric Model – Concentration Index

The formal treatment of benefit incidence proved that for social welfare to favour equitable distribution of income, any marginal increases in the subsidy on good A while reducing that on good B but just enough to keep total income unchanged will improve social welfare when the concentration curve of A is everywhere above the concentration curve of good B. In measuring socio-economic inequality such as healthcare payment, the concentration index is frequently used to measure the inequity in healthcare payment over the distribution of income quintiles. It is then used to graph concentration curves which can be compared to the Lorenz

curve (O'Donnell et al., 2016). Kakwani (1980) and Yitzhaki (1983) proposed a flexible extension of the univariate Gini index that incorporates a distributional sensitivity parameter α , specifying the attitude towards inequity within the weight defined by $1-\alpha (1 - R_i)^{\alpha-1}$. This is the weighting function in the context of the measurement of income-related healthcare payment inequity. The result is an extended version of the standard concentration index. The Extended Concentration Index is given by

$$ECI(h|y; \alpha) = \frac{1}{n} \sum_{i=1}^n \left[\frac{h_i}{h_*} (1-\alpha (1 - R_i)^{\alpha-1}) \right] \dots\dots\dots(4.9)$$

Where is *ECI* the Extended Concentration Index

h is health (measured by healthcare payment)

y is income quintile

α is distributional parameter

$\frac{h_i}{h_*}$ is the share of healthcare payment for an individual, *i*

R is rank of income (income quintile).

The distributional parameter α must be greater than or equal to 1. When income is the ranking variable, larger values of α places more value on the poorest individual. The weighting function, $1-\alpha (1 - R_i)^{\alpha-1}$ equals zero for $\alpha= 1$ and gives an index of zero regardless of the distribution of healthcare payment, *h*. If $\alpha= 2$, then it reduces to the standard concentration index of:

$$CI(h|y) = \frac{2cov(h_i, R_i)}{h_*} \frac{1}{n} \sum_{i=1}^n \left[\frac{h_i}{h_*} (2R_i - 1) \right] \dots\dots\dots(4.10)$$

The Extended Concentration Index (ECI) ranges between $1-\alpha$ and 1, where α is the distance between the weights given to the poorest and the richest individuals. The weight given to the richest individual is +1 while that of the poorest individual is more negative for higher values of α . The weighting function is asymmetric around the individual with median income, unless $\alpha= 2$. However, if $\alpha \neq 2$ then the individual with the median income does not have a weight of zero unless he has an income lower than that of the median individual when $\alpha > 2$.

Extending the above discussion of sensitivity to extremity, Erreygers et al. (2012) suggest the extension of linear weighting function of the concentration index in such a way that two conditions must be satisfied. (a) The individual with the median income plays a pivotal role with a weight of zero. (b) The weights of the other individuals should be inversely asymmetric around the median income. That is, the poorest and the richest individuals should have the same weight, but with an opposite sign. In the same way, the second poorest and the second richest individuals should have the same weight but in opposite signs, and so on. In these circumstances, varying attitudes towards inequity express one’s ‘sensitivity to extremity’ whether one is concerned about the differences in healthcare payment around the mean income or about the difference at the extremes of income distribution.

An extension of the analysis of the sensitivity and extremity is the measure of Symmetric Concentration Index, which satisfies both conditions stated above and allows for varying degrees of ‘sensitivity to extremity’ depending on the value of the distributional parameter β analogous to α . The Symmetric Concentration Index is given as:

$$SCI(h|y; \beta) = \frac{1}{n} \sum_{i=1}^n \left(\frac{h_i}{h_*} \right) \left[\beta 2^{\beta-2} \left(\left(R_i - \frac{1}{2} \right)^2 \right)^{\frac{\beta-2}{2}} \left(R_i - \frac{1}{2} \right) \right] \dots\dots\dots(4.11)$$

If $1 < \beta < 2$, then more weight is placed on the middle of the income distribution. If $\beta > 2$, the extremes are weighted more at the expense of the middle. The symmetric index will be equal to the standard concentration index if $\beta = 2$. Whenever β becomes very large, SCI is only sensitive to the difference between the upper and the lower end of the income distribution. The range of the symmetric index is $\left[-\frac{\beta}{2}; +\frac{\beta}{2} \right]$ which is the absolute deviation between the weights given to the poorest and richest individual. The choice between ECI and SCI is just a normative one. Whereas SCI is concerned with the increasing sensitivity of change if it raises the healthcare payment of one income group and reduces the healthcare payment of another income group by the same magnitude the further those individuals are from the pivotal individual, ECI will be increasingly sensitive the closer the location of such a ‘healthcare payment transfer’ is. In other words, SCI is concerned about healthcare payment inequity between income groups, whereas ECI is concerned about healthcare payment inequity within income group (O’Donnell et al., 2016).

4.2.4 Estimation Methods

In the ideal data, observed variations in prices, income and use of healthcare services do not exist. Consequently, researches have adopted various methods of estimation that can adequately address many issues related to these variations. Researchers often use many methods: experimental, quasi-experimental, and observational methods. Experiment methods use random assignments to treated and controlled groups. While this method will be most

desirable, it is very expensive in terms of cost and also time-consuming to administer. Similar to the experiment method, the quasi-experiment method also has both treated and controlled but do not randomly assign to each. Observational studies require econometric analysis to estimate demand for healthcare. It is less expensive and less time consuming to administer. However, it can be difficult to identify causality, since the correlation between the treated and the control group does not imply causality (Cook and Campbell, 1979).

This paper uses probit to analyze the demand for particular healthcare over the other, making it a binomial response variable. The multinomial probit regression analysis is used for the analysis. Probit transforms the sigmoid dose-response curve to a straight line that can then be analyzed by regression through either least squares or maximum likelihood. In this case, the maximum likelihood is used. Using STATA, probit regression estimates the elasticities for the general probability of healthcare utilization, taking values 1 if an individual sought treatment and 0 if otherwise. When it comes to the specific types of healthcare, the analysis uses multinomial probit because the dependent variable is categorized into four – no care, public, private, and alternative medical care, with no care as the reference category.

4.3 The extent to which price and income influence demand for healthcare as well as the benefit incidence of healthcare.

4.3.1 Health conditions in the two weeks preceding the interview.

There is a special section (section 3) in the Ghana Living Standards Survey (GLSS) four, five and six, which discuss the health conditions of all household members during the survey. Household members were asked if they suffered from injury or illness or both in the two weeks preceding the interview. They were also asked to indicate if they had to stop working or doing

their usual activities and for how long. The survey also gathered information as to whether they consulted a physician for healthcare or not, whom they consulted, and how much of expenditure incurred. More people aged 50+, as well as 0-5 suffered from illness or injury. More females suffered from illness or injury than males.

Patients visit physicians for various reasons (see Table 4.2). A greater percentage of the respondents who consulted health practitioners did so to treat illness and injury. This was similar across all three datasets. The rest also consulted for check-ups and follow-ups, general vaccination, and childbirth related issues.

Table 4.2: Reasons for consulting a physician

Reasons for consulting	GLSS 4 (%)	GLSS 5 (%)	GLS 6 (%)
Illness	87.2	87.6	87.1
Injury	7.0	5.3	5.4
Follow - up	-	0.9	1.0
Check - up	4.3	3.1	3.5
Prenatal care	0.9	1.2	0.8
Delivery	-	0.8	0.2
Postnatal care	0.4	0.8	0.9
Vaccination	0.2	0.2	0.1
Other	-	0.8	0.4
Total	100	100	100

Source: Author's computation using GLSS 4, GLSS 5, and GLSS 6

In terms of the place of consultation, the majority of them did their consultations in hospitals, clinics, consultant's home, pharmacy, and chemical stores. The rest went to MCH clinic and other places. In some situations, the physician rather went to the patient's home to deliver healthcare service. In case the illness is so severe that the patient cannot travel to the nearest health facility, the physician can decide to visit the patient rather.

Table 4.3: Type of facility consulted

Type of facility	GLSS 4 (%)	GLSS 5 (%)	GLS 6 (%)
Hospital	34.25	32.7	46.7
Clinic	36.75	25.7	17.8
MCH clinic	0.09	1.0	2.7
Maternity Home	0.85	0.7	0.5
Pharmacy	5.22	2.6	5.2
Chemical store	0.57	30.1	23.8
Consultant's home	9.77	3.3	0.4
Patient's Home	5.3	2.8	0.3
Other	7.2	1.1	2.5
Total	100	100	100

Source: Author's computation using GLSS 4, 5, and 6

When patients seek treatment, they incur certain expenses. The expenses normally cover consultation fee, medicine, registration fee, and diagnosis. The average medical expenses stood at GH¢ 88.03 in 2012/2013. The number of patients who consulted hospitals decreased from 34.3% in 1999 to 32.7% in 2006 but increased to 46.7% in 2013. Meanwhile, the percentage of patients who did their consultation at the clinics declined over the period. It decreased from 36.75% in 1999 to 25.7% and a further decline to 17.8% in 2013. Between 1999 and 2013, patients had shifted from consulting in clinics, patient's home, consultants' home, and other places of consultation to hospitals and chemical stores. Medical expenses, poverty levels, the presence of health facility, health insurance schemes, and the overall economic conditions of the country could account for these differences.

Before the introduction of the National Health Insurance Scheme (NHIS), user-fee was the order of the day. This was the 'cash and carry' system, where patients had to make payments before being attended to by physicians. NHIS was to help reduce user-fees to the barest minimum. However, even those who enrolled in NHIS still pay some fees. The out-of-pocket payment comprised of consultation fees, medical expenses, registration fees, diagnosis fees, fees for drugs, etc.

The survey interviewer asked respondents to indicate who pays a greater part of the medical expenses. The percentage of a household member who paid for their own medical expenses decreased from 95.8% in 1998/1999 to 89.6% in 2005/2006 and further declined to 54.5% in 2012/2013. This may be due to the NHIS, which was established post-GLSS 4 in 2003, and it paid 2.4%, and 41.5% in GLSS 5 and 6 respectively of a greater part of medical expenses.

Table 4.4: Who Paid for Medical Expenses?

Persons who paid fees	GLSS 4 (%)	GLSS 5 (%)	GLS 6 (%)
Household member	93.1	89.6	54.5
Other relative	4.5	5.8	2.9
Government	0.5	0.3	0.3
Employer	1.1	0.6	0.3
Household member's employer	-	1.2	0.3
Health insurance	-	2.4	41.5
Other	0.5	0.1	0.2
Total	100	100	100

Source: Author's computation using GLSS 4, 5, and 6

4.3.2 The Health status and the Socio-economic profile of household members.

This section looks at the working conditions, educational attainments, age, gender, location of individuals who suffered illness, as well as those who did not suffer any illness or injury. The interest is to investigate the changes in dynamics of the socio-economic profile of the sick and the healthy, over the ten periods: 1998/1999 to 2012/2013. In the GLSS 4, 5 and 6, datasets it is recorded that the number of people who suffered from illness or injury or both decreased from 26.2% of the population in 1999 to 14.5% in 2013. Over the same period, those who consulted physicians increased from 45.9% to 73.2% in the years 1998/1999 - 2012/2013.

Table 4.5: Percentage of population who fell ill and consulted a physician (1998/1999-2012/2013)

Items	1998/1999	2005/2006	2012/2013
Number of household members	25,581 (100%)	36,429 (100%)	71,382 (100%)
Those who did not fall sick	18,882 (73.8)	29,171 (80.0)	61,040 (85.5)
Those sick	6,699 (26.2)	7,258 (20.0)	10,342 (14.5)
Those who did not consult physician	3,623 (54.1)	2,603 (35.8)	2,774 (26.8)
The number of people who consulted	3,076 (45.9)	4,682 (64.2)	7,568 (73.2)

The percentages are in parentheses

Source: Author's computation using GLSS 4, 5, and 6

The study investigates and reports the socioeconomic profile of those who suffered from illness/injury and those who did not in the periods under review. In the years, 1998/1999, the headcount poverty in Ghana had reached 40%. It fell from 28.5% in 2005/2006 to 24.5% in 2012/2013. In 1998/1999, it is reported from the cross-tabulations that in 1998/1999, those who suffered from illness and injury were mainly the poor. A similar conclusion can be drawn from 2005/2006 and 2012/2013 data sets. This conclusion is not surprising at all since the poor have limited means to access healthy food, water, environment, housing, sanitation, and healthcare facilities. In terms of the type of works, non-agriculture self-employed workers have the greatest proportion in the sick population. This finding was consistent in the three data sets and may be due to their exposure to a hazardous environment since they dominate the informal sector. It is found in the literature that health status improves with education (Grossman, 1972; Zwiefel et al., 1997). This might be the explanation for the high percentage of the uneducated and no grade categories suffering from illness/injury.

Children aged 6-14 were the healthiest, leaving the old (61+) mostly sick across all the three data sets. This confirms the evidence in the literature that aging depletes health stock (Grossman, 1972; Zwiefel et al., 1997). Males and the urban population have lower percentages in the suffering from illness/injury population. A more plausible explanation is that women appeared to be sicker partly due to their reproductive health responsibilities. Furthermore, the

literature has it that women seek healthcare for ill-health more than men do. Men are more likely to exercise (go to the gym, play football, etc) more than women. The urban folks are more likely to be healthy due to the presence of better food, water, sanitation, and healthcare facilities in urban areas.

Table 4.6: Percentage of population who suffered from illness, injury or both (1998/1999-2012/2013), by sub-groups.

GLSS data sets	1998/1999	2005/2006	2012/2013
Sub-groups	%	%	%
Poverty level:			
Poor	27.2	25.3	17.1
Non-poor	25.7	20.1	13.8
Type of Work:			
No work	26.6	14.4	12.9
Paid work	27.8	20.9	11.9
Self-employment	28.8	23.8	16.9
Agric	26.4	22.1	13.1
Others	NA	17.9	14.0
Education qualification:			
No education	27.2	20.7	16.4
No grade	25.3	22.4	14.4
Primary	25.7	15.8	12.7
JHS/Middle	27.2	20.4	14.5
SHS+	27.4	17.4	11.5
Age:			
0-5	25.3	28.7	20.2
6-14	25.5	13.3	9.6
15-35	26.7	18.9	11.6
36-60	27.5	25.9	17.2
61+	24.7	35.3	25.6
Gender:			
Male	26.1	20.3	13.3
Female	26.23	22.5	15.6
Location:			
Urban	25.9	18.5	13.6
Rural	26.4	22.9	15.0

Source: Author's computation using GLSS 4, 5, and 6⁷

^{7 7} The column sum must not equal 100%. The row total must equal 100%. This is because we are comparing percentages of those who suffered illness or injury or both with those who did not suffer in the week prior to the interview. However, because the emphasis is on the those who are sick, those who are not sick are omitted.

The results in Table 4.6 above show that, though the respondents in the three datasets differ, the percentage of each sub-group that reported to have suffered from illness or injury or both in the two (2) weeks preceding the interview have declined over time. The result is consistent with the findings recorded in Table 4.6 that the total percentage of people who suffered from illness or injury or both have declined over the period. The rationale for the analysis of the results in Table 4.6 was to investigate whether or not the same conclusion could be made about the various sub-groups (by looking at the socio-economic profile). And exactly so, almost all the sub-groups indicated a drop in their percentages for those who suffered from illness or injury or both. The only exceptions are people aged 0-5 and 61+, whose percentages increased in the 2005/2006 period before declining in 2012/2013. For instance, the percentage of children who reported to have suffered from illness or injury or both increased from 25.3% in 1998/1999 to 28.7% in 2005/2006, before declining to 20.2% in 2012/2013. Similarly, the percentage of people aged 61 and above who reported to have suffered from illness or injury or both increased from 24.7% in 1998/1999 to 35.3% and then later decreased to 25.6% in 2012/2013.

4.3.3 Summary Statistics

Summary statistics about the set of observations is used to communicate the largest amount of information in simple terms. It describes the various variables to be used in the estimations. It also measures their number of observations, location, and central tendencies.

The summary statistics show that out of the total sample of 72,372 individuals, 10,442 reported to have suffered from illness or injury or both. This represents 14% of the total household members who suffered illness or injury or both, two weeks prior to the survey.

Table 4.7: Summary statistics of the dependent and independent variables.

Variable	Observation	Mean	Standard deviation
Dependent variable			
Healthcare Services			
No care	3,499	0.3	0.5
Public healthcare	3,307	0.3	0.5
Private healthcare	3,413	0.3	0.5
Alternative healthcare	121	0.0	0.1
Independent variables:			
Price	7,367	14.0	43.6
Income	15,920	460.7	1.3
Income quintile			
1st quintile	3,615	0.2	0.4
2nd quintile	2,770	0.2	0.4
3rd quintile	3,168	0.2	0.4
4th quintile	3,545	0.2	0.4
5th quintile	2,822	0.2	0.4
Insurance status			
Insured	40,600	0.6	0.5
Uninsured	30,701	0.4	0.5
Age	72,372	24.6	19.6
Gender			
Male	34,806	0.5	0.5
Female	37,566	0.5	0.5
Education			
No qualification	13,316	0.3	0.4
Primary	32,319	0.6	0.5
Secondary	2,504	0.1	0.2
Post-secondary	1,750	0.0	0.2
Tertiary	163	0.0	0.1
Location			
Urban	36,230	0.5	0.5
Rural	36,142	0.5	0.5
Severity of illness			
Not severe	3,894	0.4	0.5
Less severe	2,716	0.3	0.4
More severe	3,749	0.4	0.5

Source: Based on GLSS6

The results indicate that in the two weeks preceding the interview which ended in October 2013, about 33.8% did not seek healthcare although they suffered illness or injury or both. Those who reported to have consulted a physician indicated that consultation took place in the

public health facility (32.0%), private health facility (33.0%), and Medical alternatives (1.2%). Income is grouped into five (5) quintiles starting from the poorest to the richest. The first and fourth quintiles have the highest frequency of 22% each. This is followed by the third quintile (19%). The remaining second and fifth quintiles have the least percentages of 17% each.

In the two weeks preceding the interview in 2012/2013, the average income of an individual is GH¢ 460.7 and spends GH¢ 14.0 as out-of-pocket payment for healthcare services (amount spent to receive treatment). In the same period, the average age of the sample is 25 years. There are more insured people (56.9%) than uninsured people (43%). In the sample, there are more females (52%) than males (48%). In terms of education, those with no educational qualification account for 26.6%, while the remaining 73.4% have different qualifications. This include primary/JHS (64.6%), secondary (5%), post-secondary (3.5%) and tertiary (0.3%). There are more people in urban areas (50.2%) than rural areas (49.2%). As a measure of severity of illness, a greater percentage did not stop their usual activities (37.6%). Whereas 26% stopped usual activities for three days, 36% stopped for more than three days, making their illness more severe.

As a measure of the spread of data from the mean, a lower standard deviation indicates a more concentrated value around the mean, and therefore a lower standard deviation is desirable. Since almost all the standard deviations are less than 1, the data can be said to be very much concentrated around the mean. It means there are few outliers, making the data spread very well. The only variables with large standard deviations are three continuous variables – price, income, and age. That is why these variables have been logarithmized to reduce the standard deviation.

4.3.4 The elasticity of Demand for Healthcare Services

The import of this chapter is to estimate the sensitivity of healthcare to price and income, and also to estimate the progressivity of healthcare services in the country. In a discrete choice model such as demand for healthcare, the measure of demand is proxied by the probability of using a particular healthcare when suffered illness or injury or both. Most of the respondents who suffered from illness or injury or both reported to have consulted District hospitals (17.3%), Chemical store (17.1%), health centre (15.9%), and clinics (12.8%). The remaining places of consultation had very little patronage just about less than 5% each. These may include other teaching hospitals, other hospitals, polyclinic, CHPS, maternity, homeopathy, and traditional healers.

The place of consultation is the dependent variable for this study categorized into public, private, and medical alternatives. Simple tabulation indicates that out of the total of about 10,312 individuals who reported to have suffered from illness or injury or both, about one-third (33.9%) did not consult any physician. The remaining (66.2%) individuals consulted public health sector (32%), private health sector (33.0%), and medical alternatives (1.2%) (See Appendix 9).

In estimating the elasticity of demand for healthcare, one should consider the effects of adverse selection⁸ and moral hazard⁹ due to the presence of health insurance. Because of the effects of adverse selection and moral hazard, the elasticities will be estimated by controlling for health

⁸ Adverse selection occurs when the potential buyer of an insurance does not fully disclose to the insurer the quality of their life or product.

⁹ Moral hazard happens in an insurance transaction where the insured engages in risky behaviours knowing that the insurer will bear the cost anyway.

insurance status (Ringel et al., 2001). The elasticity of demand for healthcare is estimated using the probability of utilizing healthcare as the measure of quantity, and out-of-pocket payment used as a measure of price (amount spent to receive treatment). Income is measured by using what individuals earn from their main occupation in the two weeks preceding the survey. Price and income are used in their log forms and are continuous variables.

Table 4.8: Price and Income elasticities of demand for healthcare: The General case

Healthcare utilization with the decision not to seek healthcare as the reference category		
Dependent variables	Elasticities (without controls) ¹⁰	Elasticities (with controls)
Price	-0.004*	-0.016**
Income	0.003*	0.010**
Number of obs = 1670 Wald chi2 (6) = 71.50 prob > Chi2 = 0.000		

Source: Based on GLSS6 Significant levels at ***1% **5% *10%

Table 4.8 and Table 4.9 shows the results from the probit regression using the margins command in STATA. The margins command can be used to report elasticities. It is possible to predict elasticities from a probit with the margins command (Williams, 2012). The elasticities are interpreted at the levels of log transformation of both price and income. As expected, the price elasticity of demand for healthcare is negative indicating an inverse relationship between price and quantity and statistically significant at 5% significant level. In both cases (with controls and without controls), the price elasticity of demand for healthcare is inelastic. This means that a percentage increase in price will lead to less than a percentage decrease in healthcare utilization. The price elasticity (with controls) is -0.016. This can be interpreted as an 10% increase in price measured by out-of-pocket payment will result in a 0.16% decrease in healthcare utilization. This is consistent with other findings in the literature that price elasticity of healthcare is inelastic (Gaddah, 2011; Newhouse et al., 1993; O'Brien, 1989). This

¹⁰ The control variables are education, insurance status, gender, age, location, and severity of illness.

finding is quite different from the paper by Lavy and Quigley (1993) which found price elasticity in Ghana to be fairly elastic. Perhaps, it is because the data used is quite old and NHIS had not yet been introduced. This is one of the main reasons for this study to be conducted in order to make its findings relevant to contemporary times, taking into account the effect of health insurance.

Existing literature has demonstrated that income elasticity of demand for healthcare, in general, is fairly inelastic and positive, showing that demand for healthcare responds positively to changes in income (Feldstein, 1971; McLaughlin, 1987; DiMatteo, 1998). Income elasticity of demand for healthcare has been found to be between 0 and 0.2 (Ringel et al., 2001). Few studies concentrated on developing countries. It is therefore not surprising that this paper found the income elasticity of demand for healthcare in Ghana to be 0.01. The income elasticity of demand for healthcare is positive. This means that a 10% increase in income is likely to result in a 0.1% increase in demand for healthcare. This is because income increases the purchasing power of consumers who can then be able to afford medical expenses. However, the magnitude of both price and income elasticity of demand for healthcare are very low indicating a less sensitive demand for healthcare to changes in price and income. This finding is not only peculiar to Ghana, but they are also generally low in most countries (Gaddah, 2011; Newhouse et al, 1993; O'Brien, 1989; Feldstein, 1971; McLaughlin, 1987; DiMatteo, 1998).

The above conclusion is for the general case of healthcare utilization. But will the conclusions be different when it comes to specific healthcare services? The results in Table 4.9 seeks to answer this question by estimating the price and income elasticity of demand for some specific healthcare services – public, private, and alternative medical care.

Table 4.9: Price and Income elasticities of demand for healthcare: types of healthcare services with no care as the reference category.

Variables	Public healthcare	Private healthcare	Alternative healthcare
Without controls			
Price	-0.245***	0.121***	0.306**
Income	0.026	0.053	-1.614**
With controls			
Price	-0.19***	-0.089***	0.254
Income	0.012*	0.084*	-1.55
Number of observations = 1670	Wald chi2 (9) = 123.83		Prob > chi2 = 0.0000

Source: Based on GLSS6 Significant levels at ***1% **5% *10%

In analyzing the regression results, the focus should be on the estimates that have controls included in the regression. Price elasticity of demand for healthcare is also inelastic for the specific cases, just like the general case. The estimated elasticities for the specific cases are different from that of the general case only in terms of magnitude and sign. Price is only inversely related to demand for public and private healthcare but positively related to alternative healthcare, though not statistically significant. A price elasticity of -0.19 for public healthcare shows that a 10% increase in price (measured by out-of-pocket payment) will lead to a 1.9% decrease in public healthcare utilization. The magnitude is bigger than the general case, as well as the other remaining types of healthcare. This shows that public healthcare service is more sensitive to changes in price than other types of healthcare services.

The price elasticity of demand for private healthcare is -0.089. A 10 percent increase in price will result in a 0.9% decrease in demand for private healthcare and a 2.5% increase in alternative medical care (though not statistically significant). The choice of any of these healthcare providers may depend on the nature of diseases and the quality of healthcare services available in these two health facilities. The price elasticity of demand for private healthcare is very low. Sometimes, it even increases with the price because most people have the belief that private healthcare is of better quality and less opportunity cost in terms of time wasting (no

queues) so even if providers increase their prices, patients will still choose them instead of seeking no care. A similar conclusion could be said about alternative healthcare which comprises traditional, homeopathy and spiritual healers. If a disease is spiritually diagnosed to have been caused by evil forces, even if price is increased, patients will still choose to go there and seek treatment instead of seeking no care. One should remember that, when it comes to demand for healthcare, it is a matter of life and death, so usually patients are prepared to pay any price for certain medical care, especially when the illness is very severe. Again, patients are likely to choose a more affordable healthcare provider than the expensive one.

Just like the general case, income elasticities of public and private healthcare services are also inelastic. The healthcare services are “normal good”. Public healthcare has an income elasticity of 0.012, indicating that a 10% increase in income will result in a 0.1 % increase in public healthcare utilization. The private healthcare has an income elasticity of 0.084, a 10% increase in income will lead to a 0.8% increase in demand for private healthcare. Again, the effect of income on the choice of healthcare provider could be due to several factors, including the consumers’ ability to afford private healthcare which is perceived to be of good quality and less time-consuming. A different conclusion can be said about alternative healthcare. A 10% increase in income will lead to a 15.5% decrease in alternative healthcare, and though it is not statistically significant, making alternative healthcare inferior good. Perhaps the majority of the people who seek alternative healthcare are low-income earners.

This section computed the price and income elasticity of demand for healthcare. As expected, several variables were controlled for (age, sex, location, education, the severity of illness) including health insurance. One would expect that health insurance is not exogenous since the factors that affect demand for health insurance may also affect demand for healthcare, causing endogeneity problem. However, the test of endogeneity proved the absence of it and that health

insurance was not endogenous in the model at all (see appendix 11). The plausible explanation could be because of the calculation of price using only out-of-pocket payment, excluding the expenses borne by health insurance. Another reason could be that the probit model's post-estimation predicts only price and income elasticity of demand for healthcare and not the other control variables including health insurance. The model might have already accounted for the endogeneity problem.

The next section deals with the incidence of healthcare payment and answers the question of whether healthcare payment falls more on the rich or on the poor.

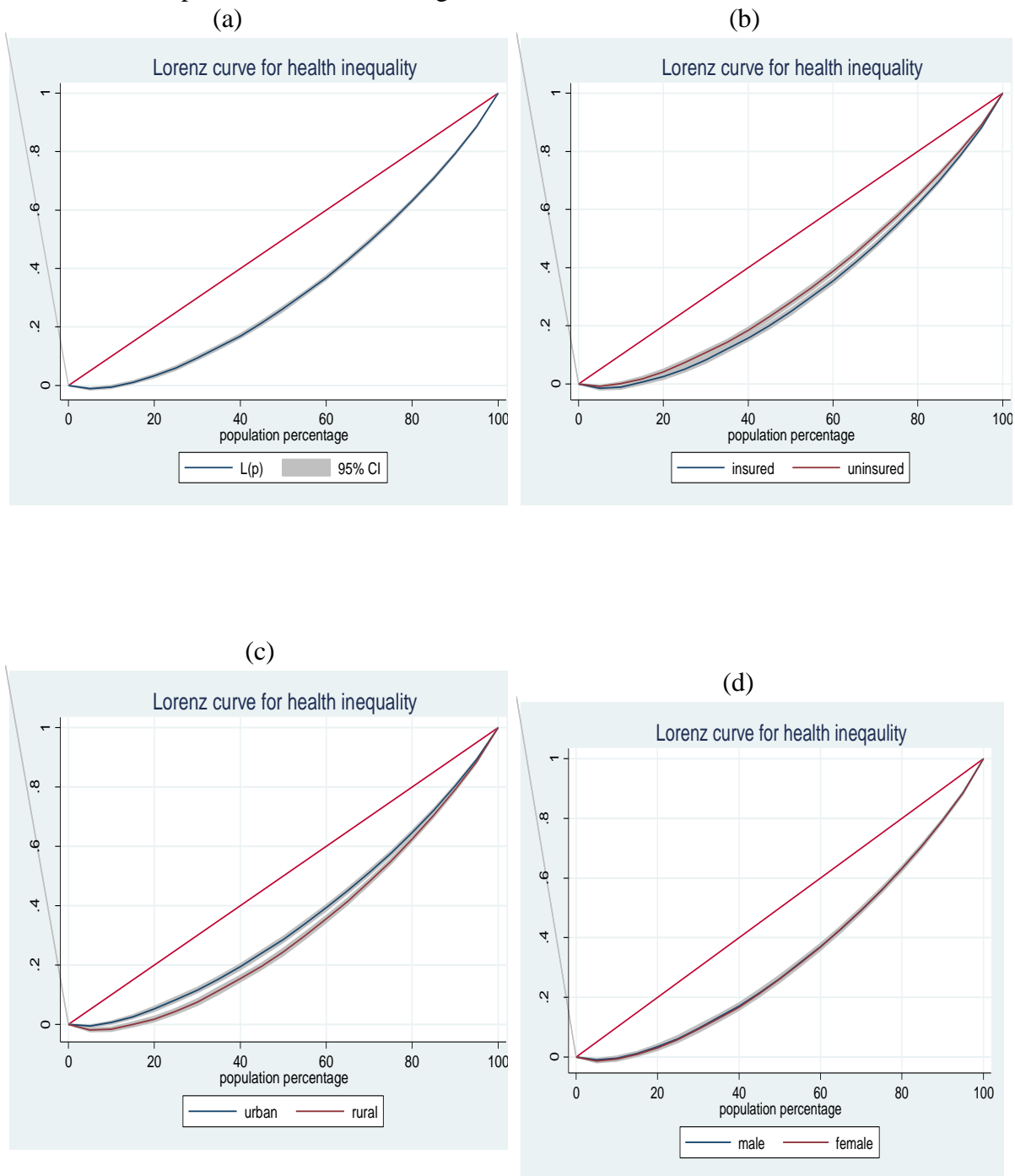
4.3.5 Benefit Incidence of the Payment of Healthcare Services

In analyzing the progressivity of the healthcare payment, the Lorenz curve is used to first estimate inequality in healthcare payment. This is the unranked-healthcare payment inequality. To rank healthcare payment inequity, the income quintile (5 quintiles) is used. The income quintile is grouped into five starting from the poorest to the richest, where the first quintile is the poorest and the 5th quintile is the richest. The Lorenz curve, concentration curves and concentration index are used to estimate whether or not this payment for healthcare services fall on the richest or the poorest. In other words, what percentage of the healthcare payment falls on the rich or on the poor? The 45⁰ line measures perfect equity. If the concentration index is negative, the curve lies above the 45⁰ line signifying concentration among the poor, making it regressive (the poor pays more). Conversely, if the index is positive, the curve lies below the 45⁰ line signifying the concentration is towards the rich making healthcare payment more progressive (the rich pays more).

Lorenz curves and concentration curves are widely used for analyzing economic inequalities and inequities among individuals. The study employs generalized Lorenz and Concentration curves. The concentration index, robust standard errors and confidence interval as well as significant levels are estimated from the sample. Furthermore, Lorenz and concentration curves are best situated for sub-population analysis and offer options to compute contrasts between sub-populations or between outcome variables.

The first part of welfare analysis within the health sector is provided by the Lorenz curve which plots healthcare payment against the proportion of the population. The 45⁰ line measures perfect equality, such that everybody is supposed to pay equally for healthcare service assuming they all have the same income. However, the presence of population behaviours does inhibit equal distribution of welfare. Any departure from the 45⁰ line measures inequality. Therefore, the closer the Lorenz curve is to the 45⁰ line, the more equal healthcare payment is distributed, and the farther away the curve is from the 45⁰ line, the more unequal payment is distributed.

Figure 4.1: Lorenz curve for healthcare payment: the general case and the sub-group case – insurance status, place of residence, and gender

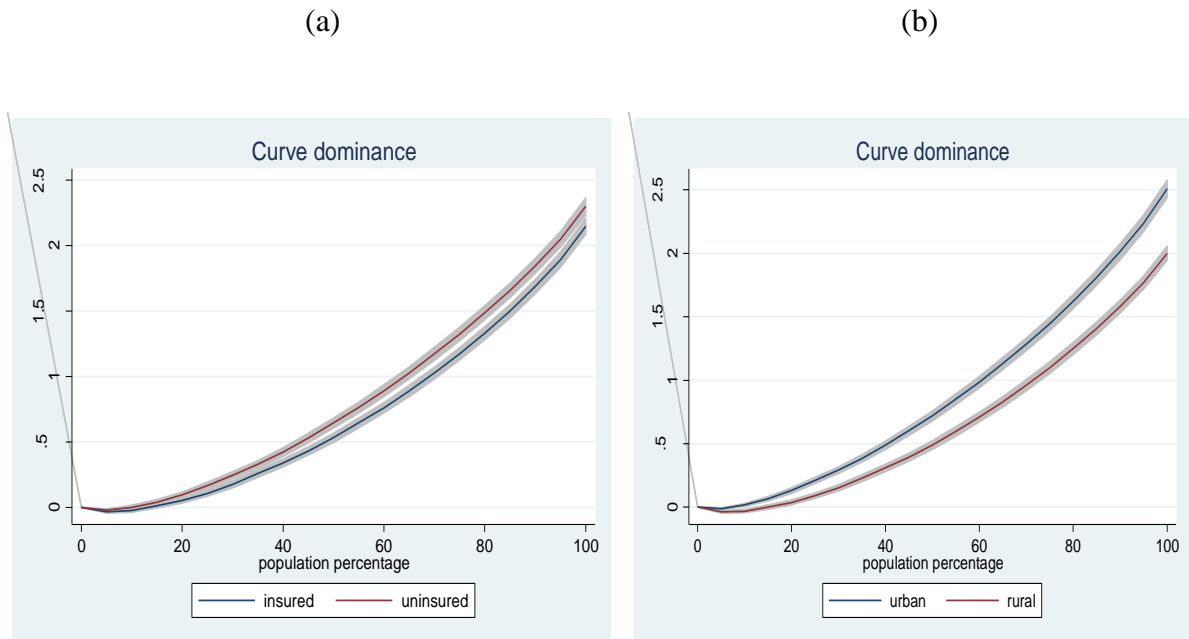


Source: Author's computation using GLSS 6

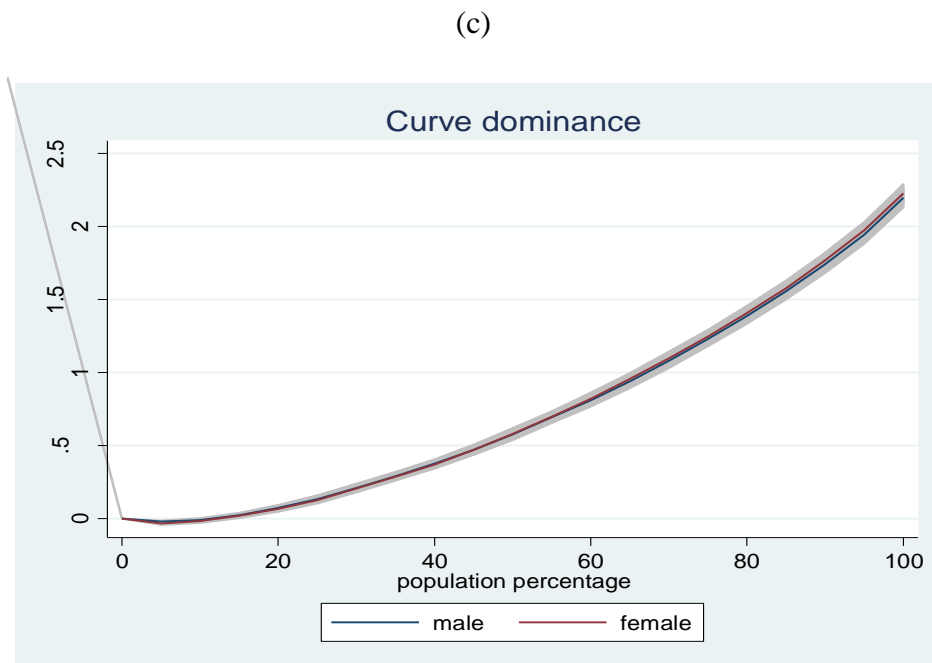
The study finds total healthcare payment is somewhat more equal since it is closer to the 45° line. (see figure 4.1 panel (a)). In terms of the healthcare payment inequalities across sub-populations, it is evident from the graph that uninsured group is more equal than the insured group. The Lorenz curve of healthcare payment of uninsured group is closer to the diagonal line and lies above that of the insured group. Hence, it appears safe to conclude that the healthcare payment distribution of insured group is less equal than the healthcare payment distribution of uninsured group (see Figure 4.1, panel (b)). The plausible explanation could be that within the insured, there is a wide variation of certain background characteristics like income levels and place of residence, whereas, within the uninsured group, the variation in the background characteristics may be minimal, although enrolment onto health insurance plays a critical role to cause this variation.

It is worth noting that the Lorenz curve does not necessarily imply that one distribution is preferred to the other from a welfare perspective. The generalized Lorenz dominance helps to evaluate welfare ordering. Using the generalized Lorenz dominance, it is concluded that not only does the Lorenz curve of uninsured group lie above that of the insured group, but the healthcare payment distribution of uninsured members generalized-Lorenz also dominates that of the insured members. The Lorenz curve of the uninsured everywhere lies above that of the insured curve. Thus, not only is the distribution of healthcare payment of uninsured members more equal than health benefit distribution of insured members, it is clearly preferred from a welfare perspective because it addresses the issue of inequality more than the insured curve (see figure 4.2 panel (a)).

Figure 4.2: Generalized-Lorenz dominance of healthcare payment among sub-groups - insurance status, place of residence, and gender.



Source: Author's computation using GLSS 6

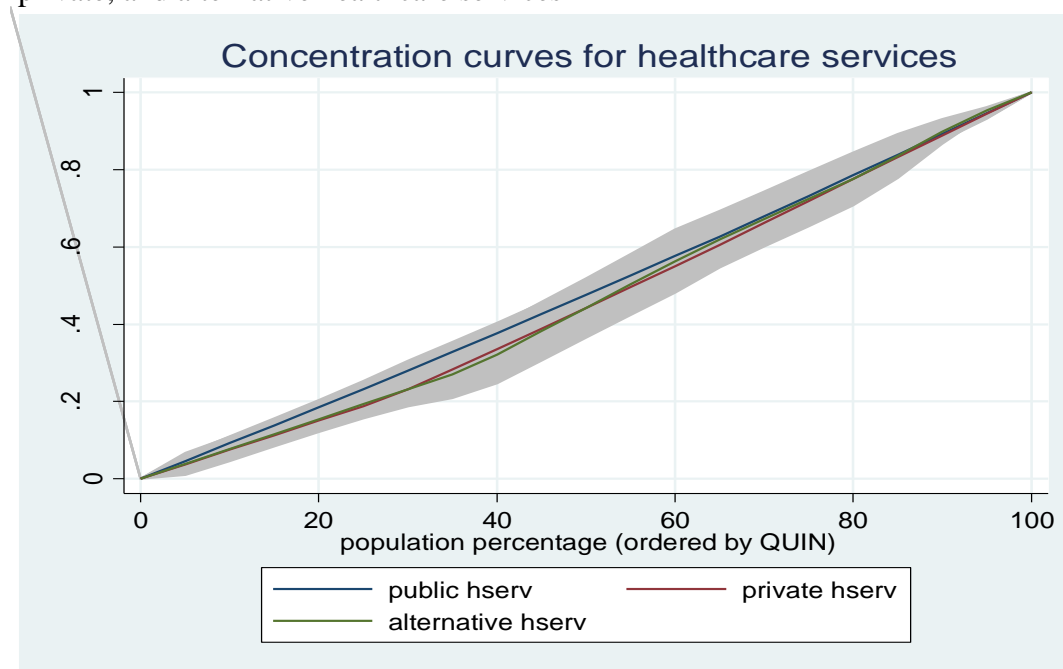


Source: Author's computation using GLSS 6

The location of residence subpopulation analysis is quite similar to the previous analysis. As expected, the urban healthcare payment is more equal than that of the rural folks (see Figure 4.1 panel (c)). The urban is not only more equal but Lorenz dominates the rural Lorenz curve for healthcare payment. This means that welfare in the urban area, as measured by healthcare payment is superior to that of rural areas (see Figure 4.2 panel (b)). Extending the discussions to capture gender dimension reveals that though the difference is negligible, female Lorenz curve for healthcare payment is more equal and dominates the male healthcare payment, indicating that healthcare payment is more equally distributed among females than males (see Figure 4.1 panel (d) and Figure 4.2 (c)). The plausible explanation could be the presence of reproductive health issues among women. Again, women enjoyed free maternal health services and are automatically enrolled in the National Health Insurance Scheme. Furthermore, women are more susceptible to sickness and are quick to seek treatment than men. It could also be that women usually get support from men who contribute to the payment of healthcare services.

As may be recalled, the concentration curve is used to illustrate how healthcare payment is distributed across the population ranked by income quintiles.

Figure 4.3: Concentration curves for the payment of all types of healthcare services– public, private, and alternative healthcare services



Source: Author's based on GLSS6

In Figure 4.3, it is shown that the concentration curve of public healthcare payment lies above the 45-degree line signifying that payment for public healthcare falls on households with low-income earnings. In sharp contrast, the private concentration lies below the 45-degree line making private healthcare payment falls more on those with high-income earnings. The alternative healthcare is not giving any clear-cut position on the curve. It alternates from low income to high income. The novelty of this study is in the use of Lorenz curves and generalized Lorenz dominance curves of healthcare benefits to analyze inequality and inequity in healthcare payment, whether the general case or the sub-group case, something the reviewed literature did not consider.

In welfare analysis, concentration curves do not show the magnitude of inequity and the direction of inequity. The concentration index is then computed to fill in the gap by showing the extent of inequity and the direction of inequity. Its conclusion is similar to the concentration

curves. A positive index value indicates that the healthcare payment incidence falls on the rich more than the poor. While a negative index value signifies that the health benefit incidence falls on the poor more than the rich.

A concentration index of 0.119 indicates a positive concentration index and suggests that overall, payment of general healthcare services fall on the rich more than the poor. All the sub-population analysis indicates that healthcare payment falls on the rich more than the poor because their concentration index values are positive (see Table 4.10).

However, the magnitude is different among the sub-group signifying that some are more progressive than others. The result is consistent with other studies that reported similar findings in Ghana and elsewhere (Demery et al., 1995; Gaddah, 2011; Chen et al., 2015). A test of equal variance between each of the categories of the sub-populations was conducted. The null hypothesis was equal variance. The F-test of insurance status and gender produced equal variance and that their null hypothesis of equal variance was not rejected. This means insured and uninsured groups had equal variance. In the same way, males and females had equal variance. However, the F-test for the location of residence indicates unequal variance between urban and rural areas because the null hypothesis was rejected. This shows that variations in the background characteristics of insurance status, and gender are not as pronounced as it is in the location of residence.

The findings are consistent with other papers that find healthcare payment in developing countries to be progressive (Khan, 2017; Chen et al., 2016; Demery, 1995). As far as the specific healthcare services are concerned, their concentration index shows varied results (see Table 10).

Table 4.10: Concentration indexes of healthcare services by sub-populations: the general case

Index	No. of obs	Index value	Robust std error	p-value
General healthcare benefits	1060	0.119	0.028	0.0000
Sub-population analysis				
Insurance status				
Insured	584	0.103	0.037	0.0055
Uninsured	476	0.143	0.040	0.0004
Covariance test	F-test = 0.233		p-value = 0.629	
Location of residence				
Urban	543	0.095	0.038	0.0130
Rural	517	0.058	0.032	0.0697
Covariance test	F-test = 2.757		p-value = 0.0971	
Gender				
Male	460	0.081	0.043	0.0613
Female	600	0.146	0.035	0.0000
Covariance test	F-test = 1.316		p-value = 0.2516	

Source: Author's computation based on GLSS6

In terms of the type of healthcare provider, the results indicate that the concentration index for public healthcare is -0.016, signifying that healthcare payment of public healthcare falls more on the poor. Payment for the private healthcare services, on the contrary, falls on the rich because the concentration index is positive (0.019). Though not statistically significant, the payment of alternative healthcare services is on those with low income. The result about public healthcare provider is consistent with what Akanzili (2012) found in Ghana using GLSS 5 data. The only difference is that while Akanzili (2012) found both public and private healthcare provider to be pro-poor, this paper finds that of the public healthcare payment to be less pro-poor. The difference in results could be accounted for by the differences in datasets and the presence of NHIS (see Table 4.11).

Table 4.11: Concentration Index of healthcare services payment by sub-populations: the specific case

Types of healthcare	Public healthcare	Private healthcare	Alternative healthcare
All	-0.016*	0.019**	-0.004
Insured	-0.006	0.009	-0.002
Uninsured	-0.029**	0.037**	-0.008**
Urban	-0.016	0.019	-0.003
Rural	-0.0005	0.005	-0.005
Male	-0.026**	0.031**	-0.005
Female	-0.0007	0.005	-0.004
	No. Of obs = 1,725		p-value = 0.0931
Source: Based on GLSS6	***1%	**5%	*10%

The sub-population analysis reveals that the concentration index for public healthcare are negative for all sub-groups, though only uninsured and males are significant. It still confirms the general conclusion that payment for public healthcare services falls on the poor, especially the uninsured. In sharp contrast, payment for private healthcare falls on the rich, and all the sub-groups indices also confirm this conclusion, because they all have negative concentration indices (especially the uninsured and males). The payment for alternative healthcare falls on the poor especially the uninsured. As observed, all the sub-population analysis confirms the general conclusion that alternative healthcare payment falls on the poor. This is because the alternative healthcare providers are affordable. For example, homeopathy, traditional medicine, or seeking healthcare from homes are easily accessible by the poor making alternative healthcare. The conclusion that payment of public healthcare service falls on the poor more than the rich is very pronounced in almost all the reviewed literature (Khan, 2017; Chen et al., 2016; Demery, 1995). However, there are varied conclusions about the benefit incidence of payment for private healthcare and sub-population analysis (Chen, 2016; Gaddah, 2011; Onwujekwe et al., 2012). The concentration index of the insured and the uninsured are of the same sign. Therefore, even though some differences exist in the background characteristics, it does not really matter, and not significant enough to change cause a difference.

A test of equal variance was again conducted and the results show that in all sub-group comparisons, public and private healthcare services F-test rejects the null hypothesis of equal variance. Thus, for public and private healthcare services payments, the various sub-groups do not have equal variance. However, alternative healthcare does not reject the null hypothesis and therefore confirms equal variance for all the sub-groups.

4.4 Summary

To achieve universal coverage, there is the need to emphasize not only on the supply factors but also the demand factors that serve as impediments to access to healthcare. It is also necessary to investigate where the benefits incidence fall. The paper focuses on first estimating the effects of price and income on demand for healthcare and estimate the sensitivity of demand for healthcare to price and income. It also estimates the benefit incidence of healthcare payment. Individuals make a choice of healthcare when they are ill. The choice is normally based not on price and income, but also the quality of the healthcare facility, and the probability of getting healed.

Some studies have attempted to estimate the effect of price and income on demand for healthcare. However, most of the reviewed literature did not consider the effect of prices on specific types of healthcare and the effect of income. This study fills in the gap by estimating the price and income elasticities of demand for healthcare, by concentrating on the types of healthcare. The paper goes a step further to identify the concentration of healthcare on different income groups. The objective is to estimate the extent to which healthcare services respond to changes in price and income, and also to estimate the progressivity of payment of healthcare services in Ghana.

The paper used data from the sixth round of the Ghana Living Standards Survey (GLSS 6), which is a household survey and nationally representative. Employing probit regression analysis, the study used STATA software to compute the estimates. In the first estimation, the decision to consult health personnel when sick is dichotomized taking the value of 1 if sought treatment and 0 if otherwise. The study used multinomial probit to estimate the types of healthcare. It is based on the individual's response to healthcare seeking when ill. The response is grouped into no care, public healthcare, private healthcare, and alternative medical care. The main objective is to estimate the sensitivity of healthcare to price and income and also estimate the progressivity of healthcare. Based on empirical literature, certain variables were included as control variables. These control variables include health insurance, age, education, location and severity of illness.

The paper found price and income elasticities of demand for health in Ghana to be -0.016 and 0.01 respectively. This clearly shows that both are inelastic, indicating that both price and income are less sensitive to demand for healthcare after controlling for certain important variables.

In terms of estimating the sensitivity of different types of healthcare provider to price and income, the paper found price elasticity of public and private healthcare to be -0.19 and 0.089 respectively. However, that of alternative healthcare is positively related to price with elasticity 0.25, though not statistically significant.

The income elasticity of demand for public and private healthcare services are 0.012 and 0.084 respectively, but that of alternative medical care is -1.55, showing that it is negatively related to income, but not statistically significant. The choice between these types of healthcare providers would depend on many factors. First, there may be issues regarding the quality of

healthcare services. For instance, when incomes of individuals increase, they are more likely to shift from demand for alternative healthcare provider to private healthcare provider, except in cases where illness is perceived to have been caused by witchcraft. In that case, patients would prefer to see spiritual interventions from the traditional healer or the spiritualist. All types of healthcare are price inelastic. In the same way, all types of healthcare are income inelastic, except alternative medical care (though not statistically significant).

Lorenz curves and concentration curves are widely used for analyzing economic inequalities and inequities in the distribution of healthcare payments. The results show the presence of inequality and inequity in healthcare payment in Ghana. The healthcare payment in the uninsured, urban and male group is more equal than their respective reference groups. The concentration curve of the payment of public healthcare services lies above the 45-degree line signifying that it falls on households with low-income earnings. In sharp contrast, the private concentration lies below the 45-degree line making payment for private healthcare services fall more on those with high-income earnings. The alternative healthcare is not giving any clear-cut position on the curve. It alternates from low income to high income (see Figure 4.3).

In welfare analysis, since concentration curves do not indicate the extent of inequity, concentration index is usually computed to quantify the degree and direction of inequity. An overall concentration index of 0.119 indicates a positive concentration index suggesting that payment for general healthcare services fall on the rich more than the poor. All the sub-population analysis indicates that healthcare payment falls on the rich more than the poor because their concentration index values are positive, making healthcare services in Ghana pro-poor.

The results also indicate that the concentration index for public healthcare and alternative medical care are -0.016 -0.004 respectively, signifying that healthcare payment of public and alternative healthcare is on the poor (because of negative concentration index). The payment for private healthcare services, on the contrary, falls on the rich because the concentration index is positive (0.019).

CHAPTER FIVE

5. THE EFFECT OF NATIONAL HEALTH INSURANCE SCHEME ON HEALTHCARE UTILIZATION AND OUT-OF-POCKET PAYMENT

5.1 Introduction

Out-of-pocket payment (OPP) puts enormous pressure on incomes of individuals and households (Blanchet et al., 2012). In the paper by Witter (2009), it was found that households encounter hardships in their attempt to utilize healthcare facilities because of poverty. Many developing countries rely on out-of-pocket payment, or tax-based systems, or mixed system to reach the goal of universal health coverage. Different types of strategies for easing payment and utilization of healthcare need to be examined if universal health coverage is to be achieved. Although rich nations may have the luxury of practicing tax-based systems because most people can afford to pay, they still have established social health insurance systems or co-payment system. However, for developing countries, the situation is different due to the fact that so many people live below the poverty line. For this reason, it is important for developing countries to transit from out-of-pocket payment to health insurance in order to improve access to healthcare (Witter, 2009).

Health insurance seems to be very attractive and is gaining more and more attention in developing countries (Blanchet et al., 2012). It serves as a means of improving healthcare demand and household protection against impoverishment which results from out-of-pocket expenses for healthcare. The World Health Organization recognizes health insurance as a promising means to attain universal health coverage. Several low and middle-income countries have been establishing different types of National or Social Health Insurance schemes (Spaan et al., 2012). Social Health Insurance can take the form of Private Health Insurance as it is

practised in Brazil and Chile or the Community-based Health Insurance like that of Ghana called the National Health Insurance Scheme (NHIS) (Spaan et al., 2012). While the Private Health Insurance is seen to serve only a certain affluent segment of the population, Community-Based Health Insurance is often seen as a mechanism to make healthcare more affordable to the poor (Spaan et al., 2012).

Ghana has a history when it comes to healthcare financing. The ‘cash and carry’ system which existed before the introduction of the National Health Insurance Scheme (NHIS) was a major obstacle to access to healthcare in Ghana. Existing literature confirms that enrolment onto the NHIS has increased utilization, both out-patient and in-patient (Sulzbach et al., 2005). The import of this study is to contribute to the effectiveness of health insurance on healthcare utilization using data from the Ghana Living Standards Survey and employing propensity score matching regression technique, placing emphasis on reasons for seeking treatment. The study again estimates the effect of NHIS on healthcare utilization from various sources. The specific objectives are as follows:

1. Estimate the effect of the National Health Insurance Scheme on healthcare utilization.
In addition to this objective, the paper also examines the effect of NHIS on healthcare utilization from different providers.
2. Examine the effect of NHIS on out-of-pocket payment.

In terms of methodology, this paper uses PSM to estimate the demand function by placing emphasis on the effect of NHIS on demand for healthcare. Price and income are still introduced into the regression as controls. The difference is that whereas in chapter four (4), income was used in its raw state (continuous variable), in this paper, income is categorized into quintiles.

5.2 Methodology

5.2.1 Data Source

As stated in section 4.2.1, the source of data for the thesis is the sixth round of Ghana Living Standards Survey (GLSS 6) which was conducted in 2012/2013. In addition to GLSS 6, this particular paper also uses data and information from the National Health Insurance Authority Report, 2013.

5.2.2 Estimation technique

Propensity Score Matching (PSM) technique is employed for this paper. The technique attempts to estimate the effect of a treatment, policy or other intervention by accounting for the covariates that predict the treatment. It can be applied to all situations where there are two groups: the treatment group and the control group. Selection bias occurs when even in the absence of treatment, participation and non-participation differ. Propensity score matching helps to solve the selection bias problem. PSM is very similar to the experimental context (Mensah et al, 2010). Its basic idea is to find in a large group of non-participants those individuals who are similar to the participants in all background characteristics, even before treatment (Caliendo and Kopeinig, 2005). Based on Rosenbaum and Rubin (1983) and Rubin (1974), Caliendo and Kopeinig (2005) suggest the use of a balancing score $b(X)$. The functions of the relevant observed covariates X such that the conditional distribution of X given $b(X)$ is independent of assignment into treatment. PSM is a balancing score that indicates the probability of participation given the observed characteristics. The obtained propensity score is the predicted probability (p) or $\log [p / (1-p)]$. The propensity score is the probability of a unit being assigned to a particular treatment given a set of observed covariates. This technique

is very effective in reducing selection bias. The major advantage of the PSM is that it is able to balance treatment and control groups on a large number of covariates without losing a large number of observations.

5.2.3 The model

The formal treatment follows from the potential outcome approach or the Roy-Rubin Model [(Roy, 1951), Rubin (1974)] which was adopted by Caliendo and Kopeinig (2005). In this thesis, the potential outcome refers to the utilization of healthcare, while treatment refers to insured. The main pillars of the model are individuals, insurance and healthcare utilization. Suppose a binary outcome insurance T , and healthcare utilization outcome Y , and background characteristics, X . The background characteristics are age, income, gender, the location of residence, the severity of illness, etc. The propensity score is defined as the conditional probability of insurance given background characteristic X . In case of a binary estimator, the insured indicator T_i is equal to 1 if the individual is insured and 0 if otherwise. The potential outcome (utilization) is then given as $Y_i(T_i)$ for each individual i , where $i = 1, \dots, N$ and N denote total population. The treatment effect (effect of insurance) can then be given as:

$$\pi_i = Y_i(1) - Y_i(0) \dots\dots\dots(5.1)$$

The presence of counterfactual outcomes does not make it possible to estimate the individual effects and therefore π_i concentrates on the average effect of insurance on utilization.

The ‘average treatment effect on the insured’ (ATT) is then defined as:

$$\pi_{ATT} = E(\pi|T = 1) = E[Y(1)|T = 1] - E[Y(0)|T = 1] \dots\dots\dots(5.2)$$

$E[Y(0)|T = 1]$ is the unobserved outcome or the counterfactual mean, which must be replaced using the mean outcome of the uninsured individuals $E[Y(0)|T = 0]$ is not a good idea since components which determine insurance decision are also likely to determine healthcare utilization leading to the problem of selection bias. π_{ATT} can be noted as:

$$E[Y(1)|T = 1] - E[Y(0)|T = 0] = \pi_{ATT} + E[Y(0)|T = 1] - E[Y(0)|T = 0] \dots\dots\dots (5.3)$$

The difference between the left-hand side of equation (5.3) and π_{ATT} is the selection bias. The true parameter π_{ATT} is estimated only if:

$$E[Y(0)|T = 1] - E[Y(0)|T = 0] = 0 \dots\dots\dots(5.4)$$

The overall (total) average treatment effect is given by:

$$\pi_{ATE} = E[Y(1) - Y(0)] \dots\dots\dots(5.5)$$

Conditional Independence Assumption (CIA) states that with a given observable covariates X which are not affected by insurance, potential healthcare utilization is independent of insurance.

$$Y(0), Y(1) \dagger T | X, \forall X \text{ (unconfoundedness)} \dots\dots\dots(5.6)$$

Where \dagger denotes statistical independence. The conditioning on all relevant covariates is limited in case of a high dimensional vector. The unconfoundedness of equation (5.6) is possible if the selection is based on observable characteristics and that all variables that influence insurance and healthcare utilization are simultaneously observed by the researcher.

Rosenbaum and Rubin (1983) suggest using the so-called balancing scores. If potential utilization of healthcare is independent of insurance conditional on background covariates X and also independent conditional on balancing score $b(X)$, then

$$P(X) = P(T = 1|X) \dots\dots\dots(5.7)$$

Where equation (5.7) is the Propensity Score (PS).

Therefore, the Conditional Independent Assumption based on propensity score can be written as:

$$Y(0), Y(1) \perp T | P(X), \forall X \dots\dots\dots(5.8)$$

Another requirement besides the independence is what is called the common support or the overlap. This requirement rules out perfect predictability of T given X :

$$0 < P(T = 1|X) < 1 \dots\dots\dots(5.9)$$

Which means that an individual with the same X has the positive probability of being either insured or uninsured.

Given that Conditional Independent and the Common Support assumptions hold, the Propensity Score estimator for ATT can be written as:

$$\pi_{ATT}^{PSM} = E_{P(X)|T=1} \{E[Y(1)|T = 1, P(X)] - E[Y(0)|T = 0, P(X)]\} \dots\dots\dots(5.10)$$

Put in words, the Propensity Score Matching (PSM) estimator is simply the mean difference in utilization over the common support, approximately weighted by the propensity score distribution of participants.

Put in simple econometrics form:

$$Y_i = \alpha + \beta T_i + \delta X_i + \varepsilon_i \dots\dots\dots(5.11)$$

Where Y_i is the various measures of utilization. That is to utilize healthcare if suffered illness or injury or both, and whether it is a public, private, or alternative healthcare provider. Utilization of healthcare could be for treating illness, injury, follow-up & check-up, child birth related issues, and vaccination purposes.

α is the autonomous effects

T_i is the insurance status dichotomised into insured and uninsured.

X_i is the background covariates which includes age, income, education, gender, and location.

ε_i is the error term

Many studies on the effect of health insurance on healthcare utilization have used different methods such as logistic regression, probit regression, Ordinary Least Square (OLS), among others. However, these methods are not able to address the selection bias often associated with enrolling onto health insurance. In other words, the very background characteristics that affect utilization can also affect enrolment, and therefore for us to effectively estimate the effect of health insurance on healthcare utilization, a mere controlling for these covariates is not enough. There is the need to match them, and the method of Propensity Score Matching (PSM) is the best-justified method for this sort of analysis.

Following the works of other authors, the following variables are chosen to estimate the demand for healthcare in this study. Perhaps the first variable to consider is healthcare. Demand

for healthcare is examined from the providers' perspective. For this reason, Healthcare is measured by the place of consultation. That is, where respondents seek treatment when they fall sick or ill. The analytical sample for the study includes all those who reported to have suffered from injury or illness or both in the two weeks preceding the interview. Therefore, the place of consultation is categorized into a public health facility, private health facility, and alternative health facility (spiritual healer, traditional healer, patient's home and homeopathic). The aim of the study is to estimate the impact of health insurance on the utilization of healthcare facility. It is important to estimate it and compare the effect of each category to no care (which also refers to no treatment, i.e. people who fell sick but did not seek care). Each category is treated as a binary (that is consulted or not). In this case, the healthcare variable will take the form:

No care: It takes the value of 1 if did not consult, and 0 if otherwise.

Public healthcare: It takes the value of 1 if consulted public healthcare provider, and 0 if otherwise.

Private healthcare: It takes the value of 1 if consulted private healthcare provider, and 0 if otherwise.

Alternative healthcare: It takes the value of 1 if consulted alternative healthcare provider, and 0 if otherwise.

Patients visited the health facility for reasons. Respondents were asked to indicate their reason for visiting a particular health facility and gave the reasons to be for treating illness, injury, follow-up and check-up, childbirth-related issues (prenatal, delivery, and postnatal care), and vaccination. Just like the previous variable, each response is also treated as binary:

Illness: It takes the value of 1 if consulted for illness, and 0 if otherwise.

Injury: It takes the value of 1 if consulted for injury, and 0 if otherwise.

Follow-up and check-up: It takes the value of 1 if consulted for follow-ups and check-ups, and 0 if otherwise.

Childbirth-related issues: It takes the value of 1 if consulted for childbirth related issues like prenatal, delivery, and postnatal, and 0 if otherwise.

Vaccination: It takes the value of 1 if consulted for vaccination, and 0 if otherwise.

The main aim of the paper is to estimate the effect of the National Health Insurance Scheme (NHIS) on healthcare utilization and out-of-pocket payment. According to the data, people who have health insurance status are those who hold insurance card and have renewed their insurance. This may refer to active membership.

Insured person: It takes the value of 1 if insured, and 0 if otherwise.

The other variables to be used for the analysis are out-of-pocket payment, the age of the respondent, and respondent's monthly income from the main occupation, which are all treated as continuous variables.

The highest educational attainment of the respondent has been found in the literature to be a good estimator of demand for healthcare (Grossman, 1972). The educational level is categorized into none (no education), those who completed primary (from class one to class six), Junior High School, Senior High School, and tertiary or higher education. This is how the education variable is categorized.

None (no education): It takes the value of 1 if no education, and 0 if otherwise.

Primary: It takes the value of 1 if primary, and 0 if otherwise.

Junior High School (JHS): It takes the value of 1 if JHS/middle, and 0 if otherwise.

Senior High School (SHS): It takes the value of 1 if SHS, and 0 if otherwise.

Higher (tertiary and higher): It takes the value of 1 if higher, and 0 if otherwise.

The remaining demographic factors which could influence the demand for healthcare are discussed below. The gender of the individual is also examined to see its impact on demand for healthcare and grouped into Male which takes the value of 1 if male and 0 if otherwise.

The area of residence is also grouped into rural and urban, where urban takes the value of 1 if urban, and 0 if otherwise.

The results show that about 33.8% of the sample (those who reported to have suffered from illness or injury or both) did not seek treatment. The type of healthcare provider individuals consulted to seek treatment were public healthcare provider (31.9%), private healthcare provider (33.0%), and alternative healthcare provider (1.4%) (see Table 5.1).

5.3 Effect of the National Health Insurance Scheme (NHIS) on demand for healthcare

Table 5.1: Summary statistics of the dependent variables and background characteristics of the total sample (uninsured and insured groups combined)

Variable	No. of Observation	Mean	Standard Deviation
Healthcare Services			
No care	3,499	0.3	0.5
Public healthcare	3,307	0.3	0.5
Private healthcare	3,413	0.3	0.5
Alternative healthcare	121	0.0	0.1
Reason for consultation			
Illness	6,580	0.9	0.3
Injury	418	0.1	0.2
Follow & check ups	385	0.1	0.2
Child birth related	132	0.0	0.1
Vaccination	37	0.0	0.1
Insurance status			
Insured	5,288	0.7	0.5
Uninsured	2,264	0.3	0.5
Out-of-pocket payment	7,367	14.0	43.6
Age	71,301	24.5	19.9
Monthly income	15,898	460.7	1.3
Education			
None	23,953	0.3	0.5
Primary	7,049	0.1	0.3
JHS	14,655	0.2	0.4
SHS	5,914	0.1	0.3
Higher	19,727	0.3	0.5
Gender			
Male	34,321	0.5	0.5
Female	36,979	0.5	0.5
Location			
Urban	35,741	0.4	0.5
Rural	35,559	0.6	0.5

Source: Author's computation using GLSS 6

Note: The sample size is those who suffered illness or injury or both.

About one-third of the sample did not seek healthcare when ill. This is quite a significant number and must, therefore, be investigated. The essence of the regression estimation will help understand the factors that influence seeking healthcare behaviour. The mean values for both

private and public healthcare facilities are equal. Does it mean they will have the same coefficient? The regression results will reveal whether or not insurance has the same effect on utilizing both public and private health facilities.

A greater number of the respondents visited a physician to treat illness (87.7%), followed by injury (5.4%). The rest sought treatment for follow-ups and check-ups (5.1%), Childbirth related issues (1.7%), and vaccination (0.5%).

The sample for the analysis is people who reported to have suffered from illness, or injury or both. It must be recalled that about 67% of the population had enrolled (out of which about 10% did not renew). But Table 5.1 indicates that about 70% of the sample is insured, while 30% are not insured. It can be inferred from the above that the probability of falling ill increases the likelihood of enrolling indicating the presence of adverse selection: the fact that ill-health individuals self-select themselves to enrol on the National Health Insurance Scheme. The average out-of-pocket payment incurred to seek medical treatment is GH¢ 14.0. Given that some people are enrolled in the National Health Insurance Scheme, it is imperative to investigate whether or not the same amount will be paid by both the insured and uninsured group.

The average age is 25 years, and the average monthly income is GH¢ 460. Clearly, the descriptive statistics show that the sampled people are very young, and also the majority of the people live above the poverty line. In terms of the highest educational qualification, 34.4% of the respondents did not have any educational qualification, 8.8% have a primary level as their highest educational level. The remaining are JHS (17.6%), SHS (6.9%) and higher educational level (32.2%). This shows that about one third do not have any education. Majority of the people who pursue any level of education end up in the tertiary. There are more females

(51.4%) than males (48.5%). In terms of location of residence, there are more people living in the rural area (61.9%) than their urban counterparts (38.1%). This makes it essential to find out about the influence of demographic factors on demand for healthcare.

The application of the Propensity Score Matching (PSM) method requires that estimations are made to verify if the health insurance status has any implication for differences in background characteristics or not. In other words, do the background characteristics differ between insured groups and uninsured groups? The essence of Table 5. 2 is to provide evidence that the background characteristics differ between insured and uninsured groups. For this reason, there is the need to match those characteristics and make sure the observations are as similar as possible, before comparing their outcomes using the propensity score matching method.

Table 5.2: Summary statistics of the dependent variables and background characteristics for the uninsured and insured groups.

Variable	Uninsured Group			Insured group		
	No. of obs.	Mean	Standard Deviation	No. of obs.	Mean	Standard Deviation
Insurance status						
Healthcare Services						
No care	1,706	0.5	0.5	1,751	0.3	0.4
Public healthcare	688	0.2	0.4	2,645	0.4	0.5
Private healthcare	1,321	0.4	0.5	2,078	0.3	0.5
Alternative healthcare	51	0.0	0.1	70	0.0	0.1
Reason for consultation						
Illness	574	0.9	0.3	4,567	0.9	0.3
Injury	47	0.1	0.3	268	0.1	0.2

Variable	Uninsured Group			Insured group		
	No. of obs.	Mean	Standard Deviation	No. of obs.	Mean	Standard Deviation
Insurance status						
Follow-up & check-ups	20	0.0	0.2	320	0.1	0.2
Childbirth related	7	0.0	0.1	105	0.0	0.1
Vaccination	4	0.0	0.1	18	0.0	0.1
Age	29,315	24.4	18.9	41,986	24.7	20.6
Monthly income	7,242	429.8	1.3	8,656	486.4	1.3
Education						
None	9,416	0.3	0.5	14,573	0.4	0.5
Primary	3,157	0.1	0.3	3,870	0.1	0.3
JHS	6,045	0.2	0.4	8,610	0.2	0.4
SHS	2,148	0.1	0.2	3,789	0.1	0.3
Higher	8,549	0.3	0.5	111,143	0.3	0.5
Gender						
Male	15,237	0.5	0.5	18,991	0.4	0.5
Female	14,077	0.5	0.5	22,995	0.6	0.5
Location						
Urban	13,465	0.3	0.5	22,378	0.4	0.5
Rural	15,850	0.7	0.5	19,607	0.6	0.5

Source: Author's computation using GLSS 6

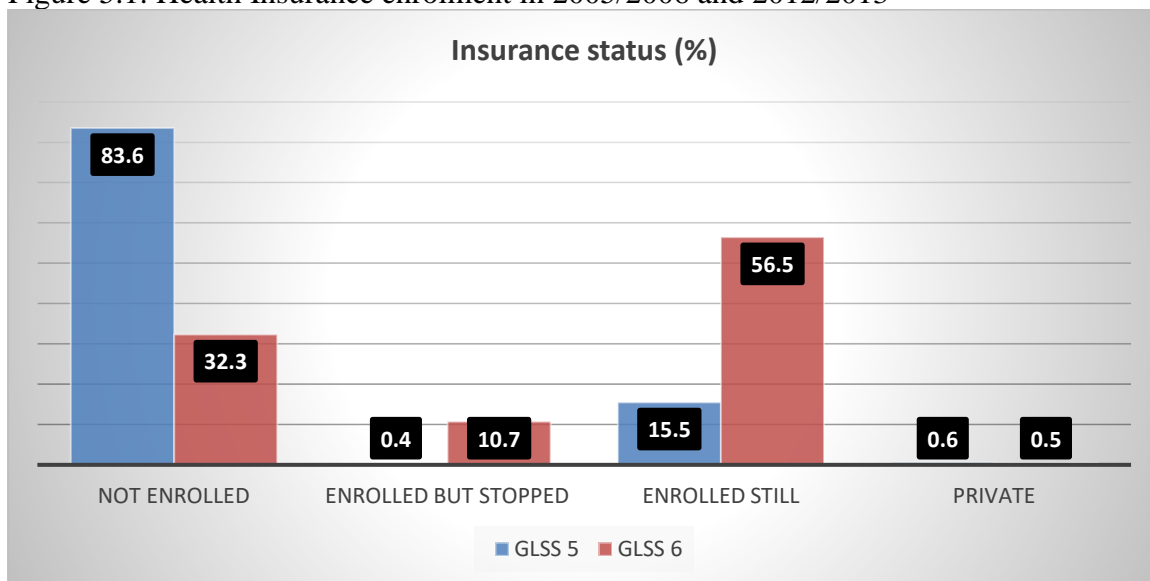
The difference in means is because those who have health insurance are different from those that do not have it. The insured persons are more likely to utilize public healthcare provider, while the uninsured would prefer not to seek treatment when ill or injured. The average utilization of healthcare to treat illness and injury, follow-ups and check-ups, childbirth-related issues, and vaccination are higher for the insured group than the uninsured group. The average

person in the insured group is older (25 years) than the uninsured group (24 years). The insured group earn a higher income, have high education, mostly females and urban dwellers (see Table 5.2).

5.3.1 Enrolment onto the National Health Insurance Scheme (NHIS)

As stated earlier, the National Health Insurance Scheme (NHIS) was established in 2003 (Act 650) to replace the ‘cash and carry’ system. The main objective of the scheme is to increase access to healthcare. One of the ways of assessing increased access to healthcare is through utilization. The scheme is publicly owned and supervised by the National Health Insurance Authority (NHIA) (NHIA, 2003).

Figure 5.1: Health Insurance enrolment in 2005/2006 and 2012/2013



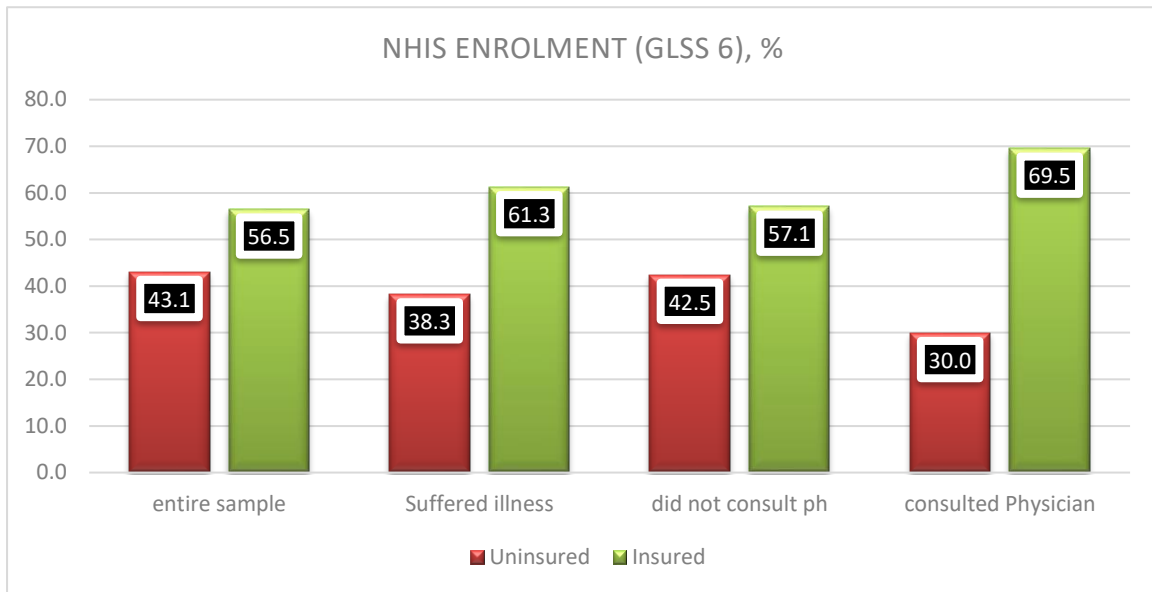
Source: Author’s computation using data from GLSS 5 & GLSS 6

The number of people in the total population who do not subscribe to any health insurance decreased from 83.6% in 2005/2006 to 32.3% in 2012/2013. The percentage of individuals who indicated that they registered but have stopped enrolling increased from 0.4% in 2005/2006 to 10.7% in 2012/2013. The National Health Insurance Authority (NHIA) is always

interested in active membership so those who are still registered on NHIS (have renewed their membership) have increased from 15.5% of the population in 2005/2006 to 56.5% in 2012/2013, while that of private subscribers had dropped from 0.6% to 0.5% in the same period. Some 32.32% of the population is not registered with any health insurance. Individuals who have stopped enrolling give reasons as no money (63%), do not need health insurance (9%), do not have confidence in the scheme (8%), and premium is too high (8%), among others (GSS, 2013). These findings are similar to that of Ghana Demographic and Health Survey (GDHS, 2014), which states that those who are not covered by the National Health Insurance Scheme (NHIS) give reasons of no money (63%), do not have confidence in the operation of the scheme (9.6%), premium is too high (6.9%), or registration office is too far (4.3%) (GSS, 2013).

In the same GLSS 6 data, about 10.7% of the population registered with NHIS but have stopped enrolling. When asked why, they gave the reasons as registered but not renewed (57%), no money (16%), registered but have not received the card (11%) and registered but in waiting period (8%), among other reasons (GSS, 2013).

Figure 5.2: National Health Insurance Enrolment in 2012/2013



Source: Author's computation using data from GLSS 6 (2012/2013)

To further understand the differences in the insured and uninsured groups, Figure 5.2 shows that enrolment into the National Health Insurance Scheme (NHIS) brings about differences in the characteristics describing the sample. The first observation is that the percentage of the insured group (56.5%) is higher than the uninsured group (43.1%). About 61.3% of all those who reported to have suffered from illness or injury or both are insured whereas 38.3% are uninsured. In the previous section, it was reported that about one-third of the people who suffered from illness or injury or both did not seek healthcare. There is a difference in this number between the two groups under investigation. For those who did not seek healthcare, 57.1% are insured whereas 42.5% are uninsured. About 69.5% of those who consulted a physician are insured higher than 29.5% who are uninsured.

To start the discussion on the effect of the National Health Insurance on healthcare utilization, there is the need to examine the dominance of health insurance coverage by the background

characteristics, which are age, income (categorized into income quintiles), education, gender, and location. The percentage of each variable adds to 100%.

Table 5.3: Dominance of health insurance coverage by the background characteristics

VARIABLES		SAMPLE		POPULATION	
Total number of observations		Insured 5,288 (100%)	Uninsured 2,264 (100%)	Insured 41,986 (100%)	Uninsured 29,315 (100%)
Age					
	0-17	43.5	42.0	48.3	45.0
	18-35	20.8	26.6	25.1	29.4
	36-54	17.5	19.7	15.7	17.4
	55-69	10.4	8.0	6.5	5.6
	70+	7.8	3.8	4.4	2.6
Test of difference		Pearson chi2 (4) = 76.7885, Pr = 0.000		Pearson chi2 (4) = 365.9475, Pr = 0.000	
Income quintiles					
	Poorest 1 st quintile	23.5	22.2	24.6	27.3
	2 nd quintile	21.0	23.6	17.0	19.0
	3 rd quintile	20.7	19.5	18.7	20.1
	4 th quintile	17.1	18.8	21.4	19.5
	Richest 5 th quintile	17.7	16.0	18.3	14.2
Test of difference		Pearson chi2 (4) = 1.4553, Pr = 0.000		Pearson chi2 (4) = 70.5930, Pr = 0.000	
Education					
	None	29.7	28.5	35.6	32.7
	Primary	7.1	8.8	8.2	9.7
	JHS	18.6	17.8	17.7	17.4
	SHS	6.3	4.5	7.8	5.8
	Higher	38.4	40.4	30.6	34.4
Test of difference		Pearson chi2 (4) = 17.9021, Pr = 0.000		Pearson chi2 (4) = 258.4450, Pr = 0.000	
Gender					
	Male	41.1	49.6	45.9	52.2
	Female	58.9	50.4	54.1	47.8
Test of difference		Pearson chi2 (1) = 45.9811, Pr = 0.000		Pearson chi2 (1) = 273.4370, Pr = 0.000	
Location					
	Urban	39.4	35.1	40.6	34.4
	Rural	60.6	64.9	59.4	65.6
Test of difference		Pearson chi2 (1) = 12.7647, Pr = 0.000		Pearson chi2 (1) = 281.4655, Pr = 0.000	

Source: Author's computation using GLSS 6

Note: The sample size is those who suffered illness or injury or both.

To understand the distribution of the insured and uninsured groups across the various background characteristics, a simple cross-tabulation is taken to record column summation of the various categories. The column sum must equal 100%. This sort of analysis, especially that of the insured group is very relevant when considering payment.

For the Age category, children below 18 years dominate the health insurance coverage with 43.5% in the sample size and 48.3% in the entire population. This is consistent with NHIA's report (2013) that the national health insurance active participation is dominated by children aged below 18 years. The poorest income quintile dominates the coverage in the sample size with 23.5%. Those with higher education dominate with 38.4%, for the sample size, but the population total is dominated by people with no education. Females have higher coverage of 58.9% and 54.1% in both the sample size and population respectively. Residence in the rural area dominates the health insurance coverage with 60.6% in the sample size and 59.4% in the population. In conclusion, all those categories who dominated health insurance coverage in the sample size also dominated health insurance coverage in the population total, except education where coverage was highest amongst higher education holders and no education dominated in the sample and population sizes respectively. The implication is that the poor and vulnerable are more likely to insure due to the catastrophic effect of illness both in terms of their inability to pay medical bills or the adverse impact of sick days on their labour income. This is particularly important because most poor people are either not working at all, or they are just vulnerably employed. With the rich, it is very likely that they can afford medical bills. It can also be that the expected utility of the rich arising from health insurance is low.

The previous paragraphs revealed which of the categories of the background characteristic dominates the insured group. For this conclusion to be justified, it is necessary to investigate whether or not the dominance is due to their likelihood to enrol in the National Health Insurance

Scheme (NHIS). The next paragraph, therefore, discusses the likelihood of enrolling onto the national health insurance by these covariates.

In estimating the likelihood to enrol, mean graphs (see appendixes 1, 2, 3, 4, 5 and 6) are drawn to show where the likelihood point lies. The mean mark for the group is the horizontal line. The likelihood of enrolment is indicated by the two vertical lines. Each of the vertical lines is coded 1 and 0, where the likelihood of enrolling is 1, and 0 if otherwise. If the end-point of the vertical line coded 1 lies above the mean line (horizontal line) then that category is likely to enrol compared with its counterparts (reference group) whose vertical end-point line coded 1 lies below the mean line.

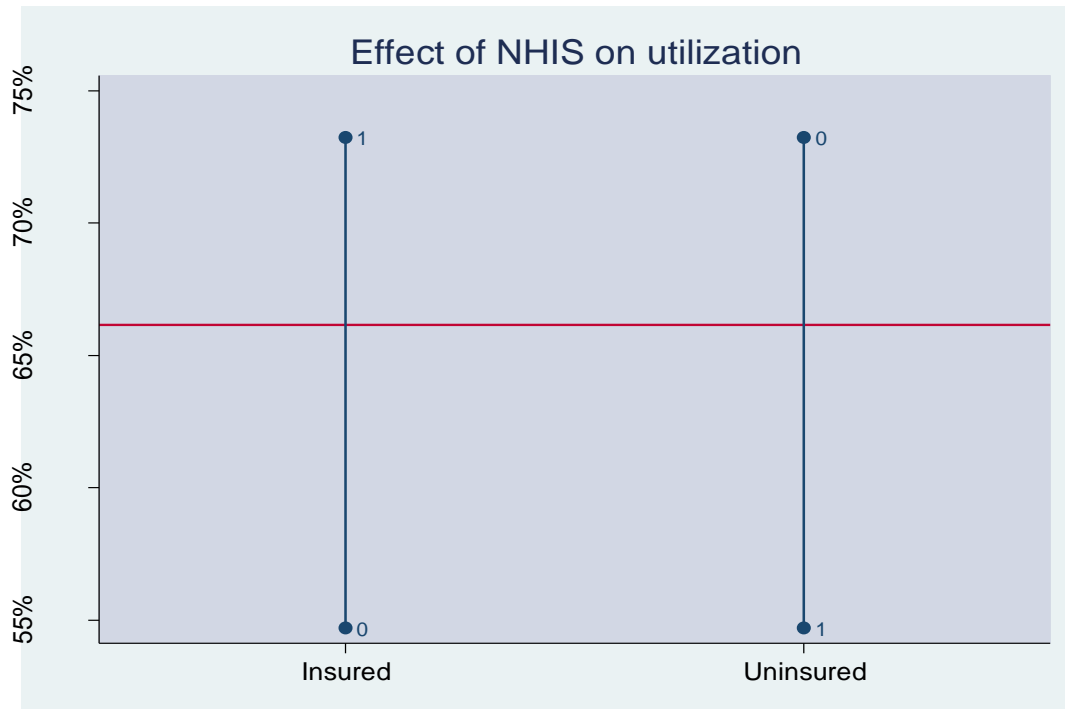
In the age categories, older folks are more likely to enrol and also enrol their children as well. This might be the reason for their dominance in the insurance group as discussed in the previous paragraph. Rich individuals in the 5th income quintile are more likely to enrol. Perhaps, they have the money to pay the premium. A greater number of people had not been insured and about 10.6% did not renew their insurance card. They gave the reason as ‘no money’ for their inability to stay insured. This finding is puzzling since Authorities of the National Health Insurance Scheme have indicated that they have done everything possible to encourage the poor and vulnerable to enrol. Interventions such as charging a lower premium, and free registration for children and the aged, sponsored-registration by some benevolent individuals were all initiated to increase enrolment by the poor. The findings from this study clearly show that the interventions by the Authorities to increase enrolment by the poor are not yielding as many results as expected due to the fact that it is still the rich who are more likely to enrol. Most people do not see the need for health insurance.

In terms of education, people with no educational qualification and those with SHS are more likely to enrol. The likelihood of enrolment is highest among formal workers, females and urban dwellers (see appendixes 1, 2, 3, 4, 5 and 6)

5.3.2 The Effect of the National Health Insurance Scheme (NHIS) on healthcare utilization.

This section looks at the likelihood that enrolment onto the National Health Insurance Scheme (NHIS) increases healthcare utilization. This is measured by the likelihood of seeking healthcare when ill, injured or both. The data reports that 66.2% of all those who suffered illness or injury or both consulted physicians. About 33.8% did not seek treatment at all. Those who consulted physician did so from public healthcare provider (31.9%), private healthcare provider (33.0%), and alternative healthcare provider (1.4%). These percentages are the benchmarks for comparison in order to conclude whether or not insurance status has increased healthcare utilization, and from what type of healthcare provider. Insurance status is dichotomized and takes the value of 1 if insured, and 0 if otherwise. The uninsured category also takes the value of 1 if uninsured and 0 if otherwise. If the value of 1 is above (below) the benchmark (which is the horizontal line), then utilization is increased (decreased).

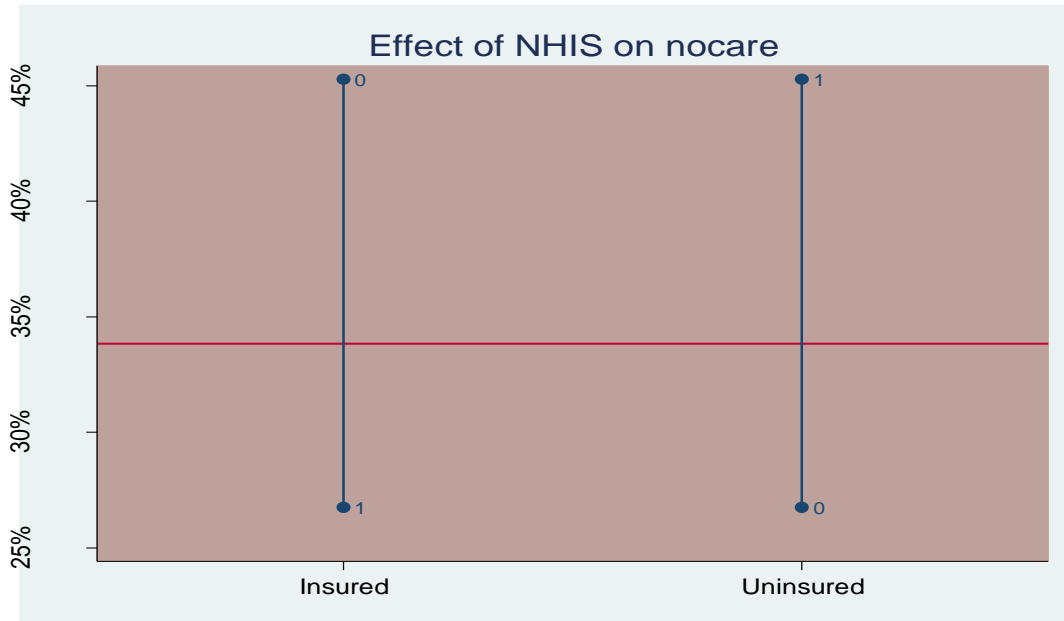
Figure 5.3: Effect of NHIS on general Healthcare Utilization.



Source: Author's computation based on GLSS6

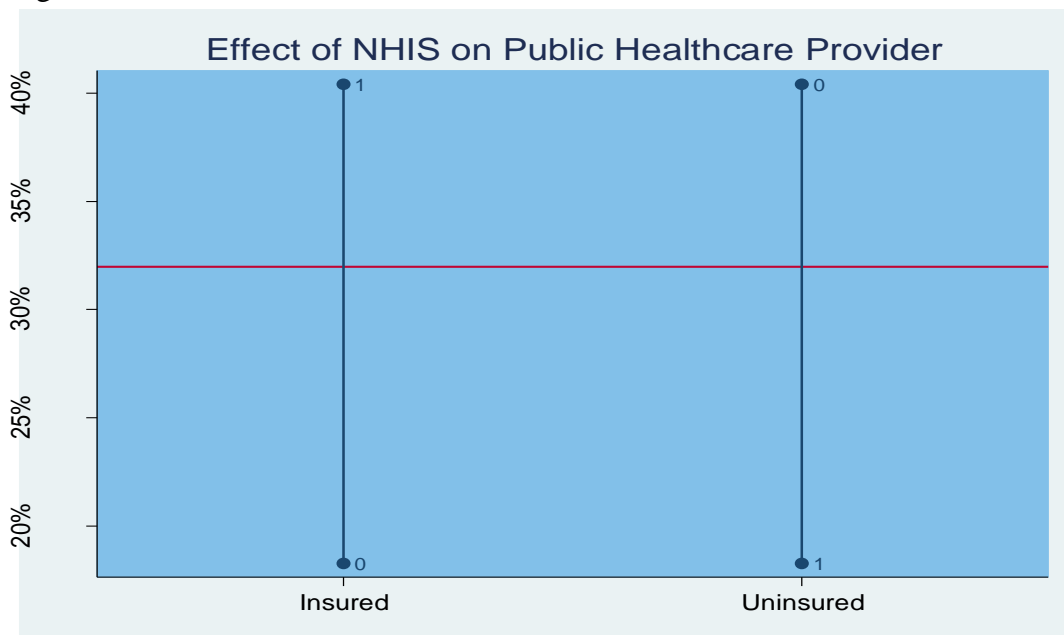
The benchmark is the mean mark of seeking healthcare which is about 66.2%. Since the insured value increases utilization to 73.2%, above the benchmark of 66.2%. It can be concluded that NHIS is likely to increase healthcare utilization by about 7 percentage points from 66.2% to 73.2% (see Figure 5.3). Extending the discussion to cover those who did not seek healthcare, and also the type of healthcare provider chosen, Figure 5.4 shows that insurance decreases the likelihood of choosing no care (not seeking healthcare when sick). Insurance status increases the likelihood of seeking healthcare from a public healthcare provider. Surprisingly, NHIS decreases the likelihood of seeking treatment from a private and alternative healthcare provider. The possible explanation could be that people insured with NHIS would rather prefer to go public healthcare provider instead of visiting the private and alternative healthcare providers (see Figure 5.4, 5.5, 5.6, and 5.7).

Figure 5.4: Effect of NHIS on No care Utilization



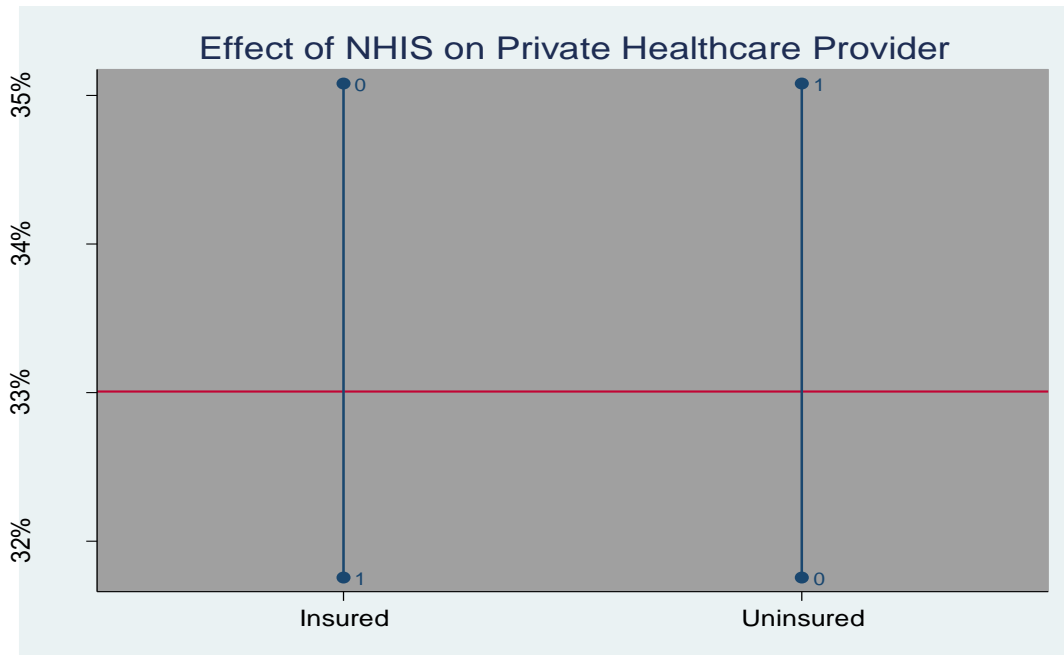
Source: Author's computation based on GLSS6

Figure 5.5: Effect of NHIS on Public Healthcare Utilization



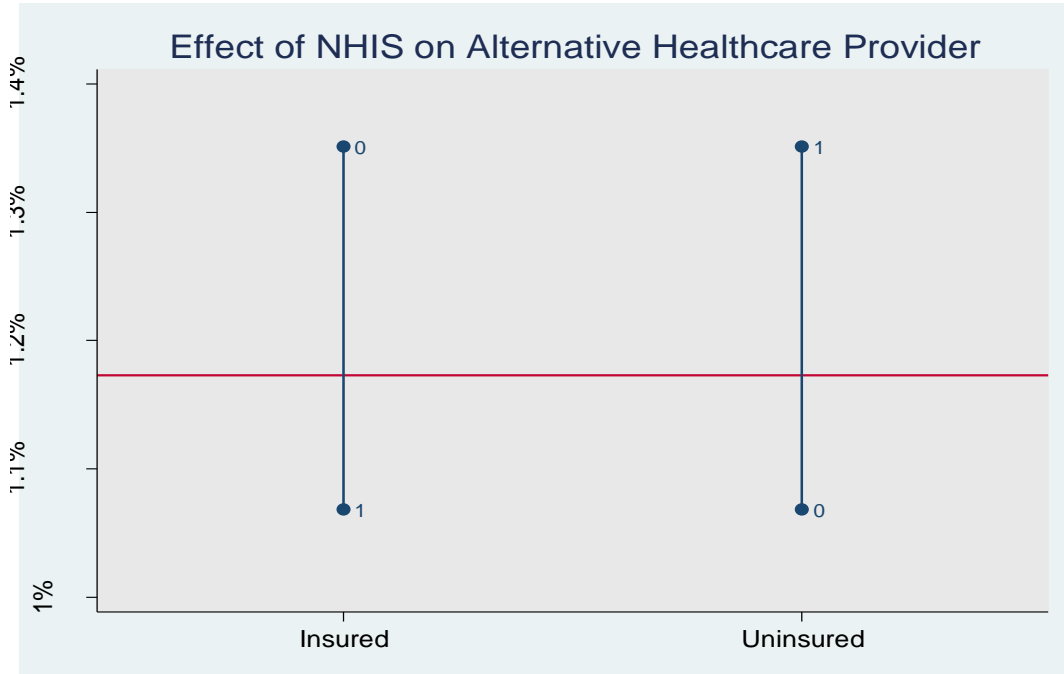
Source: Author's computation based on GLSS6

Figure 5.6: Effect of NHIS on Private Healthcare Utilization



Source: Author's computation based on GLSS6

Figure 5.7: Effect of NHIS on Alternative Healthcare Utilization



Source: Author's computation based on GLSS6

Having looked at the dominance of the background characteristics, the next important thing is to estimate the dominance of the main reasons for consulting health practitioners which is the measure of healthcare utilization. The row total must be equal to 100%.

Table 5.4: Dominance of health insurance by reasons for consultation

Variable	Illness	Injury	Follow up & check up	Childbirth-related	Vaccination
Insured	86.8	5.1	5.4	2.2	0.5
Uninsured	89.6	6.1	2.4	1.2	0.7
Total (%)	6,621 (87.7)	405 (5.4)	341 (4.5)	144 (1.9)	41 (0.5)
Pearson chi2 (4) = 22.32				Pr = 0.000	

Source: Own calculation based on GLSS 6

For the various measures of healthcare utilization, a simple cross-tabulation indicates that the National Health Insurance Coverage is dominated by individuals who suffered from an illness (86.8%), followed by those who went for follow-ups and check-ups (5.4%). The rest are injury (5.1%), childbirth related issues (2.2%) and vaccination (0.5%). However, those who are likely to enrol are people who consulted for follow-up and check-up purposes in addition to those who consulted a physician for child birth related issues (ante-natal, delivery and post-natal reasons). In order to affirm this conclusion from cross-tabulation, there is the need for multivariate analysis. The next section contains the multivariate regression and discusses the results on the effect of NHIS on healthcare utilization.

5.3.3 The Effect of the National Health Insurance Scheme (NHIS) on healthcare utilization:

Logistic regression.

Before estimating Propensity Score Matching (PSM), logistic regression is first estimated in order to ascertain whether or not insurance status increases healthcare utilization and from what type of healthcare utilization, even before accounting for the covariates that predict the treatment. Most studies prefer logistic regression estimation method before Propensity Score Matching is estimated. This is because the Propensity Score Matching estimation itself reports regression results from probit before the actual average treatment values are estimated. The essence is to estimate logistic regression so that the results can be compared with that of the probit regression. After the logistic regression, marginal effects are then computed for proper interpretations about the effects. Since the dependent variable is a categorical variable, the marginal effect is interpreted as: for two groups of individuals who are insured and uninsured, the predicted probability of seeking treatment for the individual in the insured group is higher (or lower in case of negative number) than for the individual who is uninsured by the amount of marginal effect. The marginal effect is interpreted according to the units of the dependent variable. The categorical independent variables are interpreted at the means. That of the continuous variables is interpreted as the effect of NHIS on demand for healthcare given a unit change in the amount of the continuous independent variables.

Table 5.5: Effect of NHIS on Healthcare utilization: Logistic regression (marginal effects)

Variables	General Healthcare	No care	Public Healthcare	Private Healthcare	Alternative Healthcare
Insured (Without controls)	0.189***	-0.189***	0.223***	-0.032***	-0.003
Insured (with controls)	0.214***	-0.217***	0.229***	-0.009	-0.003
Age	-0.000	0.000	-0.000	0.0004	-0.000
Income	0.01**	-0.014	0.008	0.009	-0.003**
Education					
None	-0.026	0.026	-0.020	0.000	-0.003
Primary	0.021	-0.021	-0.008	0.017	0.011
JHS	0.028	-0.028	-0.016	0.044**	0.000
SHS	-0.017	0.017	-0.070**	0.069**	-0.011**
Higher (ref)					
Gender					
Male	-0.007	0.007	-0.038**	0.019	0.005
Female (ref)					
Location					
Urban	0.053***	-0.053***	-0.039	0.086***	-0.001
Rural (ref)					

Significance level at 1%: *** 5%:** 10%:*

Source: Own calculation based on GLSS 6

Without controls, the results show that the effect of enrolment onto the National Health Insurance Scheme increases demand for healthcare by 18.9 percentage points. It also increases public healthcare by 22.3 percentage points but decreases private healthcare by 3.2 percentage points. When we control for some background characteristics, the results indicate that enrolment onto the National Health Insurance Scheme (NHIS) increases the probability of seeking healthcare when ill or injured or both by 21.4 percentage points. In terms of which type of healthcare provider to consult, insurance status decreases the probability of not seeking care by 21.7 percentage points. For the insured individuals, their chances of seeking public healthcare provider increase by 22.9 percentage points, while that of private healthcare and alternative healthcare providers decrease by 0.9 and 0.3 percentage points respectively, but statistically insignificant.

Some of the control variables have a significant effect on healthcare utilization. The background characteristics influence the individual's probability of healthcare utilization. Higher income, higher educational levels, and urban dwelling increase an individual's chances of seeking healthcare when ill or injured or both. Aging increases healthcare utilization for follow-ups and check-ups, but not for childbirth-related issues and vaccination. This is consistent with the literature which states that older people normally seek healthcare for the preventive measure by follow-up and check-up (Nketiah-Amponsah and Sarkodie, 2014). Income increases utilization for follow-up and childbirth-related issues. Compared with a higher level of education, all the other categories of education are likely to seek healthcare for illness and injury purposes, but not for childbirth and vaccination. With reference to females, males are only likely to visit healthcare providers for vaccination, but not for illness and injury purposes. Urban dwellers decrease their utilization except for check-up and vaccination.

Individuals who consulted physicians did so for various reasons – illness, injury, follow-up and check-up, childbirth-related issues, and vaccination. The next stage is to estimate the effect of the National Health Insurance Scheme on the various reasons for seeking healthcare. The marginal effects from the logistic regression indicate that NHIS increases the probability of utilizing healthcare to cure illness by 3.1 percentages while curing injury increases by 0.03 percentage points. The predicted probability of utilizing healthcare for follow-up and check-up, and childbirth-related issues are 0.8, and 0.2 percentage points respectively. The estimates rather find that health insurance decreases the predicted probability for vaccination (see Appendix 8).

This section discussed the simplest way of estimating the effect of health insurance on healthcare utilization, without matching the background characteristics (logistic regression). To ensure that both the insured and uninsured have the same characteristics, there is the need

to match the covariates using the propensity score matching (PSM) method, as discussed in the next section.

5.3.4 Effect of NHIS on healthcare Utilization: Propensity Score Matching (PSM)

In the previous section, the results of logistic regression showed how insurance affects healthcare utilization. This was to show estimations of the effect of health insurance on healthcare utilization before the introduction of propensity score matching (PSM). So then how is the PSM calculated? In the algorithm to estimate the propensity score, the treatment is insurance (sample of 10,486) taking the dummy value of 1 if insured (8,671) and zero if otherwise (1,338). The first thing to do is to estimate a propensity score matching model¹¹. The Propensity Score Matching (PSM) model first estimates the probit regression to prove that the background characteristics influence the probability of enrolling in health insurance.

¹¹ The formal treatment of the PSM model is found under methodology

Table 5.6: Probit regression results of the Likelihood of enrolment on NHIS

	Coefficient	Std. error	z	p> z
Age	0.005	0.0010	5.22	0.000
Income	0.05	0.012	4.89	0.000
Education				
None	0.182	0.061	2.96	0.003
Primary	0.278	0.052	5.36	0.000
JHS	0.385	0.062	6.21	0.000
SHS (ref)				
Higher	0.284	0.053	5.39	0.000
Gender				
Male	-0.126	0.030	-4.17	0.000
Female (ref)				
Location				
Urban (ref)				
Rural	-0.047	0.030	-1.54	0.124
Constant	0.234	0.088	2.66	0.000

Source: Author's calculation using GLSS 6

The estimated results of the probit regression show that with the exception of gender and location, the coefficients of all other variables are positive and statistically significant. It can, therefore, be concluded that the background characteristics influence the probability of enrolling, indicating the presence of selection bias. The dependent variable is the insurance status which is dichotomized into insured or not insured. Those with higher age, higher income, all the educational categories (no education, Primary, JHS, SHS, and Higher) are more likely to enrol, while males are less likely to enrol. The result is consistent with the findings of Nketiah-Amponsah (2009) that the decision of women aged 15-49 to participate in public health insurance is influenced by income, age, religion, and access to information. Since these background characteristics have been shown to influence the decision to enrol, there is the need to correct for this problem.

The estimate shows that the common support option has been selected. The region of common support is [0.57, 0.93]. The model does not have a propensity that goes as high as 1.00. The score ranges between 0.57 and 0.93. The essence of common support is to make sure that only observations that have similar propensity scores are compared in the same range. The description of the estimated propensity score in the region of common support is given below. This estimated propensity score is given in percentiles.

Table 5.7: Estimated propensity score in percentiles.

Percentiles		Smallest			
1%	0.7	0.6			
5%	0.7	0.6			
10%	0.8	0.6	Observations	=	10,486
25%	0.8	0.6	Sum of Wgt	=	10,486
50%	0.8		Mean	=	0.82
		Largest	Standard Deviation	=	0.04
75%	0.9	0.9			
90%	0.9	0.9	Variance	=	0.002
95%	0.9	0.9	Skewness	=	-1.11
99%	0.9	0.9	Kurtosis	=	4.82

Source: Author's calculation using GLSS 6

The total observations of 10,486 have a mean of 0.83. A standard deviation of 0.04 and a variance of 0.002 means that the data is concentrated around the means and limits the number of outliers. A perfect symmetric distribution has a skewness of zero. The measure of symmetry that has a skewness equal to -1.11 meaning the distribution is asymmetric and it is negatively skewed (skewed to the left so that the left tail of the distribution is longer). The kurtosis of 4.82 indicates that the distribution is relatively peaked and heavy-tailed. The final number of blocks identified is 5. This number of blocks ensure that the mean propensity score is not different for treated(insured) and controls(uninsured) in each block. The test of balancing properties

indicates that the balancing property is satisfied. This means that in each of these blocks, not only are the propensity scores similar, but the background characteristics on which the matching is done are also similar. The results show the inferior bound, the number of treated and the number of controls for each block.

Table 5.8: The Number of Blocks in Propensity Score

Inferior of block of pscore	Insurance status		Total
	Uninsured	Insured	
0.4	0	2	2
0.6	551	215	2,215
0.8	903	1,664	5,210
0.8	368	4,307	3,001
0.9	8	2,633	58
Total	1,830	8,656	10,486

Note: In this case, the common support option has been selected

Source: Author's calculation using GLSS 6

The nearest neighbour matching method is employed for this study to estimate the propensity score matching. It estimates the predicted probability of the propensity score on which the matching is done. It estimates the nearest neighbour of each treated unit and reports the bootstrapped standard errors. After bootstrapping the effect is the same. But the standard errors have been reduced and the difference is statistically significant. The difference between the outcome on the insured and the outcome on the uninsured after matching is measured by Average Treated Effect (ATT). It is interpreted that if someone is insured, his/her likelihood of healthcare utilization will be increased by the ATT outcome (see Figure 5.9).

Table 5.9: Propensity Score Matching of the Effect of NHIS on Healthcare Utilization

Dependent Variable	Average Treatment Effect (ATT)	Standard Error
General Healthcare	0.243***	0.036
No care	-0.243***	0.036
Public Healthcare	0.231***	0.026
Private Healthcare	0.014*	0.033
Alternative Healthcare	-0.002	0.009
Illness	0.022**	0.010
Injury	-0.001	0.003
Follow-up & check-up	0.009***	0.002
Child birth related	0.002	0.001
Vaccination	-0.032	0.011
Out-of-pocket payment	-6.309**	3.684

Source: Author's calculation using GLSS 6

Overall, it was found that Health insurance increases the probability of healthcare utilization by 0.243. In terms of the type of healthcare provider, the predicted probability of no care is -0.243. This means that enrolment onto NHIS reduces the probability of not seeking care. The nearest neighbour matching predicted probability of utilizing public healthcare provider is 0.231, while that of private healthcare and alternative healthcare providers are 0.014 and -0.002 respectively. This means that NHIS increases the probability of utilizing public and private healthcare providers, but not alternative healthcare provider (though not statistically significant). Comparing the results of PSM and logistic regression, it was found that PSM had bigger coefficients. Another observation is that private healthcare's coefficient is negative in the raw data but positive coefficient in the PSM. In other words, insurance decreases healthcare utilization in the raw data but increases the demand for healthcare in the Propensity Score Matching model.

Individuals who consulted physician did so for various reasons – illness, injury, follow-up and check-up, childbirth related issues, and vaccination. The PSM method also estimates the effect of the National Health Insurance Scheme on the various reasons for seeking healthcare. The PSM results show that NHIS increases utilization for treating illness by 0.022. Again,

enrolment onto the NHIS will increase healthcare utilization for treating childbirth-related issues (pregnancy, delivery, and postnatal) and for follow-ups and check-up by 0.002 and 0.009 respectively. Though not statistically significant, enrolment onto the National Health Insurance Scheme decreases utilization for treating injury and for vaccination by 0.001 and 0.032 respectively.

5.3.5 Effect of National Health Insurance Scheme on Out-of-Pocket Payment

Employing Propensity Score Matching (PSM) ensures that we verify whether or not the background characteristics influence the demand for health insurance. The results from the probit regression in Table 5.6 show that the background characteristics influence a person's demand for health insurance. PSM corrects this problem and matches all the background characteristics to ensure that they are similar in both the treated group and the control group, leaving insurance status to be the only determinant. Out-of-pocket payment is measured by fees paid for folder, diagnosis, drugs and treatment, hospital stay, and any other payment. The nearest neighbour matches result of -6.310 clearly show that the introduction of the National Health Insurance Scheme (NHIS) reduces out-of-pocket payments (see Table 5.9).

5.3.6 Financial Implication of NHIS

Table 5.10: Financial Implications of Increased Size of Enrolment

Item	2005	2013	Size of Increased (times)
Membership (millions of people)	1.3	10.2	8
NHIF transfers (GH¢ m)	98.5	752.8	8
Claims payment (GH¢ m)	7.6	785.6	103
Out-patient utilization (millions of people)	0.6	27.4	46
In-patient utilization (millions of people)	0.029	1.61	56

Source: Own calculation based on NHIA report (2013)

Between 2005 and 2013, NHIS enrolment increased by some 8 times from 1.3 million people to 10.2 million. While the National Health Insurance Fund (NHIF) transfers increased from GH¢ 98.5 million to GH¢ 752.8 million, claims increased by 103 times from GH¢ 7.6 million to GH¢ 785.6 million. In the same period, out-patient and in-patient increased by 46 times and 56 times respectively. The financial problem associated with these developments is that whereas NHIF transfers increased by only 8 times between 2005 and 2013, claims increased by 103 times in the same period. The fear is that if this continues for another eight (8) years beginning from 2014, then by the end of the year 2021, enrolment will be 18 million people. NHIF transfers would have increased to GH¢ 1.32 billion, while Claims would be GH¢ 1.33 billion, in the same period.

5.3.7 Summary

The results show that in 2012/2013, 67.7% of the population had been insured with only 32.3% who have never been insured. Out of the insured percentage of 67.7%, 56.5% are still enrolled in NHIS, the remaining 10.7% have stopped enrolment, and 0.5% are registered with private health insurance. Lack of finance is the major reason why some people are not enrolled on one hand, and for not continuing to enrol on the other hand. A bivariate analysis of the background characteristics indicate that NHIS membership is dominated by children aged below 18, individuals in the 1st income quintile, people with higher educational qualification, females and rural dwellers. However, it must be noted that dominance is not the same as the likelihood of enrolment. The mean graphs show that children aged below 18, older people above 55 years, people in the 5th income quintile, individuals with no education and those with SHS+ education, formal workers, females, and urban dwellers are more likely to enrol. Since the mean graphs reveal that enrolment onto NHIS is likely to increase healthcare utilization and decrease no care. In terms of the type of healthcare providers, NHIS is more likely to increase utilization from public healthcare providers but decreases the probability of visiting private and alternative healthcare providers. The purpose of utilization was categorized into illness, injury, check-up, childbirth-related issues, and vaccination.

A simple logistic regression shows that NHIS increase the probability of seeking healthcare by 21.4 percentage points but decreases no care by the same magnitude (21.4 percentage points), after controlling for the demographic factors. In terms of the various reasons for seeking healthcare, NHIS increases the probabilities of seeking healthcare to cure illness, for check-up and childbirth-related purposes. However, the marginal effects found a negative effect of NHIS on seeking healthcare to cure injury and vaccination purposes.

The cross-tabulation identified that insured group are richer, older, have higher education, mostly females, and urban dwellers than the uninsured group. Logistic regression alone is not able to conclude on the effectiveness of NHIS on healthcare utilization since the very background characteristic also influences the probability of enrolling. This is the reason why there is the need to match these background characteristics with the method of propensity score matching so that one can effectively estimate the effect of NHIS on healthcare utilization without any selection bias.

Having satisfied the property of common support and test of balancing, the Propensity Score Matching (PSM) estimates the Nearest Neighbour Matching scores and reports bootstrapped standard errors. The estimates show that NHIS enrolment increases the overall healthcare utilization by 0.243 and decrease no care by the same magnitude (-0.243). In terms of the type of healthcare, the predicted probability of the effect of NHIS on public healthcare provider and private healthcare providers are 0.231 and 0.014, but that alternative healthcare decreases by 0.002 (though not statistically significant). It is also found that in terms of the various reasons for seeking healthcare, NHIS enrolment increases that probability of healthcare utilization for the purposes of illness (0.022), check-up (0.009), prenatal, pregnancy, and postnatal (0.002), but decreases for injury (-0.001), and vaccination (-0.032) (though not statistically significant). One of the main objectives of introducing NHIS is to replace the cash and carry system which hitherto served as an impediment to accessing healthcare. For this reason, the study attempts to investigate whether or not this objective is achieved. The Propensity Score Matching method results found the predicted probability of the effect of NHIS on out-of-pocket payment to be 6.309. This means that NHIS decreases out of- pocket payment.

If the trend in enrolment, NHIF transfers and claims continue in the same growth pattern, then NHIS will have serious financial implications in the near future.

CHAPTER SIX

6. CHOICE OF HEALTHCARE PROVIDER IN GHANA: EFFECT OF PRICE OF TIME

6.1 Introduction

A patient is faced with an array of healthcare options when sick. Making medical decisions can be very difficult. The individual will have to decide whether or not they will want to seek treatment when ill, undergo surgery, immunize their children, go for check-ups, etc. Price, Income, Time price may all influence a person's choice of healthcare provider. The decision may also be influenced by a friend's advice, a physician's recommendation, one's experience with a particular health centre, risks and benefits, the severity of illness, among others.

Economists employ both the simple approach (where the emphasis is on current period) and inter-temporal approach to deal with the choice of healthcare provider problem. In both approaches, the individual reveals their preferences for health or for healthcare. There exists some interrelationship between wealth and health. Wealthier people are often able to afford medical bills. On the other hand, improved health status leads to a decrease in sick days, therefore, increasing productivity and income of workers. For the purpose of this paper, demand for healthcare shall be discussed in the orthodox static utility maximization framework. The individual can choose among many health facilities; public modern, private modern, pharmacy, or the traditional/spiritual healer. Depending on their health status, income, price, health insurance, etc., individuals choose a particular healthcare provider that maximizes their utility. In a situation where there is no health insurance, out-of-pocket payment is the order of the day. However, due to the existence of health insurance, healthcare services are sometimes

even provided at “zero price”. But in developing countries, there can still be underutilization of healthcare services even if healthcare services are provided at “zero price”.

The main thrust of this paper is to examine the effect of the price of time (opportunity cost) on the choice of healthcare provider assuming price is zero. Following Ringel et al. (2001), travel cost, travel time, and waiting time have been identified as possible determinants of choice of provider and calls them “attributes of healthcare” or “time price”. Travel cost may be treated as another direct cost associated with healthcare seeking. One may choose not to visit a particular healthcare provider because of the opportunity cost associated with it. For instance, even if the direct cost is zero (because of insurance), an individual may still not be willing to seek treatment from a certain healthcare provider due to the amount of time required to travel there and also the time spent at the health facility for treatment. In this case, travel time and waiting time are treated as the opportunity cost in the study. The control variables to consider may include place of residence, gender, age, among others. Another variable to consider is the proximity of the healthcare facility to residents in the rural and urban areas. The quality of service rendered by these healthcare providers will also be of importance. In this case, demand for healthcare is not only constrained by the choice of how much to pay to receive treatment but the kind of treatment rendered by providers.

The general objective of this paper is to identify the various economic and non-economic factors that affect demand for healthcare, even in the presence of health insurance. The specific objective is to estimate the extent to which attributes of a particular healthcare would influence its demand. These attributes include travel cost, travel time, and waiting time.

The results will guide policymakers to effectively gain ample knowledge about the health system, types of healthcare available, attributes of the existing health facility and how this

healthcare are funded and utilized. Developing and implementing a well-planned public policy on health should be context-specific and address most issues regarding inequality in access to healthcare.

The next section discusses the methods to be used, the data source, as well as the description of variables to be used for the analysis. Section four analyses the results on how healthcare attributes affect the choice of healthcare providers, controlling for demographic factors constant. The fifth section summarises the entire chapter.

6.2 Methodology

6.2.1 Data Description

The source of data for this study is the Ghana Living Standards Survey's sixth round (GLSS 6). The data set has been described in section 4.2.1

6.2.2 Estimation Technique

The dependent variable, type of healthcare, is categorized into public modern, private modern, drug seller, traditional/spiritual healer (including homeopathy and patient's home), with no care as the base category. These classifications were based on literature review (Nketiah-Amponsah and Sarkodie, 2014).

Some of the most common nonlinear economic relationships can be adequately presented by polynomials in the determinants (Greene, 2003). Assume the following nonlinear demand function for health care:

$$M_i = \alpha + \beta C + \gamma T + \delta W + \lambda(P = 0) + \theta D + \varepsilon \quad i = 1, 2. \quad \dots\dots\dots(6.1)$$

Where M_i is the demand for healthcare categorized into public modern, private modern, chemical seller, traditional / spiritual healer.

$\alpha, \beta, \gamma, \delta, \lambda$ and θ are the coefficients ;

C is travel cost. It measures how much the patient paid to travel to the health centre.

T is the time it took to travel to and from the health facility;

W is waiting time. Thus, time spent at the facility excluding admission;

P is price paid for receiving healthcare, upon the assumption that price is zero, $P = 0$

D represents the control variables which are age, gender, education, location, income and severity of illness.

E is the error term.

To estimate the effect of price of time on demand for healthcare when money price is assumed to be zero, there is the need to interact $P=0$ with the travel cost, travel time, and waiting time so that the equation will be:

$$M_i = \alpha + \beta PC + \gamma PT + \delta PW + \theta PD + \varepsilon \quad i = 1, 2. \quad \dots\dots\dots(6.2)$$

Where $PC, PT, PW,$ and PD are the interaction terms of the zero money price variable with travel cost, travel time, waiting time, and the controls respectively.

The multinomial probit estimation method is preferred to multinomial logistic regression because multinomial logistic regression is likely to suffer from IIA. The formal treatment of the multinomial probit is presented in section 4.2.2 under elasticities. Following Williams (2016), the marginal effects will be estimated and reported because the dependent variable is a categorical variable. Marginal effects behave like partial derivatives of each of the dependent variable category with respect to the independent variable. It also measures the slope of a given function of covariates and coefficients of the preceding estimation. It measures a change in the predicted probability for a unit change in the predictor. The marginal effect is computed differently for discrete and continuous variables. For binary variables, marginal effects measure a discrete change. A binary predictor has values 0 and 1. Therefore, the marginal effects of a binary variable measure how the predicted probabilities change as the binary independent variable changes from 0 to 1, holding all other variables constant. Assume a dependent variable, y , and a binary independent variable, x . the marginal effects of x will be equal to

$$\text{Marginal effects } x = \Pr(y=1|X, x=1) - \Pr(y=1|X, x=0) \dots\dots\dots(6.2)$$

That is marginal effects shows how $P(y=1)$ is predicted to change as x changes from 0 to 1 holding all other X s equal.

Marginal effects for continuous variables measure the instantaneous rate of change. Marginal effects for continuous variables indicate the amount of change in the dependent variable that will be produced by a unit change in the predictor (which is a continuous variable).

That is:

$$\text{Marginal effects of } x = \lim [\Pr(y=1|X, x+\Delta) - \Pr(Y=1|X, x)] / \Delta \dots\dots\dots(6.3)$$

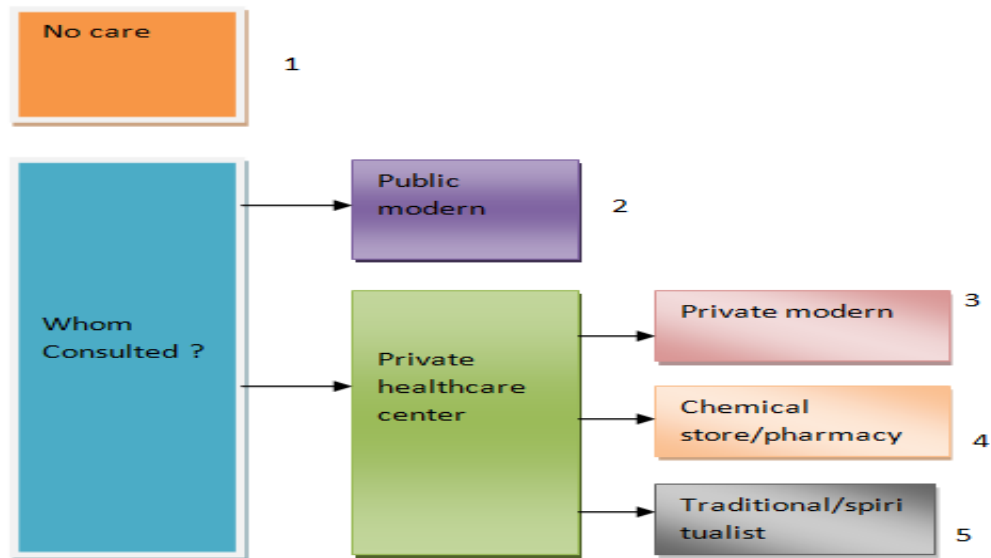
As Δ gets closer and closer to 0

For categorical variables (more than two possible outcomes), the marginal effects indicate the difference in the predicted probabilities for cases in one category relative to the reference category.

6.2.3 Variable Description

The various healthcare services demanded are illustrated in Figure 6.1. This categorization is done carefully based on literature (Nketiah-Amponsah and Sarkodie, 2014). Many of the reviewed papers use this type of categorization making it pseudo conventional. Healthcare providers are categorized into no care, public modern, private modern, chemical store/pharmacy, and traditional/spiritualist. The modern is used for both private and public just to distinguish it from the chemical store. The modern refers to a health facility where diagnosis, surgery, and admissions are done. The categorization is based on the following reasons. Most government health facilities are subsidized and therefore are less expensive than private modern healthcare facilities. Most chemical/pharmacy stores provide first aid, and primary healthcare services, and do not admit patients which make it distinct from the modern healthcare facilities. Again, some diseases are thought to have been caused by spiritual forces, hence the need for traditional and spiritual healthcare facilities.

Figure 6.1: Categories of healthcare service providers



Source: Author's conceptualization

The purpose of this study is to investigate how the attribute of a particular healthcare influences its demand. The attributes are travel cost to the health facility, the time it will take to travel to and from the health facility, and how long a patient will have to wait at the health facility in order to receive treatment. The other factor that is likely to influence demand for health care is who pays for the health expenses after treatment. This variable is categorized into self, (when the patient pays him/herself), someone (if it is paid by a relative, or employer or government), and health insurance (either private or public).

The control variables are chosen carefully based on available literature. It is confirmed in the literature that certain demographic factors affect the choice of healthcare provider. Those demographic factors considered in this study include the following: The gender or sex of the respondent, be it male or female. Existing literature has it that aging depletes the health stock and therefore aging requires greater investment in the health stock. One of the ways of investing in health stock is by consuming healthcare (Grossman, 1972). The age of the household

members is categorized into various groups. The highest educational attainment is a very important factor to consider since education increases the marginal efficiency of health investment. There are people who did not attend school at all. The other categories are people who have up to primary education, those with secondary and post-secondary including technical and vocational levels, and then people with tertiary education. There might be differences in the level, quality, and proximity of health infrastructure in urban and rural areas. In the rural areas, they are most likely to seek treatment from herbalist and this might reduce the number of visits to modern health facilities. The background characteristics of the rural folks may be different in terms of social status, education, income, etc. Depending on how severe sickness is, one may choose to seek treatment from a particular healthcare. This is also influenced by the perception of the quality of treatment. The severity of illness will be used for operational definition purposes. It is only used as a proxy measure. It will be defined by whether or not an individual stopped their usual activities due to illness, and for how many days if they could not continue to do their usual activities.

Respondents were asked to indicate the reasons why they consulted a physician and indicated they consulted to treat illness, injury, follow-up and check-up, childbirth-related treatments (antenatal, delivery and postnatal), and vaccination.

Table 6.1: Variable Description: categorical and continuous variables

Variable	Description	Continuous or categorical
No care	Did not seek treatment	1 if did not seek care, 0 if otherwise
Public modern	Hospitals and clinics that have modern facilities but owned by government.	1 if public modern, 0 if otherwise
Private modern	Hospitals and clinics that have modern facilities but owned by the private sector	1 if private modern, 0 if otherwise
Chemical/pharmacy	Pharmacy and drug/chemical seller	1 if chemical/pharmacy, 0 if otherwise

Variable	Description	Continuous or categorical
Traditional/spiritualist	Traditional healer and spiritualist	1 if traditional/spiritualist, 0 if otherwise
Travel cost	Amount of money paid to travel there and return	Continuous variable
Travel time	Amount of time spent to travel to and from the facility (in hours)	Continuous variable
Waiting time	Amount of time spent at the health facility (in hours)	Continuous variable
Price	Total amount paid to receive treatment	Continuous variable
Gender	Gender of the household member	
Male	Male	1 if male, 0 if other wise
Female	Female	1 if female, 0 if otherwise
Age	Age of respondents	Continuous variable
Education	Whether or not individuals attended school and what highest qualification attained	
No qualification	Individual has no educational qualification	1 if no qualification, 0 if otherwise
Primary	From kindergarten to JHS and middle school	1 if primary, 0 if otherwise
Secondary	Secondary qualification	1 if secondary, 0 if otherwise
Post-secondary	Technical, vocational, teacher and nursing trainee	1 if post-secondary, 0 if otherwise
Tertiary	Bachelor's, master, and Ph.D. degree	1 if tertiary, 0 if otherwise
Location	Where individual lives, rural or urban	
Urban	Individuals live in urban	1 if urban, 0 if otherwise
Rural	Individuals live in rural	1 if rural, 0 if otherwise
Income	Monthly earnings from main occupation	Continuous variable
Severity of illness	Whether or not the patient stopped usual activities and for how many days if they stopped	
Not severe	The person did not stop usual activities	1 if did not stop, 0 if otherwise
Less severe	The person stops usual activities up to three days due to illness	1 if stopped for three days, 0 if otherwise
More severe	The person stops usual activities for more than three days due to illness	1 if stopped for more than three days, 0 if otherwise

Source: Author's computation using GLSS 6

While travel cost, travel time, waiting, price, age, and income are treated as continuous variables, gender, educational qualification, and location are categorized into various groups.

6.3 Results And Discussion

6.3.1 Descriptive Statistics

In descriptive statistics, the summary statistics give us the largest information about the measure of central tendencies of each of the variables to be used. It gives information on observations, means, standard deviation, and minimum and maximum values. The number of observations indicates the total number of household members that are counted in a particular variable. Smaller sample size also means that the data is far from its true standard deviation and mean. The mean is one of the three measures of the centre of distribution. The mean is normally the measure of the average value. It is the expected value of the individual value drawn at random from the sample.

Table 6.2: Summary statistics of the dependent and independent variables.

Dependent Variable	Observation	Mean	Standard deviation
Healthcare			
No care	3,492	0.3	0.5
Public modern	3,304	0.3	0.5
Private modern	1,931	0.2	0.4
Chemical store	1,596	0.2	0.4
Traditional / spiritual	119	0.0	0.1
Reason			
Illness	6,565	0.9	0.3
Injury	418	0.1	0.2
Check up	387	0.1	0.2
Child birth	132	0.0	0.1
Vaccination	37	0.0	0.1
Independent variables			
Travel cost	7,415	2.6	9.1
Travel time	7,497	1.1	2.2
Waiting time	7,476	2.1	3.4
		181	

Dependent Variable	Observation	Mean	Standard deviation
Price	7,367	14.0	43.6
Income	15,920	460.7	1.3
Severity of illness			
Not severe	3,894	0.4	0.5
Less severe	2,716	0.3	0.4
More severe	3,749	0.4	0.5
Age	72,372	24.6	19.6
Gender			
Male	34,806	0.5	0.5
Female	37,566	0.5	0.5
Education			
No qualification	13,316	0.3	0.4
Primary	32,319	0.6	0.5
Secondary	2,504	0.1	0.2
Post-secondary	1,750	0.0	0.2
Tertiary	163	0.0	0.1
Location			
Urban	36,230	0.5	0.5
Rural	36,142	0.5	0.5

Source: Based on GLSS 6

Information gathered from the summary statistics indicate that out of the total population of 72,372 individuals, 10,442 reported to have suffered from illness or injury or both two weeks prior to the survey. This represents 14% of the total household members who suffered, lower than 21% recoded in 2005/2006, and 26% in 1989/1999. Out of the total number that suffered illness or injury or both in 2012/2013, 3,492 (representing 33.4%) did not seek treatment. This has necessitated a multinomial probit regression to ascertain the cause of this large number of people who did not seek healthcare.

The remaining 66.6% consulted a physician. Again this shows a significant improvement compared to the number of people who consulted a physician in 2005/2006 (60%) and 1999 (44%). In 2012/2013, about 66.6% consulted various physicians. Majority of them sought treatment from public modern (31.6%) and private modern (18.5%) health centers. The rest went to Chemical store (15.3%) and Traditionalist/Spiritualist (1.1%). The essence is to

estimate and establish which type of healthcare facility will be demanded due to changes in the price of time, holding demographic factors constant. Majority of the people who consulted a physician did so to treat illness (87%), injury (5.5%), check-up (5.1%), prenatal, pregnancy and postnatal reasons (1.7%), and vaccination (0.5%).

On the average, patients spend GH¢ 2.6 to travel from their destinations to the health facility, spend 1.1 hours to travel to the health facility and spend about 2.1 hours at the health facility in order to receive treatment. Having this piece of information will guide to probe further the extent to which changes in the price of time (also known as opportunity cost) affect the decision to choose a particular healthcare provider. Patients paid averagely GH¢ 14 for all medical expenses. The mean age of the sample is 25 years, while the average income is GH¢460.7. This shows that the sample group (people who reported to have suffered from illness or injury or both) is relatively young and non-poor. In the sample, there are more females (52%) than males (48%). In terms of education, those without educational qualification account for 26.6%, while the remaining 73.4% have different qualifications. This may include primary (64.6%), secondary (5%), post-secondary (3.5%) and tertiary (0.3%). There are more urban dwellers (50.2%) than rural folks (49.2%). About 37% did not stop usual activities due to sickness. But a greater percentage stopped their usual activities. Whereas 26% stopped usual activities for three days, 36% stopped for more than three days, making their illness more severe.

A lower standard deviation indicates more concentrated values around the mean, and therefore a lower standard deviation is desirable. Since almost all the standard deviations are less than 1, the data can be said to be very much concentrated around the mean. It means there are few outliers, making the data spread very good. The only variables with expected large standard deviations are the three continuous variables – price, income, and age. Log transformation of these variables has the tendency of reducing the standard deviations and the means.

Maintaining the same number of observations after log transformation is excellent, consequently, these variables were logarithmized.

6.3.2 Determinants of Healthcare Provider: Cross Tabulation

The main objective of the paper is to identify the extent to which some economic and non-economic factors influence a person’s decision to choose a particular type of healthcare service provider over the other. To achieve this objective, there is the need for both cross tabulation and multivariate analysis. Cross-tabulation is only used for categorical variables. It is needed to establish a relation between two variables and establishes the significant differences in the results between the two variables. This section estimates and reports the cross tabulation, using Pearson chi2 test. The observed difference is significant at 1% significant level.

Table 6.3: Cross Tabulation of the predictors and the dependent variable.

Variable	No Care	Public modern	Private modern	Chemical shop	Traditionalist/Spiritual
Frequency	3,492	3,304	1,931	1,596	119
100%	33.4%	31.6%	18.5%	15.3%	1.1%
Who paid					
Self	38.9	26.0	15.0	18.5	1.7
Someone	39.5	23.8	17.2	17.6	1.9
Health insurance	26.3	44.5	20.8	7.5	0.9
Test of difference	Pearson chi2 (8) = 665.1697 Pr = 0.000				
Gender					
Male	34.4	32.6	16.9	14.5	1.6
Female	32.7	34.9	18.3	13.0	1.1
Test of difference	Pearson chi2 (4) = 17.9730 Pr = 0.001				
Age					
Children	30.1	37.8	18.6	13.1	0.6
Adult	35.6	31.5	17.0	14.1	1.9

Variable	No Care	Public modern	Private modern	Chemical shop	Traditionalist/Spiritual
Test of difference	Pearson chi2 (4) = 86.6176		Pr = 0.000		
Education					
No qualification	38.7	32.4	13.6	13.2	2.1
Primary	33.5	33.7	17.3	14.6	0.9
Secondary	29.4	29.4	26.3	14.0	1.0
Post-secondary	27.9	36.4	25.3	9.7	0.7
Tertiary	35.3	29.4	5.9	29.4	0.0
Test of difference	Pearson chi2 (16) = 84.4230		Pr = 0.000		
Location					
Urban	30.4	30.1	23.0	15.6	1.0
Rural	35.2	36.0	14.6	12.6	1.6
Test of difference	Pearson chi2 (4) = 158.1664		Pr = 0.000		
Income quintiles					
1 st quintile	40.4	28.0	14.2	15.6	1.8
2 nd quintile	35.2	28.5	17.9	16.9	1.5
3 rd quintile	36.1	30.1	17.3	14.7	1.8
4 th quintile	34.1	29.7	19.9	15.1	1.2
5 th quintile	32.4	27.5	21.7	17.7	0.5
Test of difference	Pearson chi2 (16) = 23.6265		Pr = 0.000		
Severity of illness					
Not severe	43.4	26.4	14.3	15.1	0.9
Less severe	32.0	34.2	19.4	13.9	0.6
More severe	25.0	42.4	19.3	10.5	2.4
Test of difference	Pearson chi2 (8) = 447.5580		Pr = 0.000		
Reason					
Illness		50.9	26.6	20.8	1.7
Injury		52.9	20.0	20.0	7.3
Check up		52.7	37.0	8.2	2.1
Childbirth		55.2	34.5	10.3	0.0
Vaccination		14.3	17.9	64.3	3.6
Test of difference	Pearson chi2 (12) = 115.7187		Pr = 0.000		

Source: Author's computation using GLSS 6.

Majority of the people who consulted a physician paid the cost themselves, and because of that it is either they do not seek treatment at all when sick or they visit the chemical shop and the traditionalist/spiritualist. A similar conclusion can be made when a greater part of the medical expenses is paid by someone else. But when the patient knows that a greater part of the medical expense will be paid by a health insurance policy, he/she will consult a physician from a modern health facility, both public and private.

The various demographic factors considered in this study have significantly influenced the choice of healthcare provider. It is interesting to know that while males are less likely to consult any physician when sick, and even if they have to seek treatment at all, they will visit the chemical shop or the traditionalist, females consult public and private modern health facilities. When children suffer illness or injury or both, their parents/guardians are more likely to take them to modern healthcare facility both public and private. Adults, on the other hand, prefer not to seek treatment at all or at best go to the chemical shop for treatment.

In terms of education, people with no educational qualification are not likely to seek treatment when ill or injured, probably because they are not too conscious of their health situation. Again, uneducated people may not be too knowledgeable about their health conditions, the catastrophic effect of illness on their labour income, or simply do not know where to seek treatment. And even if they do at all, it will be from the traditionalist/spiritualist. Individuals who have education up to only primary prefer to seek healthcare from the public modern health facility, while secondary certificate holders will like to go to the private modern. Post-secondary education holders are more likely to seek treatment from any of the two modern health facilities – public and private. It is very interesting to note that people with tertiary educational qualification will not seek treatment or if they want to they will go the chemical seller. Perhaps they have taken enough preventive measures to avoid sickness, such that even

if they fall ill, it must be something less severe which will require just some rest or a visit to the chemical store.

As expected, urban folks prefer to seek treatment from the private modern health facilities. But when ill, rural dwellers do not seek treatment, and even if they do, they visit a public modern health facility or the traditionalist. When the individual's illness is not severe such that they did not stop their usual activities, they are not likely to seek treatment, and even if they do they just go to the chemical shop. If they stop usual activities up to three days due to sickness, they will consult public modern healthcare provider for treatment. When the illness is more severe such that the patients stopped their usual activities for more than three days, they will seek treatment from the private modern healthcare facilities and also from the traditionalist/spiritualist, especially if the sickness is perceived to be spiritual.

Income plays a critical role in the decision to choose a particular healthcare – affordability. Those in the 1st income quintile are deemed to be poor and therefore when ill will decide to either not seek treatment at all or go to the chemical shop. Those in the 2nd income quintile can only afford to seek treatment from the chemical shop or the traditionalist. The 3rd income quintile group is more likely to visit the public modern and traditionalist/spiritualist healthcare service providers when sick. The top two income quintiles (4th and 5th) are able to afford and to visit private healthcare service provider even when it is expensive. Another reason could also be that a visit to the private healthcare facilities where there are fewer patients means less opportunity cost since every hour spent at the facility will mean a loss of higher income by the rich.

In terms of the reasons provided for visiting the health facility, when individuals suffer from an illness they are likely to visit the private modern and chemical shop. If it is injury, they

rather visit the public modern health facility or go to the traditionalist. For both check-ups and childbirth related issues, patients prefer the services of a public modern health practitioner. Majority of the people who are only visiting for general vaccination purposes would prefer the chemical shop and private modern. This is not surprising at all since vaccination is usually free and individuals will not want to waste much time to do it. Again, chemical shops are found in almost at every place within a reasonable distance.

6.3.3 Determinants of Healthcare Provider: Multivariate Analysis

The previous sector reported and discussed the results from cross-tabulation which established the relationship between only two variables. Multivariate regression analysis is required to predict the value of the demand for healthcare based on two or more independent variables. The coefficient is the expected amount of change in the predicted probability for each unit change in the independent variable. It is the odds of membership in the predicted category compared with the reference group. As discussed earlier, the results will be presented in marginal effects because marginal effects tell us about the partial derivative of the predictors with respect to the dependent variable (Williams, 2016).

The regression results also report robust standard errors, z-value, p-value, and confidence interval. The presence of heteroskedasticity suggests that the variability of the variable is unequal across the range of values. The existence of heteroskedasticity means the absence of homoscedasticity. This situation can invalidate the statistical test of significance because it assumes that the modeling errors are uncorrelated and uniform. In the presence of heteroskedasticity (the error term does not have constant variance), the robust standard error is more trustworthy. That is why the results report robust standard errors (Williams, 2016).

The z-statistic which follows the normal distribution under the null hypothesis is a test for the means of a normally distributed population with known variance. Whenever the variances are known and the sample is large, the z-test is used to test the statistical significance of two population means. The z-score is for hypothesis testing. A higher value of z ($z \geq 1.64$) indicates the statistical significance of the predictors at least at 90% confidence interval. The p-value helps to validate the statistical significance of the null hypothesis. Thus, it assesses the truth of the null hypothesis. It is the probability of finding the results when the null hypothesis is true. When it is less than or equal to 0.01, then the null hypothesis is not true and will be rejected at least a 90% confidence interval (Williams, 2016).

The confidence interval is the interval estimate of a population parameter. It describes the amount of uncertainty associated with a sample estimator of the population parameter. In sampling the same population means on different occasions with interval estimates on each occasion, the resulting intervals will bracket the true population parameter in approximately the percentage of the cases. In most cases, the commonly used confidence intervals (significant level) are 90% (10%), 95% (5%), and 99% (1%).

The regression tables in this paper report the number of observations, Wald chi2, prob>chi2, and Pseudo R² in addition to the recorded marginal effects, and robust standard errors with their significance levels. The number of observations indicates the sample size. Wald chi2 tests the overall significance of the independent variables. Prob > chi2 is the probability of obtaining the Wald chi2 if in fact there is no significant effect of all the predictors. A small value shows that at least one of the predictors is not equal to zero (0) (Williams, 2016).

McFadden's Pseudo R² does not give the same interpretation as R² gives in Ordinary Least Square (OLS) regressions, and therefore, it must be interpreted with caution. Unlike OLS,

the model estimates from a multinomial probit regression are maximum likelihood estimates arrived at through iteration process. They are to minimize the variance. At every stage, different pseudo R^2 are calculated. They are called pseudo R^2 because they behave like R^2 in OLS ranging from 0 to 1. A higher value is preferred to lower value. Pseudo R^2 of 0.2 - 0.4 indicates a good fit of the model (Ringel et al., 2001). It tells us the relationship that exists between the dependent variable and the independent variables, such that this relationship predicts the chance accuracy of the predictors. Most often than not, researchers are advised to test a property of the model known as the independence of irrelevant alternatives (IIA) (Williams, 2016). In discrete choice theory, the assumption says that if individuals are asked to choose among sets of alternatives, the odds of choosing one over the other should not depend on the presence of other alternatives. In other words, in this study, a person who suffers from illness or injury or both can choose one healthcare service provider over the other regardless of whether or not other facilities exist. Since logistic regression suffers from IIA, multinomial probit method of estimation is preferred (Williams, 2016). It must be noted that travel cost and travel time are likely to have multicollinearity and therefore only one variable is put into the regression model. Travel time result is in line with achieving the objective of the paper and therefore gives better results in terms of significant coefficients than travel cost. The study reports and analyses the regression results that includes travel time but puts those involving travel cost in an appendix (see appendix 10). The regression analysis controls for insurance. The most important analysis is the one when price is assumed to be zero, with or without controls. To estimate the effect of the time price on choice of healthcare provider, there is the need to interact zero money price with travel cost, travel time and waiting time. This is referred to as zero price on the regression Tables (see Tables 6.4, 6.5, and 6.6).

Table 6.4: Effect of time price on choice of type of healthcare providers: No care is the reference group. (Without controls)

Variable	Public modern	Private modern	Chemical shop	Traditional
Regression with price:				
Price	0.0002	0.0006**	-0.0006***	0.000***
Travel time	0.078***	-0.031***	-0.113***	0.003***
Waiting time	0.110***	0.075**	-0.050*	0.012**
No. of obs = 6701			Pseudo R2 = 0.287	
Regression when price is assumed to be 'zero'				
Travel time	0.029***	0.007	-0.036***	0.0008
Waiting time	0.064**	-0.051**	-0.028**	0.013*
No. of obs = 6842			Pseudo R2 = 0.18	

10% * 5% ** 1% ***

Source: Author's computation based on GLSS 6

Even without the controls and compared with no care, increasing the price paid for medical service by GH¢1, will increase the probability of seeking treatment from public modern by 0.02 percentage points (though not significant), increases the probability of choosing private modern and the traditionalist by 0.06 and 0.00 percentage points respectively. Increasing the price by GH¢1 decreases the probability of visiting the chemical shop by 0.06 percentage points. This might be explained by the perception most people have about the quality of healthcare provided by the private and traditionalist so even if their prices increase, patients will still demand their services. However, increasing price decreases the demand for the chemical store. Increasing travel time by 1 hour increases the probability of seeking treatment from public modern and traditional/Spiritual healer by 7.8 and 0.3 percentage points respectively but decreases the probability of choosing private modern and chemical shop by 3.1 and 11.3 percentage points. In most parts in Ghana, chemical and pharmacy shops are seen at almost every corner and so if one must spend much time to travel there then the patient may not seek healthcare there and will as well visit other healthcare providers.

The time spent at the health facility to receive treatment increases the probability of seeking healthcare from public modern, private modern and traditionalist. For instance, if the time spent at the health facility increases by 1 hour, the probability of visiting public modern, private modern and traditional will increase by 11.0, 7.5, and 1.2 percentage points respectively. On the other hand, if waiting time increases by 1 hour, it will decrease the probability of visiting a chemical shop by 5.0 percentage points. This revelation is not surprising at all since certain circumstances influence the decision to seek healthcare from a particular healthcare provider. For instance, if the illness is believed to have been caused by spiritual forces (e.g. witches), then the patient is more willing to stay at the traditional/spiritual health facility to receive treatment, no matter how long it takes. Most severe illness are referred to modern healthcare providers, especially those that require some diagnosis from specialists or surgery.

Without the controls, and assuming price is 'zero', travel time and waiting time still have effects on the choice of healthcare provider. For instance, if travel time increases by 1 hour, it will increase the probability of visiting public modern healthcare provider but decreases chemical shop healthcare utilization. If the time spent at the health facility increases by 1 hour, it will increase the probability of seeking healthcare from public modern and traditional by 6.4 and 1.0 percentage points respectively but decreases private modern and chemical store/pharmacy respectively by 5.1 and 2.8 percentage points.

Existing literature reveals that certain demographic factors and severity of illness can affect the decision to seek healthcare from a particular healthcare provider in Ghana (Nketiah-Amponsah and Sarkodie, 2014). To ensure that the results of the effect of opportunity cost on demand for healthcare, it is important to control for these demographic factors.

Table 6.5: Effect of time price on choice of type of healthcare providers: no care is the reference group. (With price and other controls)

Variable	Public modern	Private modern	Chemical shop	Traditional
Price	-0.00002	0.0002**	-0.0003*	0.00***
Travel time	0.030***	0.005	-0.036***	0.0005
Waiting time	0.068*	-0.052*	-0.030	0.012*
Income	0.006	0.004*	-0.005	0.006
Age	-0.020***	-0.005	0.016***	0.009***
Gender				
Male	-0.024*	-0.014*	0.014**	0.005**
Female (Ref.)				
Education				
No qualification (ref.)				
Primary	-0.02*	-0.179	-0.042	0.055***
Secondary	-0.301	-0.122	-0.070*	0.048***
Post-secondary	-0.209	0.216	-0.004	-0.003**
Tertiary	-0.059*	0.0324***	-0.006	-0.070
Location				
Urban	-0.048***	0.094***	0.017**	-0.005**
Rural (ref.)				
Severity of illness				
Not severe (ref.)				
Less severe	0.075***	0.056***	-0.014*	-0.052**
More severe	0.015***	0.056**	-0.043	0.013***
	No. of obs = 6,459		Pseudo R2 = 0.3210	
10%	*	5%	**	1%

Source: Author's computation based on GLSS 6

When price and other factors are introduced and controlled for, the results change a little bit. For example, A GH¢ 1 increase in the price of healthcare is likely to increase the number of visits to the private modern health facility by 0.2 percentage points and no effect on traditional but decreases demand for chemical shop healthcare by 0.03 percentage points. An hour increase in the amount of time taken to travel to a particular health facility increase the probability of visiting public modern health facility by 3.0 percentage points but decreases the probability of seeking healthcare from chemical shop 3.6 percentage points

If it is assumed that a patient will spend 1 more hour at the healthcare facility in order to receive treatment, the probability of choosing private will decrease by 5.2 percentage points and the

chemical store will decrease by 3.0 percentage points but not statistically significant. However, the effect on public modern and traditional will be an increase of 6.8 and 1.2 percentage points respectively. Income only increases visit to private healthcare by 0.4 percentage points. Increasing in age reduces the probability of consulting a public and private healthcare provider by 2.0 and 0.5 respectively but increases the chances of visiting a chemical shop by 1.6 percentage points and traditional by 0.9 percentage points. Being a male increases the chances of consulting chemical shop and traditionalist/spiritualist by 1.4 and 0.5 percentage points respectively.

Educational qualification has been found in the literature to have a significant influence on choice of healthcare provider. With reference to people with no educational background, those who attained primary education qualification have a decreasing probability of choosing public modern by 2.0 percentage points and an increasing probability of 5.55 percentage points for choosing the traditionalist. Attaining Secondary educational qualification increases the probability of choosing chemical and traditionalist by 7.0 and 4.85 percentage points respectively. Attaining a post-secondary education decreases the probability of choosing traditionalist by 0.3 percentage points. Having a tertiary education qualification increases the probability of visiting private modern health facilities by 3.21 percentage points.

Compared with rural dwellers, urban dwellers are not likely to visit the private modern and chemical shop by 9.4 and 1.7 percentage points respectively. Residing in an urban area decreases the chances of seeking healthcare from public modern and traditional by 4.8 and 0.5. If the individual stops their usual activity due to illness by even one day, they are more likely to consult public and private health facilities by 7.5 and 5.6 percentage points respectively but decreases the probability of choosing chemical and traditional by 1.4 and 5.2 percentage points.

If the illness is more severe, then the chances of consulting public modern, private modern and traditional/spiritual healthcare providers will increase by 1.5, 5.6, and 1.3 percentage points.

It was so clear that when price is controlled, the explanatory variables have different effects on choice of healthcare provider. The next section discusses the effect of time price on choice of healthcare provider when price is assumed to be “zero”, and the effects of the covariates are explained below.

Table 6.6: Effect of time price on choice of type of healthcare providers (without price): no care as the reference group.

Variable	Public modern	Private modern	Chemical shop	Traditional
Travel time	-0.031***	-0.005*	-0.036***	0.005
Waiting time	0.060**	-0.05*	-0.028*	0.013**
Income	0.002*	0.003***	0.0004	0.017
Without price				
Age	-0.023	-0.003	0.016***	0.009***
Gender				
Male	-0.003	0.048	0.090***	0.0009***
Female (ref)				
Education				
No qualification (ref.)				
Primary	-0.047***	-0.031	0.079*	0.05***
Secondary	0.019**	-0.032	0.060**	0.080**
Post-secondary	0.068**	-0.157	-0.004	0.049**
Tertiary	0.046**	0.074***	-0.091	0.916
Location				
Rural (ref.)				
Urban	0.103**	0.082***	0.047	-0.047**
Severity of illness				
Not severe (ref.)				
Less severe	0.038	0.089**	0.071	-0.079
More severe	0.013**	0.057**	0.047	0.090***
No. of obs = 6,778 Pseudo R2 = 0.2957				

10% * 5% ** 1% ***

Source: Author’s computation based on GLSS 6

Even when price is assumed to be “zero”, there still remain some economic costs for choosing a particular healthcare provider over the other. These may be due to the effect of opportunity cost for visiting that health facility. If we assume price is ‘zero’ and the time taken to travel to public modern, private modern, and chemical shop increases by 1 hour, the probability of visiting these healthcare facilities decrease by 3.1, 0.5, and 3.6 percentage points respectively but increases the chances of visiting traditional healthcare facility by 0.5 percentage points even though it is not statistically significant. If the time spent at the health facility increases by 1 hour, the probabilities of visiting public modern and traditional health centres will increase by 6.0 and 1.3 percentage points respectively. This is very true in a situation where sickness is deemed chronic or caused by spiritual forces. In that case, the patient is prepared to wait for anyhow in order to receive treatment from that particular provider. The effect on the private and chemical store will be a decrease in probabilities by 5.0 and 2.8 percentage points respectively. Increasing the income of the consumer by GH¢ 1 increases the chances of visiting public and private modern healthcare facilities by 0.2 and 0.3 percentage points respectively. The result is consistent with other findings that both direct and indirect costs affect demand for healthcare (Russell, 2008; Osei et al., 2014; Kuunibe and Domanban, 2012)

When price is assumed to be zero, increasing age by 1 year increases the probability of choosing chemical and traditional healthcare facilities by 1.6 and 0.9 percentage points. Being a male will increase the chances of choosing chemical and traditional healthcare by 9.0 and 0.009 percentage points. Compared with no educational qualification, attaining primary qualifications decreases the probability of choosing public modern by 4.7 percentage points but increases chemical and traditional by 7.9 and 5.0 percentage points respectively. Having secondary educational qualification, the probability of visiting public, chemical and traditionalist/spiritualist will increase by 1.9, 6.0, and 8.0 percentage points respectively. Post-

secondary education increases the probability of visiting public and private by 4.6 and 7.4 percentage points. People with tertiary education are more likely to choose public and private modern by increasing their chances by 4.6 and 7.4 percentage points respectively. Again, compared with rural folks, urban dwellers are more likely to visit public and private modern healthcare facilities by 10.3 and 8.2 percentage points respectively but decreases the chances of visiting traditionalist by 4.7 percentage points. When illness is less severe as compared with not severe illness, it will increase the probability of consulting public and private modern facilities by 3.8 and 8.9 percentage points respectively. A similar conclusion can be made about situations where the illness is more severe. When illness stops a person from doing her usual activity for more than even a day, it will increase the chances of seeking healthcare from public modern, private modern and traditional healthcare facilities by 1.3, 5.7 and 9.0 percentage points respectively. This conclusion is similar to that of Anyanwu (2007) and Arthur (2014).

6.4 Summary

The study employs data from the sixth round of the Ghana Living Standards Survey (GLSS 6) which is a nationally represented survey. It was conducted from October 2012 to October 2013. A special section (section 3) was devoted to assessing the health conditions of household members in the two weeks preceding the interview. The study employs the method of multinomial probit regression method. The healthcare providers which are the categorical dependent variables are no care, public modern, private modern, chemical/pharmacy, and traditionalist/spiritualist. The findings are that out of the total household members of 72,372, 14% of them reported to have suffered from illness or injury or both in the two weeks preceding the interview. Out of the number of 10,442 who reported to have suffered, 33.4% did not seek

treatment. The remaining 66.6% consulted various healthcare providers which are categorized into public modern, (31.6%), private modern (18.5%), chemical store (15.3%) and traditionalist (1.1%).

The purpose of this paper is to estimate whether or not the attribute of healthcare affects choice of healthcare provider even if service is provided free of charge. These attributes are the price of time which includes travel time and waiting time (opportunity cost). The study also controlled for certain economic and demographic factors that may influence choice of healthcare which includes income, age, gender, location, the severity of illness, education. The cross tabulations reveal that about 50% of the respondents pay for the medical expenses themselves. The remaining percentage say either the medical expenses are paid by a relative or health insurance. Compared to males, females consult modern health facilities. Adults prefer chemical and traditional healthcare providers. People with higher education can afford expensive modern healthcare facilities and therefore consult them when sick. While urban dwellers visit the modern health facilities, their rural counterparts are only able to visit the traditionalist/spiritualist or the chemical store. As expected, people in the high-income bracket consult the modern healthcare facilities, whereas those in the lower-income bracket visit chemical store/pharmacy and traditionalist/spiritualist. Similarly, if the illness is deemed severe, the patient consults modern and traditional healthcare provider, but if it is not severe they do not consult at all, and even if they do, they will visit chemical store/pharmacy.

The multinomial probit regression results reveal that when price is assumed to be “zero”, an hour increase in the travel time and waiting time is to affect the probability of consulting a particular healthcare provider. This finding suggests that there is an opportunity cost of consulting a particular healthcare provider in Ghana, even if price is assumed to be ‘zero’.

CHAPTER SEVEN

7. SUMMARY, CONCLUSION, AND POLICY RECOMMENDATIONS

7.1 Summary

The concept of efficiency makes it imperative not to concentrate only on the supply side of healthcare, but also the demand side because of its relevance in estimating how much is consumed vis-à-vis how much ought to be consumed. Consumers are not likely to consume as much healthcare as they want given the fact that they are constrained by the price of healthcare and income of consumers. In addition to price and income, certain demographic factors also impede the smooth process of freely choosing a particular healthcare provider. In as much as governments and development partners all over the world are making efforts to increase the supply of healthcare, their consumption is not automatic.

There are certain economic and non-economic factors that constrain consumers from accessing optimum healthcare. Several papers have attempted to investigate the factors that constrain consumers from consuming at optimum levels. However, a number of such papers did not address the demand for healthcare in Ghana in a comprehensive manner. While some focused on only parts of the country, others focused on estimating the demand factors in isolation, while some are outdated. Papers written on Ghana did not give attention to the effect of income and price of time (opportunity cost) on demand for healthcare. This thesis contributes to knowledge by making a comprehensive investigation into the demand factors that constrain consumers from increasing their demand for healthcare, taking into consideration income, price, health insurance and time price. It uses a more recent data from the sixth round of the Ghana Living Standards Survey (GLSS 6).

The thesis first defines certain concepts in demand for healthcare, then looks into the general overview of the health systems in Ghana and relevant literature review before going into the econometric analysis.

Demand for healthcare is a derived-demand, that is, healthcare is not demanded for its own sake but for the sake of improving health status. Healthcare as an economic commodity exhibits some characteristics that make it distinct from all other economic commodities: healthcare is characterized by the features of public goods, externalities, and uncertainties, making government intervention necessary. These characteristics render some factors more influential on demand for healthcare than the traditional demand factors which are price and income. Again, the nature of healthcare makes it distinct since the amount of healthcare to be measured as consumption does not necessarily require quantities of healthcare consumed alone, but also choice of healthcare provider, the probability of use, in-patient, and out-patient utilization, number of physician visits, quality and the number of hospital days. The price side also has its own unique measurement depending on the presence of health insurance. It could be measured as out-of-pocket payment, co-payment, coinsurance, or coinsurance rate. To ascertain the factors that influence demand for healthcare, different econometric analyses were conducted in three different parts leading to three main full papers.

As mentioned earlier, healthcare is not demanded for its own sake but for the sake of improving health status. The significance of improved health status is justified by its effect on productivity and an overall impact on Gross Domestic Product (GDP) (Grossman, 1972). In the Human Capital Model, Grossman (1972) reveals that health can be seen both as a consumption good and an investment good. Improved health status becomes a consumption good because people are happy about being healthy. It becomes an investment good when it reduces the number of sick days, guarantees productivity, and increases income.

The first paper which is contained in chapter four estimates the sensitivity of demand for healthcare to price and income. The idea is to understand whether or not healthcare in Ghana is elastic, or inelastic. The findings suggest that healthcare in Ghana is less sensitive to price and income. Again, healthcare relates negatively to price and positively relates to income, making it a normal good. General healthcare services were found to benefit the rich more than the poor. The introduction of the National Health Insurance Scheme in 2003 plays a key role in analyzing the demand for healthcare. When controlled for health insurance, demand for healthcare really becomes less and less sensitive to price and income. It, therefore, becomes necessary to analyze the effect of health insurance on demand for health as a separate paper.

The National Health Insurance Scheme (NHIS) was established in 2003 to replace the then ‘cash and carry’ system. The ‘cash and carry’ system posed serious threats to access to healthcare, especially among the poor. The effect of the National Health Insurance Scheme on healthcare utilization and out-of-pocket payment is analyzed in chapter five. The objective of the paper is to investigate why people do not enrol at all, why they enrol but later do not renew their registration, and also find out how enrolment has contributed to increased healthcare utilization and reduced out-of-pocket payment. The findings of the paper confirm what others have already established that enrolment onto NHIS increases healthcare utilization, and reduces out-of-pocket payment. The paper again reveals that given the increment in claims coupled with reduced active membership enrolment, the scheme faces serious financial challenges, which can collapse the scheme if not resolved immediately.

It is established in the second paper that health insurance pools resources and shares risk, and that there are instances where subscribers pay coinsurance rate and in other cases nothing all. One might then conclude that when health insurance reduces out-of-pocket payment to “zero”, there must be a hundred percent increased access to healthcare, without leaving anybody

behind. The next paper which focuses on the opportunity cost of choosing a particular healthcare concludes that even if price is assumed to be 'zero', there still remain some opportunity costs that inhibit access to healthcare. These factors are called time price. The lesson learned is that in determining the factors that affect demand for healthcare, one must not only concentrate on price, income, and health insurance but also the time price (opportunity cost) of demand for healthcare.

The thesis contributed to the body of knowledge by undertaking a comprehensive study on the factors that influence demand for healthcare in Ghana, examined the effect of income and price of time on demand for healthcare, something other papers did not consider. This thesis also went a step further to estimate the benefit incidence of healthcare services using ranked income quintiles.

This thesis is not written without any limitations. There are some limitations with respect to the estimations and analysis. Estimation in the first paper could have been done with nested logit regression. However, the GLSS 6 data put together private and public healthcare providers as one variable, and therefore made it extremely difficult to attempt to estimate with nested logistic regression. The other two papers could have also been better if it was possible to get information about the individual's preference to a particular provider when ill or injured. For instance, instead of asking where the individual sought treatment, the data could have asked about the individual's first choice and subsequent choices of healthcare provider. In this case, one could rank the providers. Lack of information on the expected price to pay if one had visited another healthcare provider made it difficult to compute cross-price elasticity. The data does not have any information about how much the National Health Insurance Scheme paid – i.e co-payment, etc. Some respondents did not visit the health facility but rather had the physicians visit them at home. It could have been more useful if the data provided information

about the economic and opportunity cost incurred by such physicians who rather visited the patients. Moreover, the thesis is limited by inadequate resources which could have been used to gather information from primary data collection and focus group discussions. Gaining such information would be necessary to enrich the discussions. But this was not part of the original design of the study.

7.2 Conclusion and Policy Recommendations

The main aim of the thesis is to estimate a demand for healthcare function. Thus, to investigate the economic and non-economic factors that influence demand for a particular healthcare provider. In price theory, price and income have been found to be the leading determinants of demand for a commodity. The first objective of the thesis is therefore to estimate the sensitivity of demand for healthcare to price and income, and also the benefit incidence of healthcare services in Ghana. The paper concludes that generally, demand for healthcare in Ghana is less sensitive to price and income, after controlling for health insurance. Overall healthcare services were found to benefit the rich more than the poor.

Based on the above conclusions, the following recommendations are made to policymakers. The theoretical and empirical literature have demonstrated the effect of healthcare on health, as well as the impact of health on utility and productivity. It is therefore recommended to government and the general public to invest a sizeable amount of their budget on both preventive and curative healthcare measures. The Lorenz curve demonstrates the presence of inequality in terms of demand for healthcare (measured by payment for healthcare). In terms of equity, it was found that the payment for healthcare falls more on the rich than the poor. A policy to reduce this kind of inequality and inequity in demand for healthcare must be targeted

at the poor. Since healthcare benefits fall on the rich, it is recommended to government to increase access to healthcare among the poor. The benefit incidence of the payment for public healthcare falls on the poor, while that of private healthcare falls on the rich. This means that government should increase subsidy to public healthcare and invest more to improve the National Health Insurance Scheme. Government can also appeal to donors to direct some funds into funding provision of public healthcare. Second, higher income is likely to increase demand for healthcare because, with higher income, patients can afford medical bills. Every effort must be made to increase the incomes of people. Job creation is one of the ways of increasing the incomes of the number of people who seek healthcare. Therefore, government's effort to create more jobs is commendable.

Again, in addition to the general case for healthcare utilization, all the sub-group analysis for the incidence of healthcare payment falls on the rich more than the poor, making it progressive. It is recommended to policymakers to find measures to make healthcare service more affordable so that the poor can access healthcare services.

The second objective of the thesis is to analyze the effect of the National Health Insurance Scheme on healthcare utilization and out-of-pocket payment. The paper found that about one-third of the population have not registered and that about one-tenth of the population who registered did not renew their registration citing 'no need for health insurance', 'No Money' and 'lack of trust in the scheme' as the major reasons given for their inability to register or renew their registration. This revelation is very surprising given that Authorities of the National Health Insurance Scheme believe the premiums charged are the lowest and can, therefore, be afforded by the poor. In addition to this, the scheme freely registers children below 18 years, the aged above 70 years, disabled people, among others. Nonetheless, it is still the rich who are more likely to enrol than the poor.

Based on the findings, it is recommended to policymakers that efforts to increase the National Health Insurance Scheme enrolment must be targeted at the youth, the poor, the non-educated, males, informal workers, and rural dwellers. Policymakers must institute measures to reinvigorate citizens' trust in the scheme. The essence is to ensure acceptance of NHIS by providers, early reimbursement of providers, covering medicines, public education on benefits of the scheme, and the importance of reducing out-of-pocket payments. Authorities must also make the system less cumbersome to improve enrolment, get citizens to appreciate the importance of renewing their membership and being willing to pay even higher fees which nearly everyone can afford. People spend so much money on airtime and funerals but do not appreciate having health insurance.

In general, NHIS increases healthcare utilization. Ghanaians must be sensitized and encouraged to enrol. People who are not enrolled do so because there is no money to pay subscription, and also, they do not trust the NHIS system. The National Health Insurance Authority (NHIA) is therefore encouraged to improve the NHIS systems in order to win the trust of Ghanaians as stated in the previous paragraph. In order to reduce huge dropouts from NHIS and ensure that the healthcare system in Ghana becomes more pro-poor, government can encourage benevolent individuals who paid to register the vulnerable in society to help them renew their membership cards. More than half of the respondents pay a greater part of the medical cost. The Authority must cross-check the quality of services provided and also whether or not NHIS card holders make unofficial co-payments. This is because presently under the scheme, there is no co-payment. In Rwanda, the health sector is government's top priority, investing heavily in the national health insurance scheme, and making it compulsory for its citizens. Ghana can learn from this experience by realigning its public expenditure and give priority to healthcare expenditure. Again, the government of Ghana can make enrolment

compulsory by making the health insurance card a requirement for accessing certain public services such as vehicle and license registration, passport acquisition, accessing free Senior High School education (as it is the case with TIN), among others. In general, policy makers must educate on the need for health insurance to cushion them in times of trouble.

Furthermore, health insurance has been identified as a major determinant of demand for healthcare. Therefore, the National Health Insurance Scheme (NHIS), as well as many other private health insurances, must be improved to increase enrolment. This can be done by increasing funds into NHIF, reducing registration cost, and making the system less cumbersome. Due to the financial challenges facing the Fund, it is recommended to policymakers to increase the contributions into the National Health Insurance Fund before it dries out due to the financial implications of membership and claims.

As the third objective of the thesis, the paper finds the effect of opportunity cost on healthcare seeking behaviours of individuals. The study measures opportunity in terms of price of time (travel time and time spent at the health facility). The study reveals that with the presence of health insurance and other interventions, even if healthcare service is provided at 'zero price', there still remain some challenges that are likely to prevent patients from seeking healthcare. Travel cost, travel time and waiting time have been identified to impact on the probability of seeking healthcare when sick. The regression results of the effect of travel cost on choice of healthcare provider is in appendix 10.

Based on the findings, it is recommended to policy makers to improve public transport and make it more accessible, especially by the poor and vulnerable in society and at a cheaper fare. The quality of the road network should also be improved. This is because drivers charge higher price in areas where there are bad roads. Transportation by any means should be improved and

provided at a lower cost. One other factor that can contribute to travel cost is fuel cost and cost of spare parts. Fuel prices contribute significantly to increasing travel cost. It is recommended that government to reduce fuel cost. The downstream petroleum industry is deregulated therefore government does not have full control over the setting of ex-pump prices. However, certain levies and taxes imposed on petroleum products should be reduced or totally abolished in order to reduce prices. Again, duties and taxes on imported spare parts should be revised downwards. Another way of reducing travel cost is by reducing the travel distance. It is suggested to policy makers to provide as many health facilities as possible in order to increase proximity and access by every Ghanaian. Government's policy of providing CHPS compound in most parts of the country including the rural areas should be improved.

Waiting time is also found to be another significant determinant of choice of provider even if price is assumed 'zero'. Most of the time, people wait for so long at the health facility either because the number of health facilities in the area is inadequate and therefore the only facility serving the community is congested, or there are few physicians and other healthcare professionals at the facility. It is therefore recommended that health facilities be provided at every reasonable distance, and resourced with qualified health professionals. Doctors and nurses are also encouraged to accept postings to areas deficient of health professionals to help improve on the physician-patient ratio.

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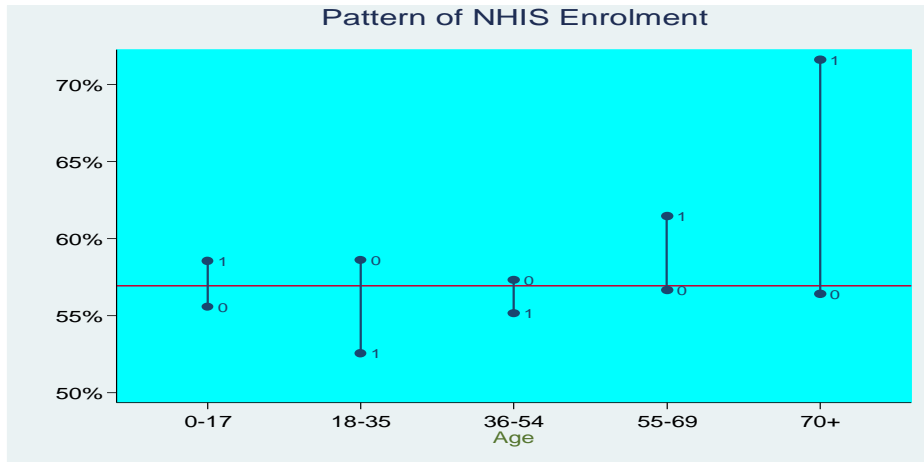
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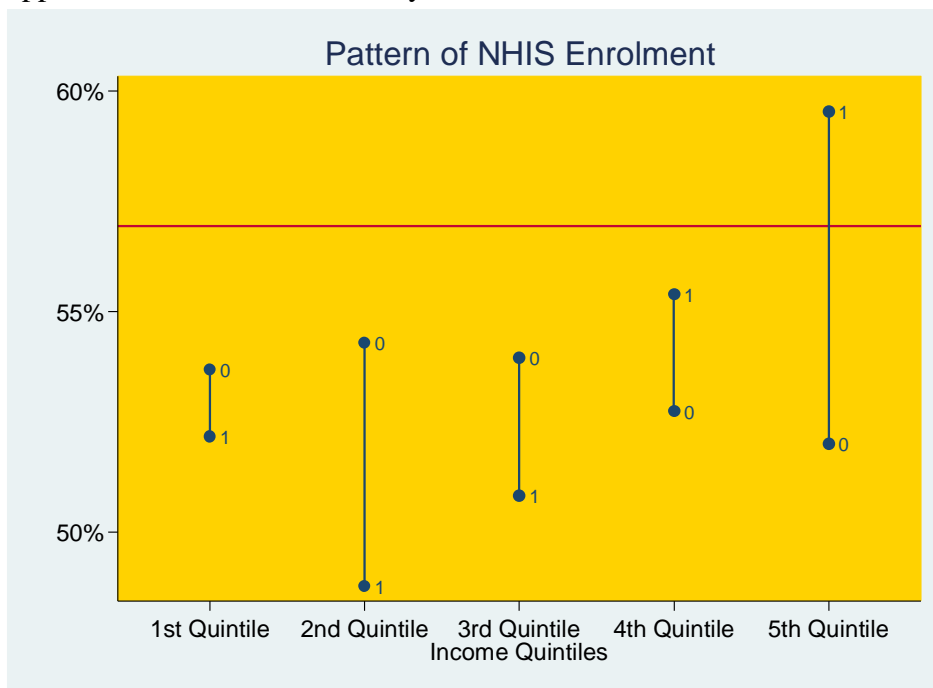
Appendices

Appendix 1: NHIS Enrolment by Age



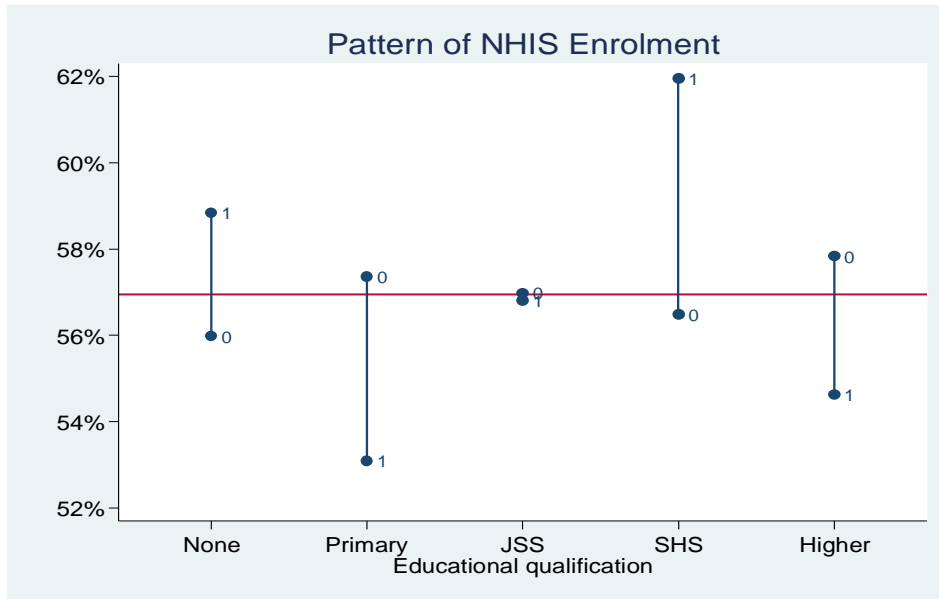
Source: Author's

Appendix 2: NHIS Enrolment by Income



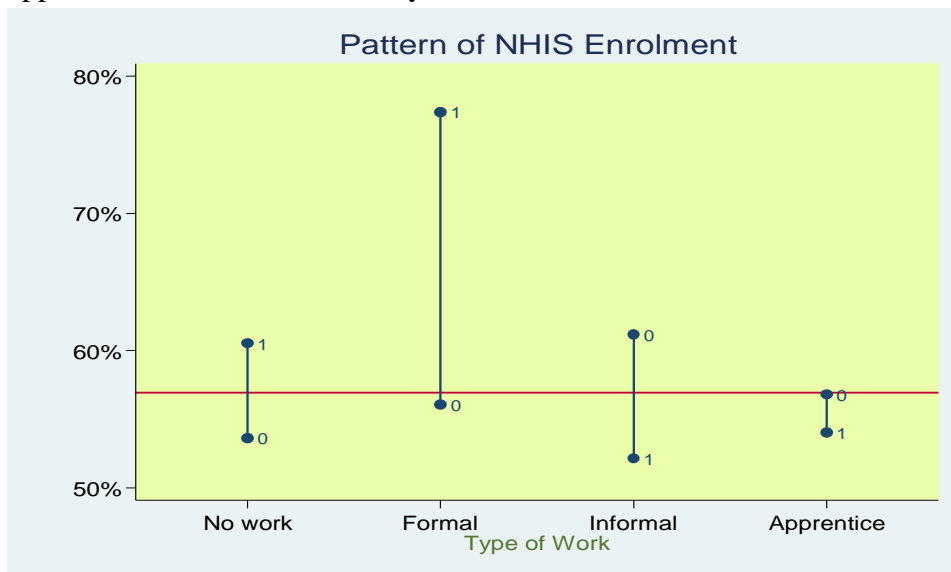
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Appendix 3: NHIS Enrolment by Education



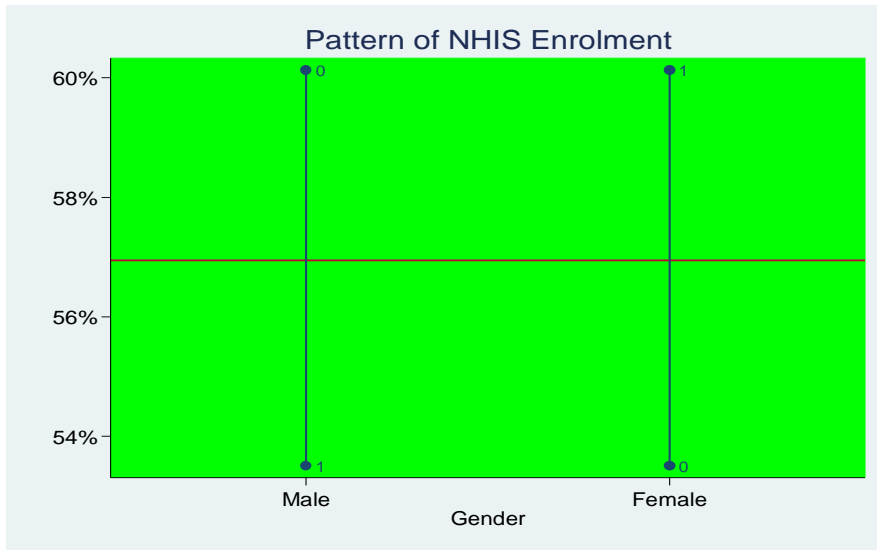
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Appendix 4: NHIS Enrolment by Work



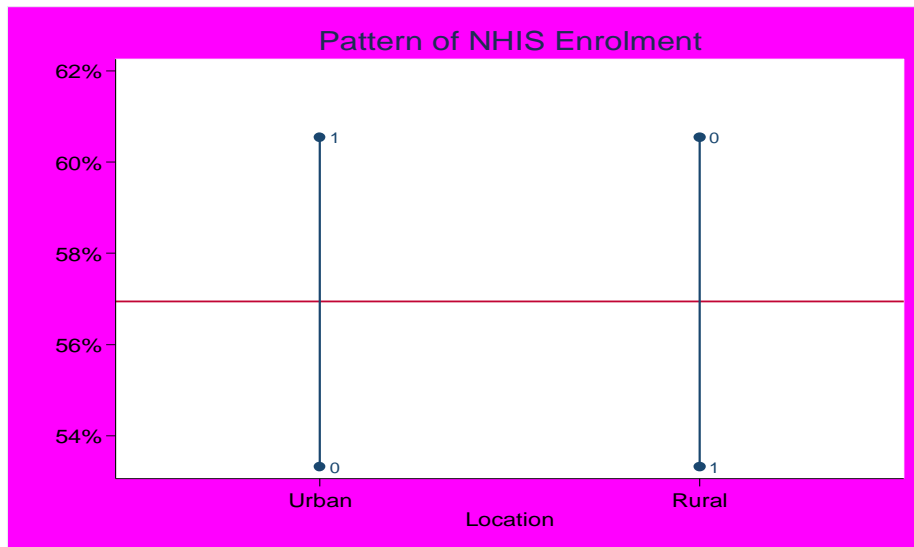
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Appendix 5: NHIS Enrolment by Gender



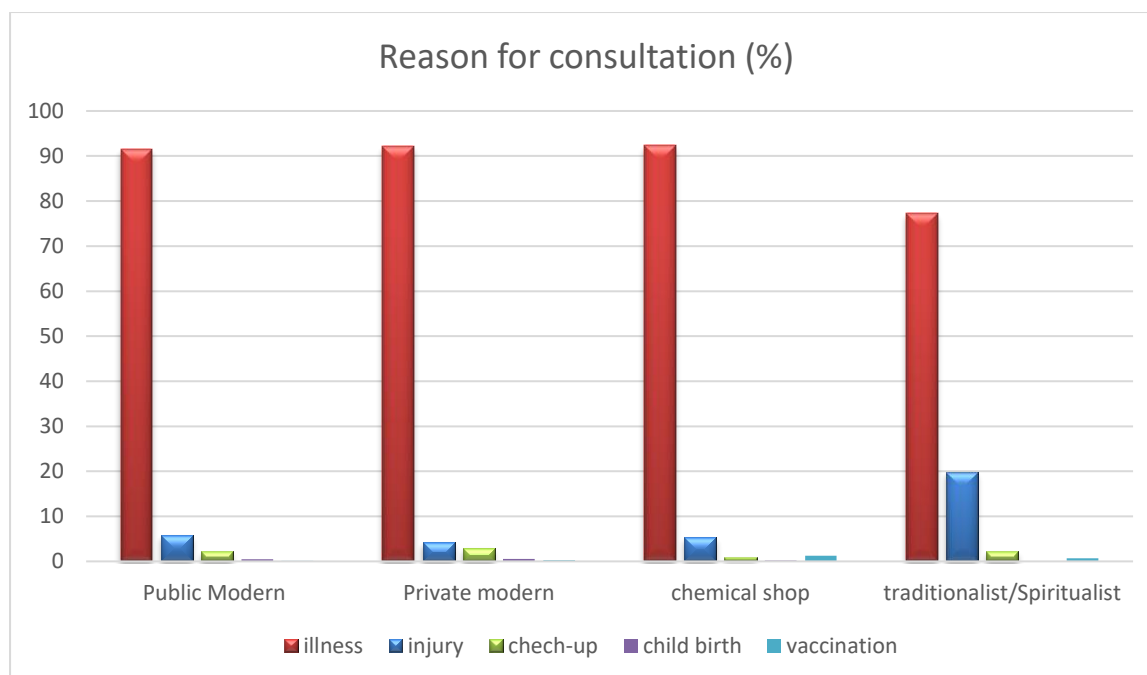
Source: Author's

Appendix 6: NHIS Enrolment by Location



Source: Author's

Appendix 7: Reasons for consulting a physician



Source: Author's computation based on GLSS 6

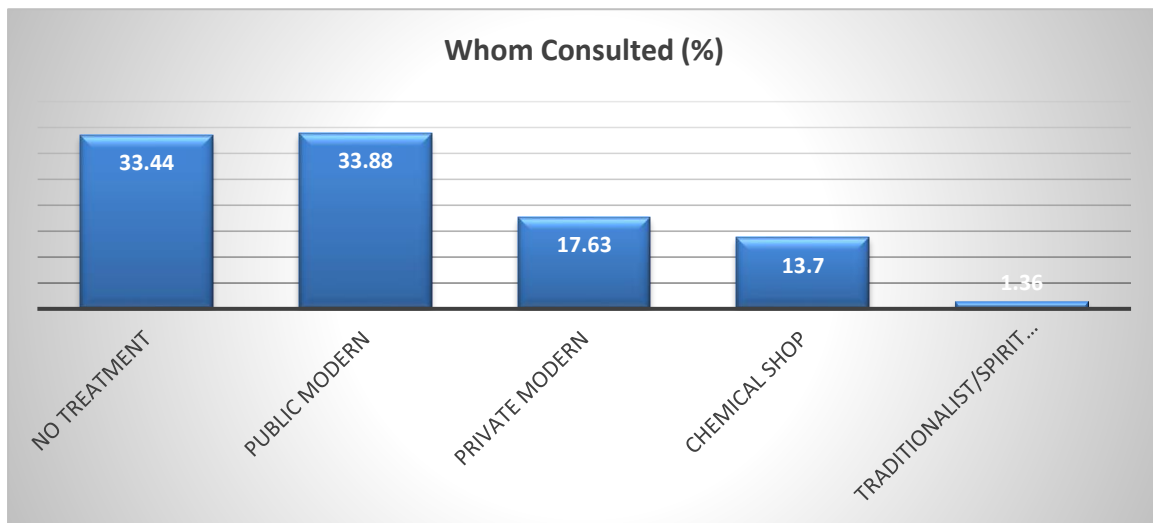
Appendix 8: Effect of NHIS on healthcare utilization for various purposes: Logistic regression (Marginal Effects)

Variables	Illness	Injury	Follow up & check up	Childbirth-related	Vaccination
Insured (without controls)	0.03***	-0.000	0.01***	0.002***	-0.046
Insured (with controls)	0.03***	0.000	0.008***	0.002**	-0.04
Age	0.002***	0.000	0.003***	-0.000***	-0.002***
Income	-0.011	-0.001	0.010***	0.009**	0.000
Education					
None	0.013	0.005	0.0022	-0.001*	0.018
Primary	0.022*	0.007	0.009*	-0.001	-0.037**
JHS	0.019**	0.005**	0.005*	-0.002*	-0.029***
SHS	0.006	0.002	0.008*	-0.002*	-0.0128
Higher (ref)					
Gender					
Male	-0.035***	0.004	-0.006***	NA	0.045***
Female (ref)					
Location					
Urban	-0.025***	-0.004*	0.002	-0.000	0.028***
Rural (ref)					
Constant	2.57a	-2.500a	-4.979a	-0.566	-4.047a

1%: *** 5%: ** 10%: *

Source: Author's computation based on GLSS6

Appendix 9: Where respondents consult a physician when sick.



Source: Author's computation using GLSS 6

Appendix 10: Effect of time price on choice of type of healthcare providers (without price): no care as the reference group.

Variable	Public modern	Private modern	Chemical shop	Traditional
Travel cost	0.1022	0.069	-0.174***	0.002
Waiting time	0.07***	-0.035*	-0.045**	0.012*
Income	0.000	0.000	-0.000	-0.000
Without price				
Age	-0.026***	-0.006	0.021***	0.010***
Gender				
Male	-0.022**	-0.008	0.023**	0.007**
Female (ref)				
Education				
No qualification (ref.)				
Primary	-0.372*	-0.017	-0.004	0.055***
Secondary	-0.359	-0.140	-0.003	0.048
Post-secondary	-0.029	-0.012	-0.004	-0.003***
Tertiary	-0.0597***	0.0216	-0.005	0.093****
Location				
Rural (ref.)				
Urban	-0.11**	0.033***	-0.003	-0.009**
Severity of illness				
Not severe (ref.)				
Less severe	-0.027*	0.034*	-0.049**	-0.012**
More severe	-0.079**	0.003**	-0.052***	0.012***
No. of obs = 6,504		Pseudo R2 = 0.0128		
10%	*	5%	**	1%

Source: Author's computation based on GLSS 6

Appendix 11: Durbin-Watson Test statistic in stata

Number of gaps in sample	1
Durbin-Watson d-statistic	(6, 1630) = 0.286019
	Prob > F = 0.286019
	Ho: No endogeneity

Source: Author's computation based on GLSS 6