CHAPTER ONE

1.1 PREAMBLE

Health is a fundamental dimension of well-being and a key component of human capital. Meanwhile, poor health and the inability to cope with episodes of illness can be considered important dimensions of deprivation. Health outcomes are affected by a number of wide-ranging factors, which under European Commission of Public Health are classified as genetics, lifestyles, environments and social economics.

Health and the risk of premature death are influenced by socio-economic factors throughout one's life time (Davey et al, 1997). Studies have shown that social and biological beginning of life are important for a child's good health later in life. (Kuh and Ben Shlamo, 1997; Holland et al, 2000). Thus, the health of individuals and cohorts in middle and old age depends on past circumstances as well as the present.

Despite the complexities involved in untangling the interrelationship between these factors, many studies, such as Jourmand et al., (2008); Afonso, 2009; Schhillinger et al., (2002);Filmer and Pritchet (1997); Kawachi and Kennedy, (1997b) have established causal relationship between them and health inequalities. Further, the evidence suggests that these factors have greater explanatory power when combined than in isolation. It is also known that socio–economic factors influence throughout lifetime, and tend to have cumulative effects within an individual's life course and between generations.

To investigate the nature of the aggregate production function of health service that determines health status, studies such as Francesco and Marios (2006) have tried to explain the determinants of health status, paying attention to understanding and quantifying the role played by the different factors in an aggregate production function of health service. These factors include direct inputs such as goods and services provided in health sector and determinants of hygienic conditions. The implicit inputs are categorised into rival and non-rival. Socio-economic circumstances are a strong predictor of health outcomes, because they are more evident in the health status of people. The purchase of rival inputs is highly driven by overall purchasing power of consumers as captured by real income per capita. Non-rival inputs to health sectors are pure public goods affecting the environment in which household make their decisions. It is strongly influenced by government spending. Health status equally depends on how well health-related knowledge is rooted in the society.

Nigeria health indicators have stagnated or worsened during the past decades, despite investment from private and public sectors to enhance the quality of health of the Nigerian people. For instance, life expectancy dropped from 45.5 years in 1980 to 45.1 years in 1995, and rose to 46.3 years in 2000 and increased marginally to 48.4 years in 2011. The Under-Five Mortality Rate (UN5MR) recorded an unstable trend as it dropped from 186 per 1000 people in 2000, to 143.21 per 1000 people in 2011 (World Bank, 2012)**.** Not until 2005, the literacy rate has been experiencing a downward slope. It rose from 35.98 per cent in 2000 to 64.1 per cent in 2011. About 52 per cent of under-five death is associated with malnutrition between 1998 and 2004 (FMOH). The maternal mortality rate (MMR) is 789 per 100,000 live births in 2008 (WDI,2012). This perhaps explains why the United Nations Development Programme (UNDP, 2011) ranked Nigeria 156 out of 187 countries on human development index in 2011, while in 2010, Nigeria was among the 20 poorest countries in the world (WHO, 2011). Thus, insight and policy measures are required to uplift the health status in Nigeria, of which identifying the underlined factors will be the initial essential step in this direction. Therefore, this study focuses on identifying and analysing the macroeconomic factors that determine the health status in Nigeria.

1.2 PROBLEM STATEMENT

Everyday, more than 160 Nigerians die of malaria, malnutrition or complications of pregnancy and childbirth (Adetokunbo, 2006), which means more than 58,400 lives are lost to avoidable health problems yearly. Despite the promise of health for all by 2000 in 1990s, and later emphasised in Vision 20, 2020, this lofty goal is yet to be realised. It is just two years to 2015 when the country is expected to meet the health-related Millennium Development Goals (MDGs) 4, 5 and 6. The goals are reduction of infant mortality, and under-five mortality rate by two-thirds between 1990 and 2015, along with improvement in maternal health through reduction by three–quarter of the maternal mortality ratio. Besides, the other goal includes, the drive towards the achievement of universal access to reproductive health and combating HIV/AIDS, malaria and other diseases, hoping that in the magic year 2015, we would have halted the spread of HIV/AIDS and malaria as well as achieve by 2020, universal access to treatment of HIV/AIDS and other diseases.

On finance, the funding of the sector is grossly inadequate. Even where there is enough fund, there is mismatch of funding, because the tertiary health institutions get more than the local health institutions. Ironically, the disease burden is more in local communities. For instance, the

best Doctors and Nurses go to federal medical centres and teaching hospital, but the bulk of the population resides in places where they rely on primary health care (PHC) and not tertiary health institutions.

The goal of health financing system is to provide everyone with access to needed health services of sufficient quality and ensure that the use of these services does not expose the user to financial hardship. Out of pocket (OOP) expenditure has been recognised to constitute barriers especially to the poor, and has the potential of pushing households into poverty. Thus, it is recommended that all countries move away from OOP to make progress towards universal coverage. Universal coverage means quality health care for all delivered in ways that protect users from financial ruin or impoverishment. It is a powerful social equalizer, contributing to social cohesion and stability.

Fifty years after independence, Nigeria's health status indicators have remained poor despite the country's wealth in natural and human resources, as well as notable achievements by Nigerians in every walk of life (including the health sector) inside and outside the country. The national strategic health development plan 2009 to 2013 (NSHDP, 2008) contends that " the health status indicators for Nigerians are among the worst in the world and that on the average, health status of the population has declined, compared with the indicators of a decade earlier." Life expectancy at birth has continued to drop, reported to be 47.55 years in 2008 (Nigerian Demographic Health Survey (NDHS, 2008)). There was a marginal increase in the value in 2011 as it was recorded to be 48.4 years, five years lower than the 53 years average for the less developed countries (LDCs). The infant mortality rate for Nigeria has been on the increase from 71.35 in 2003 to 94.35 in 2010. The death rates between 1990 and 2011 are computed at between 15 and 19.91 per 1000 population. These values are much higher than the predicted crude death rate of 8.6 (Annex 1: WHP CDR, 1995 – 2015). Over three million Nigerians are living with HIV (NACA, 2013). There has been progressive systematic increase in the cases of HIV infection among adults 15 to 49, from 1990 to 2001. In 1990, the prevalence of HIV as percentage of population was 0.7 in 1990. This rose by 35 per cent to 3.2 in 2001. It then dropped slightly to 3.0 in 2011 (World Bank, 2012).

The continued downward spiral movement of key health indicators in Nigeria seems to put a question mark on the effective implementation of the health policies so far instituted. Investigation carried out researchers and public policy analysts, on the health policies in Nigeria has shown that many of such policies failed due to lack of commitment on the part of the

stakeholders and other participants in the institutional framework, building of the policy on wrong framework, as well as lack of accurate data on childbirth.

These have resulted in lack of access to basic health care packages by large proportion of the population, and have generated such questions as: Why has health status of Nigerians not improved appreciably?, What factors are responsible for the poor health status of Nigerians? How would the factors to be identified as impediment to improved health status be curbed?

1.3 OBJECTIVES OF THE STUDY

The broad objective of the study is to examine the macroeconomic determinants of health outcomes in Nigeria. The specific objectives are to:

i. examine the pattern and trend of health outcomes in Nigeria; and

ii. Identify the relative contributions of the determinants to health outcomes in Nigeria.

1.4 JUSTIFICATION FOR THE STUDY

Nigeria's most important macroeconomic objective remains how to achieve accelerated economic growth and reduce poverty. To achieve these laudable objectives, certain variables which have the capacity to accelerate growth have to be identified. Of all these, human capital, which health status is a component stands out as a major catalyst. To this end, identifying and improving on the factors that will enhance the health status of Nigerians, and consequently leading to improved longevity and increase in productivity becomes imperative.

Despite Nigeria's endowment, in terms of abundance of labour and natural resources, the country is still categorised as low human development country and even worse than some other developing countries. Since HDI is a composite indicator measuring average achievement in three dimensions of human development—a long and healthy life, knowledge, and a decent standard of living, the state of health of any group of people is crucial to HDI performance. It then becomes necessary to determine the factors that can enhance the health status of Nigerians.

With exception of the following studies on developed countries; Francesso and Marios (2006) and Or (2000), several studies such as Bourne (2009), Riman and Akpan (2010),on the determinants of health in the literature have focused on micro-scientific and sociological factors,

with partial equilibrium analysis. Attempts in the literature appear not to have been accorded holistic approach in the literature. To the best of our knowledge, there is paucity of studies on macroeconomics perspective to health status. Thus, to bridge this gap, this study is undertaken to examine the macroeconomic determinants of health outcomes in Nigeria, a representation of developing countries.

1.5 SCOPE OF THE STUDY

This study provides an analysis of the determinants of health outcomes in Nigerian, using data covering 31 years (1980 to 2011). The data were sourced from World Data Group, World Health Organisation, World Health Statistics, United Nations Educational, Scientific, and Cultural Organisation (UNESCO), Institute of Statistics and Penn World Data. The choice of the period is informed by the fact that it represented appreciable part of the country's independent era and the availability of data.

1.6 ORGANISATION OF THE STUDY

The study is divided into six chapters, following this introductory chapter is chapter two, which presents the background to the study, while literature review is the focus of chapter three. Chapter four entails the theorectical framework and adopted methodology for the study. The data analysis and interpretation of the estimated results is dwell on in chapter five, while chapter six contains the summary, recommendations and conclusion.

CHAPTER TWO

BACKGROUND TO THE STUDY

2.1 STRUCTURE OF NIGERIA HEALTH CARE SYSTEM

The health care system in Nigeria is structured into three strata, arranged in a hierarchical order. These are primary, secondary and tertiary health institutions. Primary health care (PHC) by policy arrangements is within the purview of local governments, based on the residual operation of local government authority. Primary health structures are the first point of contact for the sick and ill persons. They undertake mild health care cases like treatment for malaria, fever, cold and nutrition disorder. Other health issues in their care are family planning and immunisation (Badru, 2003).

According to Medical and Dental Council of Nigeria (MDCN) in Badru (2003), primary health centres are also to undertake such functions as health education, diagnosis and treatment of common ailments, through the use of appropriate technology, infrastructure and essential drug list.

Secondary health centres are involved with not only prevention but also treatment and management of minimal complex cases. The more complicated cases are referred to the tertiary or specialist hospitals. Examples of secondary types are comprehensive health centres and general hospitals. The comprehensive health centres are often owned by private individuals or a group of individuals, while general hospitals are owned and funded by local government. General hospitals have provisions for accidents, emergency and diagnosis units (including X-ray, scan machines and other pathological services) among other services (Badru, 2003). The status of being a second layer of health care imposes certain acceptable standards to enhance health outcomes, which include minimum of three doctors who are to provide medical, surgical, pediatric and obstetric care.

Tertiary health institutions are made up of specialist/teaching hospitals, generally, they handle complex health problems/cases either as referrals from general hospitals or on direct admission of patients. It has such features as accident and emergency units, diagnostic and ward units, in-patient and out-patient as well as consultation units. All these units are to be equipped with basic necessary facilities and staffed by skilled personnel. Teaching hospitals also conduct researches and provide outcomes which may influence government health policies. This

explains why this type of health institutions is often university-based. Examples are University College Hospital (UCH) and Lagos University Teaching Hospital (LUTH). Further, teaching hospitals are to be fully developed and accredited for teaching various medical disciplines. They are to conform to international and acceptable standards.

In terms of distribution of health care facilities across primary, secondary and tertiary levels, the private sector are better engaged primary health care provision than in secondary and tertiary levels in Nigeria, with total number of 5,744 (79.8%), compared with 1448 (20.1%) and 1 (0.013%) at secondary and tertiary facilities respectively. The degree of distribution of health care facilities in the public sector is equally in favour of PHC with 12,184 (93.4%) facilities while that of secondary and tertiary levels are 827 (6.34%) and 28 (0.21%) respectively (Table 2.1). Evidences have shown that the majority of the population uses the private sector for its reproductive health needs, even though most registered providers are in the public sector (See Table 2.1). This fact, however, should be qualified by noting that many of the providers who are registered as public-sector providers also practice in the private sector either formally or informally.

Table 2.1: Distribution of Health care Facilities in Nigeria in 1999

	PRIMARY ***Number (%)***	**SECONDARY** ***Number (%)***	**TERTIARY** ***Number (%)***
PRIVATE	5,744	1,448	1
PUBLIC	12,184	827	28
TOTAL	17,928	2,275	29

Source: Erinosho (2005). National Health Management Information System

Total government health expenditure(TGHE) as a proportion of total health expenditure (THE) was estimated as 18.69% in 2003, 26.40% in 2004 and 26.02% in 2005 while household health expenditure (HHE) as a proportion of THE was 74.02% in 2003;; falling to 65.73% in 2004 and rising to 67.22% in 2006 and stood around 70% till 2009. The contribution of development partners to health care financing in Nigeria was also estimated as #27.87billion (4% of THE) in 2003. This increased by 29% to #36.004billion (4.6% of THE) in 2004 and by just 1% to #36.30billion (4% of THE) in 2005 (Soyibo et al., 2009). However, THE as a proportion of GDP was estimated as 12.25% in 2003, declining sharply to 7.96% in 2004 and rising to 8.56% in 2005 (Soyibo et al., 2009).

This basically shows that households are the major source of health financing in Nigeria which may partly account for the low health status and low life expectancy. To protect household from

continuing catastrophic health expenditure and poor access to health service, the Nigerian government established National Health Insurance Scheme (NHIS) formally in 2006 (Soyibo and Lawanson, 2005). The scheme comprises compulsory and voluntary contributions for different sets of participants and groups, structured along three streams of programmes: Formal Sector Programme (FSP), Informal Sector Programme (ISP) and Vulnerable Groups Programme (VSP). The FSP is compulsory for workers in public and private sectors and made up of two types of programmes; Social Health Insurance (SHI) and Public Health Insurance (PHI). Public sector workers are to operate only under the SHI while private sector workers have the option to choose either to operate under SHI or PHI.

The participation in the programme involves a contributor registering with NHIS approved Health Maintenance Organisation (HMO) which are limited liability companies. This may be formed by private or public establishments registered by the scheme to facilitate the provision of health care benefits to the contributors (Nigeria FMoH, 1986). Thereafter, the contributors are to register with a PHC provider of his/her choice (private or public) from an NHIS approved list of providers. The HMO will make payment for services rendered to the provider. Under the NHIS scheme, individuals are required to deduct from their basic salary 15% of their salary which will be set aside to cover health needs. Of the total contribution of 15%, the employer is expected to contribute 10% and the employee 5% (Felicia, 1999; NHIS 2005). Only patients under the NHIS will have access to health care services without much stress because their funds are pooled over time and the risk they bear is reduced.

The informal sector programmes are of two types; Worker-based Health Insurance (WBHI); and Community-based Health Insurance (CBHI). Membership of WBHI is made up of individuals of common economic interest who may be residing in rural or urban areas while membership of CBHI comprises those in the same location and who enrolled in a Mutual Health Association (MHA), which can be registered at the local government level (LGA) and have at least 500 financial members. The Vulnerable Group Health Insurance (VGHI) covers the permanently disabled, the aged, pensioners, and children under five (5) years and pregnant women who otherwise have not been covered by other schemes.

2.2 AN OVERVIEW OF NIGERIA'S HEALTH SECTOR PERFORMANCE

Fifty years after independence, Nigeria's health status indicators have remained poor despite the country's wealth in natural and human resources. The National Strategic Health Development Plan (NSHDP) 2009 to 2013 acknowledged that " the health status indicators for

Nigerians are among the worst in the world and that on the average, health status of the population has declined, compared with the indicators of a decade earlier." Life expectancy at birth has continued to drop, reported to be 51.4 in 2010 (Nigerian Demographic Health Survey (NDHS), 2008), two years lower than the 53 years average for the less developed countries (LDCs) while maternal mortality ratio in 2010 was estimated at 630 per 100,000 live births (World Bank, 2012), one of the highest rates in the world.

The pattern of health status in Nigeria mirrors that of other Sub-Sahara African (SSA) nations, worse than expected given Nigeria's GDP per capita, which stood at $2800 according to IMF (Wikipedia, 2012) estimate. The main causes of deaths in under-five children are neonatal-related with the communicable diseases like malaria and pneumonia. Diarrhea also contributes to a large proportion of child mortality --up to 300,000 deaths annually. Nonetheless, the country as a whole has witnessed or recorded some improvements on this front over the last ten years, given that the rate of infant mortality is on downward trend since year 2000, when it was 107 per 1000 live birth, and by 2011 stood at 93.2 per 1000 live birth. (Table 2.2)

TABLE 2.2 Nigeria's Health Indicators Trends (1980 - 2011)

Years	**Life Expectancy at Birth**	**Under-Five (5) Mortality Rate (Per 1000 People)**	**Literacy Rate (Adults)**	**Physicians (Per 1000 People)**	**Infant Mortality Rate (Per 1000 Live Birth)**
1980	45.5	216.4	67.06	0.11	117
1985	45.9	209.8	59.20	0.19	120
1990	45.6	212.6	51.34	0.15	120
1995	45.1	207.6	43.56	0.18	120
2000	46.3	186	35.98	0.27	107
2005	49.0	163.5	63.1	0.22	100
2010	51.4	142.9	63.35	0.258	94.5
2011	51.9	143.21	64.1	0.243	93.2

Source: World Development Indicator (2012)

The major causes of morbidity and mortality in under-five children in Nigeria are virtually the same as those responsible for ill-health and death in infants. Malaria, diarrhea, vaccine-preventable diseases, and acute respiratory infections are responsible for about 90% of morbidity and almost 92% of mortality in under-five children (Table 2.3). Most of these

incidences are attributable to lack of knowledge on the part of the parents, underscoring low literacy rate of Nigerian adults

TABLE 2.3 Under-five Morbidity and Mortality Rates in Nigeria (2005 – 2010)

Causes	Infant Morbidity Rates	Under-Five Morbidity Rates	Infant Mortality Rates	Under-Five Mortality Rates
Malaria	38%	30%	27%	41%
Diarrhea	27%	22%	24%	24%
Acute Respiratory Infections	15%	19%	22%	15%
Vaccine Preventable Diseases	17%	19%	22%	12%
Others	3%	3%	5%	8%

Source: *Federal Ministry of Health, Nigeria; 2008*

The analysis of health characteristics by geopolitical zones in Nigeria shows that, overall, the northern zones are worse off than the southern zones. For example, the statistics on early childhood mortality rates by geopolitical zones show that the North West and North East Zones have the worse rates. The next sets of zones with very poor performance are South South and North Central. The South West has the lowest rates. The maternal mortality rates in 2009 by geopolitical zones in Nigeria show that the North East (1,549/100,000) and North West (1,025/100,000) had particularly high rates. By comparison, the South East recorded 286/100,000 live births. The major causes of maternal mortality in these areas were hemorrhage (23%), infections (17%), malaria (11%), aneamia (11%), abortion (11%), toxemia (11%), cephalo pelvic disproportion (11%) and others (5%) (Ogunkelu, 2002:4).

This variation of maternal mortality rates across geopolitical zones is not surprising considering the fact that access to antenatal and postnatal care by types of provider as well as attendance and treatment received by an expectant mother during pregnancy by type of health personnel show that the North East and the North West had the lowest rates (NDHS, 2008). In the case of access to antenatal care, only 5.4% of women in the North West had access to a doctor. A large number of women (59%) were not attended to by anyone. These figures are in sharp contrast to the South West zone where 56.0% of the women had access to a doctor and another 35.9% had access to a nurse / midwife. The data on high risk sex behaviours and condom use by geopolitical zones in Nigeria shows that the South South zone has the highest rate for both women (36.9%) and men (60.4%) compared to the South East (30.3% for women

and 44.5% for men). The zones of North West (21.1% for women and 58.0% for men) and North East (4.3% for women; 31.3% for men) had the lowest rates (NDHS, 2004).

The data on the prevalence of fever associated with malaria by geopolitical zones shows that North East (38.5%), the North West (36%) and the South South (30.0%) recorded highest rates of children with fever and convulsions. The percentage of children with fever and / or convulsions who took anti-malarial drugs shows that the South East had the lowest rate (14.8%). The rate of anti-malarial drug use for the North East which had the highest fever prevalence rate was 27% , higher than other zones (NPC 2008; and NDHS 2008).

Nigeria government has over the years been in serious pursuit of programmes and policies that will ensure improvement and stability in the health status of her citizens. The government is also committed to perfecting the rights of her citizens by assuming obligations under international treaties as well as institute domestic legislations that will mandate specific conduct leading to better health status of individuals under her jurisdiction.

2.3 PATTERN AND TREND OF HEALTH OUTCOMES IN NIGERIA

2.3.1 Infant Mortality Rate

This is the death of an infant before the first birthday, measured as the number of deaths per 1000 infants. In Nigeria, this figure was 120 in 1990 and 1995 (Table 2.4). The situation has improved somewhat over the last 15 years. According to the United States Central Intelligence Agency (CIA) publication on the state of the world's health, the estimated infant mortality rate for Nigeria in 2003 to be 71.35, but in 2004, it rose to 98.8, which was a 38.5% jump. It remained unchanged in 2005 and dipped slightly in 2006 to 97.14. In 2007, it dipped further to 95.52, then remained at 95.72 in 2008, fell marginally to 95.25 in 2009, and in 2010, it is 94.35. According to UNICEF's report on the "state of the world's children" in 2010, infant mortality in 1990 was 120 while in 2008, it was 96. The decline in the value can be attributed to performances of health care institutions and health care providers.

2.3.2 Under-five Mortality Rate (U5MR)

This is the total number of infants that die before their fifth birthday and the rate is measured per 1000 children. The value includes the infant mortality rate. For Nigeria, this value was 318 in 1960, 209 in 1978 and 174 in 1988. UNICEF's " State of the world's children 2010" reports that in 1990, U5MR in Nigeria was 230, and in 2008, it was about 186. There are only 30 nations

with U5MR of greater than 170 and Nigeria is one of them. Between 2009 and 2011, the U5MR has dropped by 45% globally. Notably, this progress is not the reality in all countries. Currently, about half of the world's under-five deaths occur in countries like Nigeria, India, Congo, Pakistan, and China.

According to the available data (Table 2.4), report indicates that under-five mortality in Nigeria increased from 188.8 per 1000 live birth in 2007 to 158 per 1000 live birth in 2011. This implies that 158 out of every 1000 children born in Nigeria will die before they celebrate their fifth birthday. Disturbingly, a majority of these deaths are due to preventable causes which could be averted by simple methods such as household hygiene practices, good nutritional practices and good health seeking behaviour (Punch Newspaper, (14th Aug., 2013)).

TABLE 2.4: SELECTED HEALTH OUTCOME INDICATORS

S/N	INDICATORS/YEARS	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011
1	Birth rate, crude (per 1,000 people)	46.04	44.32	42.62	41.08	40.72	40.31	39.83	39.21	38.33	37.67
2	Life expectancy at birth, total (years)	44.5	44.69	45.87	47.25	47.47	47.51	47.55	47.61	47.7	48.4
3	Mortality rate, infant (per 1,000 live births)	120	120	107	98.8	97.14	95.52	95.72	95.25	94.35	93.88
4	Mortality rate, under-5 (per 1,000)	230	230	207	194	191.4	188.8	186.2	177.2	166.7	158
5	Prevalence of HIV, total (% of population ages 15-49)	0.7	2.2	3.1	3.2	3.1	3.1	3.1	3.1	3	3
6	Death rate, crude (per 1,000 people)	19.91	19.38	18.11	16.92	16.74	16.74	16.37	16.21	16.01	15.72

Sources: World Development Indicator (2012)

National Bureau of Statistics (2012)

United Nations Children's Fund (2012)

2.3.3 Life Expectancy

Research has shown that all over the world, human maximum lifespan potential or the maximum length of life that human beings can potentially attain is fixed at about 100 years. This is as true of Americans as it is of the British, French, Swedes, Japanese, Russians, Nigerians or any other nationality. Although it is inherent in all human beings to be able to live to about 100 years, only a very small number of people in any society reaches this fixed maximum lifespan potential. This is because human beings invariably die prematurely, as a result of diseases, shootings, accidents or malnutrition. The more the incidence and prevalence of accidents and

fatal diseases in a region the less the likelihood that inhabitants of that region will live out their biologically endowed fixed maximum lifespan potential.

In contrast to the fixed lifespan potential for humans, life expectancy or the actual number of years that an individual can hope to attain at birth is not fixed. It varies from country to country depending on social and economic variables. In Nigeria, life expectancy at birth was 48.4 years in 2011, a little rise from the 47.7 years recorded for the country in the previous year. It is in this regard, that the apparent low life expectancy in Nigeria can be seen in the high mortality rates in the country. From Table 2.4, life expectancy rate in 1990 was 44.55 years and 45.87 years in 2000. The increase in the value was unstable between 1990 and 2000 as it experienced a downfall of 0.11% in 1991 with actual figure of 44.52 years. Since 1991, there has been an upward trend of life expectancy in Nigeria. Despites this trend, Nigeria's life expectancy is still considered low among other developing countries like Malasia and Ghana with higher life expectancy.

2.3.4 Crude Birth Rate (CBR)

Birth rate, also called CBR is the number of live births per 1000 population in a given year. Birth rate like most annual rates relates demographic events to the population at mid-year usually first July, considered the time the average population is at risk of the events occurring during the year. Notably, birth rates are just one amongst the many components of population change, and should not be confused with the population growth rates.

Birth rate is usually expressed as the number of births over estimated total population multiplied by 1000. In Nigeria, from 1990 to 2011, the birth rates range between 35 and 46 per 1000 population (Table 2.4). In western Sahara in 1996, the birth rate of 47 per 1000 population was considered too high while in the same year in Italy, the birth rate of 9 per 1000 population was considered too low (US Population Reference Bureau). Using the above two rates as reference points and comparing with our findings, the birth rates for the periods are between 'medium' (30) and ' too high' (46).

The values of the identified crude birth rates (Table 2.4), when compared with the World Historical and Predicted CBR (WHP CBR, 1995 – 2015) of 20.9 per 1000 population (Annex 1) provides further understanding of the results shown in the compilation in Table 2.4.

From the table 2.4, the estimates reveal the absence of stability in the data. The available data fluctuate somewhat in a downward systematic trend. The downward sloping trend could be attributed to the influence of government initiatives on family planning programmes. Looking at the CBRs for the selected period, it is clear that the values are quite low when compared with the predicted 19.9 per 1000 birth.

2.3.5 Crude Death Rate (CDR)

Death rate, also called crude death rate (CDR) refers to the number of deaths per 1000 population in a given year. It is expressed as the number of deaths over estimated total population multiplied by 1000. In this study, the death rates within the reference periods analysed are computed at between 15 and 19.91 per 1000 population (See Table 2.4). These values are much higher than the predicted CDR of 8.6 (Annex 1: WHP CDR, 1995 – 2015). The reason for the sharp difference between the computed and predicted CDR could be better understood in the light of the difficulties in assessing health care services due to financial constraint, poor state of Nigeria health system, and lack of knowledge on the significant of sound healthy life. These factors made the CDRs far above the world predicted value of 8.6 deaths per 1000 population from 1995 to 2015.

2.3.6 HIV/AIDS Death Rate

HIV/AIDS epidemic in Nigeria remains a serious public health problem of enormous magnitude that must be given priority attention. The deaths caused by HIV/AIDS in Nigeria is estimated at 170.2 deaths per 100,000 population and ranked high according to the WHR, (2011). Nigeria remains one of the most burdened countries globally with over 3 million people living with HIV, significant gaps in treatment and limited domestic financing of the HIV (NACA, 2013)

From the table 2.4., there has been progressive systematic increase in the cases of HIV infection among adults 15 to 49, from 1990 to 2001. In 1990, the prevalence of HIV as percentage of population was 0.7 in 1990. This rose by 357% to 3.2 in 2001, and remains stable for the next two years before it declined in year 2006. With the valuable support of local and international partners, the country has seen the epidemic profile change significantly from a HIV prevalence rate of 3.2 in 2001 to 3.0 in 2011. Attaining the status of a country with stable change in the incidence rate of HIV infection among adults 15 to 49 years old between 2001

and 2011 is a significant achievement but the overall gaps in access to HIV/AIDS services remain a great challenge.

CHAPTER THREE

LITERATURE REVIEW

3.1 INTRODUCTION

Observably, premised on literature search there are few country-specific studies on determinants of health outcomes. The available few are on microeconomic-related research, in other words, they do not dwell on macroeconomics dimension of determinants of health outcomes. Therefore, the review in this study is skewed in the direction of cross-country studies.

A large number of environmental factors have been suggested as possible determinants of health status by different epidemiological, demographic and economic studies. They can be classified into three major categories to simplify the discussion in the literature: physical-environment, lifestyles, and socio-economic factors. The impact on health of factors relating to the physical environment such as water and soil quality, as well as noise and air pollution, is difficult to integrate into health production analyses mainly because of the lack of data. 'Lifestyle' refers to all the factors over which individuals have some control, such as alcohol and tobacco consumption, physical exercise and personal hygiene. Socio-economic factors which relates the relationship between economic activities and social life, could either be from micro-economic or macro-economic perspective.

3.2 FACTORS DETERMINING HEALTH OUTCOMES

The link between socio-economic factors and health is long-established. The term "socio-economic status" has been used variously to refer to social class, social status, position in a social hierarchy, or specific socio-economic factors such as income, education, locality or occupation. All of these are strongly related to health (Kaplan, et al., 1996).

The relationship between each of these factors and health (and with each other) is complex. Socio-economic factors are just one class of health determinants. Health status results from the interaction of biological, environmental, behavioural/lifestyle and psychological factors. The study of the relation between socio-economic status and health is complicated by the fact that there are multiple pathways between these determinants. For example, behavioural factors such as diet, exercise and smoking are socio-economically patterned (Davies et al, 1997), equally age and a number of other related variables are also highly correlated with health (Easten, 2002) and socio-economic factors.

Moreover, the relationships between socio-economic factors and health status are themselves often bi-directional, for instance,low income leads to poor health and poor health leads to low income (Judge and Peterson, 2001). Socio-economic position is a construct, and there are risks in considering any one measure of socio-economic status in isolation (Blakely and Pearce, 2002); it is the overall picture that is perhaps most important. In addition to factors like income, education, employment and occupational class, ecological factors such as small area and deprivation are increasingly recognised as predictors of variation in health status (Curtis, 1990; Gilthorpe, 1995; Gordon, 1995; Morris and Costairs ,1991; Reading et al., 1994; Townsend 1993; all cited in Salman and Crampton 2000). This implies that health is influenced by more than one's socio-economic circumstances and that the prevailing socio-economic climate in one locality plays an independent role.

Macroeconomic determinants of health status, the focus of this study, are a subset of socioeconomic factors of health status. To analyse the impact of macroeconomic determinants of health status in Nigerians, three factors are examined; income, education and government health expenditure.

3.2.1 Gross Domestic Product Per Capita

GDP per capita has been found to be a major determinant of health status (Jourmand et al., 2008; Afonso, 2009; St Aubyn, 2006). Higher GDP per capita (income) can improve life expectancy because it facilitates access to health care, education, food, and housing, all of which contribute to better health outcomes (Jourmand et al., 2008; AIHW, 2008). As income decreases, rates of poor health increase (Kawachi and Kennedy, 1997b, Kasachi et al., 1999 cited in O'dea and Howden – Chapman, 2000). The conceived relationship in question exists for all the usual measure of health outcomes including morbidity perceived health status and mortality (Kennedy et al., 1996; Kaplan et al., 1996; Wilson and Dly, 1997; cited in O'Dea and Howden – Chapman, 2000; Blakely, 2001;Blakely et al., 2002c; Sorlie et al., 1995; Backlund et al., 1996; Davey et al., 1998; Kaufman et al., 1998 cited in Blakely, 2001a).

Children from poor families have higher rate of illness, injury and death than children from the other groups (NHC, 1998). For example, Blakely et al (2003) conducted a linked census-mortality study in which 480 of 693 (69%) of 0 – 14 years old children that died during 1991 – 1994 were linked to lowest socio-economic categories of 1991 records in New Zealand. There was an approximately two-fold higher all-cause mortality rate among the lowest socio-economic

categories compared with the highest socio-economic categories of equalised household income. A number of studies have found that the relationship between income and health is curvilinear, providing evidence of diminishing health returns as income rises (Ecob and Davey, 1999; Wilkinson, 1997 cited in O'Dea and Howden-Chapman, 2000; Backlund et al., 1996; Mirowsky and Hu, 1996; and Mayer, 2002).

Blakely et al., (2002c) in the New Zealand and Census Mortality Study (NZCMS) demonstrated mortality gradients among 25-64 year old(s) for all-cause and cause-specific mortalities by income. The study reveals that in most cases each successive downward step in household income is associated with an incremental increase in mortality (ibid).

All of the examined studies (Jourmand et al., 2008; Afonso, 2009; St Aubyn, 2006, Kennedy et al., 1996; Kaplan et al., 1996, Backlund et al., 1996; Davey et al) that include measures of GDP per capita find that it is significantly related to health outcome(s). All of the studies find that health selection is not a serious issue (i.e. the main duration of causation runs from income to health). There are some suggestions from the result of the studies that long-term income may be more significant for health than short term income. In relation to income change, a person whose income reduces over time, in comparison to those whose income remains stable or increases, have poorer health outcomes. Income loss appears to have a much stronger effect on health than increases in income. In the most of studies that contain income level and income change variables, the former appears to be more significant. Persistent poverty appears to be most damaging; those people who are persistently poor, in comparison to those who experience poverty only occasionally or do not experience it at all, have the worst health outcomes (Judge and Paterson, 2001).

Saunder's (1996) contention that "in reality, what matters for people's well-being and their standard of living is… the level of their disposable income" leads him to advocate the use of an even more complex income-based indicator, designed to measure income relative to need. Perhaps the most fundamental problem with income measures lies in their ability to capture the reality of the socio-economic circumstances of certain population sub-groups. In particular, researchers have expressed doubt as to the applicability of income-based indicators to elderly or retired persons (Martelin, 1994), the self-employed and farmers (Lundberg, 1991) on the ground that the socio-economic status of respondents in these categories is likely to be underestimated by simple measures of their taxable income (Davis et al., 1997).

Another set of measurement problems in studies examining the relationship between income and health relate to the definition of income used – induced, the use of different measures of income may to some extent account for slight differences in the results in the various studies. Several analysts have argued that data on personal income alone tells us very little about respondents' actual living standards (Kunst and Mackenbach, 1994; Krieger and Fee 1994; Macran et al., 1994; Saunders 1996 all cited in Davis et al 1997). Perry (2002) argues that there is a substantial lack of overlap between different measures of well-being, with only a 40% - 50% overlap between those who are poor on an income basis versus those poor on the basis of observed deprivation of other indicators of unacceptably low living standards – suggesting a mismatch between income and deprivation. Notably, participation in paid employment is the main factor determining adequate GDP per capita (Department of Statistics 1991, cited in NHC 1998). As such, employment (or unemployment) is a major determinant of health outcomes.

Conversely, poor health can also lead to low GDP per capita income. For example, Smith (1999, cited in Judge and Paterson 2001), using US data from the Health and Retirement Survey, finds that reductions in GDP per capita often follow the onset of ill health because of its impacts on population, participation and productivity.

3.2.2 Educational Level (Literacy Rate)

Educational level has been shown to play an important role in affecting health behaviours and health outcomes. Poorly educated people die at a higher rate than highly educated people (Feldman et al., 1989; Kunst and Mackenbach, 1994a; Shkolinov et al., 1998; Fox and Goldblatt 1982; all cited in Blakely, 2001a; Blakely et al., 2002c) and, generally, people with the worst health status have low education levels (Bemsal, 1999, cited in RACP 1999).

Many studies have found that people with low literacy skills are not able to function well in a health care environment. For instance, Schhillinger et al., (2002) pointed out that patients with poor literacy usually had trouble understanding instructions on prescription drug bottles, appointment slips, medical educational brochures, and consent forms. Williams et al. (1998) report that low level of literacy is strongly correlated with poorer knowledge and self-management of asthma. Additionally, Mayeaux et al. (1996) notes that patients with poor literacy may have problems processing verbal communication and conceptualising risk in the health care environment.

There are inverse relationship between education and a range of health outcomes such as disability, infant mortality, asthma and cardiovascular disease, (Stats NZ and Ministry of Health 1999; Pamuk et al., 1998; Lin et al., 1999; Kaplan and Keil 1993; Gonzalez et al., 1998; and Davey et al., 1998; cited in Wilson 2000a). In the linked census-child mortality study conducted by Blakely et al., (2003) there was an approximately two-fold higher mortality rate among the lowest socio-economic respondents compared with the highest socio-economic categories of education, with a tendency for strong socio-economic differences in Sudden Death Syndrome (SDS) mortality, particularly by education. Low literacy level (an indicator of low educational attainment) coincides with poverty, malnutrition, ill health as well as high infant and child mortality (Mathers and Douglas, 1998; Perrin, 1998). People with low level of education are more likely to exhibit negative behaviour, such as cigarette smoking, alcohol use, and lack of exercise concomitant with high rates of obesity (Wilkinson and Marmot, 1998; McClelland et al., 1992; Dryson et al 1992; cited in Wilson 2000a).

Since bulk of one's education usually happens during childhood and early adulthood, education is a life course factor that can potentially modify one's socio-economic and health prospects later in life. For example, in England, those with A level qualifications (or training equivalents) or above have much better chances in improved of good status (Mann et al., 1992; Kuh 1993; cited in Roberts 1997) as well as in occupation opportunity and generating high income (Wadsworth 1991; ibid).

Education is seen by some researchers as the most reliable measure of socio-economic status (Williams, 1990; Krieger and Fee, 1994; cited in Davis et al 1997). "for researchers seeking to uncover mechanisms of social causation underlying the socio-economic patterning of health data, the advantage of education – based measures over other socio-economic status indicators lies in their stability" (ibid). Given that educational attainment levels are typically established at an early age and tend to remain stable over the course of individuals' lives, any relationship observed between health status and level of education is less likely to reflect the operation of social selection (Hay 1988; Valkonen 1993; Ibid). Observably, parental or early-life health status and socio-economic circumstances can impact upon an individual's educational opportunities and achievement.

3.2.3 Public Health Expenditures

Conceptually, a healthy person can work more effectively and also devote more time to productive activities. Based on micro economic evidences, Strauss and Thomas (1998) argue that health status explains the variations in wages at least as much as education. Research at the macro level can better capture the potential externalities of health sector interventions, and the existing studies are supportive of the positive contribution of health capital to growth.

Key questions for policy and health sector strategy are how far has public expenditure been instrumental in bringing about the progress in health status experienced in developing countries over the five decades, and what programmes have been particularly effective (Roberts, 2003).

Early studies (as summarised by Musgrave in 1996) find no evidence that total spending on health has any impact on child mortality. Filmer and Pritchet (1997) present empirical evidence that suggests that public spending on health is not the dominant driver of child mortality outcomes. Income, income inequality, female education, and “cultural factors” such as the degree of ethno linguistic fractionalisation explains practically all of the variation in child mortality across countries. Similar finding of lack of significance of public health expenditure have been presented by Burnside and Dollar (1998), they find no significant relationship between health expenditure spending and the change in infant mortality in low-income countries.

Using a model similar to that of Filmer and Pitchett (1997, 1999), Wagstaff and Cleason (2004) show that good policies and institutions (as measured by the World Bank’s Country Policy and Institutional Assessment or CPIA index) are important determinants of the impact of government health expenditures on outcomes. In particular, as the quality of policies and institutions improves (as the CPIA index rises), the impact of government health expenditures on maternal mortality, underweight children, under-five and tuberculosis mortality also increases and is statistically significant. Nonetheless, they conclude that the impact of government expenditures on under-five mortality remains not significantly different from zero.

A recent World Bank report includes an analysis of infant mortality and health expenditure using a panel data for the Indian states between 1980 and 1999 (World Bank, 2004). This study finds no effect of health expenditure on mortality rate. However, using data for 50 developing and

transition countries observed in 1994, Gupta, Verhoeven and Tiongson (1999) found that health expenditure reduces childhood mortality rates.

Hadley (1982) shows a positive relationship between health expenditure and health using country-level mortality data in the United States. In Europe, there is also some evidence pointing to a positive relationship between health care input and health outcomes (Forbes and McGregor, 1984; Elola et al., 1995).

Using a panel data from some Sub-Sahara African (SSA) Countries, Lawanson (2012), shows that the effects of the three public health expenditure measures (per capita public spending on health care, share of public spending on total health expenditure, and share of government budget allocation on health care) are significantly negatively related to the three mortality variables (infant mortality rate, under-five mortality rate, and crude death rate), and significantly positively-associated with life expectancy.

Sequeal to this review, this study intends to contribute to the literature by carrying out a country-specific analysis of macroeconomics determinants of health outcomes, using Error Correction Mechanism (ECM) on time series data from Nigeria.

3.3 THEORETICAL REVIEW

3.3.1 Introduction

The core thesis of human capital theory is that peoples' learning capacities are comparable to other natural resources involved in the production process: when the resources are effectively exploited the results are profitable both for the enterprise and for the society as a whole. The central empirical claim of human capital theory is that learning capacity is closely related to earning level.

Loosely speaking, human capital corresponds to any stock of knowledge or characteristics a worker has (either innate or acquired) that contribute to his or her "productivity". The variety of other characteristics which are part of human capital investment include school quality, training, state of health and attitudes towards work.

Thus, preventive and therapeutic health care services may improve workers' productivity as well as increase their quality of life. If so, these services, may increase the stock of human capital, and consequently, increase the productivity of labour services as well as the quality of life emanating from the investment (Muslikin, 1962). Workers with good health therefore provide immediate benefits to themselves and to their employers by gaining more mental acuity, strength, and stamina while on the job**.** Hence, investment in preventing, curing diseases as well as disability increases physical energy and psychology zest for living, and working is productivity-enhancing.

3.3.2 The Human Capital Model

The human capital model suggests that an individual's decision to invest in human capital stock through training in education, improved health care services, is based upon an examination of the net value of the costs and benefits of such an investment. As with physical capital, the quality and quantity of the human capital stock can be increased through investment. These investments include education and training, as well as the prevention and treatment of illness.

Generally, investments involve costs and produces benefits, and for investments to be economically viable, the benefits must exceed the costs. To understand the human-capital framework which facilitates the analysis of the economics of the health benefits (employment and leisure) and costs (treatment, costs and productivity losses) resulting from health improvement, we examine the following human capital theories via Grossman model and Augumented Solow Model.

3.3.2.1 Grossman Model

At conceptual level, increase in a person's stock of knowledge or human capital are assumed to raise productivity in the market sector of the economy, where he/she produces money earnings, and in the non-market or household sector where he produces commodities that enter his utility function. To realise potential gains in productivity, individuals have an incentive to invest in formal schooling or in on the job training. The costs of these include direct outlay or market goods and the opportunity cost of time that must be withdrawn from competing uses. This framework develops models that determine the optional quality of investment in human capital at any age.

Within the new framework for examining consumer behaviour, Grossman (1972a; 1972b; 1999; and 2000) assumes that individual inherit an initial stock of health that depreciates over time - at

an increasing rate, at least after some stage in the life cycle – and can be increased by investment. Death occurs when the stock falls below a certain level, and one of the novel features of the model is that individuals "choose" their length of life. Gross investments in health capital are produced by household production functions whose direct inputs include the time of the consumer and market goods such as medical care, diet, exercise, recreation, and hazing. The production function also depends on certain "environmental variables", the most important being the producer, that influence the efficiency of the production processes.

Health is demanded by consumers for two reasons. As a consumption commodity, it directly enters their preference function, or put differently, sick days are a source of divisibilty. As an investment commodity, it determines the total amount of time available for market and non-market activities. In other words, an increase in the stock of health reduces the time lost from these activities, and the monetary value of this reduction is an index of the return to an investment in health.

Since, the most fundamental law in economics is that of downward - sloping demand curve, the quality of health demanded should be negatively correlated with its shadow price, which depends on many other variables besides the price of Medicare. Shifts in these variables alter the optional amount of health and also alter derived demand for gross investment, measured, for instance, by medical expenditures.

3.3.2.2 An Augmented Solow Model

One of the central questions in social sciences is why some countries are more developed than others. A good place to start thinking about an answer from an economic angle remains the seminal paper of Solow (1956) model. As shown by ManKiw, Romer and Weil (1992) and by many others, the basic Solow model holds considerable explanatory power vis-à-vis contemporary income differences. Yet, it leaves much income variation unexplained which has led to various "augmentations" involving human capital (ManKiw, Romer and Weil, 1992, Ram, 2007) and health and longevity (Knowies and Oweh, 1995) leading to Augmented Solow Model.

The model adopted a production function with physical capital (K), Labour (L) and Knowledge or Technology (A): $Y_{(t)} = F(K_{(t)}, A_{(t)}, L_{(t)})$. Physical capital and human capital are assumed to be accumulating factors. Time affects output only through K, L, and A. Technology is Labour-augmenting. AL is effective labour. In the model, land and natural resources are ignored as they are not considered among factors of production. The representative agent saves output to have more capital (either physical or human). The saving rates of physical capital and human capital

are exogenously determined. However, the assumption of the same rate of depreciation in physical capital and human capital makes the attainment balanced growth paths of output possible.

The model relates output per unit of effective labour as a function of capital per unit of effective labour; $y_{it} = k^{\alpha}_{it} e^{\beta}_{it} h^{\Psi}_{it}$ Where y_{it} is output per "effective" labour unit ($A_{it} L_{it}$) in country *i* at time *t*, and k_{it}, e_{it} and h_{it} are respectively physical, education and health capital per "effective" labour unit. Thus, the contribution of health in human capital cannot be ruled out in determining the extent of labour output. This stock of health capital, along education depreciates with time in human capital, and thus, necessitates investment.

The general message is that the more of income is saved, the higher will be the level of output per effective worker which stimulates increased investment in health. From an empirical perspective, the addition of human capital to the model allows for another dimension to be involved in explaining differences in output and income levels across countries, which consequently affects health status.

3.4. EMPIRICAL REVIEW

There are a number studies that relate health care determinants to health outcomes within and between countries. The study referenced below some key representative papers related to this dissertation.

Studies on the relationship between aggregate health care spending, potential determinants, and health outcomes have provided varied results. Cross-country studies using Organisation for Economic Cooperation and Development (OECD) countries have addressed health care spending and the impact of national Gross Domestic Product (GDP) on health outcomes (Barros, 1998; Matteo, 1998; Bac and Pen, 2002; Huber and Orosz, 2003; Ariste and Carr, 2003; Sen, 2005). This was done by relating health system characteristics (e.g. population, aging, type of health system, and existence of gatekeepers) considered significant to health outcomes (Barros, 2000).

Other studies have considered the impact of aggregate-level health status determinants, including income, on cross-country health outcomes (Gravelle and Backhouse, 1987; Pritchett and Summers, 2000; Macinko, Starfield and Shi, 2003; Connelley and Doessel, 2004; Shaw, Horrace and Vogel, 2005; Arah et al., 2005; Gerdtham and Ruhm, 2005; Rajkumar and Swaroop, 2008; Biggs et al., 2010). Gravelle and Blackhouse used regression analyses to

analyse the impact of cross-sectional international data on mortality rates and described the key statistical issues of concern. Pritchitt and Summers (1996) used time series data on health (infant mortality and life expectancy) and income and reveal that the income elasticity of infant mortality lies between – 0.2 and – 0.4., while Macinko et al. (2003), Shaw et al. (2005), Arah et al. (2003), and Gerdtham and Ruhm (2005) used OECD data with a variety of explanatory variables, including medical system variables, environmental factors, primary care system definitions, pharmaceutical consumption, lifestyle variables, macroeconomic conditions on mortality. These studies use a variant of ordinary least squares (OLS) on a pooled data sample, with fixed location effects that control for factors that differ across locations but are time invariant. None, however, controls for possible cointegration and endogeneity using techniques like 2–Stage Least Squares (2SLS). Connelly and Doessel (2004) used Austrialian census data and detect a strong and statistically significant positive impact of medical expenditure on health status. Rajkumar and Swaroop (2008) use World Bank Development data for 91 counties, including public health spending, two indices of governance, and the Gini index to determine if good governance and increased health expenditure will result in improved infant mortality. Biggs et al. (2010), find generally better health results with increases in GDP.

Auster et al. (1969), reported empirical results using 2SLS on cross-sectional data for 1960 and found evidence that improved medical care reduced age-adjusted death rates while controlling for income, education, Standard Metropolitan Statistical Area (SMSA) percentage, manufacturing percentage, alcohol consumption, cigarette consumption, race and presence of a medical school.

Grossman's (1972a) empirical results adopted restricted activity days, work loss days, and self–reported health for stock of health proxies, and personal medical outlay is used as the dependent variable in the demand for medical care. The independent variables are age, education, gender, weekly wage rate, family income and family size. In 2SLS analyses, the elasticity of health stock with respect to medical care outlay is positive and about 0.2, but it is significant with only one of the dependent variables self reported health.

In another study, Hardley(1982a) investigated aggregate impacts using country level Medicare expenditure data and age-gender rate specific categories of 45 – plus year olds. For all-cause mortality rates, Hardley (ibid) shows that, for all categories, increased medical care expenditures reduce mortality. In another study, Hardley (1988) finds that greater country–level medicare spending per beneficiary resulted in significantly lower all–cause mortality rate for all

age groups, races, and both genders. In a recent communication, Hardley et al. (2011), find that more medical spending is associated with improved health status of medicare beneficiaries. Cremieux, Ouellete and Pilon, (1999) using panel data finds that higher health care spending improved outcomes while controlling for gender, race, physicians per capita, income, education population density, poverty percentage, alcohol and tobacco consumption, and nutritional intake. The Cremieux et al. (Ibid) study used OLS, nonetheless, it does not account for the potential endogeneity of health spending.

Thornton (2002) used cross-sectional state-level data for 1990 with the age-adjusted death rate as the dependent variable. Using 2SLS, the estimated coefficient on medical care expenditures was negative and not significant while controlling for income, education, alcohol and tobacco consumption, urbanisation, marital status, crime rates, and degree of manufacturing. Thornton (Ibid) claims that the marginal contribution of medical care utilisation in lowering mortality is quite small. Martin, Rice and Smith, (2008) use cross – sectional data for FY 2004 from PCT areas – geographic local health areas within England By focusing on health spending for two programs of care – Cancer and Circulatory problems – and using 2SLS, Martin et al (Ibid) find a strong positive impact of health care expenditure on outcomes. Although their theoretical model discussion refers to clinical and environmental factors relevant to the analysis, they only use a minimal set of variables presumably due to lack of available data. Rothberg et al, (2010) find little correlation between reduced mortality for certain conditions and increased spending on patients with those conditions. In particular, chronic obstructive pulmonary disease and sepsis are two conditions for which increases in spending have not translated into improvements in outcomes.

Sentell and Halpin (2006) carried out a macro analysis, using the nationally representative samples from the 1992 National Adult Literacy Survey (NALS) to estimate the effect of literacy on health status among US adults. They observe that when other factors, such as race and education, were controlled for in statistical analysis, low level of literacy was significantly associated with having a long-term illness or a condition that keeps one from work.

A few studies conducted in SSA where the world's poorest dwell on health care expenditure and outcomes have shown mixed results within and cross-country data. Kebeke's (2003) shows that the estimated expenditure on children are more correlated to child welfare than per capita household expenditures. Ssewanayana and Younger (2004) note that, in Uganda, increase in health care expenditures particularly on vaccination, will impact positively on infant mortality in

Uganda by 2015. According to them, increasing vaccination rate to 100 per cent would have the largest and probably most cost effective and impact, reducing infant mortality by 16 deaths per thousand births.

3.5 METHODOLOGICAL REVIEW

3.5.1 Introduction

The quality of research in health outcomes is an important issue for today's health economists. Pressures for efficacy studies to determine the factors influencing the quality of health outcomes are prominent. The purpose of this section is to examine the type and quality of research methodology in articles published in health economics journals on this and related issues. A total of 10 articles were reviewed for methodological adequacy on five criteria areas. Results indicated that the use of theory, sophistication of designs, strength of measurement, and application continue to be areas of concerns in health outcomes research.

3.5.2 Methodological Review on Similar Studies

The status of research on health outcome is a concern that has attracted increased attention in recent years. According to Faweett and Downs (1986), the function of research is either to test or generate theory. Additionally, the value of research is based on " the logical consistency between the theoretical design, and analysis components of an investigation". Determining methodological quality, or the soundness of research studies, is important in the development of a professional body of knowledge in health economics.

Although health economics can be considered one of the newest areas in economics studies, the amount and quality of research published is limited. Several weaknesses in health economics have been identified. For example, it was observed that there has been a limited type of methodologies being used. Some of the researches done on determinants of health outcomes have adopted microeconomic model of analysis, involving partial equilibrium analysis (Bourne, 2009; Anyanwu and Erhijakpor, 2011). The need for a more variety of methods has been recommended to ensure that the results of issues under investigation are accurate and true representation of the economy under consideration.

In most of the articles examined, there is limited use of conceptual insight and theoretical frameworks. This "dearth of theory" is a major problem in health economics research. Researches on determinants of health outcomes however, have demonstrated poor use of

theories. Most of the studies adopted Grossman's model as theoretical framework. (Bourne (2009), Francesco and Marios, (2006)).

In terms of modelling, most of the articles under review used life expectancy from birth as a proxy for health outcomes. (Fayissa and Gutema, (2005); Bourne, (2009)) This is strong indicator of health status because it measures the quality of life lived right from birth till the time of death (Francesco and Marios, (2006); Fayissa and Gutema, (2005)). In some studies, under five mortality rate (U5MR) and infant mortality rate (IMR) were used as proxy for health outcomes (Anyanwu and Erhijakpor, (2011). The assumption that education is entirely determined by parents at date $t - 1$ (Francesco and Marios, (2006)) is good one because it allows for reinforcing complementary effects between health-related investment and education. That is, the effectiveness of health related investment in enhancing life expectancy increases with the individual level of basic education.

The data characteristics of the studies examined is quantitative in nature. This quantitative method of data analysis was mostly done on panel data (Lawanson, 2012); Fayissa and Gutema, (2005)). Besides, about 65% of the studies examined gave adequate good justification for the analytic techniques used in the study, 20% were judged to be poor in justification, while 15% did not offer justification or explanation at all.

CHAPTER FOUR

THEORETICAL FRAMEWORK AND METHODOLOGY

4.1 THEORETICAL FRAMEWORK

Grossman (1972a; 1972b; and 2000) defines health as a durable capital stock inherited and depreciates over time. It is an endogenous variable that people can improve through investment in medical care, diet and exercise. Besides the production of health, Grossman's model supports the depreciation of human capital; individual age and may choose to invest in health production until the marginal cost of health production equals the marginal benefit of improved health status. The Grossman's model provides an economic framework for the relationship among inputs such as education, income, nutrition, health care and other environmental and socio-economic variables which influence the production of health that can be measured in terms of health status.

Health is demanded by consumers for two reasons; as consumption and investment. As a consumption commodity, it directly enters their preference function, or put differently, sick days are a source of divisibilty. As an investment commodity, it determines the total amount of time available for market and non-market activities. In other words, an increase in the stock of health reduces the time lost from these activities, and the monetary value of this reduction is an index of the return to an investment in health.

Since the most fundamental law in economics is the law of the downward-sloping demand curve, the quality of health demanded should be negatively correlated with its shadow price which depends on many other variables other than the price of Medicare. Shifts in these variables alter the optional amount of health and the derived demand for gross investment measured by medical expenditures.

In the construction of the model, let the inter-temporal utility function of a typical health consumer be

$$\mu = \mu(\theta_0 H_{0,\ldots,} \theta nHn, Z_0, \ldots, Zn) \quad \ldots\ldots\ldots\ldots 1$$

Where:

$n = t$ = The time period

H_0 = This is the inherited stock of health

H_t = The stock of Health in period t.

θ_t = The health service flow per unit stock

$h_t = \theta_t H_t$ is the total consumption of 'health service'

Z_t = the total consumption of other commodity in the $_t$th period.

It is important to note death takes place when $H_t = H_{min.}$ Therefore, length of life depends on the qualities of H_t that maximise utility subject to certain production and resource constraints that are outlined in what follows.

By definition, net investment in the stock of health equals gross investment minus depreciation.

$$H_{t+1} - H_t = I_t - \delta_t H_t \quad \text{.....2}$$

I_t is gross investment.

δ_t is the rate of depreciation during $_i$th period.

The rate of depreciation is assumed to be exogenous, but it may vary with the age of individuals. Consumers produce gross investment in health and the other commodities in the utility function according to a set of household production functions:

$$I_t = I_t(M_t, TH; E) \quad \text{.....3}$$

$$Z_t = Z_t(X_t, T_t; E) \quad \text{.....4}$$

Where: M_t is a vector of inputs (goods) purchased in the market that contribute to gross investment in health, X_t is a similar vector of goods inputs that contribute to the production of Z_t, TH_t and T_t are time inputs, and E is a consumer's stock of knowledge or human capital exclusive of "health capital'. In the model, the vectors of goods inputs, M_t and X_t, are scalars and associate the market goods input in the gross investment production function with medical care. The goods budget constraint equates the present value outlays on goods to the present value of earnings income over the life cycle plus initial assets (discounted property income):

$$\sum_{t=0}^{n} \frac{P_t M_t + Q_t X_t}{(1+r)^t} = \sum_{t=0}^{n} \frac{W_t TW_t}{(1+r)^t} + A_0 \quad \text{.....5}$$

Where: P_t and Q_t are the prices of M and X_t, W_t is the hourly wage rate, TW_t is the hours of work, A_0 is the initial assets, and r is the market rate of interest. The time constraint requires Ω, the total amount of time available in any period, must be exhausted by all possible uses:

$$TW_t + TH_t + T_t + TL_t = \Omega \quad \text{.....6}$$

Where TL_t is the time lost from market and non-market activities due to illness and injury. Sick time is assumed to be inversely related to the stock of health; that is $\delta TL / \delta H_t$ < 0. if Ω is measured hours and if $Ø_t$ is defined as the flow of healthy time per unit of H_t, h_t equals the total number of healthy hours in a given year. Then it can be expressed as:

$$TL_t = \Omega - h_t \quad \text{.....7}$$

Substituting for hours of work (TW_t) from equation 6 into equation 5, the single full wealth constraint is obtained as:

$$\sum_{t=0}^{n} \frac{P_t M_t + Q_t X_t + W_t(TL_t + TH_t + T_t)}{(1+r)^t} = \sum_{t=0}^{n} \frac{W_t \Omega}{(1+r)^t} + A_0 \quad \text{.....8}$$

In equation 8, full wealth is given by the right hand side, which equals initial assets plus the discounted value of the earnings an individual would obtain if he spent all of his time at work. Part of this wealth is spent on market goods, part of it is spent on non-market production, and a component is lost due to illness. The equilibrium quantities of H_t and Z_t were found in the model by maximising the utility function given by equation 1, subject to the constraints given by equation (2), (3), and (8). Since the inherited stock of health and the rate of depreciation are given, the optimal quantities of gross investment will determine the optimal quantities of health capital.

The first–order optimality conditions for gross investment in period $t-1$ are:

$$\frac{\pi_{t-1}}{(1+r)^{t-1}} = \frac{W_t G_t}{(1+r)^t} + \frac{(1-\delta_t)W_{t+1}G_{t+1}}{(1+r)^{t+1}} + \ldots + \frac{(1-\delta_t)\ldots(1-\delta_{n-1})W_n G_n}{(1+r)^n} + \frac{Uh_t}{\lambda} G_t + \ldots (1-\delta_t)\ldots(1-\delta_{n-1})\frac{Uh_n}{\lambda} G_n$$

.....9

$$\pi_{t-1} = \frac{P_{t-1}}{\partial I_{t-1} / \partial M_{t-1}} = \frac{W_{t-1}}{\partial I_{t-1} / \partial TH_{t-1}} \qquad \text{.....10}$$

Where $Uh_t = dU / dh_t$ is the marginal utility of healthy time; λ is the marginal utility of wealth; $G_t = \partial h_t / \partial H_t = -(\partial Th_t / \partial H_t)$ is the marginal product of the stock of health in the production of healthy time; and π_{t-1} is the marginal cost of gross investment in health in period $t-1$. Equation (9) states that the present value of the marginal cost of gross investment in health in period $t-1$ must be equal to the present value of marginal benefits. Discounted marginal benefits at age *t* equal $G_t\left[\frac{Wt}{(1+r)^t} + \frac{Uh_t}{\lambda}\right]$ where: G_t is the marginal product of health capital – the increase in the amount of healthy time caused by a one-unit increase in the stock of health. There is the need to convert this marginal product into value terms, given that consumers desire health for two reasons, two monetary magnitudes are necessary. The discounted wage rate measures the monetary value of a one-unit increase in the total amount of time available for market and non-market activities and the term Uh_t / λ measures the discounted monetary value of the increase in utility due to a one-unit increase in healthy time.

Consequently, the sum of these terms measures the discounted marginal value to consumers of the output produced by healthy capital. While equation (9) determines the optimal amount of gross investment in period $t-1$, equation (10) shows the condition for maximising the cost of producing a given quantity of gross investment. Total cost is maximised when the increase in gross investment from spending an additional dollar on medical care equals the increase in total cost from spending additional dollar on time. Since the gross investment production function is homogeneous of degree one in the two endogenous inputs and since the prices of medical care and time are independent of the level of these inputs, the average cost of gross investment is constant and equal to the marginal cost.

To examine the forces that affect the demand for health and gross investment, Grossman (2000) converted equation (9) into an equation that determines the optimal stock of health in period *t*. if gross investment in period *t* is positive, a condition similar to equation (9) holds for its optimal value.

From these two first order conditions:

$$G_t\left[W_t+\left(\frac{Uh_t}{\lambda}\right)(1+r)^t\right]=\pi_{t-1}(r-\pi+\delta_t) \quad \text{.....11}$$

Where: π_{t-1} is the percentage rate of changes in marginal cost between $t-1$ and period *t*. Equation (11) implies that the discounted value of the marginal product of the optimal stock of health capital at any age must be equal to the supply price of capital $\pi_{t-1}(r-\pi+\delta_t)$. The right hand side of the equation contains interest, depreciation, and capital gains components and may be interpreted as the rental price or user cost of health capital. Equation (11) therefore fully determines the optimal quantity at time *t* of capital good that can be bought and sold in a perfect market. The stock of health capital, like the stock of knowledge capital, cannot be sold because it is embedded in the investor. This means that gross investment cannot be negative. Although sales of capital are ruled out, there exist user costs of capital that in equilibrium must be equal to the value of the marginal product of stock.

In the investment sub-model of the Grossman model, the wage rate and the marginal cost of gross investment do not depend on the stock of health. In the consumption sub-model of the Grossman model, the first prediction of the model is that if the rate of depreciation increased with age, then the quantity of health capital demanded would decline over the life cycle. The second prediction is that a consumer's demand for health and medical care should be positively correlated with his/her wage rate. The third prediction is that if education increases the efficiency when gross investments in health are made, more educated would demand a larger optimal stock of health.

4.2 MODEL SPECIFICATION

Within the context of the theoretical consideration, determinants of health status in Nigeria and the literature review, we specify a model expressing the functional relationship between life expectancy (dependent variable) and other explanatory variables of concern: literacy rate, GDP per capita income and government expenditure in the health sector in Nigeria. The specification of the model is suitable for quantifying the impact of the determinants on health status in Nigeria which follows the related empirical work of Fayissa and Gutema (2005) "The determinants of health status in Sub-Sahara Africa (SSA)."

Although, many studies have analysed what determines health status of a country, prominent among which include Bourne (2009) and Riman and Akpan (2010). Our consideration of Fayissa and Gutema (2005) is not unconnected with the fact that these authors attempted to analyse the impact of some related macroeconomic variables on life expectancy as a proxy for health status using a panel data analytic approach.

Thus, the model for the estimation in this study is as follows:

$$\ln LE_t = \alpha_0 + \alpha_1 \ln LR_t + \alpha_2 \ln GHE_t + \alpha_3 \ln GPC_t + \alpha_4 \ln HW_t + \mu_t \quad \ldots\ldots\ldots\ldots 1a$$

$$\ln U5MR_t = \alpha_0 + \alpha_1 \ln LR_t + \alpha_2 \ln GHE_t + \alpha_3 \ln GPC_t + \alpha_4 \ln IMM_t + \mu_t \quad \ldots\ldots\ldots\ldots 1b$$

Where:

LE_t = Life expectancy (Proxy for health status).

$U5MR_t$ =Under-five mortality rate (Proxy for health status).

LR_t = Literacy rate.

GHE_t = Total government health expenditure.

HW_t = Total health workers

GPC_t = GDP per capita income.

IMM_t = Total immunisation rate (BCG + DPT + HepB3 + measles + Pol3).

$\alpha_1 - \alpha_4$ = Coefficients of the parameter.

μ_t = Error term.

To incorporate short-run and long-run effects of the models, we specify models in form of Error Correction Model. i.e.

$$\Delta Y_t = \alpha + \beta \Delta X_{t-1} - \beta \varnothing_{t-1} + \varepsilon_t$$

Where: ø is the error correction component of the model and measures the speed at which prior deviations from equilibrium are corrected. It shows how the dependent variable changes in response to disequilibrium.

From equation 1a,

$$\ln LE_t = \alpha_0 + \alpha_1 \ln LR_t + \alpha_2 \ln GHE_t + \alpha_3 \ln GPC_t + \alpha_4 \ln HW_t + \mu_t \quad \ldots\ldots 1a$$

$$\mu_t = \ln LE_t - \alpha_0 - \alpha_1 \ln LR_t - \alpha_2 \ln GHE_t - \alpha_3 \ln GPC_t - \alpha_4 \ln HW_t \quad \ldots\ldots\ldots 2a$$

The fact that there may be disequilibrium in the short run necessitates the use of ECM. The error term in equation 1a is then treated as the " equilibrium error" which can then be used to tie the short run behaviour of the dependent variable to its long run value. This follows from the Granger representation theorem which states that if two variables Y and X are cointegrated, then the relationship between the two can be expressed as ECM.

Thus, ECM formulation of equation 3a then becomes:

$$\Delta \ln LE_t = \alpha_0 + \alpha_1 \Delta \ln LR_t + \alpha_2 \Delta \ln LR_{t-1} + \alpha_3 \Delta \ln LR_{t-2} + \alpha_4 \Delta \ln GHE_t + \alpha_5 \Delta \ln GHE_{t-1} + \alpha_6 \Delta \ln GHE_{t-2} + \alpha_7 \Delta \ln GPC_t + \alpha_8 \Delta \ln GPC_{t-1} + \alpha_9 \Delta \ln GPC_{t-2} + \alpha_{10} \Delta \ln HW_t + \alpha_{11} \Delta \ln HW_{t-1} + \alpha_{12} \Delta \ln HW_{t-2} - \phi \mu_{t-1} + \varepsilon_t \ldots\ldots\ldots 3a$$

Equation 3a incorporates short run and long run effects of equation 1a, used in our estimation.

Similarly, from equation 1b,

$$\ln U5MR_t = \alpha_0 + \alpha_1 \ln LR_t + \alpha_2 \ln GHE_t + \alpha_3 \ln GPC_t + \alpha_4 \ln IMM_t + \mu_t \ldots\ldots\ldots 1b$$

$$\mu_t = \ln U5MR_t - \alpha_0 - \alpha_1 \ln LR_t - \alpha_2 \ln GHE_t - \alpha_3 \ln GPC_t - \alpha_4 \ln IMM_t \quad \ldots\ldots\ldots 2b$$

Thus, ECM formulation of equation 3b then becomes:

$$\Delta \ln U5MR_t = \alpha_0 + \alpha_1 \ln \Delta LR_t + \alpha_2 \ln \Delta LR_{t-1} + \alpha_3 \ln \Delta LR_{t-2} + \alpha_4 \Delta \ln GHE_t + \alpha_5 \Delta \ln GHE_{t-1} + \alpha_6 \Delta \ln GHE_{t-2} + \alpha_7 \Delta \ln GPC_t + \alpha_8 \Delta \ln GPC_{t-1} + \alpha_9 \Delta \ln GPC_{t-2} + \alpha_{10} \Delta \ln IMM_t + \alpha_{11} \Delta \ln IMM_{t-1} + \alpha_{12} \Delta \ln IMM_{t-2} - \phi \mu_{t-1} + \varepsilon_t \ldots\ldots\ldots 4b$$

4.3 DESCRIPTION OF VARIABLES AND A– PRIORI EXPECTATION

The variables used in this study are all annual time series data representing health, per capita income and educational indicators in Nigeria. These data are representation of average Nigerian. The health status of average Nigerian is captured by life expectancy at birth, literacy rate stands for the educational level, government investment in the health sector is represented by total government health expenditure. While the income of average Nigerians is proxy by GDP per, the health care providers, comprising doctors and nurses are represented by total health workers. On the vulnerable group, under-five mortality rate was used as a proxy for health status, and total immunisation rate represents all the immunisation treatments from birth to five

years of age. It includes BCG, DPT, HepB3, measles, and Pol3 vaccines. Theoretically, all the independent variables are expected to be positively related to the dependent variable.

4.4 ESTIMATION TECHNIQUE

The study adopts the use of error correction model (ECM) otherwise called error correction mechanism estimation techniques in the attempt to determine the macroeconomic determinants of health outcomes in Nigeria. The error correction mechanism assumes most economic time series data are non-stationary. In regressing a time series variable on another time series variable, one out of ten obtains a very high R^2 (coefficient of multiple correlation), although there is no meaningful relationship between the two. This situation exemplifies the problem of spurious regression. The problem arises because if both the time series involved exhibit strong trends (sustained upward or downward movement), the R^2 observed is due to the problem of trend, not to true relationship between the two (Gujarati,1997).

Granger and Newbold (1974) have specifically shown that among non-stationary time series variables, regression estimates produce unacceptable results, i.e a high degree of fit, as measured by the coefficient of multiple correlation R^2 or the adjusted coefficient of R^2, together with highly auto-correlated residuals as indicated by very low Dubin Watson (DW) statistics.

Similarly, the standard significance test (measured by the traditional t-test) will reject the null hypothesis of no trend or no relationship between the series on appropriately three-quarters of all occasions. Thus, there is temptation to accept a close relationship between the series when they are almost independent (Komolafe, 1996).

It is therefore very important to find out if the relationship between economic variables is true or spurious. An attempt to achive stationarity led to differencing data, which is, taking the first differences of all variables that appear to be highly auto-correlated until a satisfactory model could be arrived at. At the formal level, stationarity can be checked by finding out if the time series contains a unit root. The Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) tests was used for this purpose. These issues have culminated into cointegration technique of econometric analysis which shall be used in estimating our model.

Cointegration means that despite being individually non-stationary, a linear combination of two (or more) time series suggests that there is a long-run or equilibrium relationship between them. The (ECM) developed by Engle and Granger (1987) is a means of reconciling the short-run

behaviour of an economic variable with its long-run behaviour. This shall be employed in the study in testing the economic variables.

4.5 DATA REQUIREMENT AND SOURCE

The estimation runs from 1980 to 2011. The choice of these time periods is based on the availability of data on the required variables; endogenous and exogenous in the model. The basic data for this study are average life expectancy as a proxy for health status in Nigeria, literacy rate, GDP per capita income and government expenditure in health sector. The nature of data employed in this research is classified as secondary.

CHAPTER FIVE

DATA ANALYSIS AND INTERPRETATION

5.1 INTRODUCTION

In this Chapter, we discuss the estimation of the multiple regression, stationarity, cointegration and error- correction tests which are based on a time series data, obtained from the World Data Group, WHO; World Health Statistics, UNESCO; Institute of Statistics and Penn World Data.

5.2 EMPIRICAL ANALYSIS

This section presents the results of the unit root (stationarity) tests, cointegration tests and error correction model, using a time series data drawn from CBN Statistical Bulletin, 2012; WHO (2012) and WDI (2012). Data on these variables are only available for the year 1980 – 2011. Therefore, the analysis in this study is limited to this period.

Table 5.1: Definition of Regressed Variables

Variable	Definition	Sources of Data
lnGHE	This is the log of total health expenditure. A percentage of Gross Domestic Product	World Development Indicators
lnLE	This is the log of human maximum lifespan or the maximum length of life that human being can potentially attain from birth.	World Development Indicators
lnGPC	Log of GDP per capita income	CBN Statistical Bulletin
inHW	This is the log of total number of health workers comprising doctors, nurses and other professionals (per 1000 people)	World Development Indicators
lnIMM	This is the log of total immunisation rates. A sum of BCG,DPT, HepB3, measles and Pol3.	World Development Indicators
lnLR	Log of literacy rate of adult. A percentage of people ages 15 and above	World Development Indicators
lnU5MR	This is the log of total number of children that die before their fifth birthday and the rate is measured per 1000 children. It includes infant mortality rate and perinatal mortality.	World Development Indicators

5.2.1 COMBINED GRAPHICAL REPRESENTATION OF THE VARIABLES BETWEEN 1980 AND 2011

Figure 1

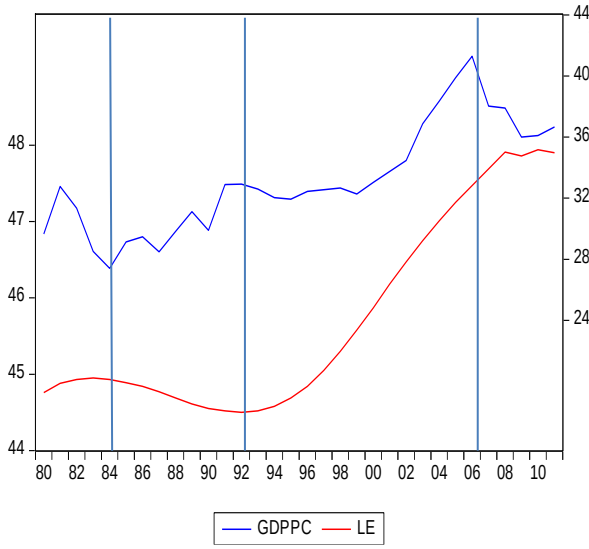


Figure 2.

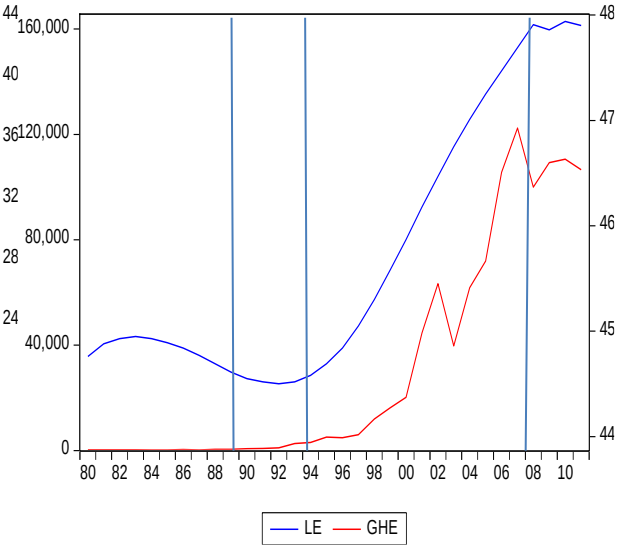


Figure 3.

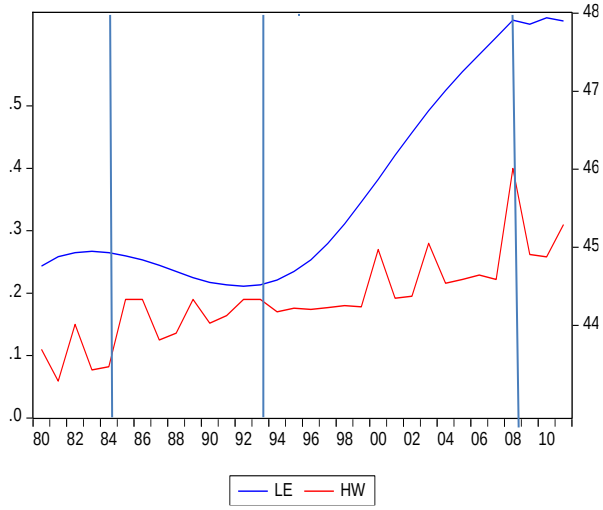


Figure 4.

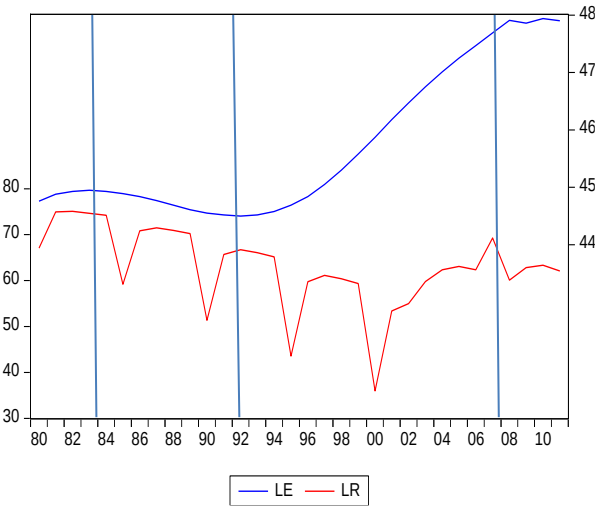


Figure 5.

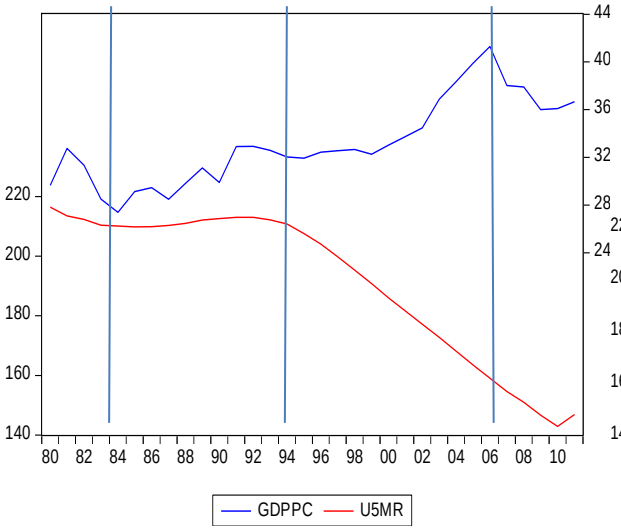


Figure 6.

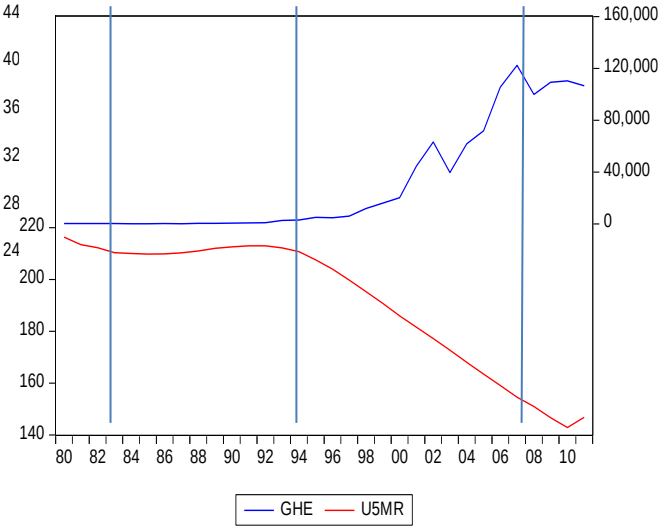


Figure 7.

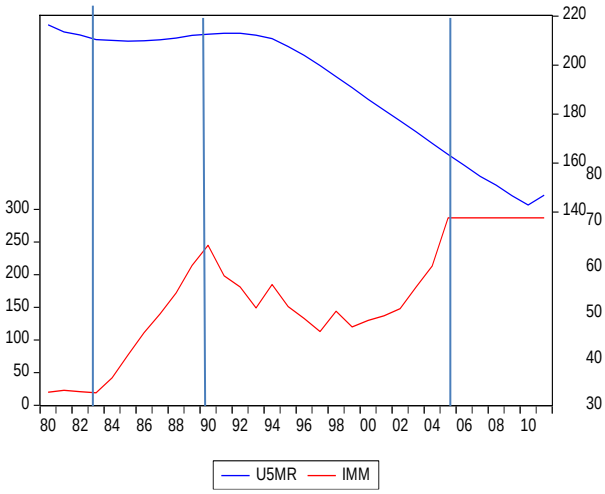
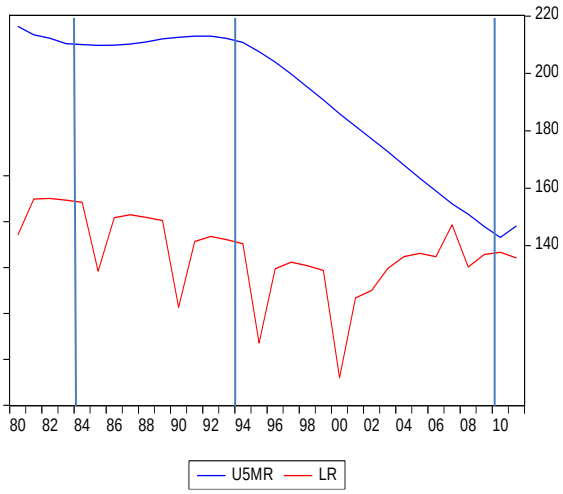


figure 8.



To illustrate the relationship between the dependent variables (i.e life expectancy and under-five mortality rates) and the individual independent variables, the combined graph of each of the explanatory variables were plotted with the corresponding explained variable as dictated by the model under estimation.

Figures 1 to 4 represent the combined relationship of the life expectancy with the individual explanatory variables that made up life expectancy model. Virtually in all the graphs, there was a co-movement between the life expectancy and GDP per capita, government health expenditure, health workers and literacy rate as shown in figure 1,2,3, and 4 respectively. The

notable co-movements are in consonance with the a priori expectations. However, in figure 4, there was a sharp and unstable divergence in the relationship between life expectancy and literacy rates between the periods of 1992 to 2007 as indicated in the third quadrants. This was due to high rate of brain drain in the country during this period. But positive correlation was recorded between the periods 2008 to 2011 as shown in the fourth quadrant.

In figures 5 to 8, the combined graph of the variables that made up the under-five mortality rates model were individually plotted with the corresponding dependent variable (under-five mortality rates). There was a divergence movement in the paired graphs. This was in line with conclusions in the theories. This trend was short-lived in the relationship between under-five mortality rates and GDP per capita (See figure 5). In the fourth quadrant (i.e. 2006 to 2011), the movement of the variables negates the apriori expectation as they are positively related. Reduction in GDP per capita adversely affected the out-of-pocket expenditure on child healthcare during this period.

5.2.2 Unit Root Test.

In case a variable is not stationary at levels, it is tested at first and second differences (Ramanthan, 1992). From the estimated regression result, we present in a tabular form the result of the unit root test for stationarity and non- stationarity of the variables.

Table 5.2: Unit Root Test at First Difference

With intercept only			
Variables	ADF	Critical value 5%	Remarks
lnGHE	-2.5109069	-2.971853	Non stationary
lnGPC	-8.027684	-2.967767	I(1)
lnLE	-3.150841	-2.986225	I(1)
lnHW	-8.252614	-2.971853	I(1)
lnIMM	-4.101787	-2.967767	I(1)
lnLR	-5.953398	-2.991878	I(1)
lnU5MR	-1.725438	-2.976263	I(1)

Source: *Author's Computation*

The results of the unit root test as shown in the table above shows that the variables are stationary at first difference. This is deduced from the fact that the absolute values of ADF test are greater than the value of the ADF critical value at the 5% level of significance.

5.2.3 Cointegration Test

Having established the order of integration and stationarity of the variables used in the estimation of the model, we proceed to test for cointegration between the dependent variable life expectancy (LE), and the independent variables; literacy rate (LR), total government health expenditure (GHE), GDP per capita (GPC) and total health workers (HW) in life expectancy model.

In under-five mortality rate (U5MR) model, we test for cointegration between dependent variable under-five (5) mortality rate (U5MR) and the independent variables: LR, GHE, GPC and IMM.

Using the Johansen method, we obtained the Table 5.3, showing the number of cointegrating vectors. The cointegration is with unrestricted intercepts and restricted trends in the VAR based on maximal Eigen value of the stochastic matrix.

Table 5.3: RESULT OF JOHANSEN'S COINTEGRATION TEST

Model	Null Hypothesis	Alternative Statistics	Trace Statistics	Max-Eigen Statistics	5% Critical Value	No of Co-integrating equation
1a	R= 0*	R=1	70.05203	34.83110	30.04	1
	R≤ 1	R=2	35.22093	20.58055	23.80	
	R≤ 2	R=3	14.64038	8.500016	17.89	
	R≤ 3	R=4	6.140366	3.697662	11.44	
	R≤ 4	R=5	2.442704	2.442704	3.84	
1b	R= 0**	R=1	53.71203	19.66655	30.40	1
	R≤ 1	R=2	34.04548	17.97942	23.80	
	R≤ 2	R=3	16.06606	8.358530	17.89	
	R≤ 3	R=4	7.707530	5.566942	11.44	
	R≤ 4	R=5	2.140588	2.140588	3.84	

*(**) denotes rejection of the hypothesis at the 5%(1%) level

Trace test indicates two cointegrating equations at both 5% and 1% levels

Source: *Author's Computation*

Since the variables are cointegrated for the two models, then there would be no loss of information, implying that there exist a long run relationship between dependent variable and the independent variables in the two models. The stationarity of the residuals implies that the dependent and independent variables used in estimating the models are cointegrated. Hence, we can proceed with estimation of the ECM.

5.2.4 Error Correction Model

The error correction modelling involves three steps. The first is to estimate a long run model; the second is to include the error term from the long run model in a dynamic over-parameterised model and the third, is to work on this model until one obtains the parsimonious model which is then interpreted. In these results, the over-parameterised model is not presented.

5.2.4.1 Long Run Model

Life expectancy model analysed the sensitivity of life expectancy (LE), a proxy for health status, to literacy rate (LR), government health expenditure (GHE), GDP per capita (GPC), and total number of health workers(HW), while U5MR model analysed the impact of literacy rate (LR), government health expenditure (GHE), GDP per capita (GPC) and immunisation rate (IMM) on under-five mortality rate (U5MR) in Nigeria. The OLS results of the two models were presented below. While Table 5.4 relates to life expectancy model, Table 5.5 relates to under-five mortality rate model.

TABLE 5.4 : Regression Results of Long Run Life Expectancy Model.

Dependent Variable is LE

Variables	**Coefficient**	**T- Statistics**	**Probability**	
Constant	3.504134	24.56758	0.0000	R^2=0.831629
Log(GPC)	0.013743	0.285001	0.7778	AdjR^2=0.806685
Log(GHE)	0.010133	4.360430	0.0002	S.E=0.012039
Log(HW)	0.003728	0.429406	0.6710	F.Stat=33.34002
Log(LR)	0.046006	2.679558	0.0124	D.WStat=0.602366

Source: *Author's Computation*

TABLE 5.5 : Regression Results of Long Run Under-five Mortality Model.

Dependent Variable is U5MR

Variable	**Coefficient**	**T- Statistics**	**Probability**	
Constant	6.492155	9.877850	0.0000	R2=0.855157
Log(GPC)	0.034408	0.152991	0.8795	AdjR2=0.833699
Log(GHE)	-0.057876	-5.455153	0.0000	S.E=0.056233
Log(IMM)	-0.000377	-0.022807	0.9820	F-Stat=39.85234
Log(LR)	-0.211415	-2.716116	0.0114	D.W.Stat=0.665272

Source: *Author's Computation*

Life expectancy model, from the regression result above and the OLS shows all the variables conform to the priori expectation. While for health workers, and GDP per capita are insignificantly positive, all other independent variables in LE model are significantly positive to life expectancy from birth. In U5MR model, while GDP per capita (GPC) is insignificantly positive to U5MR, all other independent variables are inversely related to under-five mortality rate with only literacy rate (LR) and government health expenditure (GHE) being statistically significant.

The error correction representation for the selected ARDL model, selected on the basis of the Schwarz information criterion is represented below. In each model, 32 observations were used for the estimation (from 1980 to 2011). In life expectancy model, for example, where LE is the dependent variable, the result reveals as follows:

PARSIMONIOUS ERROR CORRECTION MODEL

Using the exact AR(1) inverse interpolation method, converged after 5 iterations (i.e. dumping insignificant variables) we have the following results.

Table 5.6: Regressed Results of Life Expectancy Model.

Dependent Variable is LE

Variables	Coefficient	Standard Error	t-Statistics
Constant	0.001229	0.012574	0.103287
D(LE(-1))	0.798917	0.174829	4.569702
D(LE(-2))	0.224155	0.175446	1.277631
D(LR(-1))	0.004127	0.001613	2.558179*
D(LR(-2))	0.002190	0.001228	1.783026
D(GHE(-1))	0.003421	0.001925	1.776692***
D(HW)	0.696222	0.303844	2.291382
D(HW(-1))	-0.837903	0.321006	-2.610241*
D(GPC)	-0.017170	0.012503	-1.373303
D(GPC(-1))	0.021910	0.011027	1.986902
D(GPC(-2))	0.026125	0.008192	3.188985**
ECT(-1)	-0.089123	0.032834	-2.71431

R-Squared = 0.915833 Adjusted R-Squared = 0.869074

D-W Statistics = 1.499991 F-ratio = 19.58614

Note: * = Singnificant at 1 % ** = Singnificant at 5 % * = Singnificant at 10 %**

Source: *Author's Computation*

The result obtained above shows that the adjustment response of life expectancy is confirmed by the coefficient of the residual ECM (-1). It shows that about 0.089 of the discrepancy between the actual and the long run or the equilibrium value of life expectancy (LE) is eliminated or corrected in each period.

About 91% of the systematic variation in life expectancy (LE) in Nigeria over the period of estimation is explained in the ECM model. This percentage is indicative of the high goodness-of-fit of the model.

The F- statistic of 19.58614 is statistically significant at 5% significance level. Hence, there exist a strong linear relationship between dependent variable and all the explanatory variables of the model.

The value of the Durbin Watson Statistics of 1.4999 in the model indicates the absence of autocorrelation in the model, an indication of the efficiency of the obtained parameters estimates.

The result shows that the level of government health expenditure (GHE), GDP per capita (GPC) and literacy rate (LR) had progressive effect on life expectancy (LE) in Nigeria. Literacy rate (0.41%); government health expenditure (0.34%) and GDP per capita (2.61%) significantly explained life expectancy in Nigeria. This implies that a 1% improvement in life expectancy was brought about by less than 1% influence of these factors. Thus, health expenditure has the ability to improve health status of a population. This signifies that the levels of budgetary expenditure on health and educational sectors are sufficient to provoke a positive effect on health status in Nigeria. The positive and significant relationship between government health expenditure (GHE) , literacy rate (LR), GDP per capita (GPC) and life expectancy (LE) means that there is conformity with the theory. Thus, good education, income and government expenditure on health are necessity in stimulating improved health status. However, health workers (HW) failed to conform to the conclusions in the theories. This unexpected result of health workers (HW) could be attributed to the emergency of brain drain in the sector .

In the case of under-five mortality rate model, where U5MR is the dependent variable, the results reveals as follows:

PARSIMONIOUS ERROR CORRECTION MODEL

Table 5.7: Regressed Results of Under-Five Mortality Rate.

Dependent Variable is U5MR

Variables	Coefficient	Standard Error	t-Statistics
Constant	-0.108553	0.584605	-0.185686
D(U5MR(-1)	1.182152	0.625252	1.890682
D(U5MR(-2))	-0.327959	0.620476	-0.528559
D(LR)	-0.041025	0.044501	-1.921881***
D(LR(-1))	0.032653	0.055662	0.586636
D(LR(-2))	0.017874	0.046861	0.391427
D(GHE)	-2.25E-05	4.21E-05	-0.535357
D(GHE(-1))	-1.17E-05	3.98E-05	-0.295119*
D(IMM(-1))	0.005585	0.015233	0.366618
D(IMM(-2))	0.05585	0.015233	0.366618
D(DPC)	0.075024	0.28462	0.263594
D(GPC(-1))	-0.149373	0.305818	-0.488437
D(GPC(-2))	-0.393504	0.290442	-1.354845
ECT(-1)	-0.037213	0.159890	-0.232741

R-Squared = 0.683046 Adjusted R-Squared = 0.445331

D-W Statistics = 1.275913 F-ratio = 2.873382

Note: * = Singnificant at 1 % ** = Singnificant at 5 % * = Singnificant at 10 %**

Source: *Author's Computation*

The result obtained above shows that the adjustment response of U5MR is confirmed by the residual (-1). It shows that about 0.037213 of the discrepancy between the actual and the long run or the equilibrium value of under-five mortality rate (U5MR) is eliminated and/or corrected in each period.

The ECM explained about 68% of the systematic variation in the under-five mortality rate (U5MR) in Nigeria over the period of estimation. This percentage is also indicative of the high goodness of fit of the model.

The F- statistic of 2.8733 is statically significant at the 5% significance level. Hence, there exists a strong linear relationship between the dependent variable and the explanatory variables of the model.

The value of Durbin Watson statistics (1.275913) in the model indicates the absence of autocorrelation in the model, an indication of the efficiency of the obtained parameter estimates. The coefficient of literacy rate (-0.041) and government health expenditure were indicative of inverse change in these factors by 4.1% and 0.0017% resulting in 1% change in under-five mortality rate. Among the variables included in the model, only immunisation rate (IMM) and GDP per capita (GPC) are statistically insignificant. Besides, except for immunisation rate, all other variables included in the model conformed to the a priori expectation. The statistical insignificance of immunisation rate (IMM) and GDP per capita (GPC) determining health status of the more vulnerable group represented by under-five mortality rate (U5MR) in Nigeria negates the findings in the literature. For instance, instead of improved GDP per capita to reduce under-five mortality rates because it will facilitates access to health care, education, food and housing, all of which contribute to health outcomes (Jourmand et al., 2008), the reverse is the case in Nigeria. This may be attributed to poor and uneven distribution pattern of income in Nigeria. Besides, there is a neglect of government immunisation programmes by many Nigerians due to their level of awareness and education, especially in the rural area.

Literacy rate (LR) and government health expenditure(GHE) responded to the conclusions in the theory and are statistically significant in the model. improved education increased the value for life. This stimulates efforts, government financing inclusive, to improve health status.

5.3 POLICY IMPLICATION

The health status of the labour forces, along with other factors, in any emerging and developed economy, strongly determines the speedy growth and development of such economies. Nigeria as a developing economy, no doubt, needs such healthy labour force if its drive towards growth and development is to be realised. Against this background, it is important to note the policy implications of the results analysed above.

There is need for Nigeria government and health authorities to pursue stable and consistent macroeconomic policy that will improve life expectancy such as increments of the allocation to health sector, improvement in the utilisation of health sector allocation, promoting the quality and quantity of health workers, and engagement in health enlightenment campaign.

Lack of high-tech equipment in Nigerian health sector discourages improved life expectancy. Hence, policy measures need to be put in place to encourage acquisition of knowledge (i.e education) on the part of the health care providers and the patients, to enjoy the associated benefits. Besides, government should encourage the importation of high-tech equipment to improve the services in the sector.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 SUMMARY OF MAJOR FINDINGS

The study empirically verified the relationship between determinants of health status and health outcomes in Nigeria. The common trend through the chapters in this study is the impacts of the determinants on overall health outcomes.

Contrary to the literature, the empirical investigation reveals that and GDP per capita (GPC), immunisation (IMM) and health workers (HW) are insignificant in determining health status in Nigeria. Literature has shown that High GDP per capita can improve life expectancy because it facilitates access to health care, education, food and housing, all of which contribute to health outcomes (Jourmand et al., 2008). In Nigeria, income is not evenly distributed relative to other countries of the world, and as such the high value of GDP per capita would not necessarily improve health status and standard of living in Nigeria. In addition, brain drain syndrome affect the quality of health workers in Nigeria.

Literacy rate and government health expenditure have a positive effect on health status in Nigeria. For instance, the level of education has a positive effect on people's decision to seek health care.

6.2 RECOMMENDATIONS

Based on the findings of this study, the following recommendations are put forward for consideration.

Many government policies on health sector are largely operated in an unfavourable environment, resulting to poor macroeconomic management of the economy. For instance, government policy on allocation of fund to health sector has not been justified given the low percentage of fund allocated to the sector in the budget, coupled with the fact that corruption and mismanagement of funds could not allow the thriving of such funds. Thus, government should pay more priority to health sector in terms of funds allocation, monitoring of health programmes and developmental projects.

The level of literacy is also a major concern in Nigeria. It enhances the improvement of health status in Nigeria. As such, government should try to promote educational advancement of Nigerians in rural and urban area.

Improving the basic services such as availability of drugs, oral-rehydration and children immunisation services, to mention a few will lead to an increase in utilisation of health care and improvement in health status in Nigeria.

There is a need to increase the proportion of qualified health care providers such as doctors, nurses, technicians and also sending more qualified health workers to the rural areas should be emphasised. Besides, they should be more motivated to reduce the emergence of brain drain in the sector.

Hence, the challenge now is to devise strategies that would improve the quality of policy making with respect to health sector in order to bring about large and sustained improvement of health outcome in Nigeria in the years ahead.

6.3 CONCLUSION

From the study, it is evident that like other developing countries of the world, for Nigeria to take a giant stride towards economic development, she needs to improve the health status of the citizens by instituting and increasing the monitoring mechanism on public spending on health sector, promoting literacy rate, and creating awareness on government various health programmes in the country. Re-distribution of income through appropriate fiscal policies is also a necessity. This is fundamental and important, given the significance of improved health status to productivity and consequently to economic growth and development.

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ANNEX 1

World Historical and Predicted

Crude Birth / Death Rates.

(1950 – 2050)

Years	Crude Birth Rate	Crude Death Rate
1950 - 1955	37.2	19.5
1955 - 1960	35.2	17.3
1960 -1965	34.9	15.5
1965 -1970	33.4	13.2
1970 - 1975	30.8	11.4
1975 -1980	28.4	10.7
1980 - 1985	27.9	10.3
1985 - 1990	27.3	9.7
1990 - 1995	24.7	9.4
1995 - 2000	22.5	8.9
2000 - 2005	21.2	8.6
2005 - 2010	20.3	8.5
2010 - 2015	19.4	8.3
2015 - 2020	18.2	8.3
2020 - 2025	16.9	8.3
2025 - 2030	15.8	8.5
2030 - 2035	15	8.8
2035 - 2040	14.5	9.2
2040 - 2045	14	9.6
2045 - 2050	13.4	10

Source: United Nations, Medium Variant, 2008 rev.