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# Measures of the Determinants of Demand for Personal Healthcare Services Delivery in Nigeria

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**Abstract:** *This study sought to assess the relationship between the determinants of demand for personal healthcare services delivery in Nigeria. The main objective of the study was to assess the determinants of demand for personal healthcare services delivery in Nigeria. The specific objectives were to examine the relationship between literacy; income; environmental factors, government and private expenditures on health in Nigeria. Specifically, the study is a descriptive statistics research with the use of secondary sources of data from the World Health Development Indicators (WDI) and Central Bank of Nigeria (CBN) bullettins. The study adopted Pooled Ordinary Least Square (OLS) regression model and Autoregressive Distributed Lag Model (ARDL). The analysis was based on annual time series data for the period of 1990 to 2023. The result revealed that literacy rate has a significant negative relationship with demand for personal healthcare services in Nigeria, which implies that literacy rate in Nigeria directly contributed to the decline of private demand for personal healthcare services over time. The study also observed that per capita income has a significant positive relationship with demand for personal healthcare services, which means that a rise in income levels increases demand for private health expenditure in Nigeria. Moreso, the study found that there is actually no significant relationship between environmental factor and demand for personal healthcare services in Nigeria. Finally, the study shows that government expenditure on health significantly reduces demand for personal healthcare services in Nigeria. Therefore, government health expenditure is a substitution for private health expenditure in Nigeria over time. It concludes that demand for personal healthcare services requires a deep evaluation of public health investments, economic growth policies and educational reforms. It suggested that there is the need to focus on health promotion campaigns at all levels of governance in Nigeria, and however, policies that combine literacy initiatives with health promotion campaigns can both improve demand for quality healthcare services at the private level and also ensure healthier lifestyles and preventive care.*

**Keynote:** private expenditure, healthcare, delivery, literacy, demand, income, healthcare services, personal services, inflation, environmental factors, government expenditures

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## INTRODUCTION

Health is regarded as a critical resource in the process of economic development (Yakubu & Miftahu, 2023). The analysis of demand has been found to play a central role in modern economics analysis for healthcare services delivery. Demand for healthcare required people to seek a service they can afford and are willing to pay for. Health is positioned as a means to living well, which underscore the nexus between health and community participation (Potvin & Jones, 2011). The need for healthcare is the care that consumer believes, is essential for a person to stay good health or healthy. The choice of healthcare demand is based on utility maximization theory wherefore the decision maker chooses the health facility that provides the highest utility. Health empowers individual to serve himself, community, entire nation and world at large. Health is an important form of human capital and the foundation of socio economic development (Grossman, 2017). Investment in healthcare delivery has been extensive in recent years (Cutler & Zirui, 2024) due to it important to human life. Health is one of the major components of human capital formation (Ilori, 2015). Health itself is often defined as a fundamental "good", one which enables the creation of other tangible goods in an effort to meet human wants (Nwanosike, Agu, Nwanya, Ogbu, Raymond & Mbachu, 2022). The provision of healthcare and its associated practices and products required adequate funding (Sandro & Schalkwyk, 2024), and healthcare facilities that can enhance a country's ability to respond to emergencies and outbreaks (Ewurum & Okafor, 2024).

Health refers to as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (World Health Organisation [WHO], 2014). Health is the individual ability to cope with his or her environment physically, emotionally and socially. Though, it does not necessarily translate to the absence of diseases or sickness as seen by World Health Organization (WHO, 2014). But, it is a state of complete physical, mental and social wellbeing, undoubtedly important to people (Ghebreyesus, 1917), as the health of a nation significantly enhances its economic development by increasing productivity (Okechukwu, 2023). It is worth noting that very few studies distinguished between the impacts of supply-side factors such as healthcare facility capacity and resource availability and demand-side factors which including patient behaviours and preferences on health service utilization (Isim, Miegha & Khurshid, 2024). Health as a fundamental human right, sustaining health requires following daily advice and preventive measures to lessen the likelihood of disease. The prevention of health problems and adequate protection of one's health as well as the ability to better manage health challenges is dependent on the health literacy level of the individual (Itasanmi, Ekpenyong, & Andong, 2022).

The goal of functional health is to improve healthcare delivery which plays an increasingly important role in current healthcare reform efforts (Wolf, 2005; Strandberg-Larsen & Allan, 2009). Health spending indicators are key guides for monitoring the flow of resources, informing health policy development, and promoting the transparency and accountability of health systems (Global Health Expenditure Database, 2022). The social economic status on environmental situation affects the determinants of health (Abhotemlen & Olawale, 2021). Demand for personal healthcare

services increases access to healthcare delivery (Olubiyi & Akintobi, 2021). The use of healthcare depends on demand and availability which health consumer allocates resources based on need rather than demand. Increase prices with minimal improvements in quality or outcomes, or by mandating all-or-nothing contracts that limit the ability of insurers to cover only services that are considered high value (Sandro & Schalkwyk, 2024). The choice made according to them is driven by economic and other factors and determination of which factor is or is not important in explaining the choice is an empirical matter. The importance of a person's health status in a clinical context is related to the analysis and social evaluation of a person's health and social environment valuating the determinants of demand for health services introduce and implement appropriate incentive scheme to encourage better health services.

Health literacy engenders knowledge and skill which empowers an individual to function effectively in health continuum as a patient in the healthcare system, persons at risk of contracting diseases in the disease prevention settings and stakeholder to the health promotion efforts in the society, home, work, educational system and market place (Itasanmi et al., 2022). Essentially, demand for healthcare is characterized by the level of actual consumption of an individual in case of facing illness or injury. This consumption could differ in accordance with demand factors such as income, cost of care, education, social norms and traditions, and the qualities and appropriateness of the services provide (Asteraye, 2002; Bello, 2005). Demand for healthcare depends on the level of consumption of an individual in case of ill-health and/or illness.

The amount of consumption can differ according to the factors affecting the demand such as income, service price, education, social norms, literacy, traditions, religious believes, economic challenges and quality of healthcare service delivery. A person's decision to use or use health services is related to his or her illnesses and injury status rather than healthcare. Grossman in his theory of human capital in 1972, noted that people invest in themselves through education and health to increase their income, and proposed an approach in which many important aspects of the demand for health services differ from the traditional demand approach, a theory which plays a central role for education (Grossman, 1972). People who seek out additional education tend to be those with lower discount rates (Fuchs, 1982), and that better educated persons tend to be economically more efficient producers of health status. Education is positively related to health such that educated people demand more for healthcare, and the amount of healthcare demanded is sometimes measured by the quantity of services used, such as inpatient days, outpatient visit or prescription.

The demand for inpatient services could respond differently to price changes than the demand for outpatient services. This is because there is responsiveness of demand for different health plans to changes in the price of health insurance. Any change in the out-of-pocket costs of services or premium costs will have an effect on the number of plan enrollees and thus, in the demand for healthcare services paid for by that plan (Ringel, Hosek, Vollaard, & Mahnorski, 2004). However, decline in health service utilization during degradation or greenhouse emission would influenced not only factors related to the availability of healthcare services but also factors associated with

patient demand (Isam et al., 2024). Rational consumers maximize utility function of goods and services subject to budget constraints (Besley, Hall & Preston, 1999). Demand also depends on consumer preferences. Preferences are people's tastes and attitudes towards different goods and services. Preferences are formed based on previous experiences, genetic factors, propaganda, religious beliefs, and other cultural and social factors (Folland, Goodman, Charles & Stano, 2017; Gu, Li, & Li, 2020). Therefore, this study attempts to examine demand for personal healthcare services delivery in Nigeria.

**Statement of Research Problem**

Achieving the correct blend of healthcare expenditure remains a challenge across the world (Olatubi, Oyediran, Adubi, & Ogidan, 2018). Healthcare expenditure has serious implications for the welfare of Nigerians. Many healthcare start-ups are funded through private capitals (Cutler & Zirui, 2024). There has been raft of new private investments in the healthcare industry focused on cost cutting or revenue enhancements (increased prices and use), often funded by private equity (Cutler & Zirui, 2024). Though, spending on health is not only consumption expenditure, but a productive investment both at individual and national level (Yakubu & 2Miftahu, 2023). Demand for personal healthcare service delivery has been considerably dwindling in Nigeria due relatively deficient among socioeconomic health indicators, which out of pockect expenses takes largest crunch according to extant literatures (Ode, Adejo & Adad, 2021; Okechukwu, 2023; Adekoya, 2024). This has given rise to debates in some quarters as to whether or not there exist relationship between income, literacy, environmental factors, health education and government involvement on healthcare delivery. According to Federal Ministry of Health in 2010, private health sector is responsible for 60% of healthcare service delivery while the public health sector account for 40% (Aregbeshola & Khan, 2018), which inequality further widening accessing to healthcare services by high profile individuals, especially the political class, who continues to fly abroad on regular basis for medical treatment, and as a result of which total health expenditure as percentage of GDP stood at 5.3%, ranked 153 out of 187 the countries and territories in 2012 (Eneji, Dickson & OnabeIn, 2013).

Out-of-pocket health expenditure as a percentage of private expenditure on health is about 95%, highest as a share of total health expenditure compared with other African countries of which the highest out-of-pocket health expenditure as credited to Cameroon which is about 66% in a study where health delivery is proxies with private health expenditure (World Health Organization, 2016). A high level of out-of-pocket spending as a major source of healthcare financing limits the ability of poor households to access and utilized basic healthcare services. This has showed that domestic private health expenditure and out of pocket health expenditure contributed more to the current health expenditures in Nigeria (Ibukun & Osinubi, 2020), thus pushsover 100 million into poverty. Extant study that examine the determinants of public healthcare expenditure in Nigeria exerts that demand for health in Nigeria is price inelastic (Ilori, 2015). Studies that examine healthcare expenditure by individual in Nigeria found that financing is regressive with the incidence disproportionately resting on poor households with about seventy percent (70%) of the total expenditure on health (Adekoya, 2024). Extent literature that assess the effect of health

education intervention on knowledge and utilitilization of health facility delivery services by pregnant Women in Sokoto State, Nigeria observed that the proportion of the participants with good knowledge of the implications of the subject matter inceases significantly (Ango, Oche, Abubakar, Awosan, Kaoje & Raji, 2018).

According to SDG, average federal government allocation for education stood 7% between 2003 to 2021, a significant drop from global recommendations of 15% to 20% of the total government budget for health education. This has shown strong evidence that socio-economic challenges like education, income, ethnicity, genders and employment status have a significant impact on health as suggested by the World Bank Group (WBG) report in 2021, involvedly linked to income and education which indicates extreme weather conditions among others (Badia, Awwal, Rahila & Usman, 2021). It has also been criticized by extant literature as reason for the low private healthcare expenditure and patronage among Nigerians. Studies had linked no and/or lower educational attainment to lower income and poor health outcomes (Ferguson, Bovaird, & Mueller, 2007). There also exists widespread debate that social structural barriers to fair access to essential healthcare services including illiteracy (Baciu, Negussie, & Geller, 2017), that is, a high level of education not only guarantees that people are in a better financial position to afford great healthcare but also gives them the necessary agency to seek care and navigate the health system effectively (Atobatele, Omeje & Ayodeji, 2022). Healthcare delivery is not demanded because it is self-satisfying. The choice made is driven by economic and other factors and determination which are not important in explaining the choice. Demand for inpatient services could respond differently to income, literacy, environment challenges or government expenditure than the demand for outpatient services.

A notable study argueably infers that demand for personal healthcare services increases access to healthcare delivery (Olubiyi & Akintobi, 2021), hence, reasons for health education and literacy accordingly, symbolizes that there is a large differences in health status among different social economic group irrespective of their income level (Solanke & Rahman, 2018), health inequalities and disparities in health status and outcomes or health resources distribution among different population group [World Health Organization, (WHO, 2018)]. It there arguably seen that nearly pitilessly impossible for private health expenditure to adequately deliver sufficient health status to health seeking individual on demand for healthcare services due to government inability to adequately funds healthcare in Nigeria, in terms of universal health coverage and goals, poor health institutions, lack of adequate health information which can be damaging for patients and their relatives, health professionals and entire society (Ode et al., 2021), lacking provision for basic health amenities, mitigating per capital income gap, initiation of object forecasts, viable environmental policies as curbing inflation pressure, improving aggregate demand for, and spending on health and health related facilities as well as productivities of health personnel. Resorts to that fact that health of a nation significantly enhances economic development by increasing productivity (Okechukwu, 2023).

Suffice to say, however, that the rational consumers maximize utility function of goods and services subject to budget constraints (Wellay et al., 2018), and the amount of healthcare demanded is sometimes measured by the quantity of services used, such as inpatient days, outpatient visit or prescription. Healthcare expenditure which is the sum of public and private health expenditure covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation) (% of GDP) in Nigeria was 5.07% as at 2010 with its highest value over the past 15 years being 7.55% in 2003 while its lowest value was 3.91 in 2002 (Olatubi, Oyediran, Adubi & Ogidan, 2018). The demand for inpatient services could respond differently to price changes than the demand for outpatient services. Against this backdrop, relevant of the above debates have not shown clear-cut-edge, hence the need to assess the above subject matter. In the light of the above discussions, the following research questions were to be looked into: to what extent has literacy influenced private health expenditure in Nigeria? Income impacted on private health expenditure in Nigeria? Environmental factors influenced private health expenditure in Nigeria? and Government expenditure on healthcare influenced private health expenditure in Nigeria?

**Objectives of the Study**

The main objective of the study was to assess the determinants of demand for personal healthcare services delivery in Nigeria.
The specifics objectives were to:

1. examine the relationship between literacy and private health expenditure in Nigeria;
2. investigate the relationship between income and private health expenditure in Nigeria;
3. determine the relationship between environmental factors and private health expenditure in Nigeria.
4. assess the relationship between government expenditure on healthcare and private health expenditure in Nigeria.

**Scope of the Study**

This study attempts to examine the relationship between the determinants of demand for personal healthcare services on health delivery in Nigeria. The study employed secondary data from the World Development Indicators (WDI), World Health Organization (WHO), and the Central Bank of Nigeria (CBN) health bulletin using pooled Multiple Ordinary Least Square (OLS) to evaluated the relationship that subsists between the determinants of demand for personal healthcare services delivery in Nigeria. The study dopted time series data and proxy Dependent Variable which is Health Delivery (HTD) with Private Health Expenditure (PHER) while Independent Variable, Demand for Private Healthcare Services was proxied with Literacy [Literacy Rate (LTCR)], Income [Per Capital Income (PCIN)], Environmental Factors was [proxied with Environmental Degredation (ENDN)] while [Inflation Rate (INFL)] was used as a control variable. The study

covered a period of 34 years from Healthcare Reports and Publications of the World Development Indicators (WDI), and Central Bank of Nigeria (CBN) Health Statistical Bulletin from the period of 1990 to 2023.

## LITERATURE REVIEW

Out of pocket health expenditures remain the dominant source of financing countries' health system (Edeh, 2022), and the pattern of health financing links to the provision of health services. Okechukwu (2023) opined that out-of-pocket expenditure as a percentage of private expenditure on health. Out-of-pocket health expenditure is the imposition of user-charges at the point of consuming healthcare services, which negate that fact that more public health services could enhance level of life expectancy. Out-of-pocket payment is known as household health expenditures which accounted for more than 90% cost of accessing healthcare in Nigeria (Olayiwola & Olusanya, 2021). Both domestic private health expenditure and with out of pocket health expenditure increases at a higher rate than the domestic general government health expenditure. This shows that both domestic private health expenditure and out of pocket health expenditure contributed more to the current health expenditures in Nigeria (Ibukun & Osinubi, 2020)

Accordingly, World Health Organization in 2011 estimated that globally over 150 million people incur catastrophic health expenditure, while over 100 million are pushed into poverty due to out of pocket health payments, most low and middle income countries including Nigeria are battling with the problem of poverty. The absence of institutionalized National Health Accounts (NHA) contributes to the challenge of reassessing health spending in the country, and thus that the low levels of external health financing reflect an unwillingness to invest in the country, indicating that about 9.2% (percent) of spending is donor funded which is very low compared to Ghana with about 16.9% (percent), which has a comparable GDP per capita. The health financing system is mainly based on out-of pocket user-fees which payments are made at the point of service beyond the inability to pay for existing expensive health insurance schemes. Out-of-pocket expenditure remains a major component of private health expenditures in most of these countries especially in countries with no social health insurance. This restricts access to medical care, particularly for the poor (Gwaison & Maimako, 2020).

Olatubi et al., 2018) admitted that in Nigeria, prepaid spending or risk-pooling only encompasses 3.1% (percent) of all private health spending. The remaining private spending consists of out-of-pocket payments. This makes the development of risk pools difficult and creates an environment that is not conducive to private investment. Therefore, health is also a prominent part of human capital along with education, social conditions which are interconnected (Novilla et al., 2023). Aregbeshola & Khan (2018) noted that the high percentage of out-of-pocket health payments indicates that households contributed more to overall health expenditure than governments in Nigeria. Out-of-pocket health expenditure as a percentage of private expenditure on health is 95%, high level of out-of-pocket spending as a major source of healthcare financing limits the ability of

poor households to access and utilize basic healthcare services. Adding that Nigeria has the highest out-of-pocket health expenditure as a share of total health expenditure compared with African countries of which the highest out-of-pocket health expenditure as credited to Cameroon which is about 66% (World Health Organization, 2016).

**Health Literacy**

Literacy level of a prospective heath consumer affords him to concentrate, promote and make commitments on health expenditure. Health literacy is a measure of people's ability to read, comprehend and act on medical institutions (Mirsamiyazdi et al., 2021). An individual crave to spend on health based on advocacy and available information. Health literacy engenders knowledge and skills which empowers an individual to function effectively in the domains of the health continuum, and as a patient in the healthcare system, or person at risk of contracting the disease in the disease prevention settings and/or stakeholder to the health promotion efforts in the society in the home, work, educational system and at the market place to which the health person belong (Itasanmi et al., 2021). Prospective health seeking individual literate stance to adequately fulfills health knowledge of his or her health status within its absolute environment in terms of hospital visitation, investment in tourism as well as better utilization of various health provisions available to him, and to generates information that could serve as a basis for appropriate health interventions that could improve health literacy status and engender policy actions that would help promoting good health and management of health conditions (Itasanmi et al., 2022).

Health literacy can be defined as a complicated of interplay of factors such as skills, health awareness and what healthcare professionals expect lay individuals to know of and comprehend about health as a state of healthcare and system of services (Ode et al., 2021). The improvement of health literacy, risk perception and aversion facilitates people taking measures to manage health risk by purchasing insurance by way of diversifying health commitment and expenditure Gao, Nie, Wang & Li, 2022). Cingi (2018) opined that lack of literacy causes difficulties in finding and utilizing health information, acting in health ways and reacting to warnings given out about healthcare, events affecting the public. Health literacy is a necessary skill needed by every prospective health consumers as it allows people to take control of their wellbeing by making informed healthcare choices, ensuring communication with healthcare providers and equipping them with needed information for self-advocacy in the healthcare system (Olyani, Gholian, Tehrani, & Mohdiadeh, 2021). According to Bello (2019), imperative to have an understanding of their health literacy status and its determinants, such understanding would provide information and prompt intervention strategies targeted at improving health literacy for the general promotion of health and wellbeing. Olyani et al (2021) admitted that lack of health literacy has been found to have negative implications on individual and national health outcomes. Also inhibits capacity to make the best decisions concerning health, the tendency to have worse health outcomes and the use of unnecessary health emergency services is high.

It follow therefore that low health literacy increases the cost of healthcare outrageously because when people lack understanding of health information and instruction, there is tendency to have worse health outcomes. Having inadequate health literacy may make it difficult to understand when and how to take a prescribed drug, and where to seek appropriate medical care and how to communicate with the healthcare provider on signs and symptoms they are experiencing at personal level. Health literacy is consisting of the quality of healthcare provider support, perceived adequacy of health information, taking responsibility for health issues being focused about health involve social support, critical appraisal of health resources and ability to access health information (Osborn, 2007). In that ragards, Healthy people (2010) defines health literacy as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions. This focused on individual ability to find, understand and evaluate information which the individual use to enhance his health status and eliminate inequalities in health prospective. Nutbean (2000) sees health literacy as personal cognitive, social skills which govern the ability of individuals to harness understand with the use of information to promote and preserve good health. The ability to understand and interpret the meaning of health information in written, spoken or digital from and how this motivate people to embrace or disregard actions relating to health is a major features in important decision making (Freedman, Bess, Tucker & Boyd, 2009).

**Income**

The level of National Income (NI) or Gross Domestic Product GDP) plays a role in determining a nation's health expenditure (Hitris & Posnett, 1992). Income is an essential component in explaining healthcare expenditure. Increase in level of income can stimulate growth of health expenditure (Olayiwola & Olusanya, 2021). Health expenditure increases faster where the share of public expenditure was highest. Gustafsson-Wright and Van Der Gaag (2008) revealed that there is a clear relationship between the use of private and public health facilities and per capital income consumption. Besides that, income of an individual plays key roles in his visitation to healthcare system, access to drugs and recreational services. The amount of money needed to fund healthcare system adequately is a function of a large number of variables (Len, 1986; Umoru & Yaqub, 2013). Len (1986) uncovered public expenditure, national income and a range of demographic variables demonstrating an income elasticity that is exceeds unity. Konoreva (2006) found that the relationship between health expenditure and GDP growth rate for 24 transition countries was positive of health expenditure on GDP growth rate. Amos, Nwakuso, Baba and Olamide, (2016) noted that this excess reliance on out of pocket expenditure for medical bills curbs healthcare consumption, deepens unequal access to quality healthcare and exposes Nigeria households to incurring catastrophic health expenditure which making the goal of universal health coverage far from been realized.

According to United Nations (UN) recommendation, countries expenditure of at least 8% - 10% of Gross Domestic Products (GDP) should be devoted on health sector, in subsequent to the declaration at the Federal Capital Territory (FCT) Abuja in 2001 which advocated committing at least 15% of the annual budget to health sector by each concern African country. The Nigerian

government as a result has been making collaborative efforts to meet up with these benchmarks by increasing expenditure on health sector. And as a result of the collaburation, government has increases expenditure on health from N84.46bn in 1981 to tone of N134.12bn in 1986, and having a short falls to N41.31bn in 1987, and increases it allocation to the tone of N575.30bn in 1989. In 2002, the total government expenditure on health rose to N40, 621.42bn and significantly dropped to N33, 267.98bn in 2003. By 2010 the figure was review upward to N104, 810.08bn. Between 2011 and 2014, government expenditure on health increase to N113,766.30bn in 2011, N122,722.60bn in 2012, N131,678.87bn in 2013 and N140,635.10bn in 2014 respectively (Central Bank of Nigeria [CBN], 2017). According to Olayiwola and Olusanya (2021), health care expenditure was N1, 190.71 billion by 2019. It rose to N1, 329.78 billion by 2020 and increase to N1, 477.77 billion in 2021, and expenditure on health has been increasing on yearly basis. Despite all these efforts to achieve universal health coverage, out-of-pocket health expenditure by private individual on health services and consumption is still astronomically on the increase, meaning efforts by government is yet to really yield the require need as well as boost the National Income and rises per capital income of the average health consumer in Nigeria.

Olatubi et al., (2018) affirmed that the health financing system is mainly based on out of pocket user fees. The high share of out of pocket expenses is that it is the most expensive, least efficient and least inclusive financing channel, it weighs heavily on household budgets income and forces many into domestic financing deficit due to unpredictable catastrophic health expenditure. In short, the poor are stuck in a vicious cycle for healthcare, and payments made at the point of service. Health outcomes are poor not just in absolute terms, but also when compare to other countries with similar income per capita (Abubakar et al., 2022). Apparently, spending on health as a per cent of GDP is second lowest in the world (Croke & Ogbuoji, 2024). Beyond the inability to pay for existing expensive health insurance schemes, the willingness to prepay for healthcare is low in an environment of low trust in which people are unsure of benefits from a product or service in the future against payment for today. This is a common factor in poverty stricken environments, where decision making take place in a much shorter horizon with people refraining from saving, investing and buying health insurance. In Nigeria, prepaid spending or risk-pooling only encompasses three point one percent (3.1%) of all private health spending. The remaining private spending consists of out-of-pocket payments. This makes the development of risk pools difficult and creates an environment that is not conducive to private investment. Prepayment is low because people do not trust the system and because the quality of the services is low, while a lack of steady revenue stream discourages providers from investing. Lehan, Rudiy and Nolt (2005) revealed that out of pocket payments often made by patients in transition countries to presume substitutability effort of private health expenditure for public health expenditure.

**Environmental Factor**

Nigerian health system is characterized by wide regional disparities in health indicators, service delivery and resource availability (Umoru & Yaqub, 2013). Economic generally assume that people are rational and forward looking, maintaining a normal weight may make one more physically fit, likewise maintaining normal weight today may prevent the development of diabetes

later in life (Huskamp et al., 2015). A person is concerned not only about promoting current health but about future health as well. Though, there are increasing empirical evidence that health matters for economic growth and development (Ilori, 2015). One of the most difficult but often unavoidable tasks in healthcare cost and benefits analysis is to place value on life. So, being in good health is a necessary but not a sufficient condition for living a productive and long life. However, consumption of some goods such as tobacco products, yields current pleasure but likely to have adverse health effects later in life. Environment enhances the experience of care for patients (Robyn, 2024). Environmental degradation and greenhouse emission subjugate health status. Greenhouse gasses like methane and nitrous oxide are emitted when fossil fuels are burnt. It produces materials such as steel, cement and plastics, and grows the food we eat which has far ranging environmental and health effects. Greenhouse gases causes climate change by trapping heat and also contribute to respiratory disease from smog and air pollution. Extreme weather, food supply disruptions, and increased wildfires are other effects of climate change caused by greenhouse gases. Extreme heat waves, rising sea level, changes in precipitations resulting in flooding and droughts and intense hurricanes can directly cause injury, illness and even death (IPCC, 2021). Accordingly, climate change can affect food safety and which exposing people to contaminated foods that can result in food borne illnesses, increase precipitation, storm surge and sea temperature, hence lead to changes in infectious diseases ( 2003).

**Government Health Expenditure**

Governments worldwide have faced challenges in health crisis management, impacting their leadership and underscoring the need for international cooperation to address global health challenges (Isim el al., 2024). Adequate financing of public healthcare system is needed to achieve universal healthcare for all populations, particularly people with greatest healthcare needs (Okechukwu, 2023). Despite rising public spending on the delivery of modern healthcare, the usage of health services has remained low in Nigeria (Ogundipe, Adenekan 2022). Health expenditure is mainly government responsibility, government provides necessary healthcare services for the benefit of her people and the economy and society (Ogunjimi & Adebayo, 2019). Ugochukwu, Onyekachi, Adanma, Izuchukwu, Chinemerem, & Chuka, (2022) noted that these services include health education concerning prevailing health problems and their prevention and control, maternal and child health services including family planning, immunization against the major infectious diseases as well as treatment of minor ailments. and thus not surprisingly mean that quality can suffer when the focus is on extracting money (Cutler & Zirui, 2024).

Public health expenditure consists of recurrent and capital spending from government in all strata including federal, states and local government on budgeting allocation. This encompasses external borrowings and grants but not excluded donations from international donor agencies and non-governmental organizations, and social or compulsory health insurance funds (Al-Yusuf, 2000). WHO (2010) asserts that total expenditure is the sum of public and private health expenditure. Private expenditure on health is as a percentage of aggregate health expenditures account for the bulk of health care expenditure in Nigeria (WHO, 2008). Private health expenditures recorded seventy-forty point five percent (74.5 %) of total health expenditure against government health

expenditure which stood at twenty-five point five percent (25.5%). Accordingly, out of pocket health spending averaged sixty-nine point five percent (69.5%) with the private prepaid plans measure represents about five percent (5%) of total health expenditure. Government health spending generally increases in line with the various prevention, detection and offset declines in out-of-pocket spending. Fewer than half of Nigeria's public health facilities maintain a consistent supply of essential drugs, and many lack basic utilities like electricity and so on (Ogundeji et al., 2023). World Bank (2016) inferred that total expenditure from various levels of government is on average, and only about 29% of total health spending, as compared with the private sector expenditure, as much as 70%. Low funding from various tiers of government has led to inadequate health infrastructural facilities and poor access to quality healthcare services in Nigeria (Edeh, 2022).

According to Olatubi et al., (2018), it is imperative to know whether governance has impact on the effectiveness of health expenditure in Nigeria. Atella and Marini (2002) observed that a substitutability relationship exists between private and public health expenditure, national income, the presence of different health systems and the rule of the technical progress are all significant determinants of healthcare expenditure. Household expenditure on health has increasingly becoming a major source of healthcare financing in Nigeria, which bulk of it is over ninety percent (90%) of private healthcare spending is out of pocket payments. Proportion of Nigeria covered by private health insurance scheme including employers' plan is estimated to be about zero point zero-nine percent (0.09%) according to Onoka, Onwujekwe, Hanson and Uzochukwu, (2010). Croke and Ogbuoji (2024) supported that delayed disbursements and lack of transparency and accountability in intra-fiscal transfers had been major issue. Edeh (2022) queries that out-of-pocket payment in Nigeria remains worrisomely high, as it is the proportion of total health and gross private health expenditure, is still above 70% and 90% respectively. Government health spending as a percentage of the gross domestic product (GDP) has for more than a decade remained less than 1%, implying that out of pocket payment is the dominant health financing system in Nigeria (World Bank, 2016). As result, Nigeria government in 2014 passed into law the National Health Bill, which was targeted in principle and provide for increased access to basic healthcare for the vulnerable population. Improved health status is expected to lead to enhanced welfare as well as economic growth (Awoniyi, 2014).

Adewumi, Acca and Afolayan (2018) revealed that adequate healthcare expenditure can significantly improve health outcomes through improving life expectancy at birth, reducing child and infant mortality rates. Accordingly, public and private healthcare spending showed a strong positive association with health outcomes though public healthcare spending had a relatively higher impact. This is because public health expenditure involves spending on both preventive and intervention services and is distributed through service delivery systems such as health literacy, sanitary condition, and employment of trained and qualified doctors and nurses. Cutler & Zirui (2024) admitted that many healthcare start-ups are funded through private capital and benefit from a host of favorable tax rules. Increased expenditure in healthcare increases the productivity of human capital, thus making a positive contribution to economic grow (Raghupathi & Raghupathi,

2020). NHA (2016) found that Nigeria is still far below the universal health coverage health insurance financing target of 90%, as its health insurance contribution to total health expenditure remains at an average of only 2%. To complement the Nigeria national health insurance scheme and commit better to United Nations Sustainable Development Goal three (SDG3) and universal health coverage. Low level of government support for the healthcare productiveness prompts countries to use private health serves, and the share of the private expenditure on healthcare services is expected to be about fifty percent (50%).

The level of health spending in the low income countries is insufficient to address the health challenges the citizen of those countries are confronted with (Commission on Macroeconomics and Health, 2001). According to Isim, Miegha and Khurshid, (2024), the impact of non-adherence to medications could not be assessed due to the lack of availability of relevant data. Umoru and Yaqub (2013) noted that government expenditures on health are extremely low while private health spending represents the largest proponents of total health expenditures in Nigeria. Atella and Marini (2002) study underline the importance of investigating the degree substitution between private and public healthcare expenditures shows that public health has a high substitutability power that can offset the contraction in the private health expenditure. Private health expenditure has much lower substitutability power to increase correspondingly when the public share is reduced. Guisan and Arranz (2001) admitted that private expenditure on health was growing at rates higher than total private health expenditures in Organization for Cooperation and Development (OECD) Countries. Even the little prevention, care and treatment services provided have been mostly financed from donor fund from developed nations of the world. In that regard, Nigeria continues to combat double burden on communicable and non-communicable diseases strengthen its health system especially its primary healthcare system ensuring all Nigerians have access to quality, effective, efficient, equitable, accessible, affordable, and comprehensive healthcare services (Ogundeji et al., 2023).

**Inflation**

Policy choices in Nigeria has been greatly impacted by the direction of inflation rates (Ekpeyong, 2023). Inflation raises cost of production of health supplements and reduction in consumption of drugs treatment of ailments, hospital visitation and checkup. Inflation is one of the major disturbing components of environmental factors, a cost to health commitment and treatment, rising cost to price index and general prices of goods and services, limiting the ability of private health expenditure. Ekpeyong (2023) advices that Nigeria experienced an economic recession due to falling GDP growth and high inflation rates. Inflation is a situation whereby there is a persistent rises in general price, cost of production and dispensing drugs. It manifested in a high cost of health subscription and status declines. Pigou (1949) denotes that inflation exists when money income is expanding relatively to the output of work done by the productive agents for which it is the payment. Solow (1979) sees inflation as going on when one needs more and more money to buy some representative bundle of goods and services or a sustained fall in the purchasing power of money. Johnson (1972) defines inflation as a sustained rising trend in the general price level. This factor can be major constraint to the assessment of quality healthcare service due to despicable

infuriated costs, posing challenges on health welfare delivery and consumption. Ekpeyong (2023) infers that the price variations in goods and services over time are reflected in inflation, a key economic indicator that promote unhealthy serenity amongst dominants variables of interest in this context on economy output.

Vaish (2002) added that inflation is a process of rising and not a state of high prices showing a state of disequilibrium between the aggregate supply and the aggregate demand at the existing or current prices necessitating a rise in the general price level in the economy. Therefore, defines inflation as a sustained rise in the general level of prices brought about by high rate of expansion in the aggregate money supply. Inflation tendency is a dominant component of health issues. It hinders the ability to consistently subsists and maintain sound health status, pay for healthcare services and access drugs. Inflationary pleasure is a threat to private health expenditure, a decline to per capital income of the health seeker. It lessens health provisions on health status and commitment to views health needs and consumptions including ability to source for drugs, fight health related illnesses, and use health facilities. Balami (2006) noted that inflation is a situation of a rising general price level of broad spectrum of goods and services over a long period of time (Ademola & Badiru, 2016). Demand pull inflation is induced by excessive demand not matched with increase in supply, a situation where too much money chasing too few commodities. During war or epidemic like the covid-19, demand outweighs supply, cost push or wage price spiral inflation induced by rising costs of production. A rising wages suddenly raises cost of living of the health seekers and drugs production. Hyper-inflation extemporize a rise of aggregate demand for health delivery and out of pocket spending on health consumption. This occurs when the price level rises at a very rapid rate (Anyanwu, 1993). The main cause of hyper-inflation is an enormous expiation of the monetary supply. To the neo-classical and their followers at the University of Chicago, inflation is fundamentally a monetary phenomenon (Friedman, 1976).

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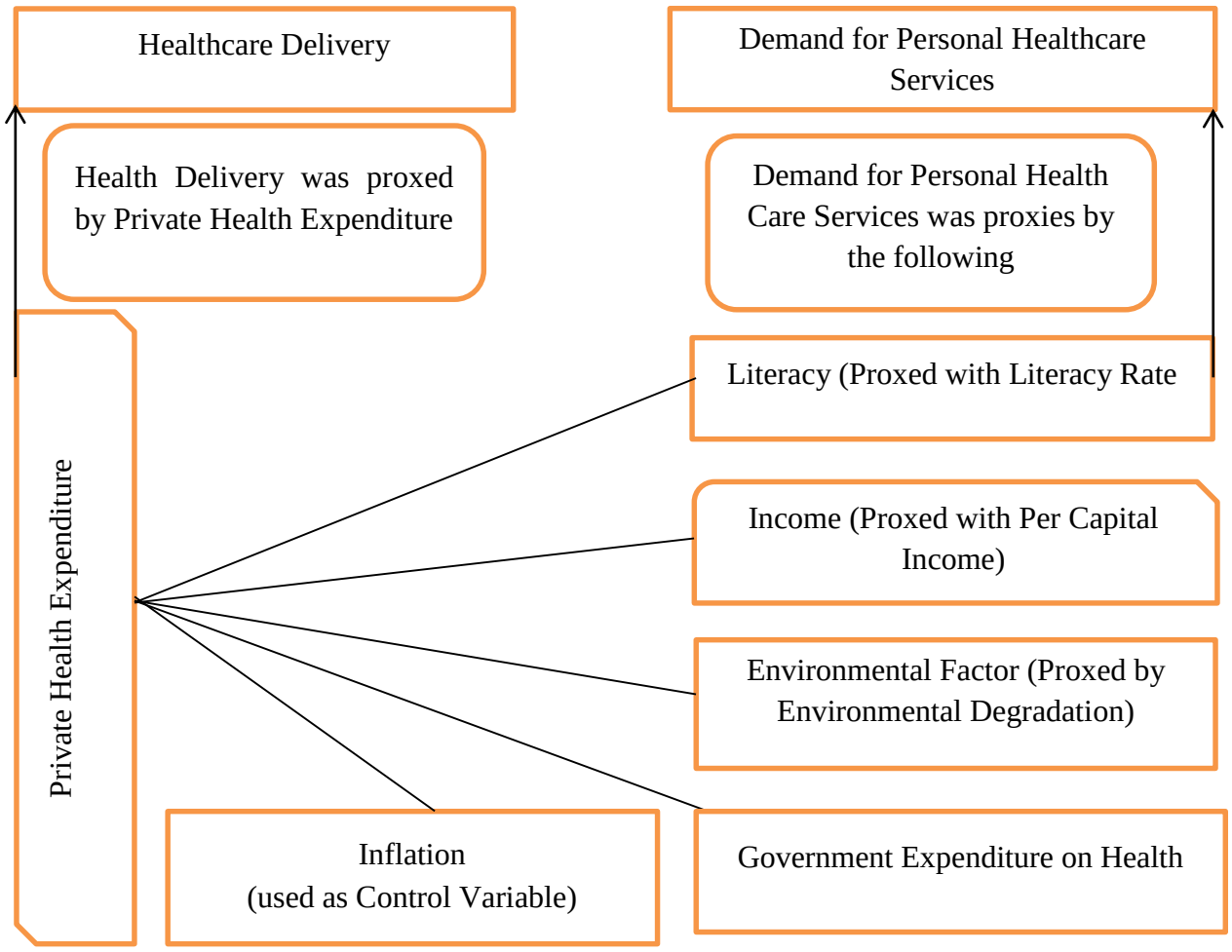
**2.6 Theoretical Framework**




**Sources:** Authors Compilation of Conceptual Model (2024).

The above Fig 2.6: theoritical model diagram shows the relationship and interaction between variables of interest. The model explains the relationship with the independent variable (personal healthcare services) proxies by per capital income, literacy rate, environmental factors, government expenditure. The depenent variable is (delivey proxed by private health expenditure. This is so, because demand for personal healthcare service can only come from out of pocket expenditure to meet healthcare delivery as demonstrated in the above diagram.

**Theoretical Review**

There are several proponent theories of consumption that seems to explain the consumption pattern of a potential health seeking consumer in relative to its income and as being promulgated in decade age long. These are Absolute Hypothesis propagated by Maynard Keynes in 1936; Relative Income Hypothesis by James Duesenberry in 1949; Permanent Income Hypothesis by Milton

Friedman in 1957; and Life Circle Income Hypothesis by Franco Modigliani, Albert Ando and Richard Brumberg was developed and dated back to early 1950s. Though, absolute income hypothesis seems to be the oldest theory of consumption. It is a fall out of Keynes psychological law, "that men are disposed, as a rule and on average to increase their consumption as their income increases but not by as much as the increases in their income (Drakopoulos, 2021). It emphasis was that an individual consumption decision is based upon its absolute income value of its current income. The common features of Keynes absolute income hypothesis in these manners are that consumption and savings are functionally and directly related to disposable income. This relationship is a stable one. Secondly, that before now the consumption model that was examined is said to be linear, and hence, a non-linear model was applied in the analysis of the hypotheses. In that regard, the slope of the curve so formed is said to be linear. Meaning that an increase in income often leads to a fall in marginal propensity to consume (MPC) while, a decrease in income leads to a rise in MPC. Thirdly, that Average Propensity to Consume (APC) declines as income increases but no matter how APC falls, it must always be greater than MPC as equally expressed algebraically.

Relatively, this study has domesticated relative income hypothesis as theory of thoughts. This theory was promulgated by James Duesenberry in 1949. The theory attempted to look at ideal that does not considered in earlier economic analysis such as; the individual consumption decision which is based or influenced by the consumption of other individuals. The consumption decision of an individual depends on the ratchet effect of an individual which was said to be habitual. The habitual nature according to them, enables the individual to maintain a given standard of living which he or she has been used to. James Duesenberry asserted that the individual consumption decision is often influenced by his social environment, given certain level of income, an individual tends to spent more on his socio status, if he lives in a society where we have more of well to do persons than he lives in a neighborhood that is dominated by the poor; likewise concentration on his health status. That the individual will do all within his reach to remain healthy by taking step alongside neighbours. The proponent advances that the individual who wants to maintain a certain status in the society tend to spend much of his or her income, thus, average propensity to consume (APC) remains constant given a relative constant income distribution. Wherefore, the relationship between consumption and the disposable income is proportional, and the demonstration effect more often than not enable the individual to spend more of his or her income. The proponent of the theory explained further that the ratchet effect by discomposing disposable income into two phases (components) such as current income (CY) and previous peak income (YPP). He noted that if current income is less than previous peak income, the individual consumption decision will be based on its relative or previous peak income rather than its current income. On that basis, the individual consumption expenditure will be augmented by the individual from his savings.

As such, the APC will rises conversely if current income is greater than previous peak income. The individual consumption decision will still be based on his relative income. Apparently, APC tends to decline in the short run thereby exhibiting a non-proportional relationship between consumption and disposable income. The proportional and non-proportional relationship between

consumption and disposable income were explained with graphical illustrations by James Duesenberry. Similarly, the neoclassical economic theory of rational consumer and constrained utility maximization was the cornerstone of modern healthcare demand analysis refers to on this study. In the paradigm, people are assumed to drive utility directly from the health obtained from medical services (Wellay et al., 2018). Basically, the model is based on the idea that 'an individual choose the outcome that maximizes the utility gain from the choice. This implied that given two alternatives K and Z, assuming there is no ties in utilities; a rational individual chooses alternative A if and only if UK > UZ and vice versa. In the events of illness, the individual "F" is assumed to maximize utility (U) conditional on the consumption of health provided by provider "H", subject to the budget constraint and health production function (Arega, 2003; Scott, 1997).

**Empirical Review**

Some empirical studies that review similar works in this area of study were either in consonants with earlier works done in this area or at variance. Adeoti (2014) attempted to provide insights into the determinants of health status and the demand for healthcare in Nigeria. The study used the 2008 DHS data, the effect of the demand for healthcare service as a complement to other unobservable factors that affect health status of children explored based on the complementary hypothesis. The data was analyzed using different estimation procedures. The study observed that the demand for immunization for children was significant in explaining child health, which expectedly induces the use of other health enhancing inputs and behaviours while poor family immunization was not significant. It also showed that older children and those residing in the rural areas suffer more from poor health rather than educated mothers who have healthier children. The study therefore recommended that the immunization coverage area be increased adding that improving education among women will enhance the demand for health inputs and improve the health of their children particularly for the poor and those residing in the rural areas.

Itasanmi et al., (2022) examined health literacy levels and its associated predicting factors among intra-city commercial drivers in Ibadan. The study used descriptive and quantitative research method and survey design, sample random techniques from 12 purposive motor parks in Ibadan. The study revealed that weighted average of the health literacy of inter-city commercial drivers of fifty-five point five percent (55.2%) respondents have adequate health literacy, whilst forty-four point eight percent (44.8 %) inadequate health literacy. It also found that sex, marital status, religious, educational level and income were significantly associated with the health literacy states of the commercial drivers. It concludes that stakeholders should make concerted efforts toward policy formations and intervention through structured education, and provision of health information to improve health literacy and general health wellbeing of the commercial drivers.

Ekpeyong (2023) investigated the dynamics of inflation volatility in Nigeria, with a specific focused on the Food Consumer Price Index (CPI), Core CPI, and Headline CPI. The study used Autoregressive Conditional Heteroskedasticity (ARCH) and Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models to capture time-varying volatility in the inflation rates. The study covers the period 28 years from January 1995 to December 2022, and employed

monthly data sourced from the Central Bank of Nigeria database. The study identified that all three inflation series display time-varying volatility signifies varying degrees of fluctuations and uncertainties in price movements over different periods. It also showed that the presence of ARCH and GARCH effects in the residuals of the volatility models confirms the dynamic nature of inflation volatility. The study identified significant structural breaks in the volatility of food CPI during the years 2000, 2008, and 2018 emphasizing the importance of understanding the drivers of inflation volatility. However, external events and policy changes during these periods impacted food prices and led to shifts in volatility. The study therefore recommends addressing the challenges posed by inflation volatility in Nigeria government should undertaking fiscal reforms, implement price stability measures, enhancing food security, strengthening monetary policy, promoting data transparency and analysis.

Wellay et al. (2018) study evaluated demand for healthcare service and associated factors among patients in the community of Tsegedie District, Northern Ethiopia. The paper used systematic random sampling technique to select 423 participants from 2189 patients of the one month census, and adopted pretested and standardized semi-structured interviewer as well as administered questionnaire to collect the data. The data were entered using Epi-info version 7 as analyzed by STATA version 11, and employed multinomial logistic regression model to identify the determinants of demand for health care service. The study revealed that in Tsegedie district, majorities (72.5%) of the patients demanded modern healthcare service. Distance to healthcare facility, user-fees, educational status of household, quality of service, and severity of illness were found to be significantly associated with demand for healthcare service. It concludes that out of pocket, payments should be changed by prepayment schemes like community based insurance than to depend on user fees. Hence, appropriate health information dissemination activities should strengthen to create awareness about modern care.

Olubiyi and Akintobi, (2021) carried out study to access the determinants of the demand for primary healthcare service in Abeokuta South local government Ogun State, Nigeria. The study used multivariate regression model alongside correlation and frequency distribution table. The study found that economic demographics factors are vital in determining demand for healthcare services. This means that there is a week but positive relationship between income and access to primary health. Nevertheless, income of parents patients education level and quality of care have positive significant effects on demand for primary healthcare services while cost of drugs exhibited negative effect.

Lloyd (2018) carried out study on poverty, user charges and healthcare demand in Nigeria. The study examined the possible trade-off between user charges and demand for public healthcare services in Nigeria. The study adopted primary data and revealed that increasing user fees substantially reduced the use of government health facility by low-income earners. It recommended among others, that government should introduce price discrimination into user fees to be set at marginal cost. Hence, the utilization of health facilities is essential for a man to live and operate to his full potentia (Ogundipe, M. & Adenekan A. 2022).

Umoru and Yaqub (2013) empirical tested the relationship between private and public health capital expenditures in Nigeria. The study employed secondary data of national expenditure on health in Nigeria from the World Health Organization National Health Accounts Series until 2011, and adopted Generalization Method of Moments (GMM). The study indicated that government health investment plans crowd in private health investment spending. The crowding in effect could be induced by government tax incentives and regulation such as policy intervention. The study also recommended that unless appropriate regulatory measures are implemented by the government, it may result to inefficiencies and unplanned effect on the part of the private sector inclusively.

Omoke and Ugwuanyi (2010) tested the relationship between money, inflation and output by employing cointegration and Granger-causality test analysis and found that no existence of a cointegrating vector in the series used. Money supply was seen to Granger-cause both output and inflation which suggested that monetary policy can contribute towards price stability in Nigerian economy since the variation in price level is largely caused by money supply. This shows that inflation in Nigeria is to large extent monetary phenomenon, hence, empirical support in context of the money-price-output hypothesis for Nigerian economy.

Agboola, Adeyemo and Ojobanikan (2017) examined enhancing access to healthcare through literacy innovative strategies in rural communities in Nigeria. The study observed that adult literacy is been relegated for attaining health literacy forgetting that the reading, writing, computing skills enable understand and communicate basic hygiene and health instruction, which enhances functionality of adult individual who is responsible for his entire household and their access to healthcare. The study has concluded that not until adult literacy innovative are adequately explored, there will still be a serious setback in accessing and utilizing healthcare facilities in Nigeria. This will constitute a serious health hazard for Nigeria populace. It however, recommended that literacy innovative strategies make health care system attractive and accessible to rural dwellers in Nigeria.

Ibukun and Osinubi (2020) study the relationship among environmental quality, economic growth and health expenditure in 47 African countries. The study showed that air pollutants reduce the quality of the environment and increases health expenditure per capita. The study substantiated the idea that economic growth has a positive significant inelastic effect on per capita health expenditure. A collaborative situation in all the five sub regions of Central Africa, North Africa, East Africa, West Africa and Southern Africa which means that increases in economic growth augment health expenditure per capita, air pollution worsen environmental quality and spur increases in health expenditure. The study concluded that increases in economic growth should not be at the expense of the environment.

Edeh (2022), explored the dynamics in catastrophic healthcare expenditure in Nigeria drawing data from three rounds of the Nigeria general household survey. The fixed percentage and rank-

dependent thresholds were used to calculate and compare the proportion of households that incur catastrophic health expenditures. The logistic regression model was employed in analyzing the factors associated with catastrophic health expenditures. The concentration of catastrophic health expenditures inequality was also assessed using the concentration curve, whereas the inequality size was determined using the concentration index. The decomposition methods were used to decompose the concentration index into determining components. It was revealed that relative to the fixed threshold value, the rank-dependent threshold revealed a higher share of households facing catastrophic health expenditures from 27% in 2010/2011 to 48% in 2015/2016. The two thresholds reveal similar trend, but differ in percentage points. The key factors associated with catastrophic health expenditures were economic status and geopolitical zone. Inequality in catastrophic health expenditure was found to be concentrated among the poor. The household economic status was uncovered as the major positive contributor to catastrophic health expenditures inequality across the sample periods. The study concluded that narrowing economic status gap across households, and increasing the depth of insurance are crucial mechanisms to reduce the probability of incurring catastrophic health expenditures among the poor in Nigeria.

Olayiwola et al., (2021) examined the impact of the health financing on economic growth in Nigeria using Auto-regressive Distributed Lag Model (ARDL) estimation technique with time series data from 1990 to 2020. The study showed that the previous year productive activities have a growth effect on economic growth both in the short-run and the long-run. The current domestic government general health expenditure has a negative growth effect on economic growth while the previous year domestic general government expenditure on health improves economic growth. The study showed that current out of pocket health expenditure negatively affected economic growth, while previous year out of pocket health expenditure improves economic growth. The domestic private health expenditure has a significant positive growth effect on the economic growth. This result strengthened the importance of private health spending than government health expenditure in improving economic growth. The study concluded that health financing is necessary for sustainable economic growth. It recommends that government should enhance individual health spending ability, increase health sector budgetary allocation and ensure prudent and effective budgetary implementation for the heath sector.

## METHODOLOGY

The research design is an *ex-post facto* and descriptive survey research design. Descriptive statistics were made possible to shown the patterns the data analyzed undertook by giving the measures of central tendencies as well as the measures of dispersion of the variables. The descriptive statistics was used to evaluate the characteristics of data: mean maximum, minimum, and standard deviation and also check for normality of the data. Normality test was conducted in order to see the spread of the data and its association with the normal distribution. The study employed. The correlation analysis is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. The study relied on secondary sources of annual time series data from 1990 to 2023, thirty-four (34) years. Time series data and adopted

positivist research philosophy because quantitative data are considered in finding the relationship between the sampled variables. The data from secondary source was obtained mainly from the World Development Indicators (WDI) and of Central Bank of Nigeria bulletins. The time series properties of the data employed in the study is first carried out to determine if they are stationary. Most time series data are non-stationary and using non stationary variable in the model might lead to spurious regression (Granger & Newbold. 1974). However, to stem the problem of spurious, it is important that the time series properties of the data set employed in estimation of the equation is ascertained, hence, testing the presence of a unit root.

**Autoregressive Distributed Lag Model (ARDL)**

The study adopted the ARDL bound testing approach used extensively by Pesaran et al. (2001) to examine the relationship between youth unemployment and demographic dividends in Nigeria; socioeconomic determinants of demographic dividends; the extent to which youth unemployment affect economic growth. The choice of the ARDL approach based on the consideration that its co-integration analysis which was unbiased and efficient. This technique has several advantages. First, it is useful in estimating the short and long-run components of a model simultaneously, which thereby helps in removing challenges linked with omitted variables and autocorrelation (Narayan, 2004). Further to this, the ARDL co-integration approach could be used regardless of whether the underlying variables are integrated at level, at the first difference order, or are fractionally integrated. This implied that the ARDL approach avoids the pre-testing problem associated with other co-integration techniques such as the Johansen co-integration, which requires that the variables are already integrated into the order of one [I(I)] (Pesaran et al.,2001).

The ARDL approach to co-integration is preferable to the Johansen approach because it avoids the problem of too many choices that are to be made in the Johansen method (1995). These include the treatment of deterministic elements, the order of VAR, and the optimal lag length to be used. In the Autoregressive Distributed Lag Model, the variables are allowed to be in the dynamic form allowing for lag effects in a variable relationship unlike the other methods such as the Johansen (1995) method which does not allow for such. In employing the Autoregressive Distributed Lag Model, two steps are succinctly followed. In the first step, the existence of any long-run relationship among the variables of interest is determined by using the F-test. The second stage requires the estimation of the long-run relationship between dependent and explanatory variables; and to determine their values thereafter, the short-run elasticity of the variables with the error correction representation of the ARDL model.

**Model Specification**

The research introduced the regression analysis model to assess the determinant indicators of demand for personal healthcare services (proxies by income, litracy, environmental degradation, government expenditure) and healthcare delivery indicators (proxed by private health expenditure) in Nigeria. The goal of regression analysis is to provide plausible explanations of observed correlation by constructing model of cause and effect relation among variables of interest. The regression analysis is a device for analyzing the causal relationship between two or more variables.

Our model estimate and methodology in use are in consonance with the procedure adopted and model specified in Olubiyi, and Akintobi, (2021); Wellay et al. (2018). However, this study examined the relationship between different factors that could cause an individual to demand for personal health care services delivery in Nigeria.

**Model**

$\Upsilon ij = \beta o + \beta_1 X_i + \beta_2 X_i + \beta_3 X_i + \beta_4 X_i + \text{- - - - - } \mu ij \text{ - - -- - - - - - - -- - - - - - - - - - - - - - - - - - - -}$ (1)

PHER = f(LTCR, PCIN, ENDN, GHEXP, INFL) - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - (2)

$PHER_t = \beta_o + \beta_1 LTCR_t + \beta_2 PCIN_t + \beta_3 ENDN_t + \beta_4 GHEXP_t + \beta_4 INFL_t \ldots \mu_t$ - - - - - - - - - - - (3)

Apriori expectation = $\beta_o < 0$; $\beta_1 > 0$; $\beta_2 > 0$; $\beta_3 > 0$; $\beta_4 > 0$.

Where;

PHER = Private Healthcare Expenditure (Proxies Dependent Variable Health Delivery)

LTCR = Literacy Rate

PCIN = Per Capita Income

ENDN = Environmental Factors (Proxied by Carbon Emission)

GHEXP = Government Health Expenditure

INFL = Inflation Rate (Control Variable)

$\mu_j$ = Residual or Error Term or Stochastic Variable

$\beta_o$ = Slope

$\beta_1$ to $\beta_3$ = Coefficients of Variables

**Model Justification**

Our model estimation and methodology in use are in tandem with the procedure adopted by Olubiyi, and Akintobi, (2021) on the assessment of the determinants of the demand for primary healthcare service in Abeokuta South local government Ogun State, Nigeria which employed multivariate regression model alongside correlation and frequency distribution table to identify the determinants of the demand for primary health care services. The explanatory variables while was proxied for dependent variable. The model specification was that quantity demanded is a function of money income and relative prices. The model was specified as; $q^* = f(y, p_1, p_2)$. Where $q^*$ = expenditure on health care services. y = income of the patient, $P_1$ = cost of drugs, $P_2$, Price of alternative Services. Iterated that there are other factors that determine the demand for health care services, which were suggested as follows: $q^* = f(y, p_1, p_2, x)$. Where; x is other factors that determine healthcare services.

This was also in consonant with Belay (2013) on explaining the demographic factor affecting the demand for healthcare, and where he has to specify education as one of the factors and quality care. Another study that used to justify our study was done by Wellay et al. (2018), which evaluated demand for healthcare service and associated factors among patients in the community of Tsegedie District, Northern Ethiopia. The paper used systematic random sampling technique to select 423 participants from 2189 patients of the one month census, and adopted pretested and standardized semi-structured interviewer as well as administered questionnaire to collect the data. The dependent variable used was health care choice represented by "Type", while the independent variables are individual, household, and access. The coefficients of each variable reflect the effect of a change in each of the variables on the probability that the individual will consult medical care and choose a certain provider relative to no-care or (self-treatment).

## PRESENTATION OF DATA

This chapter focuses on the analysis of the data for the study. This involves the interpretation of the estimated models from the previous chapter, as well as the tests of hypotheses and the discussion of the empirical findings of the study. In particular, both statistical and econometric tools are employed to demonstrate the empirical determinants of demand for personal healthcare services on health delivery in Nigeria. The characteristics of the dataset are initially described using summary statistics and trend analysis, while the coefficients that explain the main relationships of the study are estimated using econometric framework and analysis. The econometric analysis is performed in line with the objectives of the study, with particular focus on the dynamic relationships among the variables. Hence, as described above methodology, the autoregressive distributed lags (ARDL) technique is used for the analysis. This implies that the time series characteristics of the dataset are initially tested applying both the unit root and cointegration tests.

### Descriptive Statistics

The trends in the major variables in the study are analysed in this section. Figure 4.2 shows trends in private health expenditure in Nigeria over the years. The trend is relatively unstable over the periods, with the proportion of private health expenditure declining between 1998 and early 2000s by as much as 10 percentage points. This implies that private health expenditure fell significantly in the early 2000s. This may be attributed to the new civilian regime in the country with accompanying strong institutional changes in the country. The share of private health expenditure has however remained high since the 2010s and has reached 77.3 percent in 2023. The high proportion may also be linked to the privately funded health insurance scheme that is prevalent among well-to-do households in the country. In general, however, the high private health expenditure ratio is driven by high level of out-of-pocket health expenditure in the country.

The trends in the determinants of private healthcare are presented in Figure 4.3. Per capita income (depicted by the grey solid line) shows a consistent and significant upward trend, particularly after the year 2000. By 2022, PCIN has risen sharply, reflecting considerable economic growth over the

study period. The rising in per capita income suggests improved economic conditions and higher disposable income, which likely contributes to greater affordability of healthcare services and higher private health expenditure. PCIN is also strongly associated with other positive trends such as better literacy rates and increased government health expenditure. The literacy rate (dashed line) exhibits a slow but steady increase over the years. The line is relatively flat compared to PCIN, reflecting slow progress in literacy improvements. Literacy is a critical factor in health awareness and decision-making, which can drive demand for health services. However, the slow growth may indicate persistent challenges in education infrastructure or policy implementation.

The trend also shows the annual growth rate of carbon emission that represents environmental factors of degradation. The growth rate (solid black line) remains largely flat throughout the period, indicating a relatively stable but concerning level of carbon emission growth. Sustained growth in carbon emissions may exacerbate environmental health challenges, increasing the demand for health services. The trend in government health expenditure shows a marked increase starting in the early 2000s, with substantial growth observed post-2010. By 2022, government health expenditure has risen dramatically. The increasing trend in GHEXP reflects government efforts to improve healthcare infrastructure and service delivery. This increase likely complements private health expenditure and helps meet the growing demand for health care due to population growth and other factors.

The descriptive statistics for the variables in the study are presented in Table 4.1. Average proportional share of private health expenditure (PHER) is 71.05. This shows that on average, 71 percent of all health expenditure in Nigeria is from the private sector. The average private health expenditure is quite and reflects a significant reliance on private funding for healthcare in Nigeria. This indicates that households contribute substantially to healthcare costs in the country. The standard deviation is 4.52, which is much smaller than the mean score and shows very low variability in private health expenditure ratio over the years in Nigeria. The low variability in private health expenditure suggests a consistent spending pattern, indicating stability in private contributions to overall healthcare spending in the country. The stable private health expenditure rate suggests that private sector support is a consistently dependable component of health financing in Nigeria, even though it may place financial strain on households. The skewness score for the variable is -0.82 which is low. Negative skewness however suggests a left-skewed distribution, indicating that most values are concentrated on the higher side, with a few lower values. The kurtosis is relatively high at 3.08 which effectively indicates a normal-like distribution. The Jarque-Bera (J-B) statistic is 3.70 which is insignificant at the 5 percent level and suggests that the data for PHER follows a normal distribution.

**Table 4.1: Descriptive Statistics**

| Variable | Mean | Max. | Min. | Std.Dev. | Skew. | Kurt. | J-B | Prob. |
|---|---|---|---|---|---|---|---|---|
| PHER | 71.05 | 77.39 | 60.16 | 4.52 | -0.82 | 3.08 | 3.70 | 0.16 |
| PCIN | 1.25 | 7.85 | -2.94 | 4.82 | 1.73 | 6.18 | 30.36 | 0.00 |
| LTCR | 57.70 | 70.20 | 51.08 | 5.10 | 0.66 | 2.37 | 2.95 | 0.23 |
| ENDN | 0.68 | 0.92 | 0.49 | 0.12 | 0.43 | 1.98 | 2.47 | 0.29 |
| GHEXP | 138.92 | 469.36 | 0.15 | 149.89 | 0.89 | 2.48 | 4.73 | 0.09 |
| INFL | 18.56 | 72.84 | 5.39 | 15.97 | 2.18 | 6.80 | 46.01 | 0.00 |

Average per capita income growth (PCIN) is 1.25. This indicates that although per capita income is growing on average over the period, the growth is quite slow. Perhaps, the population is growing at a rapid rate that is catching up with the growth in real income. The weak per capital income growth is expected to place a greater burden households' ability to afford healthcare services in Nigeria. The standard deviation is 1.82 which is relatively low and indicates moderate fluctuations in income growth, with significant periods of decline (negative values). The income instability could create uncertainty in healthcare affordability, as household spending power varies significantly across time. The positive skewness also indicates that most of the income growth values are lower than the mean value, with some higher outliers.

Average literacy rate (LTCR) is 57.70, which is moderate and suggests that over half the population is educated in Nigeria. This is expected to positively influence health awareness and demand for health services in the country. The standard deviation score is 5.10 which shows low variability over the period. Stable literacy rates suggest that education-driven health awareness is relatively uniform, and since it is generally low, demand for healthcare services may receive low support from literacy conditions in the country. In terms of environmental conditions, average annual growth in carbon emission (ENDN) is 0.68 percent. The average growth rate of carbon emissions is low, reflecting a modest rate of environmental degradation in Nigeria. The standard deviation is also low at 0.12. Minimal variability shows stable growth in carbon emissions over time, suggesting predictable environmental conditions. However, although the carbon emission growth rate is small, steady increases in emissions could have long-term health implications.

Average government health expenditure (GHEXP) is 138.92 dollars. The average government health expenditure is quite low which shows weak public investment in healthcare services in Nigeria. The very high standard deviation of 149.89 indicates inconsistent government spending on healthcare, with potential spikes or dips in funding across the years. Inconsistent government spending can lead to fluctuations in healthcare quality and access which can influence sustainable long-term improvements in healthcare delivery. Average inflation rate (INFL) is 18.56. A high

average inflation rate indicates persistent inflationary pressure, which could erode household purchasing power and affect healthcare affordability. The standard deviation is 15.97 which is relatively high. The large variability shows significant fluctuations in inflation, suggesting an unstable macroeconomic environment.

In addition to the descriptive statistics, the initial patterns of associations among the variables are examined by the correlation analysis. From the Table, private health expenditure (PHER) has a weak correlation with literacy rate at 0.21 which suggests that higher literacy rates are slightly associated with increased private health expenditure. On the other hand, there is a negative correlation between PHER and environmental conditions at -0.387 which indicates that higher carbon emission is associated with reduced private health expenditure, likely due to environmental health burdens impacting disposable income. There is also a strong positive correlation between both GHEXP and PCIN and health expenditure, which show that increased government health expenditure complements private health spending, perhaps by improving healthcare quality and access. Also, higher per capita income strongly correlates with both increased literacy rate and private health expenditure, indicating income levels are critical to affordability.

| Variable | PHER | LTCR | ENDN | GHEXP | INFL | PCIN |
|---|---|---|---|---|---|---|
| PHER | 1 | | | | | |
| **LTCR** | 0.210<br>(0.232) | 1 | | | | |
| **ENDN** | -0.387<br>(0.024) | -0.439<br>(0.009) | 1 | | | |
| **GHEXP** | 0.583<br>(0.000) | 0.520<br>(0.002) | -0.637<br>(0.000) | 1 | | |
| **INFL** | -0.002<br>(0.992) | -0.244<br>(0.165) | 0.438<br>(0.010) | -0.240<br>(0.173) | 1 | |
| **PCIN** | 0.592<br>(0.000) | 0.548<br>(0.001) | -0.670<br>(0.000) | 0.983<br>(0.000) | -0.278<br>(0.111) | 1 |

Among the independent variables, there is a significant positive correlation between literacy rate and per capita income and government health expenditure which show that income levels and government spending contribute significantly to literacy improvements, as higher incomes may lead to better access to education. A moderately significant negative correlation of -0.439 also exists between literacy rate and environmental degradation, A moderate negative relationship indicating that higher carbon emissions are linked to lower literacy rates, possibly due to health issues hindering educational outcomes. Environmental degradation has a strong negative relationship with government health expenditure.

This shows that increased carbon emissions are associated with reduced government health spending, suggesting that environmental degradation costs increase competition for fiscal priorities in addressing environmental issues. There is also a strong negative correlation between environmental condition and per capita income. This also suggests that higher per capita income is associated with lower carbon emissions, highlighting the potential of economic development in promoting cleaner technologies. A moderate positive exits between environmental degradation and inflation rate. This shows that inflation tends to accompany higher carbon emissions, reflecting economic pressures that may contribute to environmental degradation. Per capital; income is also highly and positively correlated with health expenditure by government.

**Unit Root and Cointegration Analysis**

The unit root test for the variables is used to examine the level of stationarity of the time series used in the empirical analysis. This test is important because non-stationary time series are non-mean reverting and analysis based on such data may result in spurious regression relationships. In this study, two tests of unit roots (test of the stationarity of the datasets) are employed. These the Augmented Dickey Fuller (ADF) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. The ADF test has the advantage of being an indirect approach to testing unit roots with particular focus on stationarity processes of the dataset, while the KPSS test provides a more direct approach based on the shape of the null hypothesis (which directly tests for unit roots). The results of the unit root tests are presented in Table 4.2. In second and third columns in result show the ADF test results and it shows that, only the PCIN variable has a significant ADF statistic in levels. This shows that the variable is stationary in levels and is thus, integrated of the zero order (i.e., I[0]). All the other variables are non-stationary in levels. These variables became are stationary after first differences, showing that the variables are I(1). Thus, the variables exhibit mixed stationarity status.

**Table 4.2: Unit Root test for Variables**

| Variable | ADF Test | | KPSS | | Order of Integration |
|---|---|---|---|---|---|
| | *Levels* | *First Difference* | *Levels* | *First Difference* | |
| PHER | -1.784 | -5.397** | 0.654** | 0.283 | I(1) |
| PCIN | -3.107* | -6.364** | 0.177 | 0.195 | I(0) |
| LTCR | -2.827 | -4.065** | 0.771** | 0.253 | I(1) |
| ENDN | -1.520 | -5.484* | 0.835** | 0.088 | I(1) |
| GHEXP | -0.989 | -6.255** | 0.560* | 0.288 | I(1) |
| INFL | -0.419 | -6.166** | 0.764** | 0.082 | I(1) |

*Note: * and ** indicate signifies at 5 and 1 percent levels respectively.*

**Source:** Author's Computation, 2024.

The KPSS unit root test is also reported in the third and fourth columns in Table 4.2. The test results provide improved robustness of the unit root outcomes (Ighodaro & Adegboye, 2020). The null hypothesis of the KPSS test is absence of unit root (or presence of stationarity). This means that a significant KPSS coefficient implies non-stationarity and vice versa. The result reveals that only PCIN has insignificant coefficient in levels. This means that all other variables are stationary only after first differences, while PCIN is stationary in levels.

From the unit root tests, it is seen that the integration status of the variables is mixed (some variables are I(1) while others are I(0). Thus, all variables in the model are not integrated of the same order, which implies that the normal cointegration test may not generate adequate estimates. In the study, the Bounds cointegration test procedure within the ARDL approach to cointegration is employed for the cointegration test. The results of the Bounds cointegration test is reported in Table 4.3. The test evaluation is based on the estimated F-statistic values for each of the equations which are tested against the critical values for the lower (I0 Bounds) and upper (I0 Bounds) based on their critical F-values.

**Table 4.3: Bounds Cointegration Test**

| | | *Null Hypothesis: No levels relationship* | | |
|---|---|---|---|---|
| **Test Statistic** | **Value** | **Signif.** | **I(0)** | **I(1)** |
| F-statistic | 3.89 | 10% | 2.2 | 3.09 |
| K | 4 | 5% | 2.56 | 3.49 |
| | | 2.50% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

**Source:** Author's computation, 2024.

In interpreting the test, the focus is on the (I0 Bounds) and (I1 Bounds) values. If these values are both less than the estimated F-statistic, then the null hypothesis of no cointegration is completely rejected based on the Bounds test at the given significance level. On the other hand, if the lower and upper bounds values are greater than the estimated F-statistic, then the null hypothesis of no cointegration cannot be rejected. Moreover, if the estimated F-value lies between the critical values of the lower and upper bounds, then the Bounds cointegration test has yielded an inconclusive outcome. In this case a further test (using the Johansen technique) is required to ascertain cointegration status of the variables. Note that the test is conducted for the three equations specified above.

From the results in Table 4.3, it is seen that the computed F-statistics for the model is 3.89. which is greater than both the I(0) and I(1) values in the critical test outcomes at the 5 percent level (i.e., 2.56 and 3.49 respectively). Therefore, the estimated F-statistics pass the significance test at the 5

percent level. The null hypothesis of no cointegration is rejected for each equation, stating that a long run relationship actually exists among the combination of variables for each of the equations. This further establishes the robustness of the ARDL estimation framework used in the study.

**Analysis of ARDL Process**

In this section, the estimated models of the study are reported and analysed. Considering that the ARDL approach to cointegration analysis was adopted for the study, the optimal lag length for the relationships is initially established. Generally, cointegration-based analyses have been found to vary significantly within a dynamic framework with inappropriate application of the lag structures (Ighodaro & Adegboye, 2020).

**Lag Length Selection**

The goal of the lag selection test is to establish the optimal lag that provide the most efficient long run adjustment framework for the ARDL estimation. The lag length selection test results are reported in Table 4.4, with outcomes for the Akaike Information Criterion (AIC) and Schwarz–Bayesian Criterion (SC). Note that the minimum lag-length values represent the optimal length based on both the AIC and Sc tests. The Table shows that the second lag possesses the minimum value using the both the SC and AIC approaches. The second ag is therefore selected as optimal based on the AIC selection for all the equations.

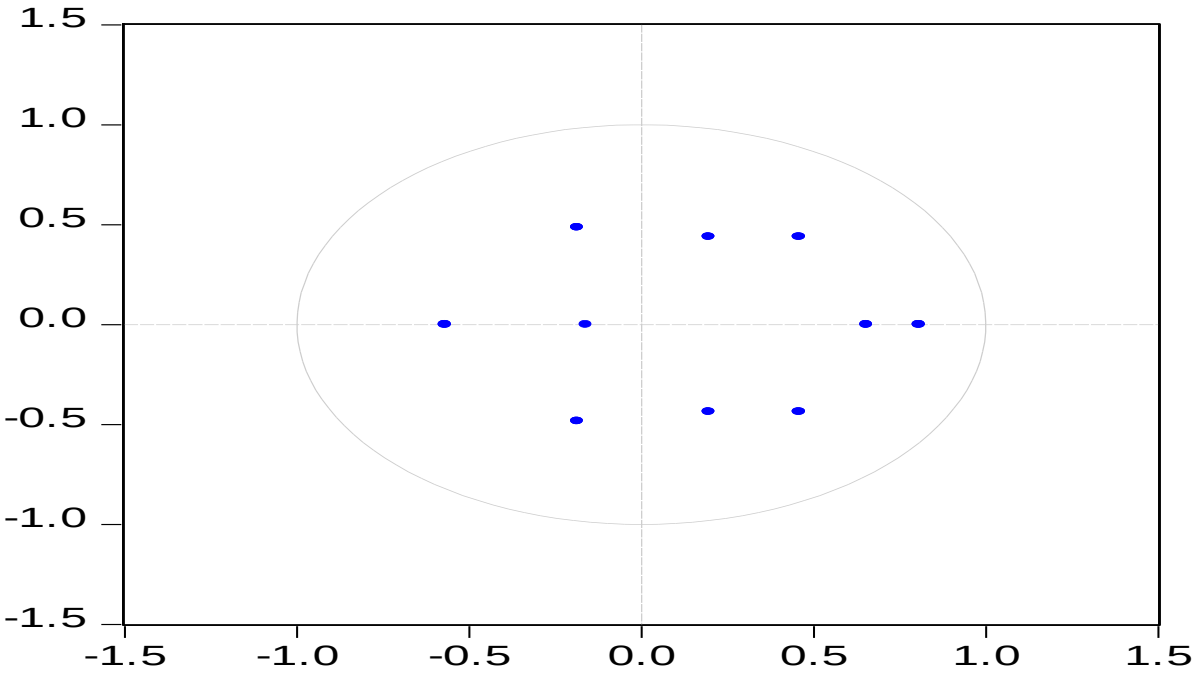
**Table 4.4: Lag Length Selection Criteria**

| ***No of Lags*** | | |
|---|---|---|
| | *AIC* | *SC* |
| 0 | 7.64 | 7.95 |
| 1 | -6.36 | -3.94 |
| 2 | -8.98* | -4.46* |
| 3 | -1.16 | -2.53 |
| 4 | -1.83 | -3.08 |

Note: * indicates selected lag. **Source:** Author, computation, 2024.

The inverse roots of the autoregressive characteristic polynomial for the lad length selection are also reported in Figure 4.2. It is expected that the dots in the plots (which represent the roots of the AR points lie within the polynomial circle if the chosen lag length is to be functional. For the equation, the points of the AR roots all lie within the circumference of the circles. This implies that the selected lag length is optimal for the ARDL structure.

**Fig. 4.2: AR Test for Lag Selection**




**Source:** Author, computation, (2024).

**Analysis of Regression Results**

The ARDL estimation that seek to explain the relationships among the critical variables in the study are evaluated on the basis of the estimations of the models. As indicated earlier, the ARDL procedure generates two estimates for the equations, which are the immediate of short run estimates and the long run estimates over time. Both of the estimates are interpreted and analysed in this section. Also, the cointegrated results were obtained based on the two optimal lag structure for the relationships. The results also report the diagnostic tests - the adjusted R-squared values. The results of the estimation of the determinants of demand for personal health care services on health delivery in Nigeria are presented in Table 4.5.

The diagnostic statistics of the model are impressive, with the adjusted R-squared value for the model at 0.49. This shows that over 49 percent of the dynamic changes in private health expenditure at any given period is explained at any given time within the model estimates. This means that the model has a moderately impressive predictive capability. Although the ARDL estimation already takes care of the first order serial correlated issues, the results of the D.W. tests are also reported. In all the estimates, the D.W. statistics had values that are sufficiently close to 2.0. This shows absence of first order serial correlation.

**Table 4.5: ARDL Results of the Determinants of Personal Healthcare Demand**

| Variable | Coefficient | t-Statistic | Prob. |
|---|---|---|---|
| *Short run* | | | |
| LTCR | -0.001 | -0.342 | 0.736 |
| PCIN | 0.063 | 4.905 | 0.000 |
| GHEXP | -0.078 | -4.440 | 0.000 |
| $GHEXP_{t-1}$ | 0.026 | 2.802 | 0.011 |
| $ECM_{t-1}$ | -0.907 | -5.375 | 0.000 |
| *Long run* | | | |
| LTCR | -0.004 | -2.263 | 0.034 |
| PCIN | 0.369 | 6.678 | 0.000 |
| ENDN | -0.122 | -0.880 | 0.389 |
| GHEXP | -0.230 | -6.581 | 0.000 |
| INFL | 0.162 | 2.062 | 0.043 |
| Constant | 0.985 | 1.771 | 0.091 |
| Adj. R-sq. | 0.490 | | |
| D-W stat | 1.716 | | |

**Source:** Author's computation, 2024.

The effects of the selected determinants of personal healthcare demand on private health expenditure is determined by considering the estimated coefficients in the model. For the short run estimates, it is seen that the optimal parsimonious estimates that were reported did not include ENDN. This shows that environmental factors are not critical factors that influence healthcare demand in immediate period. The coefficient of PCIN is significant at the 1 percent level in the short run estimates. This shows that per capita income has a significant positive impact on short run personal healthcare demand in Nigeria. As income increases, there is a strong and positive immediate shock to demand for healthcare services in Nigeria. Government health expenditure has both immediate (current) and delayed (lagged) effects on healthcare demand in the short run.

The coefficient of the current variable is negative, indicating that government health expenditure has a significantly negative immediate effect on private health expenditure. As government expenditure on health increases, private expenditure immediately declines in Nigeria. The delayed effect is however positive and significant in the short run. The coefficient of ENDN is not significant in the short run, indicating that environmental factors do not affect private health expenditure in the short run. The coefficient of the error correction term (ECM) is significant at the 1 percent level and is also negative as expected for a stable model. This indicates that any short-term deviation private healthcare expenditure from its equilibrium path will be restored back to the steady state in the long run. The ECM coefficient is very large at -0.907 which implies that adjustment to long run growth equilibrium in Nigeria is very fast since 90 percent of expected adjustment to equilibrium in the long run is completed in the first period.

The lower panel of the estimates in Table 4.5 show long run relationships and effects of the youth population and related variables on economic growth. The long run estimates are more stable since they show the steady-state coefficients that are produced after all adjustments to short-run changes have been made (Stock & Watson, 2020). Thus, the long run estimates are the more reliable estimates. In the result, the coefficients of PCIN and GHEXP are significant at the 1 percent level, while those of LTCR and INFL are significant at the 5 percent level. This shows that per capita income, government health expenditure, literacy rate, and inflation rate all have significant effect on personal healthcare demand in the long run. The coefficient of ENDN fails the significance test even at the 5 percent level. This implies that environmental factors do not significantly contribute to healthcare demand in Nigeria in the long run.

The coefficient of literacy rate is negative and significant, which shows that literacy rate has a negative impact on healthcare demand in Nigeria. This implies that as literacy rate increases, personal health expenditure also decreases. This result is interesting and shows that more literacy actually lowers private health expenditure over time in Nigeria. The coefficient of per capita income is positive and shows that in the long run, a higher per capita income level drives increased demand for personal health among Nigerians. The coefficient of government health expenditure is negative and significant. This shows that as government expenditure on health increases, private expenditure tends to reduce over time. The coefficient of inflation rate is positive and shows that rising inflation rate leads to higher private health expenditure in the long run in Nigeria.

**Post-Estimation Robustness Tests**

We provide a robustness check by testing the stability of the estimated equations' interrelationships presented in the empirical analysis. Stability test provides evidence regarding absence of structural breaks that can render linear estimates inconclusive. The first stability test is to evaluate the presence or absence of multicollinearity in the estimated models. Table 4.6 shows the results of the variance inflation factor tests. The coefficient for each variable is expected to be less than 5.0 for the absence of multicollinearity to be established. In the Table, none of the variables has a centred VIF value greater than 5.0. Based on this outcome, it is demonstrated that the estimates do not suffer from multicollinearity and the estimates as well as the accompanying standard errors are efficiently estimated.

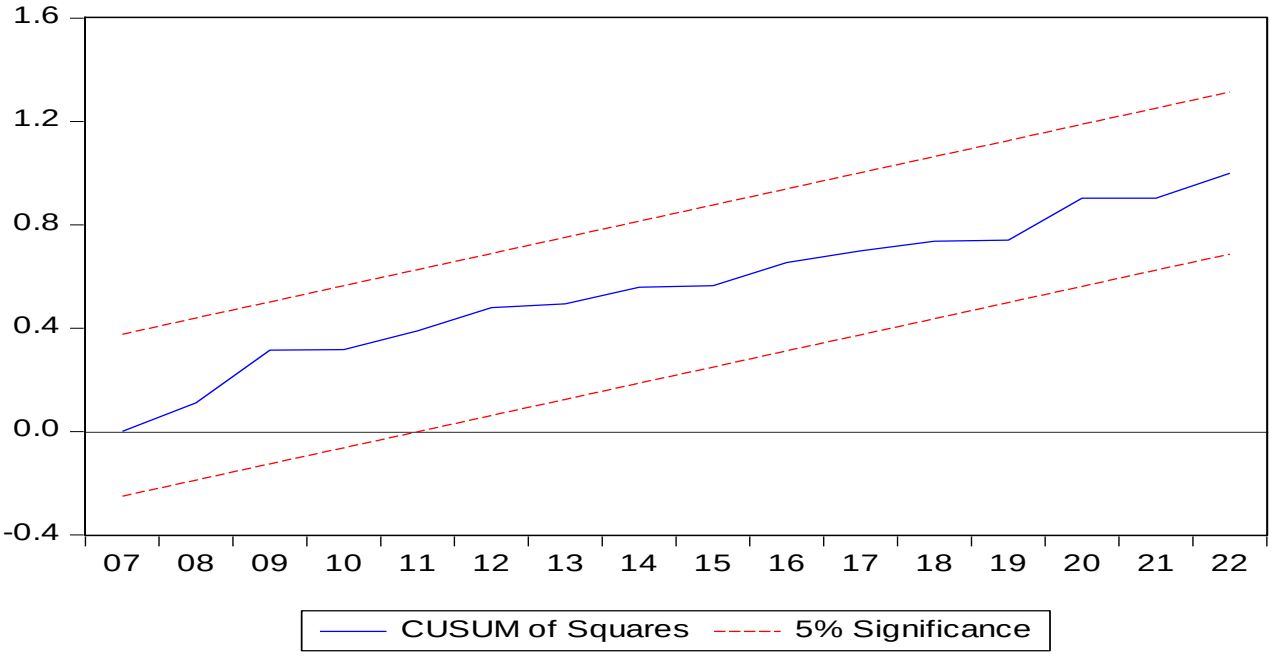
**Table 4.6: Results for Variance Inflation Factor**

| Variable | CVIF |
|---|---|
| LTCR | 1.812 |
| PCIN | 2.025 |
| ENDN | 4.702 |
| GHEXP | 2.721 |
| INFL | 3.894 |

**Source:** Author's computation, 2024.

Next, the test for stability based on the CUSUM of squares test is presented in Figure 4.3. The CUSUM of squares lines are expected to completely lie in between the dotted 5 percent significance lines. The result show that the CUSUM-square lines for the result for the model estimate is all circumscribed within the dotted 5 percent bound lines. This shows that the estimations are stable within the analysis for the three equations. The influences of structural breaks are fully taken into cognisance with the model specification and estimation procedure. These stable estimates are therefore reliable for making policy conclusions and recommendations.

**Fig. 4.3: CUSUM of Squares Plots**




## DISCUSSION AND POLICY IMPLICATIONS OF RESULTS

Important outcomes have been generated from the empirical analysis of this study which provide strong underlying implications with relevant policy dimensions. The results are therefore discussed in this section based on the hypotheses of the study.

**Hypothesis One: There is no significant relationship between literacy and private health expenditure in Nigeria**

For the test of the first hypothesis of the study, the focus is on the coefficient of LTCR in the long-run estimates of the determinants of private healthcare demand in Table 4.5. In the result, the coefficient of LTCR is -0.004 ($p < 0.05$). The coefficient of literacy rate therefore passes the significance test at the 5 percent level. This shows that the null hypothesis is rejected in this case. Thus, the result reveals that literacy rate a significant relationship with private health expenditure

in Nigeria. The direction of the relationship is shown to be negative, suggesting that literacy rate in Nigeria directly contributes to the decline of private health expenditure in Nigeria in the long run. In the result, a one percent increase in literacy rate leads to a 0.004 percent decline in private health expenditure in Nigeria.

The significant negative relationship between literacy rate and personal healthcare demand in Nigeria present interesting outcome of the study. This finding does not appear to support previous research which indicate that literacy improves personal health outcomes such as Ogundipe and Adenekan (2022) and Agboola (2017). The result of this study however demonstrate that literacy may act as a preference limitation to private health expenditure. First, the improvement in health awareness and preventive practices that higher literacy affords ensures that more literate individuals are more likely to adopt preventive health practices which are more likely to reduce the need for curative health care. As a result, the demand for private health services—and consequently, private health expenditure—may decline in the long run.

Moreover, as Lloyd (2018) also demonstrated, literate makes households to be more aware of and have greater trust in government-provided health care services. Individuals are better equipped to navigate public health care systems, leading to a substitution effect where individuals shift from expensive private health care to more affordable or subsidized public options. In the same vein, literacy may increase the capacity of individuals to enroll in health insurance schemes, which could reduce the out-of-pocket expenses associated with private health care. Over time, this reduces private health expenditure directly borne by households, especially out-of-pocket expenditure (Ibukun & Osinubi, 2020; Olubiyi & Akintobi, 2021).

**Hypothesis Two: There is no significant relationship between income and private health expenditure in Nigeria**

For the test of the first hypothesis of the study, the focus is on the coefficient of PCIN in the long-run estimates of the model Table 4.5. In the result, the coefficient of LTCR is 0.369 ($p < 0.01$). The coefficient of per capita income therefore passes the significance test at the 1 percent level. This shows that the null hypothesis is rejected in this case. Thus, the result reveals that per capita income a significant relationship with private health expenditure in Nigeria. The direction of the relationship is shown to be positive, suggesting that per capita income in Nigeria directly increases demand for private health expenditure in Nigeria in the long run. In the result, a one percent increase in per capita income literacy rate leads to a 0.349 percent increase in personal healthcare demand in Nigeria.

The finding that per capita income has a significant positive effect on private health expenditure in the long run aligns with economic theory and empirical observations in health economics. This relationship highlights how income levels influence individual and household health care spending patterns over time. This result is also inconsonance with studies like Adeoti (2014), Wellay et al. (2018), Olubiyi and Akintobi (2021). First, health care is a normal good, implying that as income increases, individuals and households allocate a larger share of their resources to improving their

health. This increase in spending on health services includes private expenditures such as consultations, medications, diagnostics, and specialized treatments. Thus, higher per capita income allows households to afford higher-quality health care services, which are often provided by private health institutions. In Nigeria, where public health care systems may face challenges such as poor infrastructure or inadequate staffing, wealthier individuals are more likely to turn to private health care providers for reliable services (Olubiyi & Akintobi, 2021). Moreover, higer income levels predisposes households to afford not only curative health care but also preventive services such as vaccinations, routine check-ups, and wellness programs. These services are often more readily available in the private health sector, driving higher expenditure (Lloyd, 2018).

**Hypothesis Three: There is no significant relationship between environmental factors and private health expenditure in Nigeria**

The test of this hypothesis is based on the coefficient of ENDN in the model result in Table 4.5. In the result, the coefficient of ENDN is -0.12 ($p > 0.05$). Thus, the coefficient fails the significance test at the 5 percent level. The null hypothesis cannot be rejected in this case, showing that there is actually no significant relationship between environmental factors and private health expenditure in Nigeria. This result is not in line with previous studies like Ibukun and Osinubi (2020) who found a positive effect of environmental degradation on health expenditure per capita in sub-Saharan Africa countries. This main deviation of the study from our study is that the focus is on Nigeria, where environmental impacts have been limited compared to some other SSA countries (Lloyd, 2018).

**Hypothesis Four: There is no significant relationship between government expenditure on health and private health expenditure in Nigeria**

This hypothesis is tested by focusing on the coefficient of GHEXP in the long-run estimates of the model Table 4.5. In the result, the coefficient of GHEXP is 0.230 ($p < 0.01$). The coefficient of government expenditure on health therefore passes the significance test at the 1 percent level. This shows that the null hypothesis is rejected in this case. Thus, the result reveals that government expenditure on health a significant positive effect on private health expenditure in Nigeria. In the result, a one percent increase in government expenditure on health literacy rate leads to a 0.23 percent increase in personal healthcare demand in Nigeria. The result is in line with studies by Adeoti (2014) and Edeh (2022) who also found that government health expenditure may substitute private health expenditure. The finding from this study suggests that increased government spending on health care reduces the reliance on private health services over time, which is consistent with the concept of public health care acting as a substitute for private care.

## SUMMARY OF FINDINGS

The current condition of healthcare in Nigeria has called for effective empirical evaluations of the main determinants and outcomes of the increasing demand and pressure on healthcare services in Nigeria. In this study, the main determinants of personal healthcare services demand in Nigeria was empirically examined. It is argued that demographic, environmental, policy, and economic

factors play strong roles in explaining personal healthcare demand in Nigeria. The study therefore focused on four critical aspects of the determinants, which are literacy rates, income, environmental degradation, government expenditure. The dynamic nature of healthcare demand ensured that the study employed the autoregressive distributed lags (ARDL) approach to cointegration analysis to estimate the empirical relationships in the study. The analysis was based on annual time series data for the period of 1990 to 2023. In general, the results from the study indicated that different factors explain the demand for healthcare in Nigeria. In particular, the study found that:

1. Literacy rate has a significant negative relationship with demand for personal healthcare services in Nigeria. This implies that literacy rate in Nigeria directly contributes to the decline of private demand for personal healthcare services in Nigeria over time.
2. Per capita income has a significant positive relationship with demand for personal healthcare services in Nigeria. Thus, a rise in income levels increases demand for private health expenditure in Nigeria.
3. There is actually no significant relationship between environmental factors and demand for personal healthcare services in Nigeria.
4. Government expenditure on health significantly reduces demand for personal healthcare services in Nigeria. Thus, government health expenditure is s substitution for private health expenditure in Nigeria over time.

**Recommendations**

The results obtained from the empirical analysis provide evidence for making the following policy recommendations.

1. The result from the study has found that literacy rates actually weaken the demand for personal healthcare services in Nigeria. Thus, there is the need to focus on health promotion campaigns at all levels of governance in Nigeria. Policies that combine literacy initiatives with health promotion campaigns can both improve demand for quality healthcare services at the private level and also ensure healthier lifestyles and preventive care.
2. Moreover, health insurance coverage needs to be expanded by both government and private sectors. This is in order to complement rising literacy rates in the country. Literate individuals and households are better positioned to understand and utilize such programs, leading to a more sustainable health financing system.
3. The study also found income levels boost healthcare services demand in Nigeria. Thus, there is the need to boost income levels in the country. While rising incomes enable wealthier individuals to access private health services, low-income households may remain reliant on the underfunded public health care system. Policymakers must address this disparity by strengthening public health care systems to ensure equitable access to quality health care.
4. Governments need to also encourage investment in private health care. The rising demand for private health services as incomes increase presents an opportunity for private sector investment in health care infrastructure. Public-private partnerships (PPPs) could also be leveraged to enhance the quality and availability of health services.
5. There is also need to strengthen public health systems in Nigeria in order to deliver better

services. This finding underscores the critical role of government spending in reducing the financial burden of health care on households. Policymakers should prioritize investments in public health infrastructure, human resources, and essential medicines to further reduce reliance on private health care, especially for economically vulnerable populations.

6. In order to improve the equity in healthcare service access in Nigeria, governments need to also increase spending in health sector. Increased government health expenditure can address disparities in access to quality health care. By improving public health services in rural and underserved areas, policymakers.

## CONCLUSION

The demand for quality healthcare services in Nigeria has increased over the recent periods. There is therefore the need to understand the underlying factors that drive this increase. This research focuses on examining the determinants of personal healthcare demand in Nigeria, focusing on the roles of literacy rate, per capita income, government health expenditure, and other relevant factors. The study reveals that while government health expenditure and literacy rate limits private healthcare demand, income levels increase the demand. This underscores the importance of strengthening public health care delivery systems to alleviate the financial burden on households, particularly for basic and preventive health services. Similarly, raising the income levels of Nigerians will enable greater investments in health and well-being. Conversely, higher education levels empower individuals to make more informed health choices, potentially reducing unnecessary health expenses through better disease prevention and management practices. The study therefore highlights that understanding the determinants of demand for personal healthcare services requires a deep evaluation of public health investments, economic growth policies, and educational reforms. By understanding and addressing these dynamics, Nigeria can build a more inclusive and sustainable health care system over time.

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## APPENDIX A

## ARDL RESULTS

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LPHER)
Selected Model: ARDL(1, 1, 0, 0, 3)
Case 2: Restricted Constant and No Trend
Date: 09/23/24 Time: 13:40
Sample: 1990 2023
Included observations: 31

Conditional Error Correction Regression

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.893460 | 0.522845 | 1.708845 | 0.1022 |
| LPHER(-1)* | -0.906673 | 0.209741 | -4.322818 | 0.0003 |
| LTR(-1) | -0.003973 | 0.002074 | -1.916217 | 0.0690 |
| LPCI** | 0.334938 | 0.094232 | 3.554406 | 0.0019 |
| ENDN** | -0.110387 | 0.118498 | -0.931555 | 0.3622 |
| LGHEXP(-1) | -0.208881 | 0.056388 | -3.704357 | 0.0013 |
| D(LTR) | -0.000594 | 0.002229 | -0.266490 | 0.7925 |
| D(LGHEXP) | -0.062641 | 0.021215 | -2.952695 | 0.0076 |

| | | | | |
|---|---|---|---|---|
| D(LGHEXP(-1)) | 0.078262 | 0.034846 | 2.245899 | 0.0356 |
| D(LGHEXP(-2)) | 0.025908 | 0.016012 | 1.618011 | 0.1206 |
| D(INFL) | 0.162435 | 0.084773 | 1.936484 | 0.0635 |

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LTR | -0.004382 | 0.001936 | -2.263171 | 0.0343 |
| LPCI | 0.369414 | 0.055316 | 6.678250 | 0.0000 |
| ENDN | -0.121750 | 0.138306 | -0.880295 | 0.3887 |
| LGHEXP | -0.230382 | 0.035006 | -6.581201 | 0.0000 |
| INFL | 0.161853 | 0.080245 | 2.061824 | 0.0431 |
| C | 0.985428 | 0.556456 | 1.770900 | 0.0911 |

EC = LPHER - (-0.0044*LTR + 0.3694*LPCI -0.1217*ENDN - 0.2304
*LGHEXP + 0.9854 )

ARDL Error Correction Regression
Dependent Variable: D(LPHER)
Selected Model: ARDL(1, 1, 0, 0, 3)
Case 2: Restricted Constant and No Trend
Date: 09/23/24 Time: 13:41
Sample: 1990 2023
Included observations: 31

ECM Regression
Case 2: Restricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(LTR) | -0.000594 | 0.001738 | -0.341916 | 0.7358 |
| D(LPCI) | 0.062641 | 0.012771 | 4.905105 | 0.0001 |
| D(LGHEXP) | -0.078262 | 0.017626 | -4.439999 | 0.0002 |

| | | | | |
|---|---|---|---|---|
| D(LGHEXP(-1)) | 0.025908 | 0.009247 | 2.801634 | 0.0107 |
| CointEq(-1)* | -0.906673 | 0.168686 | -5.374903 | 0.0000 |

| | | | |
|---|---|---|---|
| R-squared | 0.557988 | Mean dependent var | 0.002621 |
| Adjusted R-squared | 0.489986 | S.D. dependent var | 0.045218 |
| S.E. of regression | 0.032292 | Akaike info criterion | -3.881278 |
| Sum squared resid | 0.027113 | Schwarz criterion | -3.649990 |
| Log likelihood | 65.15981 | Hannan-Quinn criter. | -3.805884 |
| Durbin-Watson stat | 1.715628 | | |

* p-value incompatible with t-Bounds distribution.

| F-Bounds Test | | Null Hypothesis: No levels relationship | | |
|---|---|---|---|---|
| Test Statistic | Value | Signif. | I(0) | I(1) |
| F-statistic | 3.888982 | 10% | 2.2 | 3.09 |
| K | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

## APPENDIX B

### UNIT ROOT TESTS

Null Hypothesis: PHER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -1.784705 | 0.3812 |
| Test critical values: | 1% level | -3.646342 | |
| | 5% level | -2.954021 | |
| | 10% level | -2.615817 | |

Null Hypothesis: D(PHER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.397323 | 0.0001 |
| Test critical values: | 1% level | -3.653730 | |
| | 5% level | -2.957110 | |
| | 10% level | -2.617434 | |

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LTR has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -2.827754 | 0.0656 |
| Test critical values: | 1% level | -3.653730 | |
| | 5% level | -2.957110 | |
| | 10% level | -2.617434 | |

Null Hypothesis: D(LTR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -4.065291 | 0.0035 |
| Test critical values: | 1% level | -3.653730 | |
| | 5% level | -2.957110 | |
| | 10% level | -2.617434 | |

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LPCI has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

| | t-Statistic | Prob.* |
|---|---|---|

| | | | |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.107596 | 0.0415 |
| Test critical values: | 1% level | -3.670170 | |
| | 5% level | -2.963972 | |
| | 10% level | -2.621007 | |

Null Hypothesis: ENDN has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -1.520183 | 0.5111 |
| Test critical values: | 1% level | -3.646342 | |
| | 5% level | -2.954021 | |
| | 10% level | -2.615817 | |

Null Hypothesis: D(ENDN) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.484011 | 0.0001 |
| Test critical values: | 1% level | -3.653730 | |
| | 5% level | -2.957110 | |
| | 10% level | -2.617434 | |

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: GHEXP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | 0.989749 | 0.9955 |
| Test critical values: | 1% level | -3.646342 | |
| | 5% level | -2.954021 | |
| | 10% level | -2.615817 | |

Null Hypothesis: D(GHEXP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -6.254978 | 0.0000 |
| Test critical values: | 1% level | -3.653730 | |
| | 5% level | -2.957110 | |
| | 10% level | -2.617434 | |

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INFL has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -2.148877 | 0.2279 |
| Test critical values: | 1% level | -3.646342 | |
| | 5% level | -2.954021 | |
| | 10% level | -2.615817 | |

Null Hypothesis: D(INFL) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=8)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.107379 | 0.0003 |
| Test critical values: | 1% level | -3.689194 | |
| | 5% level | -2.971853 | |
| | 10% level | -2.625121 | |

*MacKinnon (1996) one-sided p-values.

## APPENDIX C

**DATA FOR ANALYSIS**

| Year | PHER | LTR | PCI | ENDN | GHEXP | INFL |
|---|---|---|---|---|---|---|
| 1990 | 73.26 | 55.15 | 5195.06 | 0.764 | 0.50 | 13.01 |
| 1991 | 71.35 | 55.45 | 6040.41 | 0.839 | 0.62 | 44.59 |
| 1992 | 71.35 | 55.37 | 9043.83 | 0.916 | 0.15 | 57.17 |
| 1993 | 69.38 | 53.28 | 12232.25 | 0.839 | 3.87 | 57.03 |
| 1994 | 70.38 | 53.18 | 16772.77 | 0.743 | 2.09 | 72.84 |
| 1995 | 72.36 | 53.24 | 28656.10 | 0.796 | 3.32 | 29.27 |
| 1996 | 72.95 | 53.28 | 36825.94 | 0.903 | 3.18 | 8.53 |
| 1997 | 71.35 | 53.28 | 38831.73 | 0.867 | 3.89 | 10.00 |
| 1998 | 70.37 | 52.29 | 41178.63 | 0.760 | 4.74 | 6.62 |
| 1999 | 66.37 | 52.29 | 45802.49 | 0.727 | 16.64 | 6.93 |
| 2000 | 63.27 | 53.05 | 57489.92 | 0.791 | 15.22 | 18.87 |
| 2001 | 60.16 | 53.04 | 65274.03 | 0.808 | 24.52 | 12.88 |
| 2002 | 60.75 | 53.86 | 88757.38 | 0.712 | 40.62 | 14.03 |
| 2003 | 65.05 | 54.77 | 101840.40 | 0.759 | 33.27 | 15.00 |
| 2004 | 72.81 | 63.27 | 132527.62 | 0.722 | 34.20 | 17.86 |
| 2005 | 64.55 | 67.50 | 164579.40 | 0.703 | 55.70 | 8.23 |
| 2006 | 65.97 | 70.20 | 210456.79 | 0.615 | 62.25 | 5.39 |
| 2007 | 70.46 | 65.38 | 233832.37 | 0.547 | 81.91 | 11.58 |
| 2008 | 70.94 | 51.08 | 262196.84 | 0.570 | 98.22 | 12.56 |
| 2009 | 72.76 | 52.22 | 277539.18 | 0.491 | 90.20 | 13.72 |
| 2010 | 74.47 | 55.36 | 339305.97 | 0.560 | 99.10 | 10.84 |
| 2011 | 76.88 | 55.94 | 381562.35 | 0.574 | 231.80 | 12.22 |
| 2012 | 74.73 | 55.99 | 425406.77 | 0.561 | 197.90 | 8.48 |
| 2013 | 72.84 | 56.39 | 463639.68 | 0.619 | 180.00 | 8.06 |
| 2014 | 70.93 | 57.38 | 502494.59 | 0.640 | 195.98 | 9.01 |
| 2015 | 71.85 | 59.35 | 517282.15 | 0.586 | 257.70 | 15.68 |
| 2016 | 71.89 | 61.37 | 543685.20 | 0.587 | 200.82 | 16.52 |
| 2017 | 75.19 | 61.85 | 593807.13 | 0.561 | 245.19 | 12.09 |
| 2018 | 77.39 | 62.02 | 650680.25 | 0.573 | 296.44 | 11.40 |
| 2019 | 75.95 | 63.29 | 716359.67 | 0.588 | 388.37 | 13.28 |
| 2020 | 71.50 | 61.36 | 740432.20 | 0.538 | 423.33 | 16.95 |
| 2021 | 74.68 | 62.05 | 825090.96 | 0.586 | 386.24 | 17.40 |
| 2022 | 76.24 | 62.73 | 925981.08 | 0.629 | 437.52 | 17.94 |
| 2023 | 77.39 | 62.85 | 1047457.83 | 0.67389 | 469.36 | 19.36 |

Sources: Central Bank of Nigeria [CBN], (2023)