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Impact of Government Healthcare Spending on Life Expectancy in Nigeria: 1986 – 2024

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ABSTRACT
Healthcare spending increment is an essential component for higher life expectancy, since a healthy population translates to an excellent labour force, which makes an economy function effectively. However, this is extremely difficult to achieve, especially in developing countries. Therefore this paper examined the impact ofgovernment healthcare spending on life expectancy in Nigeria. Specifically, it investigated the relationship between, health recurrent expenditure and health capital expenditure on life expectancy using time series data from 1989 to 2024 and the Dynamic Ordinary Least Squares (DOLS) method was adopted in carrying out the empirical analysis. The paper found that, there's a positive correlation between health recurrent, capital expenditures and life expectancy, implying that increasing government spending on health is likely to result in higher life expectancy. This relationship is statistically significant. The paper recommends an *increase in allocation to the health sector. This should include both recurrent and capital expenditures to ensure a comprehensive improvement in healthcare infrastructure, services, and accessibility and while increasing expenditure is crucial and equally important to ensure that these funds are used efficiently. It is important to implement measures to reduce waste, curb corruption, and improve the management of health resources to maximize the impact of spending on life expectancy.*

Keywords: Life Expectancy, Government Recurrent health expenditure, Government health capital expenditure, JEL Classification Codes: I15,I18,H51.

I. INTRODUCTION

Health constitutes a vital aspect of an individual's well-being and is indispensable for human resource development within a nation. In the absence of good health conditions, the execution of economic activities becomes exceedingly challenging, and if any such activity takes place, it is unlikely to be efficient (Cremieux, *et al*, 1999, as cited in Matthew *et al*, 2015). Consequently, health status serves as an indispensable indicator reflecting the level of development within an economy. Several metrics have been used to measure health status, with life expectancy emerging as a prominent and widely-used indicator (Ojo, *et al*, 2020; Oladosu, *et al*, 2022).According to Edeme, *et al*, (2017), improved health conditions directly correlate with enhanced life expectancy and reduced child mortality rates, which have the potential to drive economic growth in both developed and developing nations. Nigeria, as a developing country, recognizes the significance of health in national development, as evidenced by its inclusion in the constitution (Ahonkhai,*et al*, 2023).

The Nigerian Constitution (1999) mandated that all citizens should have access to convenient, protective, restorative, and rehabilitative healthcare. However, Nigeria's life expectancy was estimated at 47.9 years, up from 45.8 years in 1999 but down to 47 years. (Matthew et al., 2015). These figures were among the lowest global trailing behind Ghana at 54.4 years and Cameroon at 48 years in 2011. Recent statistics from the World Bank (2021) indicated only a marginal improvement, with life expectancy in Nigeria standing at 54.49 years for both sexes in 2019, still falling significantly short of global expectations. The United Nations Population Fund (UNFPA) (2019) corroborated these findings, highlighting that the life expectancy of the average

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Nigerian in 2019 was better only than that of people in Sierra Leone, Chad and the Central African Republic, which had 53, 54 and 54 years respectively.

The highest allocation of budget made to the Ministry was 6.08% in 2012. Consequently, the average budget allocation to the Federal Ministry of Health (FMH) over the course of 20 years is 4.69%. The current health expenditure is below the 15% commitment of the Abuja Declaration by 10.31%. This falls short of the threshold when compared to countries like Rwanda, Swaziland, Ethiopia, Malawi, the Central African Republic, and Togo, which have upheld the Abuja Declaration commitment. Moreover, capital expenditure in the health sector is lagging behind, despite being expected to drive increased investment. Over a span of 20 years, recurring costs make up 78% of total health expenditure, while capital costs make up only 22% (Obi & Ozolua, 2021). According to data from the World Bank in 2021, the average life expectancy for both males and females in Nigeria was recorded at 54.49 years in 2019, showing a minimal improvement. Nigeria and reached its lowest point at 3.3% in 2016. The health capital expenditure as a percentage of total government expenditure on health in Nigeria was 3.1% in 2017, 2.9% in 2018, and 3.2% in 2019.

The significant disparity that favors ‘current expenditure highlights the government's prioritization of Human Resources for Health and office overhead expenses was positioned at 161 out of 195 countries globally in terms of life expectancy in 2019, falling behind countries such as South Africa with 61.46 years, Libya with 70.61 years, Egypt with 70.23 years, and India with 69.16 years. Policymakers have recognized the enhancement of human health as a crucial factor in improving human capital and the overall well-being of nations. To advance global health status, the United Nations organized a conference in New York in 2019, emphasizing universal health coverage. Moreover, the African Union's resolution in 2001, requiring African countries to allocate 15% of their budget to the health sector to enhance the health status of their populations, remains unfulfilled by many African nations (Ibrahim & Rejoice, 2022). In order to enhance the overall health status of the population, countries allocate financial resources to their healthcare sectors annually. In 2020, the United States had the highest percentage of its budget allocated to healthcare, with approximately 19.7%. This was significantly higher compared to the 12.8% allocated by Germany and the 12.2% allocated by France. According to data from the World Development Indicators of 2022, the average life expectancy is approximately 79 years in the United States, 80 years in Germany, and 82 years in France.

An examination of Nigeria's budgetary patterns over time indicates that the Federal Government consistently allocates approximately 5% to 6% of its budget towards healthcare, never surpassing this threshold. Challenges within the health sector in Nigeria include healthcare services, constrained budgetary resources, inadequate health infrastructure, uneven distribution of healthcare personnel, and ineffective cooperation among key stakeholders (Adedokun, et *al*, 2017).

Improving life expectancy is a critical goal for Nigeria's healthcare system, and understanding the role of government spending is essential to achieving this objective. Therefore, the main objective of this paper is to examine the impact of government health capital expenditure and government health recurrent expenditure on life expectancy in Nigeria from 1986 to 2024.

The paper thus uses the following specific objectives:

i. examine the impact of government health capital expenditure on life expectancy in Nigeria.
ii. assess the effect of government health recurrent expenditure on life expectancy in Nigeria.

II. LITERATURE REVIEW

Conceptual Review

Healthcare spending

What is involved in healthcare spending includes the total resources such as money, time, and effort devoted by individuals, households, businesses and governments to healthcare goods and services. It covers a wide range of costs related to medical care, public health initiatives, and overall health maintenance and enhancement (Smith et al., 2020). A broader perspective, as articulated by Robinson and White (2016), asserted that health expenditure includes financial outflows directed toward healthcare infrastructure, personnel, research and the entire healthcare ecosystem.

According to the World Bank (2014), health expenditure involves the provision of health services, preventive and curative care, family planning, nutrition activities, and emergency aid designated for health, excluding water and sanitation provision. Conversely, the World Health Organization (WHO, 2015) defined health expenditure as the sum of final consumption of health goods and services plus capital investments in healthcare infrastructure. Ke, Saksena, and Holly

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(2011) argued for increased healthcare expenditure, whether through financial means or by enhancing the quality of human resources in the healthcare sector, as a means to directly improve the lifespan of populations. healthcare financing options include tax-based governmental health finance, out-of-pocket household health spending, private sector (donor fund), and health insurance are all examples of health financing, as stated by Olayiwola, al. (2017). Donor institutions such as the World Bank, the World Health Organization, and the European Union provide grants and loans to finance healthcare in the country.

According to the World Health Organization (WHO) in 2020, health spending comprises all health and healthcare costs, including medical care, prevention, rehabilitation, community health activities, health administration, regulation, and capital production. In Nigeria, healthcare financing options consist of tax-based governmental health finance, out-of-pocket household health spending, private sector (donor fund), and health insurance, as outlined by Olayiwola, *et al*, (2017). Organizations such as the World Bank, the World Health Organization, and the European Union offer financial assistance in the form of grants and loans to support healthcare in the nation. Life expectancy is a metric used to estimate the average lifespan of individuals, taking into account current mortality rates. This calculation is based on a life table that outlines the probabilities of death, mortality rates, and survival rates across different age brackets. According to WHO (2006),

Life expectancy at birth is defined as the average lifespan of a newborn, taking into account the general mortality rate and mortality patterns across various age groups. Merriam-Webster (2016) defines life expectancy as the average number of years an individual is expected to live, and Crimmins (2000) notes that life expectancy estimates are usually calculated based on age or age groups. The measure of life expectancy at birth is widely used as it is not influenced by the age distribution. According to Esteban (2017), life expectancy is determined by calculating the average age at which individuals within a specific population typically pass away, and is defined as the projected number of years an individual is anticipated to live.

Health spending is the financial investment in healthcare services, whereas life expectancy indicates the average lifespan of individuals. Increased health expenditure is typically linked to improved health results and longer life expectancies, as it enhances the accessibility and standard of healthcare services. Apart from the direct impact on health results, health spending can also boost economic growth by enhancing the efficiency and workforce involvement of healthier individuals. Nevertheless, healthcare quality, delivery efficiency, and social determinants of health are also significant factors that influence life expectancy.

Health Expenditure Per Capita

Health expenditure per capita are expenditure on health that measures the final consumption of health goods and services (i.e. current health expenditure). This includes spending by both public and private sources on medical services and goods, public health and prevention programmes and administration, but excludes spending on capital formation (investments). To compare spending levels between countries, per capita health expenditures are converted to a common currency (US dollar) and adjusted to take account of the different purchasing power of the national currencies. Economy-wide (GDP) PPPs are used as the most available and reliable conversion rates (Organization for Economic Cooperation and Development [OECD], 2015).

Capital Health Spending

Public health expenditure, according to Aigbedion (2020), includes recurrent and capital expenditure from government (central and municipal) budgets, external borrowings and grants (including donations from international agencies and non-profit groups), and social (or compulsory) health insurance funds. The total expense is equal to the sum of capital and recurrent expenditures. Also, Aigbedion (2020) opined that government health expenditure is the whole of total health expenditure so that health is recognized as a public good that the private sector has a minor investment in. Thus, government health spending has caused public health promotion and through specified channels will lead to human development. World Health Organization (2000) believed that health expenditures encompass all activities whose primary purpose is to restore, improve, and maintain health for the nation and individuals during a defined period. Records of expenditures for these activities, or a basis for estimating them, are required regardless of the type of institution or financing entity, which includes traditional, complementary, and alternative medicine, it also includes preventive and long-term care.

Recurrent health expenditure is a key indicator of the government's commitment to health

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investment (World Health Organization, 2022). While, capital health expenditures are usually in form of investment into developmental projects such as construction of road and bridges, railways, building of schools and hospitals among others. Out-of-pocket health spending represents the direct payments made by individuals while receiving health services. However, the increase in the amount of out-of-pocket health expenditures creates an Extra burden on households and increases inequality in the society (Beylik et al., 2022).

Recurrent Health Spending

Health recurrent expenditure (HRE) is the expenditure on products and services used to keep the health sector running on a daily basis. This includes things like healthcare worker salary, medical supplies, and facility maintenance. HRE is a key indicator of the government's commitment to health investment (World Health Organization, 2022). Government expenditure refers to all expenses made by a nation's government on collective needs of a country (Muguro, 2017). These expenditures are government regular spending on a routine basis for workers' wages and salaries, goods and services and other administrative expenses. They are different from capital expenditures which are usually in form of investment into developmental projects such as construction of road and bridges, railways, building of schools and hospitals among others. Wanjiru (2013) puts it that government spending on education and health sectors leads to development and build-up of human capital that will be more resourceful and adequately creative to enhance economic growth.

Health expenditure includes all expenditures for the provision of health services, family planning activities, nutrition activities and emergency aid designated for health, but it excludes the provision of drinking water and sanitation (World Health Organization, 2023). Generally, public health expenditure consists of health and health related expenditures which are defined based on their primary or predominant purpose of improving health, regardless of the primary function or activity of the entity providing or paying for the associated health services. Health includes both the health of individuals as well as of groups of individuals or populations. Health expenditure consists of all expenditures or outlays for prevention, promotion, rehabilitation, community health activities, health administration and regulation, and capital formation with the predominant objective of improving health.

2.2 Empirical Review

Multiple research studies have utilized different data sources and statistical approaches to investigate the impact of government healthcare spending on life expectancy. The review studies are repletion the relationship between government healthcare expenditure and life expectancy in Nigeria and outside Nigeria.

Awoyemi et al. (2024) conducted a comprehensive time series analysis to investigate the effect of government health expenditure on health outcomes in Nigeria, with particular focus on life expectancy and mortality rates. The study employed the Autoregressive Distributed Lag (ARDL) bounds testing approach to determine the short-run and long-run dynamics between the variables. Using annual data that captures government spending on health and population health indicators over several decades, the researchers found a statistically significant positive relationship between health expenditure and life expectancy in the long run. In the short run, results also suggested that any increase in health expenditure has a relatively quick impact on improving health outcomes, although the magnitude is smaller than in the long run. Notably, the study revealed that government health spending helps reduce mortality rates, especially among vulnerable populations such as children under five.

Joseph and Agada (2024) focused on the empirical relationship between public health expenditure and life expectancy in Nigeria, analyzing annual time series data from 1985 to 2022. Their study adopted a rigorous econometric methodology, including the ARDL model and Granger causality test, to explore the nature and direction of the relationship between public health spending and life expectancy at birth. The results of the ARDL bounds test confirmed the existence of a long-run equilibrium relationship between the two variables, indicating that increases in government health spending are associated with gradual but significant improvements in life expectancy over time. However, the Granger causality test revealed that there was no direct short-run causality flowing from public health expenditure to life expectancy, suggesting that other mediating variables or lags in policy implementation might influence the effectiveness of health spending.

Oniore et al. (2024) carried out an empirical investigation into the impact of various components of public health spending on life expectancy in Nigeria, using the ARDL econometric framework to analyze data spanning from 1990 to 2023. Their study decomposed health spending into key categories such as per capita health expenditure, capital health expenditure, recurrent expenditure, and out-of-pocket spending to determine their individual and collective effects on life expectancy. The findings indicated that all forms of health spending had statistically significant effects on life expectancy in the short run, but the long-run impact varied depending on the type of expenditure. Recurrent health expenditure and per capita spending were found to have a stronger positive effect on life expectancy, likely due to their direct link with the provision of essential health services such as immunization, maternal care, and treatment of communicable diseases.

Ahonkhai, et al. (2023) examined the relationship between government health expenditure and health sector performance in Nigeria from 1981 to 2021 using the autoregressive distributed lag technique. The analysis found that government health domestic spending, income per capita, medical provider remuneration and international health grants have a positive impact on life expectancy and a negative impact on new-born mortality while corruption, health insurance and medical consultants have a negative impact on life expectancy and a positive impact on infant mortality in Nigeria.

Iyakwari, et al. (2023) studied the effect of health expenditure on life expectancy in Nigeria using time series data from 1990 to 2021 and the ARDL and ECM models. The short-run analysis revealed that it would take a 71% adjustment speed for the model to move from the short run to the long run, indicating that health expenditure may take time to have an impact on life expectancy. The study found a negative relationship between health capital expenditure and health recurrent expenditure in the long run, while out-of-pocket health expenditure had a positive relationship with life expectancy.

Opeloyeru and Lawal (2017) shows that the higher the life expectancy, the higher the output per capita in the long run. Empirically, government healthcare spending has a relatively strong and direct effect on economic growth; this in turn improves national productivity that public health expenditure and gross domestic product positively impacts life expectancy in Nigeria. The causal relationship between public healthcare expenditure and economic growth indicated that one way relationship exist between the variables in the short run and long run, while a reversal response occurred between the two in the long run only (Subhalaxmi, 2017).

Olabisi (2019) conducted a study on the factors influencing life expectancy in developing nations. The research revealed that the key determinants of life expectancy in these countries encompassed economic progress, educational attainment, healthcare accessibility, as well as social and cultural influences. More specifically, the study observed a positive and noteworthy correlation between economic growth, as measured by GDP per capita, and life expectancy. Furthermore, factors such as education, healthcare accessibility, and social and cultural influences were found to have notable positive effects on life expectancy. Olowookere et al. (2019) conducted a study utilizing the Autoregressive Distributed Lag (ARDL) method to examine the correlation between healthcare spending and health results in Nigeria. The results revealed that investments in health capital had a beneficial and significant influence on both life expectancy and infant mortality rates. Conversely, ongoing healthcare expenditures were found to have a detrimental and significant impact on these outcomes. It was recommended that policymakers in Nigeria focus on boosting health capital investment and decreasing recurrent health spending to improve overall health outcomes in the nation. Alabi and colleagues (2018) also investigated the relationship between healthcare funding and life expectancy in Nigeria through a study utilizing data from 1986 to 2016. The research demonstrated a direct relationship between funding for healthcare and life expectancy in Nigeria. This suggests that increasing financial support for healthcare can result in a higher life expectancy for the population.

Ezeani and Efobi (2018), utilized the ARDL model to examine the influence of health expenditure on life expectancy in Nigeria between 1981 and 2015. Their results revealed that in the short term, the estimated coefficient for health expenditure was positive but not statistically significant, suggesting that the impact of health expenditure on life expectancy is not immediate. However, in the long term, the coefficient estimate for health expenditure was positive and statistically significant, indicating a positive relationship between higher health expenditure and increased life expectancy. Hence, it is suggested by the authors that policymakers should prioritize healthcare funding to improve the health outcomes of the Nigerian population. While most studies analyzed health expenditure variables such as recurrent health expenditure, health capital expenditure, and total health expenditure.

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Sango-Coker and Bein (2018) investigated the impact of healthcare spending on life expectancy using some selected West African health expenditures in Iran. Sango-Coker and Bein (2018) investigated the impact of healthcare spending on life expectancy using some selected West African countries from 1999 to 2014. Using pooled regression and pairwise correlation, the empirical results obtained include that the female population lived longer than the male population and a positive relationship was obtained between the variables of healthcare spending and life expectancy for the public healthcare sector.

Theoretical Framework

Kee Theory of Health Expenditure

The theoretical foundation of this paper is based on Kee's (2009) health expenditure model, commonly known as the "Human Capital and Health Expenditure Model" or the "Human Capital Model". One aspect of the model focused on uniform slope, while another aspect focused on varying slopes. Kee's assessment of provincial health spending highlighted several important factors that affect decisions regarding healthcare expenditures.The theory outlined how several factors influence a country's level of expenditure on healthcare and assumed that health expenditure is influenced by both demand-side and supply-side factors. The features of a population that influence demand for healthcare services are referred to as demand-side factors which includes the population's size and age structure, the prevalence of chronic diseases, and the availability of health insurance. The features of the healthcare system that influence the supply of healthcare services are referred to as supply-side factors and includes the availability of healthcare facilities, the quantity of healthcare providers, and the cost of healthcare technologies. According to Kee, provinces with greater incomes are predicted to be able to spend more on health, given that price of health also determines health expenditure especially in the case of higher out of pocket payment. Health care is not similar to other goods because government is heavily involved in its delivery, supervision, payment of physicians, medical personnel and also a non-storable good and its delivery cannot be delayed. Also the share of senior population is an increasing function of age and associated with higher spending.

As outlined by Kee (2009), examining health expenditure through the lens of demand and supply factors can provide valuable insights into the contribution of higher health care expenditure to human development by improving health outcomes, life expectancy, standard of living, reducing preventable deaths and illnesses, increasing workforce productivity, economic growth.

These decisions are influenced not only by income levels but also by the costs of healthcare services. The government plays a significant role in overseeing and regulating healthcare supply, making the sector complex. Additionally, providing healthcare services to the elderly population is associated with higher healthcare costs. The dynamic models under consideration follow a specific format.

Dynamic model considered are of such form:

$hit = \alpha + phit - Xit\beta + \varepsilon + \sum it = Uit$............ (1)

In the given model, i represents the provinces and t represents time. The symbol β denotes a vector of dimensions K x 1, where K is the number of independent variables. X is a matrix of dimensions K x NT, containing both income and non-income variables. The parameter μi is specific to each province, and Uit represents the stochastic error term. Additionally, the model highlights three key factors affecting the supply of healthcare services: the nature of healthcare services, the production cost of healthcare services, and the availability of healthcare providers. The mathematical representation of the model is as follows: Demand for healthcare services.

$Q = f(E, Y, I,$.. ….. (2)

Where: E represents educational level of the population, Y represents level of income of the population, I represent the availability and type of health insurance coverage, T represents advancements in healthcare technology while supply of healthcare services is mathematically as:

Supply of healthcare services

$Q = g(P, C, N)$.. …. (3)

Where: P represents the healthcare services price, C represents healthcare services production cost, N represents availability of healthcare providers

The equilibrium level of healthcare services in the market can be determined by setting the demand for healthcare services equal to the supply of healthcare services:

$f(E, Y, I, T) = g\ (P, C, N\ )$... (4)

Equation (4) indicates that the balance of healthcare services is influenced by various factors such as education and income levels, the type and

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accessibility of health insurance, advancements in healthcare technology, the cost of healthcare services, and the presence of healthcare providers. Kee's model underscores the significance of investing in healthcare technology and human capital to enhance life expectancy, living standards, and economic development. Additionally, it takes into account market dynamics like prices and supply that impact the accessibility and affordability of healthcare services.

III. Methodology

The study employed an *ex post facto* research design, involving the collection and analysis of existing data. Variables such (LEX) Life Expectancy, (HCE) Government Health Capital Expenditure, (HRE) Government Health Recurrent Expenditure utilized. The data analysis employed the time series data obtained from the Central Bank of Nigeria (CBN) statistical bulletin (2021), the Global Health Expenditure database of the World Health Organization (2022), and the United Nations Development Programme (UNDP) (2021).

Model Specification

This paper used theFully Modified Ordinary Least Squares (FMOLS), a technique that eliminates feedback in the cointegrating system by augmenting the cointegrating regression with lags and leads of the differenced values of the explanatory variables, so that the resulting co integrating equation error term is orthogonal to the entire history of stochastic regressor trend.

As proxy, the implicit function is

LEX = f (HCE, HRE) -- (5)

Where:

LEX = Life Expectancy

HCE = Government Health Capital Expenditure

HRE = Government Health Recurrent Expenditure

It is expressed explicitly as

$LEX1= \alpha + \beta_1 HCE_t + \beta_1 HRE_t + u_1$ ------------------------------------- (6)

Where;

α = intercept

$\beta_1 - \beta_2$ = parameter estimates of the regressors

u_1 = stochastic error terms.

IV. Data Presentation and Analysis

This section presents the descriptive statistical analysis of key economic indicators, including (LEX) Life Expectancy, (HCE) Government Health Capital Expenditure, and (HRE) Government Health Recurrent Expenditure. The analysis includes measures of central tendency, dispersion, and normality.

Table 1: Descriptive Statistics

	LEX	HRE	HCE
Mean	49.46441	133.2626	22.73000
Median	49.88000	72.08000	20.11000
Std. Dev.	2.946464	146.1014	19.14130
Skewness	0.014541	0.876599	0.364838
Kurtosis	1.732943	2.404856	1.706233
Jarque-Bera	2.275562	4.856192	3.125533
Probability	0.320529	0.088205	0.209556
Observations	34	34	34

Source: Author's Computation, using E- views 12, 2024

The Table provided presents descriptive statistics for three variables: LEX, HRE, and HCE. These statistics summarize the key characteristics of the data collected for each variable, such as central tendency, dispersion, and distribution. The mean shows the average value of the variable. The mean values for LEX, HRE, and HCE are 49.46, 133.26, and 22.73, respectively shows the average. The median values are slightly different from the mean values, indicating some skewness in the distributions. The standard deviations for HRE and HCE are relatively high compared to LEX, suggesting that the data for these variables are more spread out. The skewness values for LEX HRE and HCE are positive, indicating right-tailed distributions. The kurtosis values for all three

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variables shows that the distribution has a long left tail with lower values that are lower than the value of the mean with kurtosis are less than 3, suggesting that the distributions have heavy tails (more outliers). The Jarque-Bera test and associated probabilities suggest that the distributions for all three variables are normality distributed given a probability value greater than 0.05.

Unit Root Test Results

Variables	ADF		
	ADF Values	**Critical Values**	**Order of Int.**
HCE	-5.683994*	-3.653730	I(1)
HRE	-6.506177*	-3.653730	I(1)
LEX	-9.057700*	-3.653730	I(0)

**** implies significance at 1% level, **implies significance at 5% level and *** implies significance at 10%***

Source: *Author's Computation, using E- views 12, 2024*

The result in Table 2revealed that the Health Capital Expenditure (HCE) in Nigeria (RGDP) and Health Recurrent Expenditure (HRE) in Nigeria were stationary at first difference, meaning that the integration was of order one 1(1) at a 1% level of significance, while the Life Expectancy in Nigeria was stationary at levels meaning that the integration was of order zero 1 (1). This implies that the variables were integrated into order 1(0) and order 1(1) of the variables as postulated by Pesaran, et al.., (2001).

Table 3 Fully modified ordinary least square (FMOLS)

Dependent Variable: LEX

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HRE	0.005921	0.00411	1.43948	0.0204
HCE	0.10796	0.03166	3.40965	0.0019
C	46.19497	0.4728	97.7055	0
R-squared	0.873871	Mean of LEX		49.5682
Adjusted R-squared	0.865462	Standard deviation of LEX		2.92838
F-statistic	138.5397			
Prob(F-statistic)	0.00000			

Source: *Author's Computation, using E- views 12, 2024*

The data in the Table 3 indicates that with constant levels of health recurrent and capital expenditure, life expectancy stands at 46.19497 years. This suggests that when government spending on health remains unchanged, life expectancy is maintained at this level. The table also shows a positive correlation between both health recurrent and capital expenditures and life expectancy, implying that increasing government spending on health is likely to result in higher life expectancy. This relationship is statistically significant, with probability values below 0.05.

The model's goodness of fit, as indicated by an R^2 value of 0.87 or 87%, suggests a strong fit. Specifically, 87% of the variation in life expectancy in Nigeria is explained by changes in government health expenditure, with the remaining 13% due to the stochastic error term. The overall significance of the model was assessed using the F-statistic, which had a value of 138.5397 and an associated p-value of 0.00000. These results indicate that the model is highly significant, with a significance level below 0.05%, confirming its strong explanatory power.

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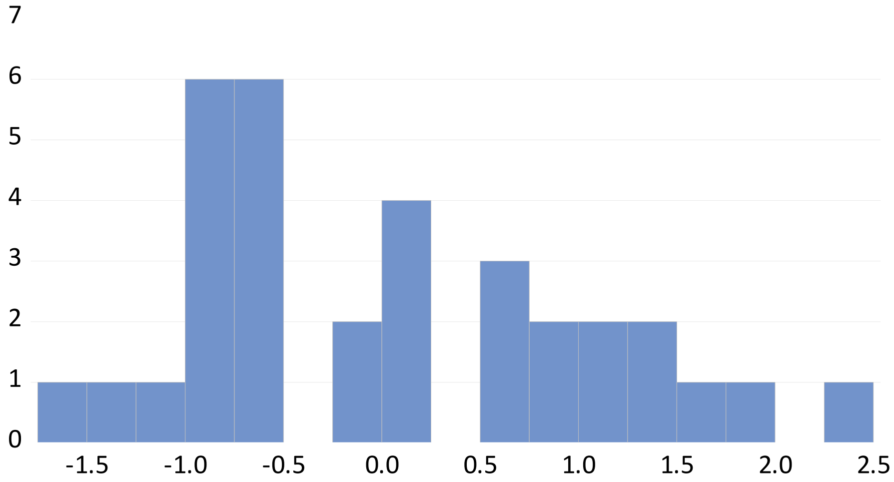
Post Estimation Diagnostic Test



Series: Residuals	
Sample 1991 2023	
Observations 33	
Mean	0.033718
Median	-0.156372
Maximum	2.471849
Minimum	-1.627685
Std. Dev.	1.039440
Skewness	0.483208
Kurtosis	2.327150
Jarque-Bera	1.906691
Probability	0.385449

Figure 1: Normality test

Source: *Author's Computation, using E- views 12, 2024*

The results shown in Figure 1 indicate that the probability value from the Jarque-Bera test is 0.385449, which suggests that the hypothesis of a normal distribution can be accepted.

V. Discussion of Findings

These findings align with existing literature that underscores the critical role of government health expenditure in improving health outcomes. For instance, the work Ahonkhai, *et al*, (2023) demonstrated a similar positive relationship between government health spending and life expectancy in African countries. Their study found that increased public health expenditure significantly enhances life expectancy, a conclusion that resonates with the findings from the Nigerian context.

Similarly,Iyakwari, *et al*, (2023)) emphasized the effectiveness of government health expenditure in improving health outcomes, particularly in low-income countries. They argued that public spending on health is essential for reducing mortality rates and increasing life expectancy, particularly in environments where private health expenditure is low or unaffordable for most of the population.

Furthermore, these findings are consistent with the predictions of on Kee's (2009), which posits that as a country's economy develops, there is a natural tendency for the government to increase public expenditure, including on health, which in turn leads to better health outcomes. The strong goodness of fit in the model suggests that the Nigerian government's health spending is effectively contributing to life expectancy improvements, consistent with this theoretical framework.

Finally, the findings from this study reinforce the critical importance of government investment in health for improving life expectancy. They contribute to the broader understanding of how public spending can be a powerful tool for enhancing population health, particularly in developing countries like Nigeria. These results advocate for continued or even increased government health expenditure as a means to further improve life expectancy and overall public health.

VI. Conclusions and Recommendations

Health expenditure is a fundamental pillar of individual well-being and a critical component of human resource development within a nation. The analysis reveals that despite its recognized importance, Nigeria's health sector faces significant challenges, including inadequate government expenditure, insufficient infrastructure, and poor management. These issues have led to suboptimal health outcomes, as evidenced by the country's persistently low life expectancy rates.

Based on the findings, the following recommendations are proposed**:**

1. Given the positive impact of government health spending on life expectancy, it is recommended that an increase its allocation to the health sector. This should include both recurrent and capital expenditures to ensure a comprehensive improvement in healthcare infrastructure, services, and accessibility, with coordinated involvement from key institutions such as the federal ministry of

Finance, the national Assembly particularly the health committee, and the federal ministry of health and social welfare.

2. While increasing expenditure is crucial, it is equally important to ensure that these funds are used efficiently. Measures should be implemented to reduce waste, curb corruption, and improve the management of health resources to maximize the impact of spending on life expectancy.The responsibility for implementing these measures rests primarily with the Federal Ministry of Health and Social Welfare, supported by key institutions such as the National Primary Health Care Development Agency (NPHCDA), the Budget Office of the Federation, the National Health Insurance Authority (NHIA), the Office of the Auditor-General for the Federation, and anti-corruption bodies like the Independent Corrupt Practices and Other Related Offences Commission (ICPC) and the Economic and Financial Crimes Commission (EFCC).

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APPENDIX I
Data

Year	Recurrent Capital Expenditure on Health	Recurrent Expenditure on Health	Government Spending	Life expectancy at birth, total (LEX, years)
1986	0.263	0.134	NA	46.70
1987	0.225	0.041	NA	46.09
1988	1.459	0.423	NA	45.01
1989	3.012	0.575	NA	46.03
1990	2.403	0.501	NA	46.04
1991	1.256	0.618	NA	45.69
1992	0.291	0.150	NA	45.67
1993	8.882	3.872	NA	45.79
1994	7.383	2.094	NA	45.51
1995	9.746	3.321	70.7	45.49
1996	11.667	3.175	75.4	45.57
1997	14.854	3.891	71.6	45.79
1998	13.589	4.742	70.2	46.04
1999	43.611	16.639	67.2	46.61
2000	57.957	15.218	60.16	47.19
2001	39.883	24.522	60.74	47.62
2002	80.531	40.621	65.05	47.93
2003	64.782	33.268	72.81	48.44
2004	76.500	34.200	64.55	48.77
2005	82.800	55.700	65.97	49.3
2006	119.018	62.254	70.46	49.73
2007	150.779	81.909	70.94	50.03

2008	163.977	98.219	72.76	50.23
2009	137.116	90.200	74.47	50.71
2010	170.800	99.100	76.88	50.95
2011	335.800	231.800	74.73	51.36
2012	348.400	197.900	72.84	51.5
2013	390.400	180.000	70.93	51.71
2014	343.755	195.977	71.85	51.79
2015	325.190	257.700	71.89	51.84
2016	339.282	200.824	75.19	52.04
2017	403.957	245.188	77.27	52.31
2018	465.300	296.442	75.95	52.55
2019	593.127	388.232	70.52	52.91
2020	646.793	423.359	74.58	52.89
2021	620.591	386.244	73.68	52.68
2022	702.979	437.521	71.89	55.44
2023	752.976	468.639	72.43	56.22
2024	789.469	478.965	73.01	56.02

Source: *Central Bank of Nigeria (CBN) Statistical Bullentin, 2024*