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Impact of Per Capita Income on Life Expectancy in Nigeria

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Abstract

In the quest for a healthier and more prosperous future, Nigeria aims to translate its economic gains into improved health outcomes. This study delves into the complex dynamics between per capita income and life expectancy, seeking to uncover the secrets to a longer and healthier life. Accordingly, this study examines the impact of per capita income on life expectancy in Nigeria applying annual data from 1990 to 2023. To analyze the data, Autoregressive distributive lag (ARDL) model was employed. The result revealed that in the long run, per capita income, public health expenditure, corruption perception index, and the National Health Insurance Act, have a

positive impact on life expectancy, while carbon emission has a negative impact on life expectancy. All the variables were statistically significant in explaining life expectancy. In the short run, only the corruption perception index and the dummy variable lagged by twoyears and had a different direction of impact from the long-run result. In addition, only per capita income, public health expenditure, the National Health Insurance Act and the two-year lag of the National Health Insurance Act were not statistically significant. Following the results, the study recommends an increase in per capita income through the introduction of social protection programs like unemployment benefits, regular adjustment of minimum wages and encouraging entrepreneurship to create new income opportunities.

Keywords: Per capita income, Life Expectancy, Corruption, Public Health Expenditure

1. INTRODUCTION

One of the primary needs of every individual is improved health. Many persons invest in their health by improving their nutrition, exercising regularly and going for regular medical check-ups. This enables them to achieve higher health status and longevity. Investment in health may be determined by an individual's income level. In countries where citizens have high income levels, their life expectancy rate is known to also be high, which may be attributed to their investment in health (Asiedu et al., 2022). For instance, Luxembourg and Singapore have one of the highest per capita incomes in the world, amounting to $142,214 and $127,565respectively, and their life expectancy is approximately 83 years and 85 years respectively. Whereas, countries with lower incomes also have low life expectancy rates, which may be attributed to insufficient funds to invest in their health. For instance, Burundi and Sierra Leone have one of the lowest per capita incomes in the world, summing to $308 and $472 respectively, and their life expectancy is approximately 67 years and 58 years respectively (World Bank, 2023). In Nigeria, individuals also aim to improve their health by investing their income in healthcare requirements.

1.2 STATEMENT OF RESEARCH PROBLEM

The per capita income of Nigeria is not among the lowest in the world yet life expectancy is ranked among the lowest in the world. In 2010, when per capita income was at $2,280, life expectancy stood at 51 years. Between 2015 and 2020 per capita income fell from $2,680 to $2,075, though life expectancy increased from 52 years to 54 years. By 2022, per capita income increased to $2,163 while life expectancy stood at 55 years (World Bank, 2023). Despite the relatively moderate per capita income in Nigeria, the country's life expectancy ranks among the lowest globally. Highlighting a critical disparity between per capita income and life expectancy. This disparity suggests that per capita income is not effectively translated into higher life expectancy. This may be attributed to insufficient per capita income to purchase improved nutrition and pay for better health care services. Also, individuals may invest their incomes in what they consider priority (like shelter, education and food) leading to poor life expectancy levels (Wilson & Olawale, 2021).

Low life expectancy in Nigeria may also be attributed to the mismanagement of funds allocated by the government to the health sector annually. For instance, in 2017, health management organizations were accused of misappropriation of 350 billion naira allocated to the health sector. Misappropriation of funds intended for the health sector may affect public health expenditure leading to poor infrastructural health facilities and inefficient healthcare delivery services, which are detrimental to the health of citizens (Wasiu, 2020). Longevity in Nigeria may be affected by environmental factors (Omir, et al., 2023). Environmental factors like carbon emission, cause cardiovascular diseases, which affect the life span of individuals. Structural changes in the economy caused by the introduction and implementation of health policy (National Health Insurance Act (NHIA)) may also affect the life expectancy of citizens (Muhammad, et al., 2006). The challenging problem connected with this study is that life expectancy is still a problem in Nigeria.

It is against this backdrop that this study adds to the discussion and debate on the impact of per capita income on life expectancy in Nigeria. Following this introduction, the remaining part of the study is structured to contain four other sections. Section two contains the theoretical framework and empirical literature. Section three covers the materials and methods. Section four

reveals the analysis of results and discussions and section five represents the conclusion and recommendation.

2. LITERATURE REVIEW

Theoretical Framework

Grossman's Theory of Health Demand

The theory of health demand is attributed to Grossman (1972). This theory explains that health is a capital good that is durable but depreciates if not improved. The durability of a population's health is dependent on the level of investment and consumption of health. This investment can be made by the government or individuals. Investment by the government includes government allocation of funds to the health sector while the individual investment comprises purchasing health care services and maintaining a healthy lifestyle. The level of health consumption depends on the price of healthcare services and the cost of maintaining a healthy lifestyle. These prices affect the consumption of healthcare services because of an individual's income. The theory acknowledges that income is a major determinant for the consumption of healthcare services and a healthy lifestyle. The theory further explains that individuals with higher incomes demand health services more than those with lower incomes. Also, higher-income earners may have a longer life span than those with lower incomes because of the disparity in their income, consumption of healthcare services and lifestyle (Taofik & Ditep,2022). This theory was adopted because of its importance to this research. The theory explains how income is invested in health and life span.

Empirical literature

Studying selected countries in West Africa (Nigeria, Ghana, Cote d'Ivoire, Niger and Burkina Faso), Jude, et al., (2023) examine the socioeconomic determinants and drivers of life expectancy from 1985 to 2018. Utilizing panel fixed effect least square dummy variable regression, the study discovers that per capita income is a major socioeconomic determinant and driver of life expectancy in West Africa. Studying some OECD countries, Anwar, et al., (2023) explores public spending on health, the per capita income of individuals and the outcome of health. Spanning 1996 to 2020 and employing the generalized method of moments. The outcome of the exploration showed that public health expenditure and per capita income improve life expectancy.

Applying the same methodology as Anwar, et al., (2023), and Asiedu, et al., (2022) examine the impact of income per capita on health outcomes in Africa. The study spans from 1994 to 2014, specifically analyzing 45 Sub-Saharan countries and 83 non-Sub-Saharan countries, and the outcome of the study shows that per capita income is significant in influencing life expectancy in Africa. In Iran, Shahraki (2021) studies from 2000 to 2017, the influence of public spending on health, private health spending and life expectancy. After applying the Vector Error Correction Model, the study revealed individual incomes improve life expectancy. Employing a cross-country regression method on several countries from 1981-2017, Bidani and Ravallion (2020) study the impact of gender disparity on health outcomes, specifically the impact of health financing on the life span of men and women. The major variables employed in the study were public health financing, per capita income and life expectancy. The study revealed that though

per capita income positively impacts life expectancy, the impact is not statistically significant. On the other hand, public health expenditure significantly and positively impacts life expectancy.

Analyzing some countries based on their income levels, Rezapour, et al., (2019), examine the influence of private and government health spending on life expectancy. The study spans from 2002 to 2015, employing panel data regression models. The outcome of the analysis reveals that life expectancy improves when individuals and government spend on health services. Nketiah-Amponash (2019) studies the factors that determine investment in health and health status in Sub-Saharan Africa, applying panel regression. The findings reveal that investment in health is measured using per capita income and government spending on health. While health status is measured using life expectancy. The study reveals that between 2000 to 2015, government health spending and per capita income were the major factors responsible for the rise in life expectancy.

In Ghana, Boachie, et al., (2018) apply Ordinary Least Square (OLS) and the two-stage least square technique to determine the relationship between government health spending and health outcomes. The study discovered that between 1980 and 2014, per capita income and public health expenditure were significant variables in improving the life expectancy of Ghanaians. Applying multiple regression models from 1995 to 2011, Mahumud, et al., (2013) focused on life expectancy, economic growth and expenditures on health care and revealed that economic growth and health expenditure improve life expectancy in Bangladesh. Also, per capita income was relevant in improving life expectancy.

In Nigeria, Elijah, et al., (2024) empirically analyze the relationship between the government allocating funds to the health sector and life expectancy using the Vector Error Correction model. The variables applied in the study were life expectancy, government health expenditure, per capita income, unemployment rate and population growth. The study revealed that from 1990 to 2023, government allocation of funds to the health sector and per capita income had a positive relationship with life expectancy. Similarly, population growth influences life expectancy positively, while the unemployment rate affects life expectancy negatively. The study on government spending on health and its impact on health sector outcomes was conducted by Wilson and Olawale (2021) in Nigeria. The study spans from 1981 to 2020. The result of the Autoregressive Distributed Lag (ARDL) model applied revealed that government health expenditure has a positive impact on life expectancy while per capita income has a negative impact on life expectancy.

An analysis of health expenditure and health outcomes in Nigeria was conducted by Omoloba (2020). The analysis applied an error correction mechanism and the Granger causality test, revealing that from 1980 to 2018, health expenditure was significant in improving the longevity of Nigerians. Per capita income revealed a positive though insignificant relationship with life expectancy, while corruption significantly and negatively affected life expectancy. Similarly, Okosodo and Mamudu, (2019) investigate the impact of per capita income on health outcomes in Nigeria from 1980 to 2016. The study utilized the Error Correction Mechanism and Johansen Co-integration methodology and discovered that per capita income though has a positive impact on life expectancy, is not significant in explaining changes in life expectancy. Health expenditure is the only variable that significantly affects life expectancy in Nigeria.

Covering the period 1980 to 2015 and employing the ARDL model, Orekoya (2017) examines the relationship between income inequality, health spending and health performance in

Nigeria. The findings of the result suggest that there is a long-run relationship between health indicators and income inequality. Per capita income is significant in explaining health status when public health expenditure is an indicator of health status but per capita income becomes insignificant in explaining health status when life expectancy is measured to explain health status.

3. MATERIALS AND METHODS

The model of Okosodo and Mamudu, (2019) was adapted for this study. Below is the model specification:

$$LE_t = a_0 + a_1 LPCI_t + a_2 LHE_t + a_3 UR_t + U_t \quad \ldots\ldots (1)$$

Where LE is life expectancy, PCI is per capita income, HE is health expenditure by the government, UR is the unemployment rate, U is the error term, t represents time, L represents Log, a_0 is the constant and $a_1 – a_3$ are the coefficients. The variable unemployment was dropped because it did not suit the objective of the study while, public health expenditure, corruption perception index, environmental factors measured by carbon emission and National Health Insurance Act (representing health policy) were included to effectively answer the research objective and suggest appropriate policy recommendations. Therefore, the model is specified as:

$$LXT_t = a_0 + a_1 PY_t + a_2 PHE_t + a_3 CPX_t + a_4 CO_t + a_5 D_t + U_t \ldots. (2)$$

Where: a_0 represents the intercept of the relationship in the model, $a_1 – a_6$ are the coefficients of each of the independent variables, LXT is life expectancy, PY is per capita income, PHE is government health expenditure, CPX is corruption perception index, COis carbon emission and D_1 is a dummy for NHIA (Nigerian Health Insurance Act). The dummy variable is in line with Jude, et al., (2023). Where D= 0 absence of policy break, D=1 if otherwise.

To adequately apply linear techniques, variables with large figures were standardized into a log form. Therefore, the model is specified as:

$$LXT_t = a_0 + a_1 \log PY_t + a_2 \log PHE_t + a_3 CPX_t + a_4 CO_t + a_5 D_t + U_t \ldots. (3)$$

Types and Sources of Data

This study spans from 1990 to 2023, utilizing annual time series data. The variables employed in the study included life expectancy, per capita income, public health expenditure, corruption perception index, carbon emission and National Health Insurance Act. Data was attained from the World Bank, Central Bank Statistical Bulletin and Corruption Perception Index.

Estimation Procedure

The ARDL model was applied in this study and it is preferable when variables are integrated of order one and zero and have a long-run singular relationship. In line with Pesaran and Shin (2001),the ARDL model specification of the equation is written as an unrestricted error correction model (UECM) to test for co-integration between the variables under study. The general ARDL model of the order (p,q) according to Alfa, et al., (2021) is given as:

$$Y_t = \alpha_0 + \alpha_{1t} + \sum_{i=1}^{P} \emptyset_i y_{t-i} + \beta' xt + \sum_{i=0}^{q-i} \boldsymbol{\beta_i' \Delta x_{t-i}} + \boldsymbol{\mu_1} \quad \ldots\ldots (4)$$

X_t = kx1 vector of I(1) variables that are not co-integrated,

Pi = kxk coefficient matrices such that the vector autoregressive process in Δx_t is stable

α_0, α_1 and ($\emptyset = \emptyset_1 + \emptyset_2 + \ldots\ldots\ldots\ldots + \emptyset_P$) = short-run parameters

μ_1 and μ_{1s} = serially uncorrelated disturbances with zero mean and constant variance. The ARDL model for this study is specified as:

$$\Delta LXT_t = \varphi_o + \sum^{n}_{i=1} \varphi_1 \Delta LXT_{t-i} + \sum^{n}_{i=1} \varphi_2 \Delta logPY_{1t-i} + \sum^{n}_{i=1} \varphi_3 \Delta logPHE_{2t-i} + \sum_{i=1}^{n} \varphi_4 \Delta CPX_{3t-i} + \sum^{n}_{i=1} \varphi_5 \Delta CO_{4t-i} + \sum^{n}_{i=1} \varphi_6 \Delta D_{5t-i} + \beta_0 LXT_{t-1} + \beta_1 logPY_{1t-1} + \beta_2 logPHE_{2t-1} + \beta_3 CPX_{3t-1} + \beta_4 CO_{4t-1} + \beta_5 D_{5t-1} + \varepsilon_t \ldots (5)$$

Where Δ is the first difference operator, $\varphi$is the drift component, while ε is a white noise error term. Equation (5) is an unrestricted error correction model with the summation sign expressing the error correction dynamics, which is $\varphi_{1\text{-}6}$, while β_1-$\beta_5$represents the long-run relationship. The ARDL short-run relationship model is specified as:

$$\Delta LXT_t = \varphi_o + \sum^{n}_{i=1} \varphi_1 \Delta LXT_{t-i} + \sum^{n}_{i=1} \varphi_2 \Delta logPY_{1t-i} + \sum^{n}_{i=1} \varphi_3 \Delta logPHE_{2t-i} + \sum_{i=1}^{n} \varphi_4 \Delta CPX_{3t-i} + \sum^{n}_{i=1} \varphi_5 \Delta CO_{4t-i} + \sum^{n}_{i=1} \varphi_6 \Delta D_{5t-i} + \varphi_7 ecm_{t-i} + \varepsilon_t \ldots\ldots (6)$$

Where ECM is the error correction term and authenticates the existence of a long-run relationship when its coefficient is statistically significant and negative.

Pre-estimation Diagnostic Test

Stationarity Test

This study takes into account structural breaks caused by policy changes, therefore Dickey Fuller minimum-statistics was applied as against the conventional Dickey-Fuller test because its analysis includes structural breaks. The introduction of health policy (NHIA) makes the use of Dickey-Fuller minimumstatistics vital to the study. Other related studies may not have required the use of structural breaks if health policies were not accounted for. Similarly, erroneous outcomes are avoided because Dickey Fuller minimum-statistics will not reject the existence of unit roots with the presence of structural breaks (Muhammad, et al., 2006).

Post-estimation Test

The post-estimation test carried out to ascertain the robustness of the model includes, Breusch-Godfrey Lagrange Multiplier (LM) test determines the existence of autocorrelation, the heteroscedasticity test to ascertainwhether the variables are unequal across the range of values,the Normality test employing Jacque-Bera test to conclude if the error terms used in the study are normally distributed and CUSUM and CUSUM Sum of squares to determine the stability of the estimated parameters throughout the time frame of the study.

4. ANALYSIS OF RESULTS AND DISCUSSIONS

Table 1: Summary Statistics

	LXT	PY	PHE	CPX	CO_2	D_1
Mean	49.06	1488	182.3	10.08	0.675	0.559
Median	48.50	1703	101.2	2.200	0.629	1.000
Maximum	56.00	3201	984.9	28.00	0.916	1.000
Minimum	45.00	270.0	3.120	0.270	0.491	0.000
Std. Dev.	3.684	940.3	234.6	11.90	8.064	0.504
Skewness	0.366	0.181	1.902	0.619	0.418	-0.237
Kurtosis	1.694	1.634	6.445	1.413	4.939	1.056
Jarque-Bera	3.175	2.828	37.31	5.741	2.848	5.671
Probability	0.204	0.243	0.000	0.056	0.241	0.059

Source: Researchers computation using E-views 13

Table 1 reveals the descriptive statistics for the secondary data employed in the study. The mean values of the variables are all positive, revealing an upward trend in the time series. Though PY, and PHE have higher mean values, the small mean values of the other variables indicate a fairly robust distribution. Also, PY and PHE have higher standard deviation values, indicating that the other variables estimated are close to their actual values. Only D_1 was negatively skewed (to the left), and other variables were positively skewed. Also, the Kurtosis of the distribution shows that only PHE and CO are leptokurtic (estimated value greater than 3) while other variables are platykurtic (estimated values less than 3.0). Consequently, the Jarque-Bera probability values indicate that the variables excluding PHE are asymptotically normally distributed.

Table 2: Order of Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-303.0465	NA	0.038295	19.44041	19.80684	19.56187
1	-131.6177	246.4289	5.26e-05	12.72611	16.02402	13.81927
2	-16.49850	107.9243*	5.02e-06*	9.531157*	15.76053*	11.59602*

****Indicates lag order selected by the criterion***
Source: Researchers computation using E-views 13

The order of lag selection criteria in Table 2, revealed that lag 2 is the appropriate lag length for this study as determined by Schwarz Information Criterion (SIC) test statistics because an over-fitted model is better than an under-fitted model. To avoid misspecification of the error term, the model with the least value of information criteria was chosen.

Table 3: Test for Stationarity

Variables	DF Min-t Levels	DF Min-t Difference	Remarks
LXT	-1.551	-10.97	1(1)
LogPY	-3.221	-5.082	1(1)
LogPHE	-2.473	-7.343	1(1)

CPX	-23.34	-	1(0)
CO	-4.124	-7.597	1(1)
ADF Critical value at 5% = -4.444			

Source: Researchers computation using E-views 13

Table 3 represents the Dickey Fuller minimum statistics which were employed to determine the unit root test for stationarity. Intercept was included in the test because it was statistically significant. The result revealed that only CPX of the series in the research model is stationary at levels, implying that it is integrated of order 1(0). While the other series are stationary at the first difference, which means they are integrated oforder 1(1). The unit root test for the dummy variable (D_1) was not tested because it is standardized. Modifications in different health policies may be responsible for the break-points in data between the early 2000s and early 2023.

Table 4: ARDL Bounds Test for Co-integration

Test Statistics	Value
F-statistic	8.268

	10%		5%		1%	
Sample Size	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.334	3.515	2.794	4.148	3.976	5.691
35	2.254	3.388	2.685	3.96	3.713	5.326
Asymptotic	1.99	2.94	2.27	3.28	2.88	3.99

* I(0) and I(1) are respectively the stationary and non-stationary bounds.

Source: Researchers computation using E-views 13

Table 4 indicates that there is a long-run equilibrium relationship between the variables in this study because the computed F-statistics of 8.27 exceeds the upper and lower bounds at 5 per cent significant level.

Table 5: ARDL Long-Run Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LogPY	1.409	0.552	2.553	0.021
LogPHE	0.864	0.339	2.548	0.021
CPX	0.041	0.015	2.751	0.014
CO_2	-4.442	1.851	-2.400	0.029
D_1	1.188	0.527	2.257	0.038
C	4.911	9.053	0.543	0.595

Source: Researchers computation using E-views 13

Table 5 shows the long-run ARDL result at a 5 per cent significance level. From the table, per capita income (LogPY) has a positive and significant impact on life expectancy (LXT). LogPY is elastic to variations in LXT because the elasticity is greater than 1 (1.409). This means that a change in LogPY results in a more than proportionate change in LXT. The outcome is as

expected implying that an increase in Nigeria's per capita income will improve life expectancy because higher incomes allow for better access to healthcare services and improved nutrition which will improve life expectancy. The findings of this study agree with the results of Omoloba (2020) and Okosodo and Mamudu, (2019) but disagree with the negative relationship discovered between the variables by Wilson and Olawale (2021). Public health expenditure (LogPHE) also has a positive and statistically significant impact on life expectancy (LXT). LogPHE is inelastic to changes in LXT since the elasticity is below 1 (0.864). This explains that changes in LogPHE lead to a less than proportionate change in LXT. The result of the study conforms to the results of Wilson and Olawale (2021) and Omoloba (2020). The result implies that as public health expenditure rises, life expectancy also rises because a rise in public health expenditure will lead to enhanced healthcare services, improved healthcare infrastructure and enhanced medical research and development which will aid the longevity of Nigerians.

The corruption perception index (CPX) revealed a positive and significant impact on life expectancy (LXT). Implying that a unit increase in CPX will lead to approximately 0.04 increase in LXT. The positive impact of corruption on life expectancy does not conform to expectation but may be a result of faster access to healthcare services for those who can afford them and personal connections for better healthcare treatment leading to higher life expectancy. This result disagrees with the findings of Omoloba (2020), who discovered a negative impact of corruption on life expectancy.

Carbon emission (CO_2) has a negative and statistically significant impact on life expectancy (LXT), implying that a unit increase in CO_2 will decrease LXT by approximately -4.44. This finding conforms to reality because as carbon emission increases, there will be an increase in poor air quality leading to lung cancer, respiratory problems and cardiovascular diseases which will lower life expectancy. The dummy variable representing health policy (NHIA) has a positive and significant impact on life expectancy (LXT). This implies that variations in health policy lead to a more than proportionate change in life expectancy because the coefficient of $D_1$is greater than 1. The findings conform to expectations, implying that health policy benefits citizens by minimizing the cost paid by individuals for healthcare services, thereby making healthcare services affordable and reducing life expectancy.

Table 6: ARDL Short-Run Co-integrating Result

Variable *	Coefficient	Std. Error	t-Statistic	Prob.
ECM	-0.166	0.017	-9.751	0.000
D(LogPY)	0.154	0.289	0.535	0.598
D(LogPY(-1))	0.765	0.168	4.552	0.000
D(LogPHE)	0.347	0.205	1.696	0.103
D(CPX)	-0.141	0.019	-7.150	0.000
D(CPX(-1))	-0.041	0.011	-3.653	0.001
D(C02)	-4.442	1.001	-4.435	0.000
$D(D_1)$	0.563	0.281	2.002	0.057
$D(D_1(-1))$	0.862	0.309	2.788	0.010
$D(D_1(-2))$	-0.862	0.587	-1.469	0.161

Source: Researchers computation using E-views 13

In the short run, ARDL result revealed in Table 6, all the variables except the lagged-by-two-year dummy variable (D_1) representing health policy fail to agree with reality. Only the corruption perception index (CPX) and the dummy variable (D_1) lagged by twoyears had a different direction of impact from the long-run result. Also, at a 5 per cent level of significance, only LogPY, LogPHE, D_1 and the two-year lagged of D_1 were not statistically significant, every other variable was statistically significant. The coefficient of corruption perception index (CPX) reveals a negative impact on life expectancy, implying that a unit increase in corruption in the current year and the lagged one-year period, decreases life expectancy by approximately -0.14 and -0.04 respectively.

This result agrees with the findings of Omoloba (2020), who explained that increasing corruption will lead to poor public health infrastructure and insufficient government funds which will eventually result in low life expectancy. The result also indicates that the dummy variable (D_1) lagged by twoyears fails to have the expected sign (-0.862). The negative impact of health policy on life expectancy may be attributed to the inequitable distribution of the policy, suggesting that health policy that includes subsidies may reduce personal responsibility for health, resulting in unhealthy behaviours. Also, health policy may only cover selected people leading to lower life expectancy of those not included in the policy.The coefficient of the error correction mechanism (ECM) is negative and statistically significant at a 5 per cent level of significance. This shows the short-run model will adjust back to the long-run equilibrium at the speed of approximately 17 per cent.

Table 7 Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.367	Prob. F(2,22)	0.698
Obs*R-squared	1.596	Prob. Chi-Square(2)	0.450

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.152	Prob. F(8,24)	0.390
Obs*R-squared	16.61	Prob. Chi-Square(8)	0.343
Scaled explained SS	5.240	Prob. Chi-Square(8)	0.989

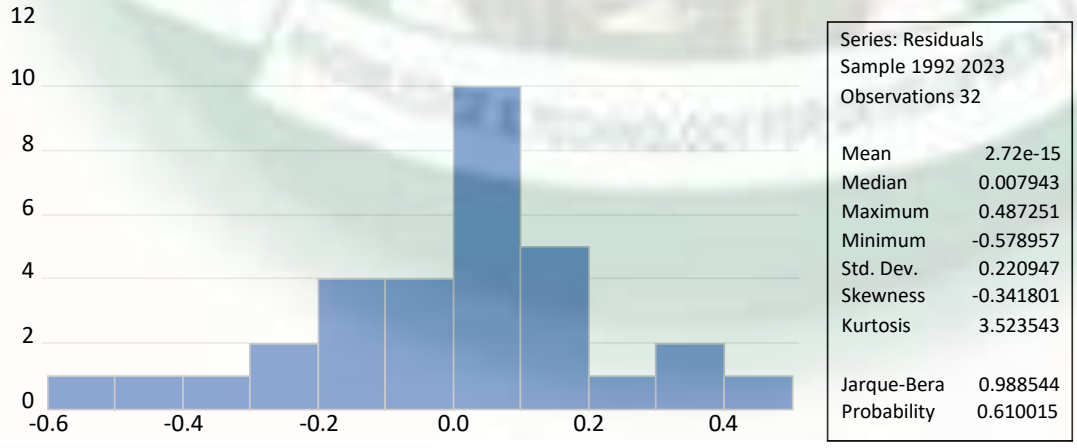
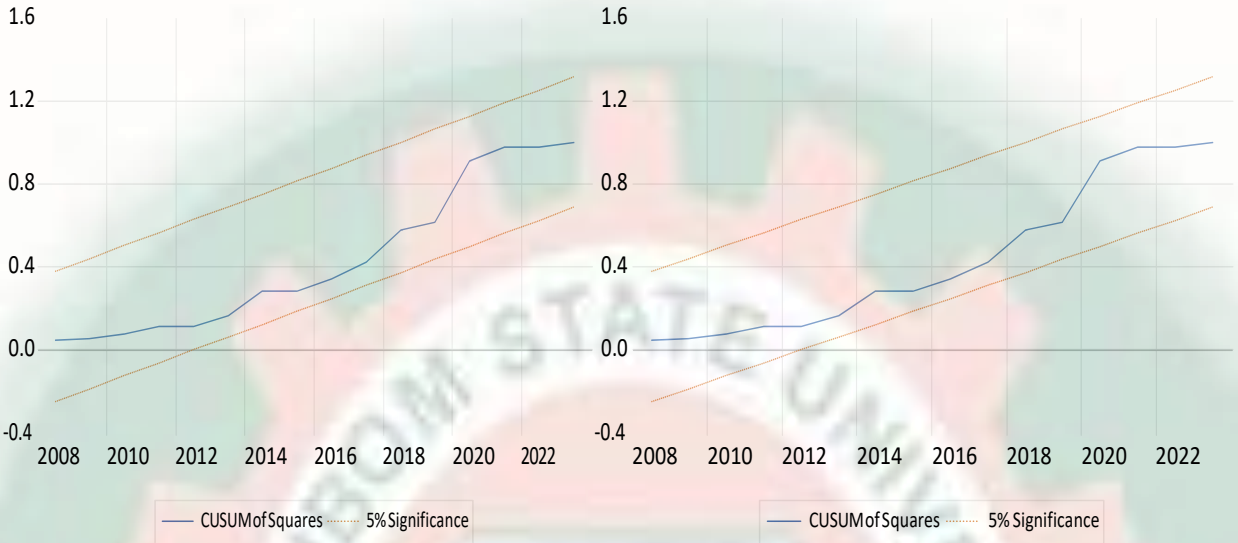


Figure 1: Normality plot
Source: E-views 13 output



Figures 2 and 3: CUSUM and CUSUM Sum of Squares plot of Stability
Source: E-views 13 output

Table 7 shows the post-estimation test, indicating the absence of serial correlation in the model because its probability value of (0.450) is higher than the 5 per cent level of significance. Also, the result shows the absence of heteroskedasticity in the model because its probability value (0.343) is greater than a 5 per cent level of significance. Consequently, the normality plot is shown in Figure 1, indicating that the Jarque-Bera value and its probability value are 0.989 and 0.610 respectively. Therefore, the null hypothesis that error terms of the data employed in the study are normally distributed is not rejected. The CUSUM and CUSUM Sum of squares plot reported in Figures2 and 3indicate stability because the plot reported is within the 5 per cent critical lines.

5. CONCLUSION AND RECOMMENDATIONS

This study examines the impact of per capita income on life expectancy in Nigeria spanning 1990 to 2023. Dickey Fuller minimum statistics was employed to determine the unit root test of stationarity, the result revealed the variables have mixed order of integration. The outcome of the bound test showed a long-run relationship between the variables. The Autoregressive Distributed Lag (ARDL) Model was then applied to the study. The long-run result revealed that per capita income, public health expenditure, corruption perception index, and the National Health Insurance Act have a positive impact on life expectancy, while carbon emission has a negative impact on life expectancy. Similarly, in the short run, only the corruption perception index and health policy lagged by two years and did not remain consistent with the long-run result.

The study recommends that the government can improve life expectancy in Nigeria by, increasing per capita income through the introduction of social protection programs like unemployment benefits, regularly adjusting minimum wages and encouraging entrepreneurship to create new income opportunities. Also, there is a need for continual allocation to the health

sector by the government as it shows that public health expenditure positively impacts life expectancy in Nigeria. Similarly, corruption can be reduced by establishing an independent healthcare corruption-monitoring agency to reduce corruption within the health sector. Consequently, the government should introduce more healthcare policies that provide subsidies to citizens that are not included in the Health Act because health policy improves life expectancy.

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