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Population Growth And Healthcare Financing In Nigeria: Causality And Policy Implications

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ABSTRACT

Rising population comes with consequences, but we are concern about the health implications of this trend especially in regards to Nigeria, therefore, this study is on population growth and healthcare financing in Nigeria: causality and policy implications, between 2000 and 2022. The study presented Nigeria's unique experience with the use of time series data to validate outcome. The Auto Regressive Distributed lag (ARDL) model approach and Granger causality test were used for estimation. Outcome of the ARDL indicated that, the employment status of Nigeria's citizens has noteworthy effect on healthcare financing in the future and population growth, educational expenditure and unemployment rate are all influential on healthcare financing in the interim. Additionally, population growth does not have influence on healthcare financing in Nigeria, while poor planning in respect to demographic variations in Nigeria might be responsible. However, outcome of the Granger causality test indicated a unidirectional causality between; population growth and healthcare financing, population growth and educational expenditure, unemployment rate and population growth, gross domestic product per capita and unemployment rate and a weak causality between unemployment rate and healthcare financing. Although, finding implies demographic variations directs healthcare financing, however funding is inadequate to meet the rising population. It is on this premise that the following suggestions where arrived at; budgetary allocation to the health care sector should reflect demographic variations, this will improve on health infrastructure to meet the need of the rising population, the health insurance scheme should be repositioned to cover more people from the informal sector and allocation to the educational sector should also reflect demographic variations to cater for the rising population, this will also lead to expansion of the existing schools to meet target of enrolment and the need for more teachers. Skills acquisition should be imbedded in the curriculum to enhance the chances for economic mobility in the future.

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INTRODUCTION

Over the years, Nigeria has experienced rapid surge in population and this has impacted on the country's socio-economic affairs especially the healthcare sector.

Such surge in population increases the demand for healthcare services and the financial implications to sustain the emerging trend are inadequate. Understanding the interplay between healthcare financing and growth in population enables relevant stakeholders globally to either review or formulate policies and programmes required for implementation of effective healthcare delivery in response to population growth. Igbinedion and Mogbolu, (2023) and Boachie, (2017) submitted that, over the past decades, economic literature tilted interest in good health, and good health establishes foundation of wellbeing and happiness of the citizens and also define the productive ability of the workforce, and bring about growth for the healthy population. Most developing nations including Nigeria spend less than the 15% of their budgetary allocation on health (Wright et al., 2025). Between 2001 and 2021, Nigeria allocated less than 8% of its national budget to the healthcare sector. This is in contrast to the benchmark set by Heads of State of the African Union of the 2001 Abuja accord that suggested member countries should allocate at least 15% of their annual budget to their health sector. The low budgetary allocation to the health sector by successive administration has made about 70% of Nigerians rest their hope for healthcare funding through out-of-pocket healthcare expenditure (Wright et al., 2025; Erinoso et al., 2023). Consequently, rising population comes with challenges for the health system and many more. This situation is also true for Nigeria. The increase in population has exerted more pressure on existing limited healthcare infrastructure, thus leading to depletion of available resources in the country. The high demand for healthcare services due to what is perceived to be population explosion in Nigeria have made the government and other relevant stakeholders more involving in health financing in the country (Adesola et al., 2024; Agboola et al., 2024).

Overall Health Budget-Shortfall in the 15% Benchmark to Health Sector, 2001-2021

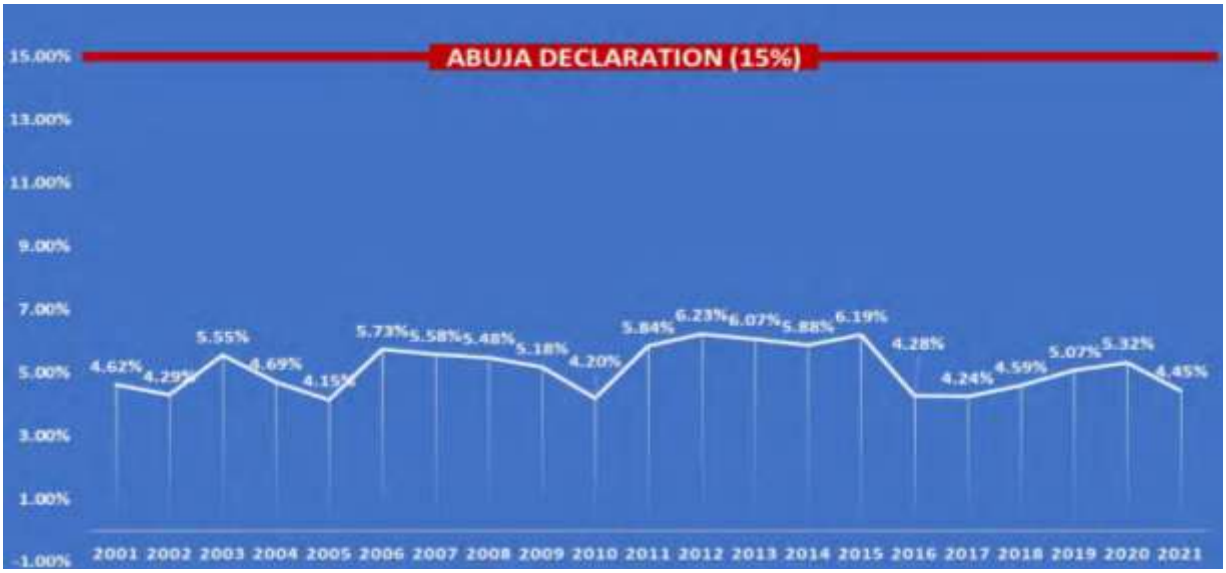

Figure 1. Overall Health

Source : https://drpcngr.org/wp-content/uploads/2021/04/15-BENCHMARK-TO-HEALTH-SECTOR-IN-NIGERIA-MODIFIED-03.pdf

Though, health care financing in Nigeria has been on the rise over the last two decades and same for population growth. According to data from the Central Bank of Nigeria (CBN) and the World Development Indicator (WDI) between year 2000 to 2022 health financing rose from ₦15.22 billion (CBN, 2023) in year 2000 for a population of 126, 382.494 (WDI, 2023) to ₦423.36 billion (CBN, 2023) in 2022 for a population of 223,150.896 (WDI, 2023). Though, there is increase in health care financing but the increase is not adequate to meet the healthcare needs of the increasing population. Meanwhile, chronological figures indicated that Nigeria's healthcare has not recorded encouraging performance from both healthcare users and professionals (Josiah et al., 2025; Ogaji & Brisibe, 2015). Although, the authorities in Nigeria has made concerted efforts over the years to enhance the health sector through annual allocation of finances, however, a lot of reasons one of which is population growth has consistently strengthened the intricacy of the health care requirements (Josiah et al., 2025; Welcome, 2011). Nigeria is among leading nations with out-of-pocket health spending globally, leading health care financing as a major challenge to the Nigerian health care system (Josiah et al., 2025; Onwujekwe et al., 2019).

Studies by various scholars have situated the Nigeria's healthcare sector and its population growth from diverse perspective. Wrigt et al., (2025) is concern about out-of-pocket expenses on health outcomes of various families from divergent socioeconomic strata, using univariate, bivariate and binary logistic regression and submitted that about 15% of families in Lagos metropolis rest on out-of-pocket expenses for their health care needs. For Adesola et al., (2024) it was surging population and their health care needs, using content analysis and submitted increasing population brings about the burden of non-communicable and infectious disease. And Okwuarinma (2024) looked at the challenges confronting civic and private sector equipment in healthcare system in Nigeria, using descriptive statistics and submitted that, funding mechanisms and policy reforms to address healthcare delivery was grossly inadequate. Therefore, this study focussed on population growth and healthcare financing in Nigeria: Causality and policy implications with respect to Nigeria's unique experience. The paper utilised yearly data collected from published works in order to validate their findings.

METHODS

Empirical Literature

A mega city experience of the influences related to tragic spending in relation to healthcare by Wright et al., (2025). Exploring cross sectional survey technique, analysis was carried out with through the use of univariate, bivariate and binary logistic regression. Result indicated that, 15% of families in Lagos metropolis experience tragic healthcare spending. The study submitted that tragic health spending is more associated with families with low socioeconomic status. The study therefore advocated that relevant authorities should promote the enrolment into the health care insurance net to reduce the effect of tragic health spending for low

income earners. On the other hand, Onwujekwe, et al., (2025) investigate the driving force and differences between informal and formal healthcare expenditure in Nigeria. The study employed the descriptive research method to examine the driving force and the challenges of healthcare expenditure in the areas of research interest. The study revealed that factors that both facilitates and constrain healthcare expenditure in formal and informal sectors are feasible at individual, organisational, and environmental levels. This study thus suggests that the harmonisation of these factors would provide valuable insights for decision makers and practitioners for harnessing the contextual factors to link informal healthcare providers successfully and effectively in order to improve access to quality health services.

Nigerian's health scenery was traversed by Adesola et al., (2024) from the stand point of rising population and its health consequence. The study explored both content and graphical method of analysis and raised key concerns. Which includes; increasing population which brings about twin burden of non-communicable and infectious disease burden, this brings about high morbidity and death rates, rise in healthcare cost, fall in productivity and inequalities in health, presenting important test on Nigeria's health system. In addition, the study also highlights the critical association between educational level and health outcomes, where they submitted that, low level of education and health outcomes affects the significance of tackling general weakness in the Nigeria's education sector. The study therefor, suggested the need for critical stakeholders from all segment of the economy to put all hands to work and solve the health challenges confronting the nation. While people- centred primary healthcare expenditure in addressing social justice was examined by Gatome- Munyua et al., (2024). The study employed cross sectional survey technique from Argentina, Burkina Faso, Indonesia and Tanzania to analyse the implications of poor healthcare expenditure. The study revealed that drivers of inequality in healthcare financing are poor and proliferation of new financing schemes healthcare expenditure that sometime do not recognise the principles of universality. The study therefore suggests the consolidating multiple coverage schemes, harmonising health purchasing functions and streamlining funding flows to the provider level. This would address some constraints often limit the ability of governments to allocate more public resources to healthcare. An empirical analysis of the effects of population explosion was examined by Brida et al., (2024) in response to economic growth spanning from 1960 to 2019. The work employed notion of distance between the critical paths of different countries to analyse the joint dynamics of economic and demographic growth in 111 countries. The study revealed that, the existence of three nations, each of which exhibits a different dynamic behaviour pattern. The study hence, suggest the existence of dynamic interdependence of economic growth and population variations between countries. The work therefore, recommended that different countries employ policy favourable to them in accordance with population changes aimed at addressing economic growth. While for Okwuarinma (2024) investigated challenges confronting public and private sector equipment in healthcare system in Nigeria. The study employed descriptive method to analyse it impact with focus on Delta State. The study revealed that, funding mechanisms and

policy reforms to address healthcare delivery in Delta state is grossly inadequate. These factors are speculatively responsible for ineffectiveness, dissatisfaction, and low access to health insurance in the state. The study therefore suggested realistic and implementable policies and programme for effective healthcare financing in the state which would align with global goal of achieving universal health coverage.

Healthcare availability, expenditure and rising concern of aging population in India was examined by towards Sahoo et al., (2023). The study employed descriptive method and utilising secondary sources of data. The study revealed that Indian healthcare system is challenge with twin burden of disease and rising incidence of non-communicable diseases. This healthcare crisis and aging population is responsible for poor healthcare financing in the country. The research therefor suggested effective community-based health insurance schemes, to help complement low healthcare financing in the country. The study further commended reform to accommodate strong national policies focusing on universal access to critical healthcare delivering in India. However, Haward (2023) examined healthcare expenditure and its influence on Japan's aging population. The study employed and utilised existing literature, demographic data and policy evaluation to arrive at the research outcomes. The study revealed that Japan's demographic landscape is rapidly changing, leading to an unprecedented increase in the aging population. This situation has further presented significant challenges for the healthcare system, particularly in intensifying huge expenditure in the healthcare system. It is on this premise that the study suggested and recommended consistence investment in the healthcare system to address the challenges that come with aging population in Japan.

Impact of public health expenditure, allowances and economic growth in resource-based nations was examined by Igbinedion and Mogbolu (2023) using Nigeria and Mozambique experience. The study employed the fully modified ordinary least square method and the error correction mechanism on yearly data for each of the two countries. The findings of the study revealed that, public health expenditure, personal allowances received and per capita income have significance in ensuring growth development in Nigeria and Mozambique. The study therefore, suggested that government spending on public health should be prioritised to enthrone transmittals and economic development Nigeria and Mozambique. And multi-sectorial healthcare financing in China in response to ageing population was examined by Wenqing Wu et al., (2023). The study explored cross sectional survey technique adopting literature research and inductive summarization in analysis. The work revealed that, despite multiple streams of public healthcare financing in China, the pressure of ageing population, China's healthcare financing arrangement will continue to face enormous challenge with increasing healthcare expenditure. It is on this premise the study recommended that the state should pay keen interest in addressing challenges arising from ageing population through consistence public healthcare funding which will help in reducing it negative implications.

Amartya Sen's Capability Theory

In situating this study, Sen's capability theory was used to capture the relevance of healthcare financing on the population of a given nation. Hence, Sen's capability theory is a theoretical framework developed by Indian economist and philosopher, Amartya Sen in (1980s) and further elaborated by Martha Nussbaum. The crux of the theory is human centric in nature arguing that a person's capability to live a good life and contribute meaningfully to economic activities is defined by good health. Sen's theory is premise on the idea that good health is fundamental to economic growth and development of any nation. However, this theory has been criticised by several critics for being individualistic thereby neglecting the importance of the roles of different organisations in the improvement of healthcare system that ensures good life as postulated by the theory. Despite this criticism, Sen's capability theory has been employed extensively in the context of human development, notably, the United Nations Development Programme, as a broader and deeper alternative that links imperative of healthcare financing to performance of the economy. However, in regards to this study, the theory is seen from a wider perspective of the individual. In that an individual do not exist in vacuum, every individual exist in a nation where the authorities' healthcare financing plays a role in improving their status and thereby that of the population by extension.

Nature and Sources of Data

The study used time series data, Public health Expenditure (PHE) from the CBN, Population Growth (POPG) from the WDI, Gross Domestic Product Per Capita (GDPPC) from WDI, Educational Expenditure (CBN), and Unemployment Rate (UER) from National Bureau of Statistics.

Model Specification

The study adapts the model by Silver et al., (2024) on interrogating the effect of fiscal state on private health expenditure in OECD nations: Quartile ARDL inquiry. In this study, the model was modified by introducing some variables in order to attain the objective of this study, the model provides a dynamic linkage between relationships, and the ARDL thus, providing solution to the problem of endogeneity by embracing lagged independent and dependent variables and addresses issues of biased in estimation.

$$PHE = f(POPG, GDPPC, EDE, UER) \quad (1)$$

$$PHE_t = \beta_0 + \beta_1 POPG_t + \beta_2 GDPPC_t + \beta_3 EDE_t + \beta_4 UER_t + \varepsilon_t \quad (2)$$

Where:

PHE = Public health expenditure as proxy for healthcare financing.
POPG = Population growth
GDPPC = Gross domestic product per capita
EDE = Educational expenditure
UER = Unemployment rate

ARDL Model

$$\Delta PHE_t = \alpha_0 + \sum_{i=1}^{p} \delta_i \Delta InPHE_{t-i} + \sum_{k=0}^{p} \beta_k \Delta InPOPG_{t-i} + \sum_{l=0}^{p} \gamma_l \Delta InGDPPC_{t-i} + \sum_{l=0}^{p} \gamma_l \Delta InEDE_{t-i} \sum_{k=0}^{p} \beta_k \Delta InUER_{t-i} + \lambda_1 InPHE_{t-1} + \lambda_2 InPOPG_{t-1} + \lambda_3 InGDPPC_{t-1} + \lambda_4 InEDE_{t-1} + \lambda_5 InUER_{t-1} + \mu_t \quad (4)$$

The model for Granger causality thus;

$$POPG_t = \beta_0 + \sum_{i=1}^{p} \beta i PHE_{t-i} + \sum_{j=1}^{p} \alpha j POPG_{t-j} + \varepsilon_{1t} \quad (5)$$

$$PHE_t = \lambda_0 + \sum_{i=1}^{p} \lambda i POPG_{t-i} + \sum_{j=1}^{p} \delta j PHE_{t-j} + \varepsilon_{2t} \quad (6)$$

Stationarity Test

Table 1. Augmented Dickey Fuller Unit Root Test

Variable	T. Stat	Probability value	Stationarity	Order
PHE	-4.940704	0.0042	Stationary	I(1)
POPG	-4.498307	0.0223	Stationary	I(1)
GDPPC	-5.321694	0.0154	S tationary	I(0)
EDE	-4.137759	0.0193	Stationary	I(1)
UER	-4.498307	0.0342	Stationary	I(0)

Source: Authors computation with extract from E-views

The result of the ADF unit root test in Table 1 showed mix order of stationarity which is an indication that ARDL estimation technique will be suitable.

RESULTS AND DISCUSSION

ARDL Result and Interpretation

Table 2. ARDL Long and Short Run Result

Variables	Coefficient	Std. Error	t-Statistics	Prob.
Long-run				
LPHE(-1)	-1.184608	0.157860	-7.504155	0.0000
LPOPG(-1)	2.608793	1.306028	1.997502	0.0711
LGDPPC	0.016812	0.009465	1.776128	0.1033
LEDE(-1)	0.405203	0.297076	1.363968	0.1998
UER(-1)	0.046152	0.018743	2.462366	0.0315

Short-run				
D(LPOPG)	130.8959	11.04301	11.85327	0.0000
D(LEDE)	0.660280	0.074784	8.829197	0.0000
D(UER)	-0.059515	0.010917	-5.451381	0.0002
ECM(-1)	-1.184608	0.103594	-11.43512	0.0000
R-Squared	0.722347	D. Watson	2.529001	
A.R-Squared	0.706781	Prob.(F. Stat)	0.000000	

Residual Plots

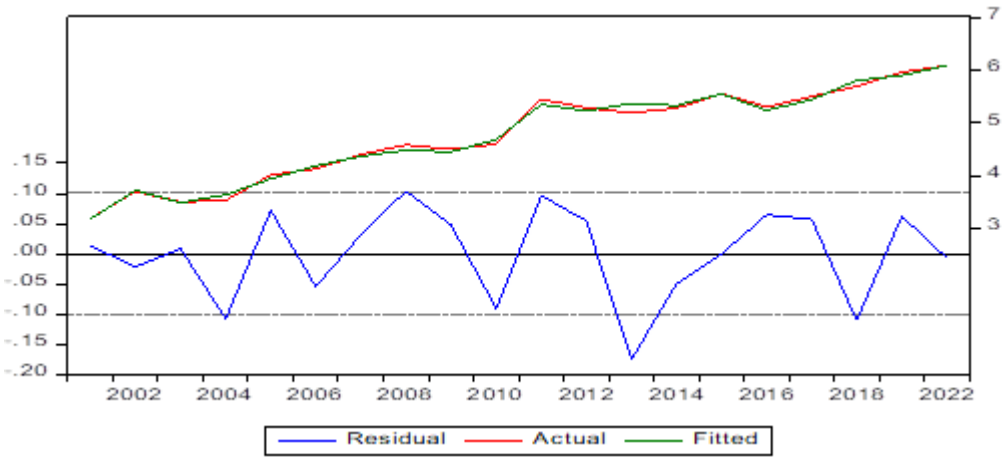

Figure 2. Residual plots of population growth and healthcare financing

The graph of the residual in fig. 2 indicated rising population at the top, while the fluctuating state of healthcare financing is indicated below.

Outcome in Table 2 the futuristic component of the ARDL indicated that unemployment rate (UER) has noteworthy influence on healthcare financing (PHE) as indicated by the probability value, being significant at 5%. While, population growth in the first lag, gross domestic product per capita, and educational expenditure in the first lag are all not significant at 5%. This implies they have no effect on healthcare financing in the future. This showed that in the future, its only unemployment rate that will have influence on healthcare financing in Nigeria, all other variables; population growth, gross domestic product per capita, and educational expenditure will not influence healthcare financing in the future. Although, population growth is supposed to influence healthcare financing, but inadequate planning and poor allocation of resources especially healthcare resources, might be responsible for inadequate consideration of population distribution in allocation of resources. Allocation to the educational sector in Nigeria have been fluctuating, a key factor that could determine the outcome of health expenditure in Nigeria in the future. On the other hand, GDPPC has improved but the outcome only benefited out-of-pocket health care expenditure, which has surge over the years in Nigeria. Unemployment has only improved the status of the poor to access private health services. Unfortunately, in the future, POPG, GDPPC, EDE are not influential

on healthcare financing (PHE) in Nigeria. While in the interim, all the variables; population growth, educational expenditure, and unemployment rate are all significant at 5%. This means, they all have noteworthy influence on healthcare financing in the interim. This implies that, these variables might have influence on healthcare financing in Nigeria in the future. Consequently, within the period understudy, the outcome of the ARDL components indicated that, population growth did not influence healthcare financing in Nigeria.

Generally, outcome depict that, the independent variables; population growth, gross domestic product per capita, educational expenditure and unemployment rate explained about 72% of the aggregate variations in healthcare financing (PHE), while the remaining 28% imbedded in the stochastic term. The outcome of the probability value also indicated that the model is robust.

The outcome of the futuristic ARDL indicated that, the unemployment status of Nigerian's citizens will have noteworthy effect on healthcare financing, thereby drawing the place of out-pocket healthcare expenditure influencing healthcare financing in Nigeria. This calls for more investment towards job creation to enhance personal sources of income to improve on health status of the individuals. This outcome is similar to that of Wright et al., (2025) where they found that about 15% of families in Lagos metropolis experience catastrophic health expenditure. On the interim, population growth, educational expenditure and unemployment rate are all influential on healthcare financing. This might be so as, Nigeria's rising population is influential on healthcare financing and the healthcare infrastructure is not expanding relative to the demographic variations. Educational expenditure might improve school enrolment in the interim to free up resources for households for healthcare financing hence it seems out-of-pocket driven. However, in the future it might help improve economic mobility of the citizens, as people spend on their health in Nigeria when they have jobs. Although, Adesola et al., (2024) observed that, low level of education and health outcomes affects the significance of tackling general weakness in the educational system of Nigeria.

It is expedient therefore that our study recommends that Nigeria, in line with Brida et al., (2024) should bring about policies in line with peculiarities with her demographic need geared towards enhancing her developmental objectives through effective healthcare services. This can be better attained when access to healthcare insurance is expanded and well-coordinated to the meet the ever expanding health care demand by the citizens

Granger Causality Result and Interpretation

Table 3. Result of Granger Causality Test

Null Hypothesis	Observation	F-statistics	Probability Value
LPOPG does not Granger cause LPHE	21	10.4007	0.0013
LPHE does not Granger cause LPOPG		1.03546	0.3777
LGDPPC does not Granger cause LPHE	18	0.56905	0.5795

LPHE does not Granger cause LGDPPC		0.99424	0.3965
LEDE does not Granger cause LPHE	21	0.50627	0.6121
LPHE does not Granger cause LEDE		0.96082	0.4036
UER does not Granger cause LPHE	21	3.10278	0.0727
LPHE does not Granger cause UER		0.88986	0.4301
LGDPPC does not Granger cause LPOPG	18	4.48627	0.0330
LPOPG does not Granger cause LGDPPC		1.27473	0.3122
LEDE does not Granger cause LPOPG	21	0.01459	0.9855
LPOPG does not Granger cause LEDE		3.69974	0.0478
UER does not Granger cause LPOPG	21	8.32360	0.0033
LPOPG does not Granger cause UER		2.39455	0.1231
LEDE does not Granger cause LGDPPC	18	1.86602	0.1939
LGDPPC does not Granger cause LEDE		0.11919	0.8886
UER does not Granger cause LGDPPC	18	0.91281	0.4258
LGDPPC does not Granger cause UER		10.4761	0.0019
UER does not Granger cause LEDE	21	2.07436	0.1581
LEDE does not Granger cause UER		0.78827	0.4715

Sources: Authors computation with extracts from E-views.

Outcome of the Granger causality test in Table 3 indicated that population growth considerably predict the future value of healthcare financing. Evidenced by the probability value which is less than 0.05%, implies rejection of the null hypothesis and acceptance of the alternate hypothesis that population growth Granger cause healthcare financing. This presented a considerable evidence of unidirectional causality between LPOPG and LPHE. Population growth considerably predict the future value of educational expenditure evidenced by the probability values which is less than 0.05% at 0.0478 implies rejection of the null hypothesis and acceptance of the alternate hypothesis.

Consequently, unemployment rate predict the future value of population growth as evidenced by the outcome of the test probability value which is less than 0.05% at 0.0033. this means that we reject null and accept the alternate hypothesis. On the other hand, unemployment rate Granger cause population growth indicating unidirectional causation between the UER and LPOPG. While gross domestic product per capita predicts the future value of unemployment rate as evidenced by the outcome of the test probability value which is 0.0019 is less than 0.05%. This suggest that the study reject of the null hypothesis in favour of the alternate hypothesis which states that gross domestic product per capita Granger cause

unemployment rate. This implies unidirectional causality between LGDPPC and UER. A marginal case exists for unemployment rate and healthcare financing, where the test probability value rest at 0.0727. This is an indication of weak evidence of no causation. An indication that a weak causation exists between the variable UER and LPHE. All other test outcome does not meet the condition for the rejection of the null hypothesis evidenced by the probability value which is above the threshold of 0.05%. This is an indication that there is no causation between the variables concern. These variables are, LPHE and LGDPPC, LEDE and LPHE, LEDE and LGDPPC, UER and LPHE, UER and LEDE.

Lack of bidirectional or reverse causality implies that the causal connections are one way. The implication for Nigeria is that demographic variations directs healthcare and educational expenditure. This means that demographic factors guide public expenditure in these sectors. Thus, gross domestic product per capita stimulates surge in population and unemployment rate, showing that development economically affects demographic and employment dynamics. In conclusion, there is existence of a unidirectional causation between population growth rate and healthcare financing in Nigeria.

Post Diagnostic Test

Normality Test

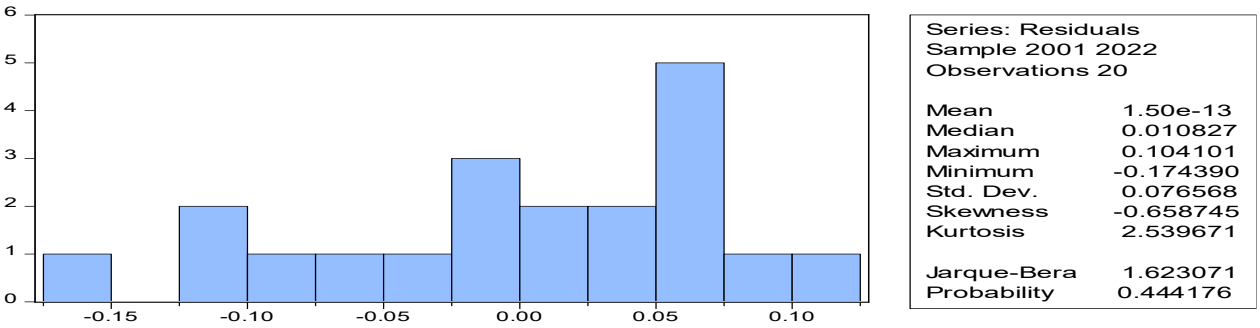

Figure 3. Normality Test

Confirming the robustness of the regression through some test. Outcome of the normality test in fig. 3 indicated that the Jarque-Bera statistics is higher than 0.05% which implies that residual from the evaluation is normally distributed.

Table 4. Breusch-Godfrey Serial Correlation LM Test Result

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	2.013145	Prob. F(2,9)	0.1894
Obs*R-squared	6.181790	Prob. Chi-Square (2)	0.1455

Source: Authors' computation with extracts from E-views

Outcome of the serial correlation test in Table 4 is an indication that the model is free

from serial correlation. This is because the probability values are greater than 0.05% level of significance.

Table 5. Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: No homoskedasticity

F-statistics	1.112667	Prob. F(8, 10)	0.4285
Obs *R-squared	8.947802	Prob. Chi-Square (8)	0.3467
Scaaled explained SS	1.467396	Prob. ChiSquare (8)	0.9932

Source: Authors' computation with extracts from E-views

The outcome of the heterskedasticity test indicates that the null hypothesis cannot be rejected, as the probability values; 0.4285, 0.3467 and 0.9932 are above the 5% level of significance. Therefore, there is no heteroskedasticity.

Table 6. Multicollinearity Test: Correlation

Matrix

	LPHE	**LPOP**	**LGDPPC**	**LEDE**	**UER**
LPHE	1.000000	0.970682	0.371846	0.978519	0.919788
LPOPG	0.970682	1.0000000	0-337305	0.969952	0.955786
LGDPPC	0.371848	0.337302	1.000000	0.309930	0.296269
LEDE	0.978519	0.969952	0.309930	1.0000000	0.926192
UER	0.919788	0.955786	0.296269	0.926192	1.000000

Source: Authors computation with extracts from E-views

The correlation matrix on Table 6 indicated presence of multicollinearity that is strong negative correlation between the variables, and the correlation coefficients closer to -1. This implies that as population growth (POPG), healthcare financing (PHE) decreases thereby, bringing about the downward trend.

Stability Test

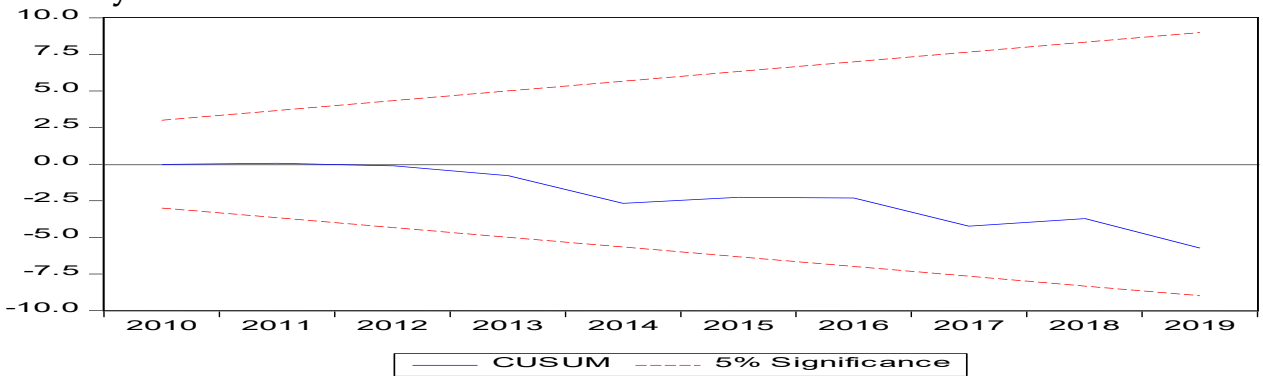

Figure 4. CUSUM

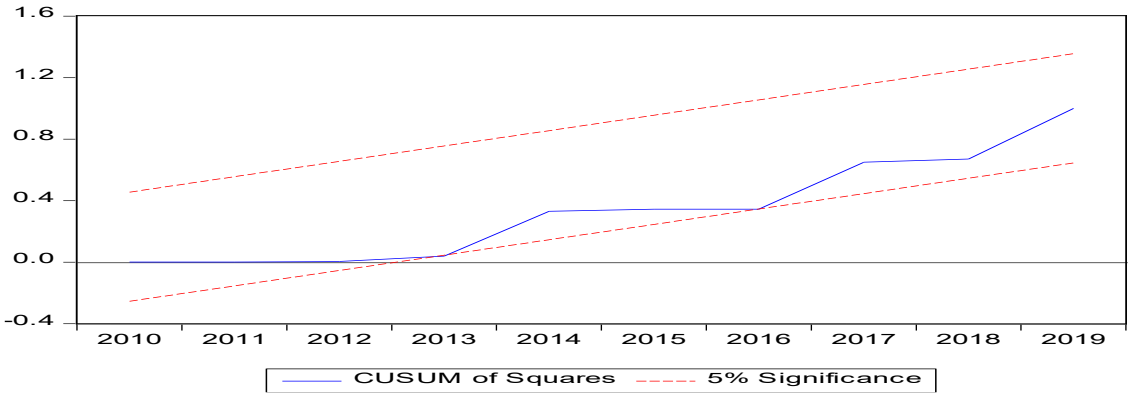

Figure 5. CUSUM of squares

From the figures 4 and 5, (CUSUM and CUSUM of squares) the blue lines lie within the red enclosing lines is indication that the model is dynamically stable.

Discussion

Nigeria is witnessing rise in its population thereby affecting its socio-economic affairs and by extension the healthcare sector. To determine the influence of population growth on Nigeria's healthcare financing, component of the ARDL indicated that UER has influence on healthcare financing (PHE) indicating 5% significance. While, population growth in the first lag, gross domestic product per capita, and educational expenditure in the first lag are all not significant at 5%. This implies they have no effect on healthcare financing in the future. This showed that in the future, its only unemployment rate that might have influence on healthcare financing in Nigeria, all other variables; population growth, gross domestic product per capita, and educational expenditure will not influence healthcare financing in the future. Consequently, the findings revealed that the independent variables; POPG, GDP per capita, EDEX and UNER explained about 72% of the aggregate variations in PHE, while the remaining 28% imbedded in the stochastic term. Our study revealed that unemployment status of Nigerian's citizens might affect healthcare financing, thereby drawing the place of out-pocket healthcare expenditure influencing healthcare financing in Nigeria. Consequently, it revealed that Nigeria's poor implementation of the 2001 Abuja accord to 15% it annual budget to her health sector is responsible for poor health care financing in response to her population growth. This calls for more investment towards job creation to enhance personal sources of income to improve on health status of the individuals. Base on the result of the causality, there is no causation between the variables concern. These variables are, LPHE and LGDPPC, LEDE and LPHE, LEDE and LGDPPC, UER and LPHE, UER and LEDE. This outcome is similar to that of Wright et al., (2025) where they found that about 15% of families in Lagos metropolis experience catastrophic health expenditure. This finding defers with Adesola et al., (2024) where they revealed that, low level of education and health outcomes affects the significance of tackling

general weakness in the educational system of Nigeria. This study therefore recommends implementing policies and programmes to improve economic wellbeing of it citizens as well as education

CONCLUSION

We evaluated population growth and healthcare financing in Nigeria: causality and policy implications between 2000 and 2022. The outcome of the futuristic ARDL indicated that, the unemployment status of Nigerian's citizens has noteworthy effects on their ability to afford effective healthcare. Conversely, population growth, educational expenditure and unemployment rate are all influential on healthcare financing. Outcome from the Granger causality test indicated a unidirectional causality between; population growth and healthcare financing, population growth and educational expenditure, unemployment rate and population growth, gross domestic product per capita and unemployment rate and a weak causality between unemployment rate and healthcare financing. While there was no causation between healthcare financing and gross domestic product per capita, educational expenditure and healthcare financing, educational expenditure and gross domestic product per capita, unemployment rate and healthcare financing and unemployment rate and educational expenditure. The outcome of this study necessitate the following policy implications; Budgetary allocation to the health and educational sector should be done in reflection to Nigeria's demographic variations. As mere increase seems not enough but in the light of the rising population will be more appropriate. Skills acquisition should go along with the educational curriculum to enhance the chances for economic mobility for the youths after school. As this will enhance per capita income of the citizens and improve individuals' economic contribution to the nation.

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