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Public Debts and Capital Development in Nigeria

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Abstract

Purpose - The study examined the effect of public debt on healthcare capital development in Nigeria.

Design/ Methodology/ Approach - The study employed an ex post facto research design. The population consisted of 45 Federal Government Ministries in Nigeria. The sample size consisted of 5 Federal Government Ministries in Nigeria. It employed the purposive sampling technique in the selection of the sampled ministries from 1994 to 2023. Data were analyzed using descriptive and inferential (multiple regression) statistics.

Findings - The findings revealed that public debt had a significant effect on health capital development (Adj. R2 = 0.709, F(2, 27) and F statistic of 9.712, $p < 0.05$) in Nigeria. The study concluded that effective public debt service enhances healthcare capital development in Nigeria.
Originality/Value - Because of this study, government, policyholders, academics, and the public should stay informed about the status of healthcare development, as well as the measures in place to support healthcare capital development. Hence, the monitoring of the budget, the release of funds, and the adequate expenditure of funds for healthcare development.

Keywords: Public debt, Debt service cost, Capital development, Healthcare capital development, and Debt Management Office.

1. Introduction

Healthcare capital development plays a significant role in the development of every nation, and Nigeria is no exception. As far as the health sector is concerned, the well-being of every human being will determine his or her output. In Nigeria, the Nigeria Medical Association has condemned on several occasions the lip service of the government to the health sector in terms of the budget allocation for the sector. Recently, we have noticed the exodus of medical practitioners to countries like Canada, Dubai, and the United Kingdom, among others. Rather, government officials patronize overseas countries for healthcare.

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In Nigeria, a large number of hospitals and clinics in the country do not have access to clean water; the same percentage do not have safe toilets, and 55.6 per cent of the total population do not have access to electricity. Out of the total road network of 193,200 km, currently over 85 per cent are dilapidated. The causes of its deplorable state are attributed to low budgeted funds for the sector, poor maintenance, and high turnover of medical personnel to developed countries. The deficiency was noticed during Covid-19 and attracted the government to see health as important as blood for livelihood. Governments of every country, including Nigeria, made efforts and secured loans for the resuscitation of the health sector. Funds obtained were used to build more hospitals, buy equipment, and compensate health personnel, as well as to purchase Personnel Protection Equipment. The government has introduced a public-private partnership as a model to finance the health sector, and rapid growth was recorded immediately; however, this could not be sustained due to huge capital requirements and low income from patients. In Nigeria, every citizen sees healthcare as the primary responsibility of the government. The challenges of the partnership are sourcing for capital, high interest rates, and unhealthy contractual agreements. With these issues, it is obvious that private companies are not given an enabling environment to thrive. Abdelbary, I., & Benhin, J. (2019)

It is barbaric that hospital environments do not have good roads, stable electricity, the art-of-the-heart equipment, and a bad maintenance culture, and this has resulted in early calls to the grave of many citizens.

We have seen the spring out of the National Health Insurance Scheme and the Health Management Organization; with this, there is growth in the number of healthcare centers across the country, and yet our government officials refuse to patronize them and rather seek medical attention outside the shores of the country.

Ghana, as a developing country, is facing the same problem that Nigeria is facing. There is a drop in local contributions by private individuals. While executing the plans requires significant financial investment, financing is a major problem, with health expenditure in 2019 lower than 3.5% of GDP. Also, donations have been falling since 2010, when Ghana became a lower-middle-income status. A low record of 10% in donations was made between 2015 and 2020 by development partners for the health sector. Retrieved (May 11, 2025) from https://www.who.int/news-room/feature-stories/detail/health-financing-primary-health-care-ghana-universal-health-coverage-roadmap

2.0 Theoretical Review

2.1 Conceptual Review

2.1.1.1 Healthcare Capital Development

Healthcare capital development is defined as the expenditure incurred on public non-current facilities or infrastructures by the government that could last for more than one year (Asafor et al., 2019; Eke & Akujuobi, 2021).

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Healthcare Capital Development refers to infrastructures such as good roads, good water, good rails, sea waters, office and public buildings, property, plant, and equipment in government hospitals, property, plant, and equipment in government schools, airport facilities, airways, electricity facilities, etc. The availability and status of these facilities determine the level of economic growth and development in the country. It is no longer news that developed countries have all these facilities in place, and that boosts the level of economic growth and development that are being enjoyed. In this study, capital development was considered using five properties of capital development of healthcare capital development. Capital expenditure refers to the financial resources allocated by a government towards the enhancement of various facets of infrastructure, technology, facilities, and human capital (Efanga et al., 2020; Chen et al., 2022).

Health capital development is an expenditure that consists of capital expenditure in the health sector. This expenditure comprises building, medical equipment, major maintenance, and other capital expenditure relating to the health environment. Health capital expenditure is always considered in a country's budget, and there are complaints that the executive government in Nigeria does not really take the sector seriously. The public goods in the health sector are buildings, medical equipment, pipe-borne water, roads, personal protective equipment, and plant. Abasifreke N. Ideh, Simeon G. Nenbee, and Bariika N. Vite (2022)

It is an obligation of the Nigerian government to contribute 15% of its annual budget to the health sector. Hence, the government is yet to meet this demand, and the highest figure recorded was in 2012 at 6.23%. Even the current President Tinubu has just earmarked 1.17 trillion from the budget, which is 5.03% of the annual budget in 2023. The low contribution of the government has resulted in an increase in out-of-pocket health expenses for every citizen. Retrieved (May 11, 2025) from https://drpcngr.org/wp-content/uploads/2023/12/Analysis-of-the-2024-Health-Budget-Proposal-by-the-Federal-Government-of-Nigeria-dRPC.pdf

With the increase in healthcare in non-developed countries, the available resources are posing many challenges to a growing population. This is life-threatening for developed countries because any outbreak disease from developing countries will not spare any part of the world, and the aftermath will cripple human and economic development. Hence, the need for international and national non-governmental organization involvement and support to ensure that human existence is not being threatened and that life remains tranquil. This is evidenced during the outbreak of Ebola and Covid-19. Langlois EV, McKenzie A, Schneider H, Mecaskey JW (2020)

2.2.5 Theoretical Framework

The balanced growth and Lerner theories were selected as the underpinning theories to reinforce the dependent theory of healthcare capital development and the independent theory of public debt, respectively.

Typically, the balanced growth theory considers deriving aggregate output as a function of total healthcare capital and labor inputs, which is closely related to the ideals of the essence of healthcare capital development in creating human capacities and abilities toward increasing

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economic value in Nigeria. The theory was considered appropriate since it situates the danger of diminishing economic returns when healthcare capital development is not given appropriate attention to each input while maintaining constant returns to scale overall. Moreover, intellectual property rights, such as copyrights and patents, serve as incentives for businesses to expand their operations, as noted by (Khan et al., 2022). This implies that there should be a proper balance between investment in healthcare capital development and other economic sectors, agriculture, and industry, since agriculture and industry are complementary and an increase in industrial output requires an expansion of agricultural output. The theory also declared that there should be balanced growth between the domestic sector and the foreign sector. In addition, the study selected Lerner's theory to support the independent variable of public debt, considering the relevance of Lerner's theory to the philosophies and ideology proposed in Lerner's theory. Lerner's theory recognizes such changes and the critical implications of public debt for policy formulation and effectiveness. The Lowe-Lerner approach emphasizes continuous scrutiny of historical, institutional, structural, technological, and socio-environmental changes in the nexus between public debt and the significance of optimal utilization of debt for the benefit of citizens. In addition, while Lowe and Lerner extensively discussed the perils of authoritarianism and the importance of safeguarding individual freedom, they do not subscribe to the notion that economic policies inevitably infringe upon freedom or that the absence of policies ensures its protection when using collective resources and incurring debts on behalf of citizens.

H01: Public debt has no significant effect on healthcare capital development in Nigeria.

3.0 Methodology

Research Design - To achieve the objective of this research, an ex-post facto research design was used, using time series data for the period under consideration. In justification of the choice of research design, the study considered the use of ex-post facto time series because the study considers a cross-sectional related study that examined the past event relationship between the dependent and independent variables, the influence of public debts on capital development for a 30-year period, and the data were obtained from the Audited Report of the Auditor General of the Federal Republic of Nigeria.

Data Collection - The relevant time series data needed for this study were collected from secondary sources. The secondary data extracted contain information from verified Ministries, Departments and Agencies of the Federal Government of Nigeria. The relevant data required to proxy the research variables were extracted from the time series data from the National Bureau of Statistics (NBS), Budget Office of the Federation (BOF), Ministry of Budget and Economic Planning (MDEP), Bureau of Statistics, and Central Bank of Nigeria Statistics Bulletin for the period under consideration. The study covered a period of 30 years (1994-2023) using time series data for the period under consideration. In justification for the use of 30 years, the study considered 30 years.

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Research Variables:

Where
HCHD = Healthcare capital development, development, PBD = Public debts and DSC = Debts service cost

MODEL SPECIFICATION:
Regression Equation
$Yt = \beta 0 + \beta 1Xt + \beta 2X2t + \mu t$ equation 1

$HCHDt = \beta 0 + \beta 1PBDt + \beta 2DSCt + \mu t$ ----------Model 1

Main Model
$CPt = \beta 0 + \beta 1PBDt + \beta 2DSCt + \mu t$ ----------Model 6
Where;
μi = disturbance term. $\beta 0$ = intercept. $\beta 1 - \beta 4$ = coefficient of the independent variables. The test above is carried out at 10% test statistics.

Data Presentation and Analysis:

Descriptive Statistics

Statistic	LHCHD
Mean	23.864
Median	24.198
Maximum	25.756
Minimum	20.434
Std. Dev.	1.412
Skewness	-0.851
Kurtosis	2.959
Jarque-Bera	3.626
Probability	0.163
Observations	30.000

Source: Researcher's Study, 2025

Interpretation of Descriptive Analysis

Healthcare Capital Development (LHCHD) has a mean of 23.864 and a median of 24.198, suggests a relatively symmetric distribution with minor skew. The slight difference between the mean and median indicates that while the data is not perfectly symmetric, but the asymmetry is not extreme. The standard deviation of 1.412 reflects moderate dispersion, implying that

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healthcare capital development exhibits some fluctuation over the period studied. The skewness of -0.851, which is statistically significant, indicates a distribution that is negatively skewed—suggesting that while the majority of the observations cluster around higher values, a few outlier observations on the lower end distort the symmetry. This negative skewness could reflect the periodic underinvestment in healthcare capital in certain years. Furthermore, the kurtosis of 2.959 is suggestive of a slightly platykurtic distribution, where the tails are heavier than those of a normal distribution, implying a higher probability of extreme values. However, the Jarque-Bera test result with a statistic of 3.626 (p-value = 0.163) suggests that the null hypothesis of normality cannot be rejected, allowing the use of parametric techniques in subsequent analyses.

Correlation Matrix:

able 4.1.2 Result of the Correlation Analysis

	LHCHD
LHCHD	1.000
LPBD	0.764
LDSC	0.820

Source: Researcher's Computation, (2024). Note: Table 4.1.2 shows the Pearson pairwise correlation matrix The dependent variable measures are: Natural Logarithm of Healthcare capital development (LHCHD, Natural). The independent variables are Natural Logarithm of public debt (LPBD) and Natural Logarithm of debts service costs (LDSC) for the 30-year period from 1994 to 2023 in Nigeria. The estimation process was facilitated using E-views 12.0.

Interpretation

Specifically, in Table 4.1.2, the correlation between Healthcare Capital Development (LHCHD) and Public Debt (LPBD) is high at 0.764. This positive correlation is expected, given that healthcare is prioritized similarly in national development plans and receives funding from similar sources, such as government budgets and international aid. The sector may also benefit from overlapping policy initiatives aimed at improving the overall human capital of the country. Likewise, the high correlation of 0.820 between Healthcare Capital Development (LHCHD) and Debt Service Cost (LDSC) suggests that infrastructure investments in healthcare often reflect broader government strategies focused on improving societal well-being. Such correlations are typical in settings where multiple forms of capital development are tied together by shared policy objectives and resource allocation strategies.

Conclusion

Overall, the observed correlations between the dependent and independent variables in the dataset are expected given the interrelated nature of the sectors and the macroeconomic variables involved. The relatively high correlation coefficients reflect the close relationship between public debt and Healthcare capital development. Therefore, the high correlation among these variables

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is not surprising, as it reflects the natural interdependencies that exist in macroeconomic and development-related variables.

4.2.1 Hypothesis One

The results from the Autoregressive Distributed Lag (ARDL) model in Table 4.2.1 provide an in-depth analysis of the relationship between Public Debt (LPBD), Debt Service Costs (LDSC), and Healthcare Capital Development (LHCHD) over the period from 1994 to 2023. The model consists of two main components: the Error Correction Regression (ECM) and the Long-Run Equation, which together shed light on both the short-term dynamics and the long-term equilibrium relationship between these variables. Additionally, diagnostic tests have been conducted to ensure the robustness and validity of the model.

Objective One: To determine the effect of public debt on healthcare capital development in Nigeria

Research Question One: To what extent does public debt affect healthcare capital development in Nigeria?

Research Hypothesis One (H01): Public debt has no significant effect on healthcare capital development in Nigeria.

Model One: Healthcare Capital Development Model
The combined equation can be structured as:
The ARDL model for the effect can be expressed as follows:
$LHCHDt = C + \beta1LPBDt + \beta2LDSCt + \ +) + \epsilon t$

Substituting the Coefficients:

Substituting the specific coefficients derived from the ECM and Levels Equation into the equation yields: 0.432 and 0.349
Long-Run Equation:
$LHCHDt = 0.432LPBDt + 0.349LDSCt \ + \epsilon t$

Short-Run Equation:
$LHCHDt = 2.008 – 0.194D(LPBDt) – 0.939D(LPBDt-1) + 0.196D(LDSCt) - 0.569D(LDSCt-1) – 1.010D(LDSCt-2) – 0.855D(LDSCt-3) - 0.670CointEqt−1 + \epsilon t$

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Table 4.2.1: Auto Regression Distributed Lag Model (ARDL)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Error Correction Regression				
C	2.008	0.265	7.580	0.000
D(LPBD)	-0.194	0.202	-0.961	0.351
D(LPBD(-1))	-0.939	0.345	-2.726	0.015
D(LDSC)	0.196	0.246	0.797	0.437
D(LDSC(-1))	-0.569	0.195	-2.913	0.010
D(LDSC(-2))	-1.010	0.175	-5.764	0.000
D(LDSC(-3))	-0.855	0.182	-4.698	0.000
CointEq(-1)*	-0.670	0.100	-6.664	0.000
Long Run Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPBD	0.432	0.524	0.826	0.421
LDSC	0.349	0.352	0.993	0.336
Diagnosis tests:				

ARDL Bound Test @ 5%: $F - stat$ = 13.157 (I (0) = 3.79, I (1) = 4.85

R^2 = 0.791 $Adj.R^2$ = 0.709; F- $stat$ = 9.712 (0.000)

$X^2_{JB} = 25.758\ (0.000); X^2_{LM} = 0.796\ (0.471); X^2_{BPG} = 0.281\ (0.971)$ $X^2_{RR} = 0.102\ (0.754)$

Source: Researcher's Computation (2024) from E-Views 12. Notes: SE: standard error; represent Jarque-Bera normality test, LM test for serial correlation, Breusch-Pagan Godfrey test for heteroscedasticity, and Ramsey Reset test for linearity, respectively. I(0) and I(1) represent the lower and upper bounds, respectively. While the respective probability values are in brackets; ECT: Error correction term. The dependent variable is the Natural Logarithm of Healthcare capital development (LHCHD). The independent variables are Natural Logarithm of public debt (LPBD) and Natural Logarithm of debts service costs (LDSC) for the 30-year period from 1994 to 2023 in Nigeria. The estimation process was facilitated using E-views 12.0.

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Interpretation

For the ARDL Bound Test, the value of the F-statistic, 13.157, which is greater than the critical values bound at the upper bound I(1) of 4.85 at the 10 percent level, is an indication of the existence of a long-run relationship between the dependent variable, Healthcare Capital Development, and public debts measured as public debt and debt service cost. Having found a long-run relationship, the study then estimates the conditional ECM and level equation results, as well as the diagnostic tests, and the results are presented in Table 4.1.2.

Diagnostic Test:

The Linearity Test

The linearity assumption of the ARDL test was estimated using the Ramsey RESET test. The ρ-value of the F-statistic, 0.754, being greater than the 10 percent chosen level of significance implies that the model is correctly specified, since the p-value is more than 0.10. Therefore, the null hypothesis cannot be rejected, which implies that there exists a linear relationship between the dependent variable, Healthcare Capital Development, and macroeconomic factors measured as Public Debt and Debt Service Cost.

The Heteroskedasticity Test

Breusch-Pagan/Cook-Weisberg test was conducted for heteroskedasticity; that is, testing for the consistency of the variations in the residuals of the model over the period "t". The result, with the ρ-value of 0.971 being greater than the 10 percent chosen level of significance, shows that the covariance of the error terms has a constant finite variance. This implies that the model is homoscedastic.

The Breusch-Godfrey Serial Correlation LM Test

The Breusch-Godfrey Serial Correlation LM Test was carried out to determine whether successive error terms are correlated. The probability value of the F-statistic, 0.471, is in favor of the null hypothesis, which states that there is no serial correlation in the residuals up to the specified lag order at the 10 percent significant level.

Normality Test

The probability value of the Jarque-Bera statistic is 0.00; this suggests that the null hypothesis of normality is hereby rejected. This implies that the estimated model is not normally distributed.

Discussion of Findings

The result obtained is consistent with some prior studies that have found similar results (Nzeh, 2020; Olusegun et al., 2020; Mhanfir, 2019; Ushie, 2023; Yusuf & Mohd, 2023; Alade, 2022; Ofurum & Fubara). 2022). For instance, Onyendi (2024) investigated the impact of public debt servicing on per capita output in Nigeria from 1981 to 2022. The study aimed to determine how debt servicing affected gross domestic product per capita during the period. The findings

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indicated a significant effect of public debt servicing on per capita output, the absence of a long-run relationship between debt servicing and output per capita, and no causality between the explanatory variables (debt servicing, budget financing, debt to GDP ratio, inflation, real effective exchange rate) and per capita output.

However, on the contrary, some other previous studies documented inconsistent results (Aribiyi et al., 2023; Ani et al., 2023; Nurudeen et al., 2022; Ezenwobi & Anisiobi, 2021; Syder & Isagua, 2021; Faizulayev et al., 2020; Getinet & Ersumo, 2020; George-Anokwuru & Inimino, 2020). For instance, the studies conducted by Aribiyi et al. (2023) investigated the influence of foreign debts on Nigeria's infrastructure development using an Auto-regressive Distributed Lag (ARDL) analysis, based on annual time series data spanning from 1983 to 2019. Data were gathered from various sources, including the CBN Statistical Bulletin, National Bureau of Statistics (NBS), World Development Indicators (WDI) databank, and UNCTAD Database. The ARDL long-run coefficient analysis indicated that BMFI and BBFI had, respectively, insignificant negative and significant positive effects on Nigeria's infrastructure (INFRA), while the control variables FDI and TOPEN exhibited significant positive and negative effects on INFRA.

Recommendation

The study concluded that effective public debt service enhances capital development in Nigeria. It was recommended that the Debt Management Office, Federal Government of Nigeria, and ministries should ensure optimal utilization of public debts to provide healthcare capital development. The study recommended that DBO should critically review debt service modalities and policies and advise the government accordingly to ensure that the utilization of public debts on healthcare capital development and fund allocation does not undermine the significance of capital development in Nigeria.

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