African Journal of Social and Behavioural Sciences (AJSBS)
Volume 15, Number 10 (2025) ISSN: 2141-209X

EFFECTS OF PUBLIC DEBT CRISES ON LIFE EXPECTANCY: AN EMPIRICAL INVESTIGATION FOR SUSTAINABLE DEVELOPMENT OF NIGERIA

Timothy Oladayo Popoola[1], Oluwaseyi A. Mohammed[2], Victoria Ohunene Aliyu[3], Olayinka Adeyemi Peter[4], Mukhtar Olaide Amasa[5], Benjamin Egem-Odey[6], Ahmed Hamza[7] & Maria Funmilayo Ogunlade[8]

[1,8]Department of Economics, Ahmadu Bello University, Zaria, Nigeria

[2 – 7]Department of Economics, Veritas University, Abuja, Nigeria

*m.seyi@yahoo.com

ABSTRACT: Nigeria faces persistent public debt crises, alongside one of the lowest life expectancy levels in Sub-Saharan Africa. Accordingly, this study empirically estimates the effect of public debt on life expectancy in Nigeria. Covering the period from 1981 to 2020, the study employs the Johansen co-integration approach. The findings indicate a negative and significant long-run relationship between Nigeria's external public debt and life expectancy. Conversely, domestic public debt is statistically significant and contributes positively to life expectancy in Nigeria in the long run. Based on these results, the study recommends reducing external debt while ensuring that domestic debt is properly monitored and safeguarded against misappropriation to enhance life expectancy at birth in Nigeria. Nigeria's governments could also finance their budget deficits with domestic borrowing. However, they should ensure that such funds are allocated to priority projects that have the capacity to deepen the economy and improve citizens' well-being.

Keywords: Debt Crises, Life-Expectancy, Nigeria, Co-Integration Approach

INTRODUCTION

Public debt is often considered a special medium employed by nations, particularly developing countries such as Nigeria, to bridge deficits and finance critical infrastructure. It is also suitable for improving citizens' quality of life and promoting sustainable growth and development (Eke & Akujuobi, 2021). Again, it is widely recognized that public borrowing often accelerates economic growth and improves factor productivity by increasing output.

To increase the level of sustainable development in a way that would improve the health status of Nigerians, countries such as Nigeria, which have a scarcity of funds, need to resort to borrowing from either domestic or external sources (Todaro & Smith, 2006). This is important as several economic theories argue that countries borrow for two main purposes. First, to achieve more macroeconomic efficiency, and to finance higher levels of consumption and production for sustainable development. Second, to adequately finance the balance of payments deficit, to reduce

the budget constraint, and again boost sustainable economic development that would reduce poverty and health issues.

From the beginning, public debt is considered a special medium employed by nations to bridge their deficits and carry out economic infrastructures that are suitable to increase the quality of life of citizens, and promote sustainable growth and development, particularly for developing countries. In Nigeria, the fall in the world oil prices of 1978 was referred to as the origin of Nigeria's debt crisis, which started in the 1980s (Mutasa, 2003). Three decades later, Nigeria is characterized as the nation with the highest debt in sub-Saharan Africa with low capital formation (Eke & Akujuobi, 2021; International Monetary Fund, 2018). The nation's low capital formation might be a result of its low levels of domestic investment, inefficient sustainable development, and low savings (Todaro & Smith, 2006). The nation is also experiencing one of the lowest average life expectancies.

For instance, her external debts increased rapidly from #11.19 billion in 1981 to #898.25 billion and #16,023 billion in 2010 and 2023 (Central Bank of Nigeria, 2024), with life expectancy of 50.9 years and 54.1 years, respectively, between 2010 and 2024 (World Bank, 2025). From these statistics, the point-percentage change in the external debts between 2010 and 2023 is 94.4%, while average life expectancy merely increased by 3.8% between the periods. These suggest that as public debts is speedily rising, the average life expectancy in Nigeria is merely the same after a decade. Therefore, this study hypothesizes that public debt negatively impacts life expectancy in Nigeria.

The research questions guiding this study are: To what extent has public debt influenced life expectancy in Nigeria? What is the long-run effect of public debt on life expectancy in the country? Consequently, the central objective of the study is to estimate the effect of public debt on life expectancy in Nigeria over the period 1981–2020. These periods were considered based on data availability on various public debts in Nigeria. Again, from 1981 to date, Nigeria has experienced an increase in both external and domestic debt compared to pre-1980 levels. As Abubakar and Inuwa (2020) observed, Nigeria began to experience external debt problems in the early 1980s, as a result of a fall in oil prices in the international market, which reduced the country's foreign exchange earnings.

Following this introductory section, the following section reviews the relevant literature, section three outlines the methodology, section four presents and discusses the findings, and section five offers the conclusion and policy recommendations.

RELATED LITERATURE REVIEWED

According to Nassir & Wani (2016), debt implies an obligation to pay money, deliver goods, or render service under an express or implied agreement. On the other hand, life expectancy, or longevity, refers to the average number of years an infant is expected to live if mortality patterns at birth remain constant in the future (World Bank, 2025).

Table 1 reveals that life expectancy in Nigeria increased marginally from 46 years in 1995 to about 54 years in 2020, while Rwanda's LEB increased from 31 years to about 66 years during the same

period (World Bank, 2025). In comparison, average life expectancy in Nigeria is lower than in Ghana, Rwanda, and South Africa.

Table 1: Average Life Expectancy at birth (total) in Nigeria compared to other countries

	1980	2000	2020
Ghana	52.3	57.5	64.0
South Africa	56.9	61.4	60.0
Rwanda	47.9	48.1	65.0
Nigeria	45.5	46.1	54.0

Source: Compiled from World Development Indicators, 2025

Theoretically, the neoclassical growth theory dates back to 1956, when Robert Solow put forward a formal model that postulated that the key variable in growth is labour productivity (i.e., output per worker), driven by the quality of health and well-being.

The model assumed that output (Y) is produced by employing technology, labour, and physical capital. The model is expressed as: Y = f (A, K, L) where Y is the aggregate output, A is the number based on the current state of technology, K is the quantitative measure of the size of the stock of manufactured capital and L the quantity and quality of labour employed during that period of time K, A and L are the only factors of production explicitly included in the model. It should be noted that the efficiency of health status is paramount to determine the contribution of L to Y.

It is against this backdrop that the neo-classical growth theory was adopted, considering that public debt, when borrowed to finance health, education, and development investments, is considered productive and can contribute positively to economic growth by increasing labour via improved health status.

In terms of the empirical literature, Ma, Hu, and Zafar (2022) examined the effect of external indebtedness on health outcomes in the emerging economies of Sri Lanka, Bangladesh, India, Thailand, Malaysia, China, and the Philippines. Their study employed the panel ARDL methodology and found that public health spending increased life expectancy and reduced the infant mortality rate in emerging economies.

Likewise, Razavi-Shearer (2022) investigated the impact of external debt on life expectancy in 103 low-and middle-income economies. The results of the study showed that using a multivariable regression panel analysis, external debt variables significantly and inversely impacted life expectancy.

Bese & Friday (2021) assessed the nexus for Turkey using the ARDL model. Unlike the findings of Razavi-Shearer (2022), the study's empirical outcome showed that, in the long term, long-term external indebtedness positively affected life expectancy, whereas the short-term effect was adverse.

Abd Rahman, Ismail, and Ridzuan (2021) investigated the effect of an ageing population on the external indebtedness of 36 upper-middle-income countries. By applying the system GMM approach, the study concluded that an ageing population can increase external debt, as more will have to be budgeted for healthcare, pensions, social security, and age-friendly infrastructure. In contrast, Abbas, Wizarat, and Mansoor (2020) employed panel fixed effects (FE) and system GMM techniques to conclude that life expectancy contributes to rising external debt in the South Asian countries Sri Lanka, Bangladesh, Pakistan, Nepal, and India.

In Nigeria, Abubakar and Inuwa (2020) examine the impact of external debt service on health outcomes in Nigeria, 1995-2017. The Autoregressive Distributive Lag (ARDL) Bound test result indicates that there is a long-run relationship between external debt service and health outcomes in Nigeria. Koginam (2024) assessed the impact of federal government debt on health expenditure in Nigeria for the period 1981-2022. The study also used the ARDL approach and found that government debt, the nominal exchange rate, and public health expenditure are co-integrated in the long run.

From the foregoing, it is glaring that there is no conclusive evidence on the impact of public debt on health outcomes. Thus, there is a need to conduct more rigorous analysis of the issues in developing countries, particularly in Nigeria. Again, several studies, such as Abubakar and Inuwa (2020) and Koginam (2024), on the issue in Nigeria did not explicitly measure public debt but instead focused on external public debt as the dependent variable. However, government borrowing is mainly from both internal and external sources as a fiscal channel for financing budget deficits. It is therefore on this premise that this study investigates the impact of both external and domestic government debts on life expectancy in Nigeria. This is considered important because Nigeria is characterized by high public debt and one of the lowest life expectancies in sub-Saharan Africa. Again, there is a need to estimate the long-run effect of public debts on life expectancy in Nigeria.

METHODOLOGY

Model Specification

It has been established in the literature by several authors, such as Abubakar and Inuwa (2020) and Koginam (2024), that public debts exhibit a long-run effect on health in Nigeria. However, unlike these limited studies in Nigeria, the innovation of this study is the estimation of both internal and external public debt on life expectancy in Nigeria. This provides a comprehensive estimation of the impact of public debts on health outcomes. Although this study followed the research of Koginam (2024) that considered the effect of federal debts on public health expenditure in Nigeria, it differed from the aforementioned by focusing on health outcomes, such as the average life expectancy of Nigerians.

Therefore, the model for consideration was given as:

$$LE_t = f(PD_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where t = 1, 2,…, 40, that is, from 1981 to 2020. LE is the average life expectancy, and PD is the public debt in Nigeria, respectively.

Based on the insights from neo-classical and Keynesian economic theories, the model assumes that the average life expectancy. (LE_t) is to a reasonable extent, dependent on the public debts (PD_t). This is because Keynesian theory suggests that fiscal policy is the best option for a nation seeking sustainable growth, as it serves the interests of the general populace. It further argued that in periods of budget deficits, the use of public debt instruments may yield positive health outcomes through investment in critical sectors, such as the health sector, and through increased employment opportunities.

Thus, the econometric model for the study from equation (1) is:

$$LE_t = \alpha + \sum_{i=j}^{i} \beta_{1j} PD_{t,j} + e \qquad \text{.....(2)}$$

where α and β are the econometric parameters.

Data

The yearly time series data on life expectancy at birth (LE) and public debt, including domestic debt (DD), external debt (ED), and multilateral debt (MD), for 40 years between 1981 and 2020, were used in the study. The annual average life expectancy (LE) for these periods was obtained from the World Bank Development Indicators (WDI, 2025). While yearly public debt variables were from the Central Bank of Nigeria (CBN, 2024).

Table 2: Description of Data

S/N	Type	Level	Description	Apriori Expectation
1.	Endogenous	LE_t	LE represents the average life expectancy	
2.	Exogenous	DD_t	Domestic debts	Positive
3.	Exogenous	ED_t	External debts	Positive
4.	Exogenous	MD_t	Debts from multilaterals	Positive

Source: Author's Computation (2025)

Estimation Technique

The study adopted Johansen's co-integration procedure. The technique helps to clarify the long-run relationships between public debts and life expectancy variables. The approach is also the maximum likelihood for finite-order vector autoregressions (VARs). It was chosen not only because it is VAR-based, but also due to the evidence that all variables in the study were of the same order of integration. This, therefore, makes the approach more appropriate than the alternative multivariate methods.

More so, the statistical properties of the estimated model (diagnostic tests) were also analyzed. The model was tested for normality, serial correlation, autoregressive conditional heteroskedasticity, heteroskedasticity, and stability. These tests are often used in econometric analysis to validate and check an econometric model's assumptions. They are equally important to ensure that the results are reliable and the model is correctly specified.

RESULTS AND DISCUSSIONS

Table 3: Descriptive Statistics of the Variables

	LE	***DD***	***ED***	***MD***
Mean	48.41	1,973.40	3,203.63	768.76
Std. Dev.	2.63	2,779.72	4,571.07	1,387.95
Maximum	52.91	12,705.62	16,023.89	6,832.72
Minimum	45.48	2.33	11.19	0.18
Obs.	40	40	40	40

Source: Author's Computation (2025)

Table 3 presents the descriptive statistics for the longevity rate and also includes the characteristics of public debt in Nigeria. The average life expectancy in Nigeria is 48.4 years, with a maximum of 52.9 years in 2020. This is particularly lower compared to the maximum life expectancy in Ghana (64.7 years), Angola (62.4 years), Burundi (62.3 years), and Benin (60.4 years) in the same African region (World Bank, 2025). The average external public debts were #3,203.63 billion annually.

Table 4: Augmented Dickey Fuller test

Variables	**Level**	**First Difference**	**Order of Difference**
LE_t	2.0180	2.6593	I(0)
DD_t	3.5087	5.0388	I(0)
ED_t	2.7031	3.7630	I(0)
MD_t	3.6013	6.8551	I(0)

Source: Authors' Computation (2025)

Table 4 shows the unit root test for the series used. Based on the estimate, all variables are stationary at the level. Since all variables are at I(0), the Johansen co-integration technique is appropriate for this study.

Table 5: Unrestricted Co-integration Rank test (Trace Statistics)

Hypothesized No of CEs	***Eigen value***	***Trace statistics***	***0.05 Critical value***	***Prob*****
None*	0.4760	57.9944	47.8561	0.0042
At most 1*	0.4042	33.4322	29.7971	0.0183
At most 2	0.3009	13.7479	15.4947	0.0901
At most 3	0.0038	0.1456	3.8414	0.7027

Source: Authors' Computation (2025)

Trace test indicates two co-integrating equations at the 0.05 level
**denotes rejection of the hypothesis at the 0.05 level*

Table 6: Unrestricted Co-integration Rank test (Maximum Eigenvalue)

Hypothesized No of CEs	Eigen value	Max-Eigen statistics	0.05 Critical value	Prob**
None	0.4760	24.5623	27.5843	0.1163
At most 1	0.4042	19.6842	21.1316	0.0787
At most 2	0.3009	13.6022	14.2646	0.0634
At most 3	0.0038	0.1456	3.8414	0.7027

Source: Author's Computation (2025)
Max-eigenvalue test indicates two co-integrating equations at the 0.05 level
**denotes rejection of the hypothesis at the 0.05 level*

The results obtained from both trace and maximum Eigenvalue statistics are reported in Tables 5 and 6. It was found that there are two co-integrated vectors between variables. The results suggest that the null hypothesis of no co-integration between public debt and longevity should be rejected at the 5% level. This suggests that there exists a long-run relationship between them.

Table 7: A Co-integration of the Normalized Equation

	Coefficient	Standard Error	t-statistics	Remarks
DD_t	0.0018	0.0014	1.2857	Positive related
ED_t	-0.0029	0.0013	-2.2307	Negative related
MD_t	-0.0115	0.0073	-1.5753	Negative related

Source: Author's Computation (2025)

Table 7 shows the long-run effects of the variables, where external and multilateral debts have an inverse impact on life expectancy in Nigeria. These statistics were also statistically significant at the 10% level. These findings were in line with Razavi-Shearer (2022). For instance, Razavi-Shearer (2022) found that public debts were inversely related to life expectancy. However, domestic debts have a positive and significant impact on life expectancy. Perhaps there are factors that could improve citizens' health as domestic debt rises. This finding was in line with Ma et al. (2022) and Bese and Friday (2021).

Having presented the study's findings, it is also important to analyze the statistical properties of the estimated models. Hence, the normality, serial correlation, stability, as well as auto-regressive conditional heteroskedasticity for the models are demonstrated in Table 4.8.

Table 8: Diagnostic test results

test	*statistics*	*p-value*	*Remarks*
Jarque-Bera statistics for normality	0.3035	0.3172	Normally distributed
Breusch-Godfrey serial correlation LM test	0.5339	0.1565	No serial correlation
Breusch-Pagan-Godfrey heteroscedasticity test	4.0133	0.1915	The model is fine

From the results, the probability value of the Jarque-Bera statistic is 31.7%, which exceeds 5%. It implied that the study's model has a normally distributed residual. Similarly, while the probability value of the Breusch-Godfrey serial correlation LM test is 15.6%, the Breusch-Pagan-Godfrey heteroscedasticity test is 19.2%. Both are also more than 5% which suggests that the model is free from serial autocorrelation and heteroscedasticity problems.

Our results, therefore, suggest that external debt from international organizations or individuals could be associated with a high debt profile and could trigger a payment crisis, necessitating rescheduling and refinancing. Although most of the external debts of developing countries are disbursed for capital projects, such as road and rail construction and defense, only a small portion can be allocated to the health sector. This negatively impacts well-being and lowers life expectancy.

The findings also demonstrate that resources from domestic debt could increase funding for the health sector. This increases the availability and accessibility of healthcare in both rural and urban areas. This can ultimately improve health outcomes and increase Nigerians' average life expectancy.

Conclusion and Policy Recommendations

The primary objective of this study was to estimate the effect of public debts on life expectancy in Nigeria. The analysis employed annual time series datasets covering the period from 1981 to 2020. Using the Augmented Dickey–Fuller (ADF) unit root test, all variables were found to be stationary at the level. To assess the long-run relationship between public debts (domestic, external, and multilateral) and life expectancy, the Johansen co-integration technique was applied. The results from both the trace and maximum eigenvalue statistics confirm the existence of a long-run relationship among the variables in Nigeria.

Therefore, this study concluded that Nigeria's governments could finance their budget deficits with domestic borrowing but should ensure that such funds are applied to priority projects that have the capacity to deepen the economy and improve the well-being of its citizens.

The findings of this research are highly relevant to policymakers, especially given Nigeria's high public debt levels and comparatively low life expectancy. The findings recommend that Nigeria's Debt Management Office (DMO) develop strategies to ensure that external loans are used solely for the purpose for which they were acquired. This could be achieved by emphasizing accountability, transparency, and proper monitoring of the loan. Similarly, governments should prioritize economic diversification and aggressively pursue sustainable development. This will result in robust economic growth and buoyant human capital development. It will also reduce the

need for external debt to fund the budget deficit. Likewise, emphasis on sourcing funds domestically to support improvements in the health sector would enhance longevity and promote sustainable development.

REFERENCES

Abubakar, S. B., & Bala, I. M. (2020). Impact of external debt servicing on health outcomes in Nigeria (1995-2017). *International Digital Organization for Scientific Research*, *5*(1), 1-20.

Abbas, S., Wizarat, S., & Mansoor, S. (2020). External debt distress in South Asia: Evidence from panel data analysis. *South Asian Journal of Macroeconomics and Public Finance*, *9*(2), 221–236.

Abd Rahaman, N. H., Ismail, S., & Ridzuan, A. R. (2021). Ageing population and external debt: An empirical investigation. *Journal of Business Economics and Management*, *22*(2), 410–423.

Attapattu, A. M. C., & Padmasiri, H. M. N. (2018). Long-run effect of public debt on economic growth in Sri Lanka. *IOSR Journal of Business and Management (IOSR-JBM)*, 66-73.

Bese, E., & Friday, H. S. (2021). The effect of external debt on life expectancy through foreign direct investment: Evidence from Turkey. *International Journal of Economics and Financial Issues*, *11*(2), 1–11.

Central Bank of Nigeria. (2024). *CBN Statistical Bulletin*. Abuja, Nigeria.

Eke, C. K., & Akujuobi, N. E. (2022). Public debt and economic growth in Nigeria: An empirical investigation. *International Journal of Development and Management Review*, *16*(1), 178-192.

International Monetary Fund (IMF). (2018). *Macroeconomic developments and prospects in low-income developing countries*. Washington, D.C.

Koginam, A. O. (2024). Impact of federal government debts on health expenditure in Nigeria: An ARDL approach. *Journal of Society, Environment and Development*, *1*(2), 20-37.

Ma, Y., Hu, M., & Zafar, Q. (2022). Analysis of the impact of external debt on health in an emerging Asian economy: Does FDI matter? *Frontiers in Public Health*, *33*, 1–7.

Mohammed, O. A., Njiforti, P. P., & Rafindadi, S. A. (2022). Economic analysis of the impact of reproductive health policy on reproductive health outcomes in Nigeria: Evidence from Wisconsin Logic Model. *Asian Journal of Management Sciences and Economics*, *9*(1), 1-26. http://multidisciplinaryjournals.com/ajmse-vol-9-no-1-2022/

Mohammed, O. A., Njiforti, P. P., & Rafindadi, S. A. (2021). Analysis of the impact of reproductive health outcomes on women's labor force participation and earnings in Nigeria. *Asian Journal of Management Sciences and Economics*, *8*(1), 20-46.

Mohammed, O. A., Popoola, T. O., Bognet, A. C., & Dahunsi, O. E. (2023). Determinants of healthcare seeking behavior amongst households in Nigeria. *Abuja Journal of Economics and Allied Fields*, *12*(5), 129-143.

Nwangwu, C., Mohammed, O. A., Oshaji, P., Ajiboye, O. S., Anibilowo, M. A., Ugbodu, J. I., & Kazeem, O. H. (2024). Modeling the effect of maternal and child healthcare service quality on neonatal mortality in Nigeria. *ISRG-Journal of Multidisciplinary Studies*, *2*(1). https://isrgpublishers.com/isrgjms-volume-ii-issue-i-january-2024/. DOI: 10.5281/zenodo.10518254.

Nwangwu, C., Mohammed, O. A., Popoola, T. O., Oshaji, P., Anibilowo, M. A., & Ajiboye, O. (2025). Households' socio-demographic factors and health insurance uptake among women of reproductive age in Nigeria. *Global Research Journal of Public Health and Epidemiology*, *13*(6), 30–38.

Nwangwu, C., Mohammed, O. A., Popoola, T. O., Oshaji, P., Anibilowo, M. A., & Ajiboye, O. (2025). Exclusive breastfeeding practice in Nigeria: Do women's socio-economic factors matter? *Global Research Journal of Public Health and Epidemiology*, *13*(6), 20–29.

Oshaji, P., Nwangwu, C., & Mohammed, O. A. (2025). Drivers of catastrophic health expenditure among women of reproductive age in Ekiti State, Nigeria. *Journal of Health and Medical Sciences*, *8*(4), 58-71.

Popoola, T. O., & Mohammed, O. A. (2023). Measles outbreaks and under-five mortality in Nigeria: Issues and policy options. *Journal of Economics and Allied Research*, *8*(3), 35-45.

Popoola, T. O., & Mohammed, O. A. (2024). Macroeconomic and socio-demographic determinants of longevity in Nigeria. *Lapai Journal of Economics*, *8*(1), 23-33.

Nassir, U. H., & Wani, H. K. (2016). An evaluation of relationship between public debt and economic growth: A study of Afghanistan. *Munich Personal RePEc Archive*, 75538, 1-19.

Nur, H. R., Shafinar, S., & Abdul, R. R. (2019). How does public debt affect economic growth? A systemic review. *Cogent Business and Management*, *6*(170133), 1-16.

Razavi-Shearer, D. (2022). The continued impact of multilateral debt on the population health outcomes of low- and middle-income countries. *The University of Washington*.

Todaro, P. M., & Smith, S. C. (2006). *Economic Development* (9th ed.). Pearson Education, Harlow.

World Bank. (2025). *World Development Indicator*. World Bank.