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Determinants of Debt Servicing in Nigeria

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Abstract

This study investigated the determinants of debt servicing in Nigeria. Both ex-post facto and longitudinal research methods were used to analyse the Federal Republic of Nigeria's debt servicing and budget implementation from 2008 to 2024. Secondary data was obtained from the FGN's Annual Budget and reports. A time series analysis was carried out to determine these relationships. The study revealed that foreign exchange rates significantly influence Nigeria's debt servicing, while debt servicing does not influence foreign exchange rates. Inflation rates do not significantly influence Nigeria's debt servicing, while debt servicing does influence inflation rates. Also, interest rates and debt service ratios have a strong reciprocal causal relationship. The study recommends that the government should prioritise sound monetary policy for exchange rate stability and fiscal stability, and balance low interest rates to stimulate the economy and reasonable debt service requirements.

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Introduction

Debt financing is an efficient source of funding, particularly for emerging countries. According to the external debt stock influences economic growth and development. Despite its crucial role in structural transformation, the rate at which the nation's debt is rising has negatively impacted its ability to generate sufficient growth, cope with crises, and invest in development. For instance, the world's total debt surged by over $12 trillion, reaching nearly $323 trillion (Zeenatsambo, 2025). While Nigeria's total public debt amounted to N142.3 trillion in 2024, these figures emphasise the unsustainable debt servicing obligations governments face (Zeenatsambo, 2025). While the World Bank recommends a debt service to revenue ratio of 22.5%, Nigeria's current ratio exceeds

60%. This indicates that for every ₦100 earned as revenue by the Nigerian government, ₦60 is spent on debt servicing. It is, therefore, evident that many developing African nations, particularly Nigeria, are at risk of falling into unsustainable debt situations [1-3].

On the one hand, this rapid debt accumulation might be due to a combination of factors. According to many prevailing socio-economic issues emerge in the 21st century as determinants of external debt, especially in developing countries. In contrast, argued that economic growth, imports, population, foreign exchange reserves, total debt service, poverty, and income instability are common factors that contribute to external debt as documented in the literature. Inflation, interest rates, terms of trade, trade liberalization, currency depreciation, budget deficit, exchange rate, national savings, and financial development are all included [4-6].

Likewise, opined that, among these factors, domestic currency depreciation can reduce sovereign risk, but it can also negatively impact a country's default probability. While suggested that the exchange rate impacts debt burden, the peculiarity of Nigeria in terms of her policy on foreign exchange rates, in recent times, warrants a thorough study. For instance, the Central Bank of Nigeria (CBN) introduced multiple exchange rates between 2014 and mid-2023. In 2024, it reintroduced a unified exchange rate. In this regard, stated that the effect of exchange rate policy on countries is country-specific and is dependent on each country's economic fundamentals, economic policies, and implementation. Meanwhile, attributing the major cause of exchange rate fluctuations in Nigeria to external debt and vice versa has been the major concern of scholars and policymakers in the country [7-10].

In the same vein, there is a rising global interest rate fueled by monetary tightening in developed economies. Based on this, Nigeria's central bank maintained its benchmark interest rate after six hikes last year. While Nigeria's central bank argued that it was in response to foreign exchange market stability and anticipated inflation reduction, this entails some relationship between interest rate, foreign exchange rate and inflation. The basis of this relationship and its effect on debt servicing were examined in this study using the time series approach. Conversely, Aimola and Odhiambo (2020) opined that the relationship between public debt and inflation varies from country to country, with no consensus among scholars on this relationship. The relationship between public debt and inflation has become a significant topic in recent decades as policymakers investigate its impact on fiscal deficit financing and whether debt service impacts inflation. Based on this, this study, therefore, examines the determining factors of debt servicing [11-14].

Literature Review

This section extensively examines the theories and empirical studies that explain the concept related to the determinants of budget implementation and debt servicing.

Debt Servicing

Debt servicing involves the repayment of principal and interest on borrowed funds and is essential for maintaining a country's creditworthiness and fiscal stability. For developing nations like Nigeria, debt servicing often consumes a significant share of government expenditure due to rising borrowing costs and limited revenue generation. This high financial obligation constrains fiscal space, limiting the allocation of funds to vital developmental priorities such as infrastructure, education, and healthcare. Over-reliance on debt to bridge budget deficits exacerbates fiscal challenges, potentially leading to unsustainable debt levels and increasing economic vulnerability. Addressing this issue requires balancing debt financing with effective revenue generation and prudent expenditure management to ensure long-term fiscal sustainability [15,16].

High debt servicing costs pose significant challenges to fiscal management, diverting resources away from critical sectors such as infrastructure, social services, and economic growth initiatives, as evidenced by Nigeria's allocation of over 80% of government revenue to debt servicing in 2023. This crowding-out effect limits developmental spending and exacerbates macroeconomic instability through increased fiscal deficits, depreciating exchange rates, and heightened inflationary pressures. Additionally, effective debt servicing is vital for maintaining creditworthiness, as defaults or delayed payments can raise borrowing costs and reduce access to credit markets. Unsustainable debt burdens also create an intergenerational challenge, passing financial liabilities to future generations and potentially constraining long-term economic growth.

Institutional weaknesses and corruption further compound these issues, undermining efficient debt management and increasing fiscal mismanagement risks. Addressing these multifaceted challenges requires robust governance, economic reforms, and a strategic approach to fiscal sustainability [15,17,18].

Recent studies highlight the complex relationship between debt servicing and economic growth in Sub-Saharan Africa, with significant implications for Nigeria. Found that high debt servicing ratios are negatively correlated with GDP growth, particularly in nations with limited revenue generation capacity. Underscored this challenge in Nigeria, where over 70% of government revenue in 2022 was allocated to debt servicing, leaving little fiscal space for development. This overwhelming debt burden, coupled with inefficient revenue mobilization, calls for urgent reforms in public finance management to improve expenditure efficiency and reduce fiscal vulnerabilities [19,20].

Institutional weaknesses further exacerbate these challenges, as showed that corruption inflates borrowing costs and undermines the effectiveness of debt servicing strategies. The emphasised that rising global interest rates and currency depreciation are compounding these issues, with Nigeria's debt-to-GDP ratio expected to surpass 40% by 2025. The highlighted the trade-off between debt servicing and public investment, noting that excessive debt repayments often lead to underinvestment in critical infrastructure, stifling long-term growth. These findings collectively underline the need for improved institutional quality, robust fiscal reforms, and strategic investment to balance debt obligations with economic development priorities [15,21,22].

Understanding the Constructs

Foreign Exchange Rate

Defined the foreign exchange rate as the price of one country's currency in relation to another country's currency. While this provides the specifics of the foreign exchange rate, it, however, ignores the mechanism that forms the basis of foreign exchange rates. Similarly, describes the foreign exchange rate as the value of a nation's currency when it is traded for another currency. This portrays foreign exchange rates in a transactional context but neglects the various types of foreign exchange rates. Also, Le (2024) defined the exchange rate as the rate at which one currency is exchanged for another currency. While being broad in approach, it does not state the underlying mechanism of foreign exchange rates [23-25].

Defined the exchange rate as the relative price of one currency expressed in terms of another currency (or group of currencies). This specifies exchange rates as a relative price. However, it makes no explicit distinction between fixed, floating, or hybrid exchange rate systems. Based on this, the study defined foreign exchange rates as the relative price of exchanging one currency for another on the international financial market [26].

Inflation Rate

While there is a consensus among scholars on the concept of inflation rate, two perspectives have emerged. The first perspective relates to the price of items over a period. In this regard, the defined the inflation rate as the rate of increase in prices over a given period. The inflation rate is typically a broad measure of the overall increase in prices or the increase in the cost of living in a country. It is typically measured by price indices like the Consumer Price Index (CPI). Similarly, inflation measures how much more expensive a set of goods and services has become over a certain period, usually a year [27].

Conversely, the second perspective ties inflation to purchasing power. In this regard, Fernando (2025) defined the inflation rate as a gradual loss of purchasing power. This is usually reflected in a broad rise in prices for goods and services over time. Such shows how much more expensive a set of goods and services has become over a certain period, usually a year. Based on this, the study defined the inflation rate as a percentage change in price.

Interest Rate

On the one hand, defined the interest rate as the percentage of interest relative to the principal. It is either what lenders charge borrowers or what is earned from deposit accounts. Interest rates, expressed as a percentage of the principal amount over a specific period, serve as the cost of borrowing money or the return on savings. However, it does not specify whether it applies to lending, borrowing, or deposits. Similarly, defined an interest rate as the amount of interest due per period as a proportion of the amount lent, deposited, or borrowed. While being comprehensive, it may be

made clearer by stating whether it refers to nominal or effective interest rates [28,29].

On the other hand, described the interest rate as the interest rate that a country's monetary authority (i.e. the central bank) sets to influence the evolution of the main monetary variables in the economy. The policy interest rate determines the levels of the rest of the interest rates in the economy. However, it ignores the role of supply and demand in financial markets in determining actual borrowing and lending rates. Based on this, the study defined interest rate as the cost of borrowing money or the return on investment [30].

Corruption Perception Index

Defined the corruption index rate (CPI) as an index that scores countries on the perceived levels of government corruption by country. The Corruption Perceptions Index (CPI) assesses the perceived levels of public sector corruption across different countries and territories. It is an index that uses a scale from 0 to 100, where 0 indicates high levels of corruption and 100 indicates low levels (very clean). While being a composite indicator, the score ranks according to the level of corruption in the country [31,32].

Institutional Theory

In 1970, John W. Meyer and Brian Rowan proposed the institutional theory. This theory holds that corporate structure and behaviour are determined by institutional norms, practices, rules, and laws. In this regard, opined that institutional theory assumes that institutions serve as governance structures while social standards manage individual behaviour, conformity entails legitimacy, and past structures beget new institutional arrangements [33].

Empirical evidence shows the importance of the assumptions of institutional theory. For instance, asserted that the influence of external debt on domestic investment is determined by the quality of institutions. Emphasised the significance of institutional strength for efficient inflation management. Furthermore, the emphasised the need for institutional reforms in stabilising exchange rates and increasing debt sustainability. While robust institutions create a more predictable and stable environment, efficient bureaucracies and reduced corruption ensure that borrowed funds are allocated effectively. Institutional theory provides a comprehensive understanding of the correlation between macroeconomic factors like foreign exchange rates and fiscal outcomes like debt servicing [15,34,35,36].

However, ongoing changes in the environment, events, and circumstances have called its assumption of relative stability into question. While it excessively concentrates on formal structures, such may not be stable over time. Notwithstanding these objections, its applicability to macroeconomic factors emphasises how crucial institutional reforms are to fostering economic expansion and fiscal sustainability [22].

Empirical Review of Foreign Exchange Rate on Debt Servicing

Examined the relationship between exchange rates and gross debt loans using the autoregressive distributed Lag (ARDL) model. Results showed a weak, non-significant positive relationship between gross loan debt and foreign exchange rates. Appreciating or depreciating exchange rates can impact the burden of gross debt, and the level of gross debt can also impact exchange rates [37].

Investigated the factors influencing Pakistan's public debt dynamics and its sustainability using the debt dynamic approach and the ARDL approach. It was found that there was a positive impact of fiscal deficit, exchange rate depreciation, and interest rate on public debt. The study also revealed instability in public debt for the entire study period, except for a few years. The main driving forces for increasing the debt burden are fiscal indiscipline, rising costs due to exchange rate depreciation, and higher interest rates [38].

Assessed the long-term impact of domestic currency depreciation on external debt in 41 emerging economies from 1999 to 2019. Results showed that larger depreciations increase the external debt-to-GDP ratio, potentially reducing debt sustainability. Poorer economies faced greater external debt burdens. Higher exchange rate volatility and floating exchange rates contributed to increased external debt burdens. Exchange rate depreciation has asymmetric effects, with central bank independence limiting its impact [39].

Studied the relationship between external debt and exchange rate fluctuations in Nigeria from 1981 to 2018 [10]. It was found that external debt, debt service payment, and foreign reserve positively impact short-

term exchange rate fluctuations. Conversely, evaluated the effect of currency rate swings on Nigeria's fiscal performance by utilising regression analysis and Granger causality tests on data from 2010 to 2021. The study concluded that the naira devaluation contributed to a 25% rise in debt payment expenses between 2020 and 2022 [40].

Examined the long- and short-term effects of foreign exchange on Indonesia's external debts. Results showed a long-run cointegrating relationship between the two variables, with a positive long-run effect on Indonesia's external debt. The study also found an asymmetry in the elasticities of external debt concerning rupiah-to-US dollar exchange rate fluctuations. Similarly, explored the politics of public debt management in advanced capitalist societies, comparing debt management reforms in Germany and the UK. It was revealed that a lack of partisan contestation and market discipline created a space for coordination between capitalist states and large dealer banks. This quietude prevented changes in interest rates and debt servicing costs from being seen as faulty debt management [41,42].

However, identify central bank independence as a mitigating factor, but few studies have investigated how different exchange rate regimes (fixed, floating, and managed) affect debt servicing results. Also, observed no significant association between exchange rates and gross debt loans, whereas, discovered considerable long-run relationships. This disparity highlights the need for additional research into the elements that moderate this relationship, such as corruption. Again, this is a need for comparative studies across various regimes and policy contexts [37,39,41].

Based on this, this study, therefore, hypothesises that: **Ho1: The** Foreign exchange rate has no significant influence on budget implementation and debt servicing in Nigeria.

Empirical Review of Inflation Rate on Debt Servicing

Examined how external indebtedness and inflationary persistence impact the efficiency and sustainability of inflation targeting during disinflation events. As the recent Argentine experience demonstrated, a slowing inflation rate and a large current. The account deficit may make stabilization more difficult. The study demonstrated that rapid inflation adjustment can lead to achieving the target without incurring excessive external debt. Slow inflation adjustment can lead to high-risk premiums, foreign exchange shortages, and the collapse of the inflation-targeting system [43].

Investigated the impact of public debt on inflation in Ghana from 1983 to 2018 using ARDL bounds testing and an error correction model. Results showed a stable long-run relationship between inflation and explanatory variables, with a positive and significant impact of public debt. Similarly, examined the impact of public debt on inflation and unemployment in Nigeria from 1985 to 2020. Using annual data, the study found a long-term relationship between public debt and unemployment, with increased public debt leading to more unemployment. However, external debt causes more unemployment than domestic debt [14,44].

Conducted a panel data analysis with structural breaks, focusing on fiscal data from Nigeria's federal and state governments from 2000 to 2021. Data on inflation trends and debt servicing expenses were obtained from the Nigerian Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN). Debt servicing costs increased by 18% on average during inflationary periods of more than 12%. To offset these effects and improve fiscal sustainability, the report advocated for tighter fiscal discipline and inflation indexing of public spending [40].

Examined the correlation between inflation, governmental debt, and unemployment in Ghana between 1990 and 2022. Using the ARDL framework to estimate the variables, a long-term link between governmental debt and inflation was established. Inflation has a negative correlation with both short and long-term governmental debt. The analysis implied that prioritizing domestic loans over foreign debts could be a smart way to mitigate inflationary risk. Likewise, assessed the impact of public debt on Nigeria's macroeconomic indicators from 1980 to 2020. It used the autoregressive distributed lag (ARDL) bounds testing approach for cointegration and suggested that domestic debt increases national output but reduces unemployment and inflation rates. However, external debt raises unemployment and inflation rates [45,46].

Analysed South Africa's public debt, revealing that it is influenced by economic growth, unemployment,

inequality, and high government expenditure. Data from 1990 to 2020 was used to analyse the determinants. Government deposits, business confidence, inflation, revenue, and unemployment were significant determinants. Government expenditure was found to be negligible. In the same vein, explored the impact of public debt shocks on Nigeria's macroeconomic stability using a New Keynesian approach. It was found that there is a positive relationship between output and foreign debt, while the debt service to revenue ratio, interest rate, and domestic debt has a negative relationship with economic growth. An increase in external debt positively impacts economic growth, while an increase in the debt service to revenue ratio, interest rate, and domestic debt negatively affects Nigeria's macroeconomic stability [47,48].

While focus on Ghana and Nigeria, Hlongwane and Daw (2023) analyse South Africa. However, these studies consider other factors that can impact this relationship. There is little discussion of how these moderating variables can affect debt servicing costs and inflation. This gap could be bridged by including corruption [14,44,46].

This study, therefore, hypothesises as follows:
Ho2: The Inflation rate has no significant influence on budget implementation and debt servicing in Nigeria.

Empirical Review of Interest Rate on Debt Servicing

Following the 2008 financial crisis, asserted that low interest rates allowed developing nations to borrow in international markets, leading to a record external debt level. As central banks raise interest rates, many are at risk of default due to the mix of public and private creditors and domestic politics. Using structural equation modelling (SEM), the investigated the causal link between interest rates, fiscal performance, and institutional characteristics in 40 low- and middle-income countries. The analysis analysed data from 2005 to 2022, including interest rate trends, debt profiles, and fiscal expenditures. The data found that a 1% increase in interest rates causes a 5% increase in debt servicing costs. However, countries with strong institutional attributes could better manage interest rate risks and maintain fiscal stability [22,49].

Assessed debt sustainability due to historical public debt levels in advanced economies. Using a continuous-time model with a stochastic debt-to-GDP ratio, the study found that theoretical sustainability conditions are not directly related to typical sustainability measurements such as debt level or interest rate differential. When the primary surplus is limited, a state-specific threshold level of public debt determines sustainability. Secular stagnation characteristics such as slow population growth, low productivity growth, and increased production risk have varying implications for debt sustainability [50].

Presented an integrated perspective on public debt evolution, focusing on financial, social, and governance factors. It highlighted economic growth, interest rates, life expectancy, unemployment, government effectiveness, and the sovereign debt crisis as major determinants. The Covid-19 pandemic has led to increased public debts in Eurozone countries. Similarly, examined the impact of debt servicing on Nigeria's economy using data from 1980 to 2022. The analysis found a positive but insignificant relationship between External Debt Service (EDS), Domestic Debt Service (DDS), Interest Rate (INR), and Exchange Rate (EXR) [51,52].

Examined the impact of public and publicly guaranteed debt on Nigeria's economic growth. Results showed that domestic debt has a significant positive relationship with long-term economic growth, while external debt has no significant impact. This suggests that domestic debt is more beneficial for economic growth than external debt, as interest paid on loans can be used for productive economic purposes. Again, analysed the macroeconomic effects of public debt in India from 1980 to 2017 using a structural vector autoregression framework. Results showed that public debt negatively impacts economic growth but positively impacts long-term interest rates and investment. Domestic debt has a more adverse effect than external debt [53,54].

Despite extensive studies on the relationship between interest rates and debt servicing, the available literature has significant gaps. While the address how rising interest rates raise debt servicing costs, they do not investigate how interest rate volatility impacts debt sustainability across different periods. According to Briceño and Perote (2020), the COVID-19 pandemic increased public debt levels in Eurozone countries. However, there is limited empirical evidence on the impact of post-pandemic fiscal and monetary policy on debt servicing costs in emerging economies [22,49].

Therefore, this study hypothesises that:

Ho3: The Interest rate has no significant influence on budget implementation and debt servicing in Nigeria.

Conceptual Framework

The conceptual framework presented in Figure 1 below shows the linkages between the elements that influence budget execution and debt servicing in Nigeria.

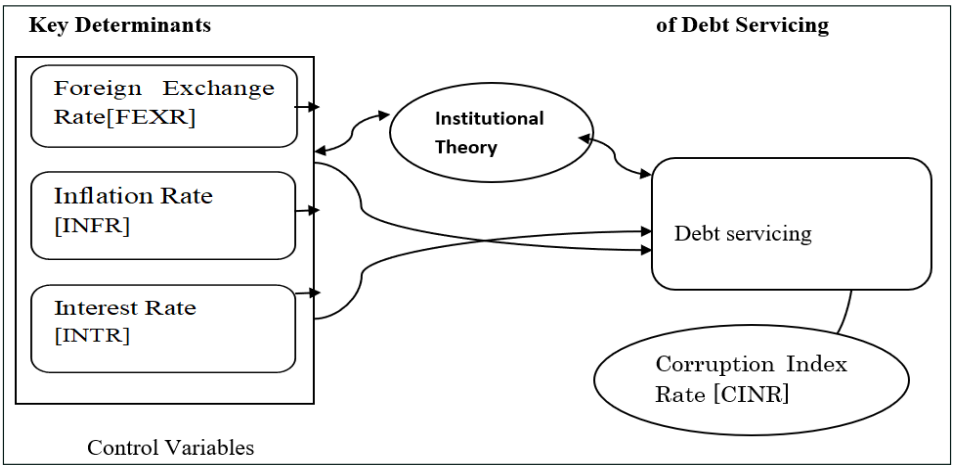

Figure 1: The Conceptual Framework. Authors' Concept (2024).

Method and Data Source

The study uses both ex-post facto and longitudinal research methods to analyse the Federal Republic of Nigeria's debt servicing and budget implementation from 2008 to 2024. Secondary data was obtained from the FGN's Annual Budget and reports. The econometric model was tested using the Stata statistical package.

$DS_t = \beta_0 + \beta_1 FEXR_t + \beta_2 INFR_t + \beta_3 INTR_t + \beta_4 CINR_t + \varepsilon_t$ ……..…..equ 1

Where:

DS= Debt Servicing

FEXR= Foreign Exchange Rate

INFR= Inflation Rate

INTR= Interest Rate

CINR Corruption Index Rate

β_0= Constant

β_1-β_4= Gradients

t = time

ε= Error Term

Measurement and Description of Variables

Table 1 shows the variables under study, as well as their description, measurement, data source, and supporting literature. This includes the Foreign Exchange Rate, Inflation Rate, and Interest Rate MPR.

Table 1: Measurement and Description of Research Variables

SN	Variable	Description	Measurement	Data Source	Literature Evidence
	Dependent Variable:				
1	Debt servicing	Debt servicing involves the repayment of principal and interest on borrowed funds.	It's calculated by dividing total debt service payments (interest and principal) by total revenue.	Government Annual Reports.	(DMO, 2022)

	Independent Variables:				
2a	Foreign Exchange Rate	The foreign exchange rate is the value of one country's currency in relation to another's currency.	Official exchange rate at the end of the year	CBN REPORT	
2b	Inflation Rate	The inflation rate refers to the rate at which prices rise over time.	Official inflation rate at the end of the year	CBN REPORT	
2c	Interest Rate	The interest rate is the percentage charged on the entire amount of a loan or paid on deposits over a given period.	Official interest rate at the end of the year	CBN REPORT	
2d	Corruption Index Rate	The Corruption Perceptions Index (CPI) ranks countries on a scale of 0 (very corrupt) to 100 (extremely clean).	Perceived levels of public sector corruption, scoring on a scale of 0 (highly corrupt) to 100 (very clean).	CPI 2023 Reports	

Data analysis techniques

This study used inferential statistics (regression analysis, correlational analysis, and so on) as well as descriptive statistics.

Data Analysis and Discussion of Findings

This section depicts the characteristics of the variables used, data analysis, and study findings. These statistics summarise the variable distribution.

Descriptive Statistics

A typical DS mean score of 0.936 indicates that debt servicing absorbs approximately 93.6% of gross revenue earned on average. The observed range (from 0.17 to 2.61) shows significant fluctuation among the 17 data points, indicating that Nigeria has experienced less hardship in some years but has a significantly larger debt burden in others. The standard deviation is 0.74, indicating significant variability in debt service levels. The skewness is 0.60, suggesting a significant right skew, while the kurtosis is 2.46, indicating mild platykurtosis. This suggests fewer extreme values.

Similarly, the exchange rate is represented by FEXR. The statistics reveal significant variation, with a mean of 340.30 and a large standard deviation of 340.49. This signifies a period of high currency volatility or depreciation. The lowest number is 118.57, and the highest is 1550.70. The skewness of 2.85 indicates a substantially right-skewed distribution. This represents currency depreciation. The kurtosis at 10.69 is high. This indicates the presence of extreme exchange rate changes.

In the same vein, the sample's inflation rate spans between 8.05% and 34.8%, with an average of 14.74%. The significant dispersion and high average imply that inflation is a key worry and a potential risk factor affecting debt sustainability. The standard deviation of 6.62 indicates significant inflation volatility. The skewness of 1.82 implies a right-skewed distribution with more extreme values. The kurtosis of 6.12 indicates a fat tail with periods of extremely high inflation.

Furthermore, INTR represents the interest rate. The typical value is roughly 13.12%, with a low of 6% and a maximum of 27.5%. This discrepancy implies that interest rates changed over observations. A right skew is indicated by a skewness of 1.35. This suggests times when interest rates are high. A distribution with a fat tail is indicated by a kurtosis of 5.84. This implies substantial fluctuations in interest rates. On the other hand, the CINR indicator assesses perceived corruption in the public sector, with a mean of about 25.65 on a scale of 0 to 100 basis points. The relatively low standard deviation of 1.32 and the small range (24 to 28) suggest that the sample's levels of corruption are quite constant. The skewness of 0.18 shows a nearly symmetric distribution, whilst the kurtosis of 1.70 suggests a slightly platykurtic distribution with few extreme values.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
DS	17	0.94	0.74	0.17	2.61	0.6	2.46
FEXR	17	340.3	340.49	118.57	1550.7	2.85	10.69
INFR	17	14.74	6.62	8.05	34.8	1.82	6.12
INTR	17	13.12	4.86	6	27.5	1.35	5.84
CINR	17	25.65	1.32	24	28	0.18	1.7

Results obtained from the measurement of variables

Test of Variables

This section covers necessary pre- and post-estimation tests to guarantee that the study's findings are relevant and credible.

Pre-estimation Test

To ensure that the assumptions of the selected model were fulfilled and that there was enough data for analysis, the following tests were carried out.

Variables' Stationary Test

Table 3 shows the results of the stationary test. The Dickey-Fuller (ADF) test detects the presence of a unit root in the variables being studied. According to the null hypothesis, data distribution changes over time. According to the alternate hypothesis, data distribution is constant across time. If the significance level is greater than 0.05, the null hypothesis is accepted; otherwise, it is rejected. All variables have p-values more than 0.05, implying that they are not stationary. Log transformation was performed on the variables, and the p-values for DS, FEXR, INFR, INTR, and CINR were 0.0017, 0.0007, 0.0000, 0.0392, 0.0072, and 0.0000, respectively. This means that each variable was steady.

Despite this, the Engle-Granger Cointegration Test was used to determine whether variables were cointegrated. As indicated in Table 3, the test statistics were -4.040, with p-values of 0.0012. In this respect, the null hypothesis has been rejected. This suggests that the cointegration regression's residuals are stationary. The study demonstrates cointegration with stationary residuals, showing a long-term equilibrium relationship between variables, although individual variables are stationary. Also, selection order criteria were determined using the Akaike Information Criterion and the Schwarz-Bayesian Criterion. The result for SBIC (Schwarz-Bayesian Criterion) was -417.838 at lag 4, while the result for Akaike Criterion (AIC) was -421.227 at lag 4. The study chooses Lag 4 as the optimal lag selection since it has the lowest value.

Table 3: Stationary Test

Variable	Dickey-Fuller Lag (0)		Dickey-Fuller Lag (0) After Transformation	
	Z-value	P-value	Z-value	P-value
BI	-0.87	0.7969	-3.955	0.0017
DS	-1.58	0.4960	-4.184	0.0007
FEXR	4.63	1.0000	-5.972	0.0000
INFR	1.68	0.9981	-2.956	0.0392
INTR	0.63	0.9884	-3.531	0.0072
CINR	-2.55	0.1036	-5.513	0.0000
Engle-Granger Cointegration Test	-4.04	0.0012		
Akaike Information Criterion	-417.838			
Schwarz-Bayesian Criterion	-421.227			
The table shows unit root tests.				

Multicollinearity

The model's estimates and standard errors are affected by perfect linear correlation between independent variables. The Variance Inflation Factor (VIF) analysis was used to detect multicollinearity in data distribution. VIF values between 5 and 10 indicate moderate to high multicollinearity, with a mean of 1.35 indicating no multicollinearity among variables.

Table 4: Variance Inflation Factor

Variable	VIF	1/VIF
CINR	1.61	0.62187
INFR	1.29	0.77304
FEXR	1.27	0.78616
INTR	1.24	0.80892
Mean VIF	1.35	

The table above shows the VIF values.

Correlation Analysis

Table 5 shows the pairwise correlation coefficients and test findings for independent variables. The test findings showed that the correlation coefficient between FEXR and INFR is 0.2067 ($p = 0.4260$), showing an insignificant but weak relationship. This demonstrates that there is little association between the variables. Furthermore, the correlation between FEXR and INTR is 0.0329 ($p = 0.9003$). This shows a tiny yet weak positive relationship. The correlation coefficient between INFR and INTR is 0.0234 ($p = 0.9290$), showing a non-significant association. CINR has no significant connections with other factors. The study concludes that there is multicollinearity among the variables.

Table 5: Pairwise Correlation

	FEXR	INFR	INTR	CINR
FEXR	1.0000			
INFR	0.2067	1.0000		
	0.426			
INFR	0.0329	0.0234	1.0000	
	0.9003	0.929		
CINR	-0.2815	0.3246	0.379	1.0000
	0.2738	0.2037	0.1335	

The table above shows a pairwise correlation.

Post-Estimation Tests

Similarly, a heteroskedasticity test was performed to calculate the constant variance of residuals or changes in fitted values. The null hypothesis for this test is homoscedasticity, whereas the alternative hypothesis is variable variance at different values. Heteroskedasticity is shown by a higher chi-square test statistic and a significant p-value (p-value < 0.05). Otherwise, homoskedasticity is assumed. The test findings indicated a chi-square of 2.85 and a significant value of 0.0911, indicating strong evidence of homoskedasticity.

Likewise, autocorrelation in the data distribution was assessed using Durbin's Alternative Test for Autocorrelation. The absence of serial correlation is the null hypothesis (H_0). The residuals show a serial correlation, which is the alternative hypothesis (H_1). The test statistic has one degree of freedom (df) and a Chi-square (χ^2) distribution. With a p-value of 0.7330 and a result of 0.116, this suggests that serial autocorrelation does not exist.

Additionally, the Skewness/Kurtosis normality tests were employed to evaluate if the variables were normal. The null hypothesis indicates a normal distribution, whereas the alternative hypothesis indicates a non-normal distribution. If the significance level is greater than 0.05, the null hypothesis is accepted; otherwise, it is rejected. The results indicated that DS, FEXR, INFR, INTR, and CINR were regularly distributed.

Table 6: Summary Of Post-Estimation Test Results

Test	F-Statistic	F-Statistic
Heteroskedasticity test	2.85	2.85
Durbin's Alternative Test for Autocorrelation	0.116	0.116
Skewness/Kurtosis tests for normality:		
DSR	2.73	0.2551
FEXR	0.71	0.7009
INFR	0.41	0.8144
INTR	4.03	0.1335
CINR	3.06	0.2169

The table above shows the results of post-estimation tests.

Vector Error Correction Model (VECM)

The Vector Error Correction Model (VECM) was used to analyse short- and long-term relationships identified by the Engle-Granger Cointegration Test. R-squared and p-value are used to illustrate the short-run dynamics. The R-squared for Foreign Exchange Rate is 0.9925, and the p-value is 0.0000. This implies that the model

explains short-term changes and provides significant evidence for short-run effects. This implies that exchange rate movements are largely predictable based on previous values and other factors. INFR and INTR have an R-squared of 0.94, indicating that the model explains most of the variability.

The FEXR has an R-squared of 0.9799 and a p-value of 0.0001, suggesting that the model explains short-term changes and provides significant evidence for short-run effects. This implies that FEXR is highly responsive to economic shocks. The R-squared for INFR is 0.9344, with p-values of 0.0047. This implies that 93.4% of short-term inflation changes are accounted for. The R-squared for INTR is 0.9929, with a p-value of 0.0000. This indicates that the model explains 99% of the variability. This suggests that interest rates respond quickly to economic changes. The CINR has a p-value of 0.0000 and an R-square of 0.9710, which indicates a very high explanatory power. The BI has an R-square of 0.9431 and a p-value of 0.0009, indicating a statistically significant but moderate explanatory power.

Table 7: Vector Error Correction Model

Sample: 2011 – 2024		Number of obs = 14			
Log-likelihood = 915.9416		AIC		=	-121.71
		HQIC		=	-121.98
Det (Sigma_ml) =-1.02e-63		SBIC		=	-118.79
Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_DSR	12	0.1507	0.9431	33.1794	0.0009
D_FEXR	12	0.0621	0.9799	97.3367	0
D_INFR	12	0.0913	0.9344	28.5056	0.0047
D_INTR	12	0.0321	0.9929	280.781	0
D_CINR	12	0.0183	0.971	67.0094	0

The above table shows the error correction model

Cointegrating Equations in VECM

The cointegrating equation illustrates the long-term equilibrium relationship between the variables. Additionally, the chi-square statistic is 125.4675, and the p-value is 0.0000. The cointegrating equation is statistically significant because the p-value is less than 0.05, indicating a strong long-term relationship among the variables.

Table 8: Cointegrating Equations in VECM

Equation	Parameters (Parms)	Chi² (Wald Statistic)	P-value (P>Chi²)
Cointegrating Equation	3	125.4675	0.0000

The above table shows the cointegrating equations

Stability Test

Figure 2 illustrates the companion matrix plot. The VECM model is stable, with all roots within or on the unit circle and no eigenvalues outside the circle. This indicates no divergence over time. This stability allows for confident impulse response functions, variance decomposition, and forecasting, ensuring well-behaved relationships among variables for accurate forecasting.

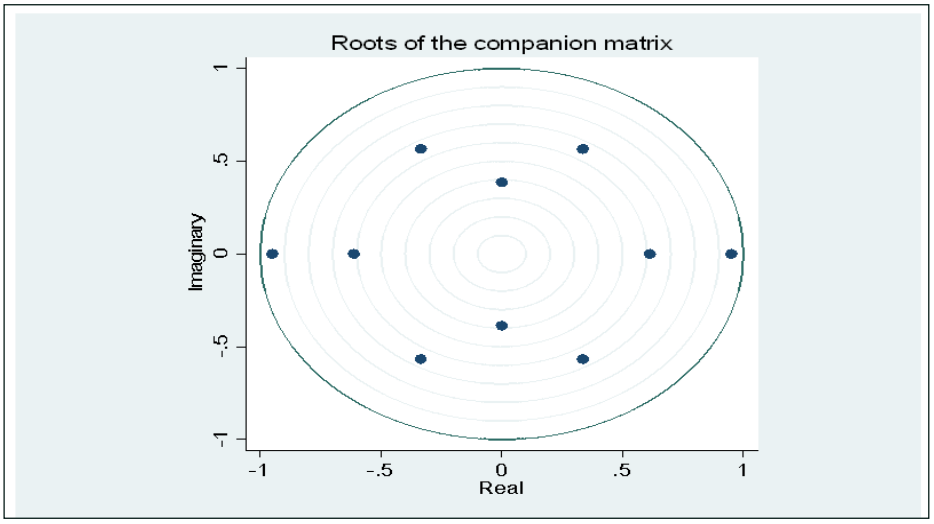

Figure 2

Impulse Response Function (IRF) Plot

Figure 3 portrays the impulse response function (IRF) plot. Each panel depicts a distinct relationship between an impulse variable (the shock source) and a response variable (the affected variable). A change in CINR affects DSR. The response begins somewhat negatively, then becomes positive, and finally stabilises. This implies that CINR initially decreases DSR. However, the effect fades with time. Also, A shock to the INFR has an immediate negative impact on DSR, followed by volatility, but eventually, it stabilises. This indicates that inflation reduces DSR first but then neutralises it. Similarly, a shock to the INTR results in a severe negative response at first, followed by an increase. The impact dissipates after roughly 6 steps. Higher interest rates initially reduce DSR, but the effect fades with time.

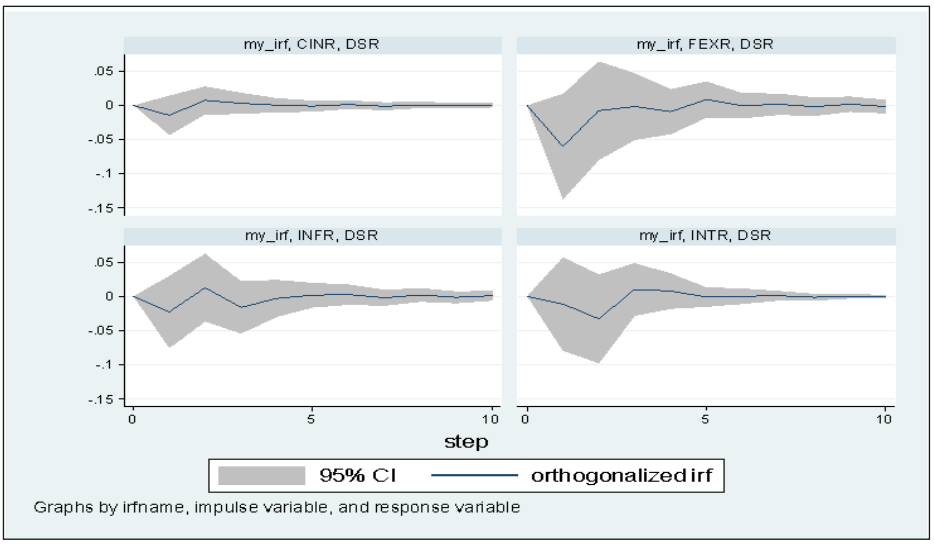

Figure 3

Granger Causality

Granger causality tests assess if historical data series on one variable aid in the prediction of another. Accordingly, the null hypothesis states that the dependent variable is not Granger-caused by the independent variables. Otherwise, the alternative hypothesis states that the dependent variable is Granger-caused by the independent variables. Granger causality is shown by a low p-value (usually less than 0.05), which results in the rejection of the null hypothesis.

Foreign Exchange Rate and Its Influence on Debt Servicing.

The relationship between DSR and FEXR, as shown in Table 9, reveals the chi-statistic to be 14.3220 with a p-value of 0.0010. Since the p-value is less than 0.05, the study rejects the null hypothesis. This implies that FEXR does Granger-cause DSR. Foreign Exchange Rates significantly influence debt servicing in Nigeria. In this regard, FEXR has considerable influence on DSR. The Chi-square of 0.874 and the p-value of 0.646 indicate that DSR does not Granger-cause FEXR. This implies that, under conditions of corruption, the foreign exchange rate has a major impact on debt servicing, whilst the reverse is not true. While this disagrees with the null hypothesis, this conclusion also agrees with the findings of Adler and Garcia-Macia (2022) [15,22,55].

Inflation Rate and Its Influence on Debt Servicing

The relationship between DSR and INFR is denoted by a Chi-square of 5.5911 and a p-value of 0.0610. While this is insignificant, it implies that INFR does not Granger-cause DSR. The Inflation Rate has no significant influence on DSR. Conversely, the Chi-square of 9.506 and p-value of 0.009 indicate that DSR Granger causes INFR. This implies that under conditions of corruption, while the inflation rate has little influence on debt servicing, DSR does influence inflation. While this agrees with the null hypothesis, this conclusion, however, disagrees with the findings [15,22,55,56].

Interest Rate and Its Influence on Debt Servicing

The link between DSR and INTR is represented by a Chi-square of 6.8942 and a p-value of 0.0320. While this is substantial, it suggests that INTR influences DSR. The inflation rate has a major influence on DSR. Conversely, the Chi-square of 17.987 with a p-value of 0.000 indicates that DSR Granger causes INTR. This implies that, under conditions of corruption, interest rates and debt servicing have a bilateral causal relationship. While this is not consistent with the null hypothesis, it does not contradict the conclusions of Ahmed et al. (2023) [56].

Equation	Excluded	chi2	df	Prob > chi2
DSR	FEXR	14.322	2	0.001
DSR	INFR	5.5911	2	0.061
DSR	INTR	6.8942	2	0.032
DSR	CINR	14.726	2	0.001
DSR	ALL	36.082	8	0.0000
FEXR	DSR	0.874	2	0.646
FEXR	INFR	2.1127	2	0.348
FEXR	INTR	1.5477	2	0.461
FEXR	CINR	0.7179	2	0.698
FEXR	ALL	8.5208	8	0.384
INFR	DSR	9.506	2	0.009
INFR	FEXR	12.791	2	0.002
INFR	INTR	19.674	2	0.0000
INFR	CINR	15.653	2	0.0000
INFR	ALL	52.073	8	0.0000
INTR	DSR	17.987	2	0.0000
INTR	FEXR	10.763	2	0.005
INTR	INFR	7.9364	2	0.019
INTR	CINR	11.13	2	0.004
INTR	ALL	32.356	8	0.0000
CINR	DSR	0.72503	2	0.696

CINR	FEXR	1.9619	2	0.375
CINR	INFR	1.8638	2	0.394
CINR	INTR	26.155	2	0.0000
CINR	ALL	50.599	8	0.0000

The table above shows the Granger Causality.

Discussion of Findings

The Granger causality test provides useful insights into the relationships between key economic variables in Nigeria. The foreign exchange rate Granger-causes the debt service ratio, implying that fluctuations in the foreign exchange rate have a significant impact on debt repayments in Nigeria. However, the debt service ratio does not Granger-cause foreign exchange rates, implying that changes in the debt service ratio have no impact on the exchange rate.

Similarly, the relationship between the inflation rate and the debt service ratio produces conflicting results. While the inflation rate does not significantly influence the debt service ratio, it does influence inflation. This suggests that debt servicing, particularly government debt repayments, has a significant influence on inflation, whereas inflation has only a minor effect on the country's debt servicing capability. In the same vein, a strong bidirectional causal relationship exists between interest rates and debt service ratios. This indicates a reciprocal relationship in which interest rates influence debt repayments and vice versa. In general, the findings show that foreign exchange rates and interest rates have the most significant influence on Nigeria's debt servicing, while inflation has a less direct influence.

Conclusion and Recommendations

The determinant of debt service in Nigeria was examined in this study. The body of research on these factors was assessed. From 2008 to 2024, CBN annual reports were used to collect statistics on the debt service ratio, inflation rate, interest rate, foreign exchange rate, and corruption perception index. Time series analysis was used to investigate this data. The analysis shows that foreign exchange rates have a big impact on debt servicing. This demonstrates the extent to which fluctuations in the foreign currency rate can affect Nigeria's debt servicing. Additionally, interest rates and debt servicing have a complementary causal relationship. This emphasises how crucial interest rate policies are in deciding how the government will manage its debt. Inflation rates have little effect on debt servicing. This suggests that inflation has a more indirect and secondary effect on debt servicing.

In light of this, the following suggestions were put forth: First, sound monetary policy should be the government's top priority to maintain exchange rate stability. This will maintain fiscal stability by lowering the chance that currency fluctuations may have on debt payments. Second, the Central Bank of Nigeria (CBN) should attempt to strike a balance between maintaining low interest rates to stimulate the economy and ensuring that debt service requirements are reasonable, as interest rates have a substantial impact on debt servicing [57-63].

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