
Effect of External Debt on External Reserves in Nigeria

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Abstract

It is widely held that developing nations are constrained by insufficient funds to build basic infrastructure that would set the pace for capital formation and sustainable growth. Faced with shortfalls in revenue and the need to increase investment in public works, developing countries engage in deficit spending to bridge the gap in funding public expenditure. One source of deficit spending is external debts. This study investigates the effect of external debt on external reserves in Nigeria from the first quarter of 2009 to the fourth quarter of 2022. An ex post facto research design was adopted for the study. Quarterly time series data for external reserves, multilateral debt, and bilateral debt were collected from the Central Bank of Nigeria statistical bulletin and Debt Management Office reports. Philip Perron test was used to test the stationarity of the data and the Johansen cointegration test was utilized to determine the presence of a long-run relationship. Dynamic Ordinary Least Squares technique was used to test the effect of external debt on external reserves in Nigeria. The findings showed that multilateral debt has a significant effect on external reserves in Nigeria. However, bilateral debt has an insignificant effect on external reserves in Nigeria. The study recommends that the Nigerian government should strengthen its capacity in debt negotiation and contracting. This involves conducting comprehensive assessments of loan terms, interest rates, grace periods, and repayment schedules before accepting multilateral debt. Furthermore, the Ministry of Finance through the Debt Management Office should continue to improve its debt monitoring and evaluation mechanisms for bilateral loans. This involves establishing transparent processes to track the utilization and impact of borrowed funds.

Keywords: Bilateral Debt, External Debts, External Reserves, Multilateral Debt.

Introduction

Policymakers, researchers, and academics are familiar with the necessity for public debts and the difficulties that developing countries have in financing them. It is often believed that developing countries are restricted by a lack of resources to establish the fundamental infrastructure necessary to drive capital formation and sustained growth (Saheed et al., 2015; Rahaj, 2018). This suggests that most government revenue in developing countries—tax revenue, crude oil proceeds, and proceeds from other natural endowments—is insufficient to promote sustainable

growth. Developing nations engage in deficit spending to fill the funding gap for public expenditures due to tax shortfalls and the need to boost investment in public works (Peter & Dumani, 2020). This deficit spending is financed through domestic and external financial markets.

External debt refers to debts that are obtained externally from other countries or financial institutions. A country's external debt is the amount owed to other nations or international organizations (Ajibola et al., 2015). It is a tool used by nations to fill budget gaps and carry out economic initiatives that can raise citizens' standards of living and encourage sustainable growth and development. Economic growth should be accelerated by external borrowing, especially when domestic finance is insufficient (Hameed et al., 2018). In the Nigerian economy, external debt is a significant source of revenue and a means of financing capital accumulation (Adepoju et al., 2017).

Nigeria, like many other developing countries, relies on borrowing from outside to finance a variety of programs and initiatives aimed at promoting economic development. However, the increase in external debt also raises concerns about how it can impact the country's foreign reserves, a crucial indicator of the strength and stability of the economy. It is difficult to predict how external debts and reserves will interact. The issuing of debt denominated in foreign currencies may increase external reserves; nevertheless, the repayment of public external debt may not only create a decline in the level of reserves but also temporarily impair liquidity management. To understand how changes in external debt levels (especially, the multilateral and bilateral debts) may affect the country's capacity to maintain a sufficient level of external reserves, this study explored the relationship between external debts and external reserves in Nigeria.

Most of the previous studies carried out like Saheed et al. (2015); Peter and Dumani (2020); and Jibrin and Aliyu (2020) conducted on external reserves were carried out on reserve accumulation and utilization, the demand for international reserves, the impact of reserve holding, implications for investment, inflation, and so on, without assessing the plausible interplay between external debt and external reserve in Nigeria. While some other studies carried out in Nigeria like Asogwa et al. (2018); Ndubuisi (2017); Nwanne and Eze (2015); Anidiobu and Okolie (2016) have made considerable efforts in the extant literature on studies that focused on external debt and external reserve using mostly Ordinary Least Squares regression after running cointegration. The estimation of long-run estimates in a co-integrated panel with the OLS will yield inconsistent and inefficient parameters. This is because of the problem of serial correlation and endogeneity usually associated with time series data. This study, therefore, seeks to close the knowledge gap by examining the effect of external debt on external reserves in Nigeria using cointegration and the Dynamic Ordinary Least Squares regression approach. This approach helps to eliminate the issue of serial correlation and endogeneity which is prevalent in time series data while looking at both the long run and short run effect. Thus, the following specific objectives were considered:

- i. To examine the effect of multilateral debt on external reserves in Nigeria.
- ii. To investigate the effect of bilateral debt on external reserves in Nigeria.

This study hypothesized that:

H₀₁: Multilateral debt has no significant effect on external reserves in Nigeria.

H₀₂: Bilateral debt has no significant effect on external reserves in Nigeria.

Literature Reviews

External Debt

According to Arnone et al. (2015), the portion of a country's debt that was borrowed from foreign lenders, such as commercial banks, governments, or international financial institutions, is known as its external debt. When domestic financial resources are insufficient to support public goods that improve welfare and spur economic growth, external debt becomes unavoidable (Krajewski & Mackiewicz, 2018). To finance the specific project(s) in the borrowing country that will lead to developments and growth, external debts are monies obtained from outside the country's border that are often in foreign currency and are interest-bearing.

Ogbeifin (2017) asserts that the discrepancy between domestic savings and investment is the cause of external debt. Debt builds up as the deficit increases, forcing the nation to borrow money at ever-increasing rates to survive. The debt owed by the public and private sectors of the Nigerian economy to non-residents and nationals that is repayable in foreign money, goods, and services was further defined by him as the country's external debt.

Foreign commercial banks, international financial organizations like the IMF, World Bank, and ADB, as well as the governments of foreign countries, can provide external debt (Ariyo & Raheem, 2011). Typically, these debts take the form of tied loans, which are obligations to be utilized for predetermined purposes agreed upon by the borrower and the lender. Both firms and governments are eligible to borrow money abroad. These take the shape of commercial borrowings from outside sources. The interest rate on international loans is correlated to LIBOR (London Interbank Offer Rate), and the real rate will rely on the borrower's credit rating and be LIBOR plus the applicable margin (Fosu, 2017). Although this study concentrated on multilateral debt and bilateral debt because they are the forms of external debt that the Nigerian government uses most frequently, external debts can also take the form of commercial debt.

Multilateral Debts

The debt owed by developing nations to the World Bank and International Monetary Fund (IMF), collectively referred to as the Bretton Woods Institutions (BWIs), is referred to as multilateral debt (International Monetary Fund, 2018). These organizations have during the past ten years grown to be the largest debtors to the developing countries. Multilateral loans from the World Bank, regional development banks, and other multilateral and intergovernmental organizations are among those that are public and publicly guaranteed. Loans from funds managed by a global organization on behalf of a single donor country are not included; they are

categorized as loans from governments (World Bank, 2020). The total of principal and interest payments made in the designated year constitutes debt service payments.

Multilateral debt is the portion of a nation's external debt load that is owed to International Financial Institutions (IFIs) like the World Bank and the International Monetary Fund (IMF). Due to the IFIs' standing as "preferred creditors," as suppliers of core development and balance-of-payment loans, multilateral debt looms larger than other obligations for most of the world's poorest countries (Draz & Ahmad, 2015). Due to their status, payments must be made to them before private and bilateral (government-to-government) debt. Additionally, these organizations assert that their bylaws forbid them from forgiving debts or providing debt relief, as frequently done by governmental and commercial creditors. Governments have a special incentive to pay off their multilateral debts because IFIs determine a country's creditworthiness. Poor countries typically cannot access credit or capital from other sources until the IMF gives its approval, which typically necessitates adhering to the economic policies it recommends.

As of 2022, Nigeria owes a total of N9.6338 trillion on multilateral loans. Nigeria's multilateral debt service (TDS, current US dollars) value was \$274,294,000 in 2018; by 2021, it had increased to \$512,625,367 (DMO, 2022). The payment of principal and interest to the World Bank, regional development banks, and other multilateral organizations is referred to as multilateral debt service (World Bank, 2020). Public and publicly guaranteed debt service is the total principal payments and interest on long-term liabilities of public debtors and long-term private debts that are guaranteed by a public institution, paid in money, products, or services.

Bilateral Debts

Loans from governments and their institutions, such as central banks, autonomous organizations, and official export credit agencies are all examples of bilateral debt (World Bank, 2020). A bilateral loan is given to a borrower by just one lender by the conditions of a facility agreement. A straightforward lending arrangement known as "bilateral debt" involves just one lender and one borrower. These loans are referred to as "bilateral" loans because there are only two parties involved, each of whom has a financial obligation to the other: One will make a financial contribution according to the terms of the loan agreement, and the other will make repayments by the same document (Merritt, 2017).

A bilateral loan is one given by one lender to another. Bilateral facility agreements govern the provision of bilateral loans, which are typically easier to obtain than syndicated loans. A bilateral loan is distinguished by the fact that it comes from a single source. A bilateral facility, however, may contain more than one borrower, and in some situations, a borrower may have two or more bilateral loan agreements with various lenders (James, 2019). There are only two parties involved in a bilateral loan, which is a type of credit arranged between a borrower and a single lender. The lending company's credit terms are typically simpler for lenders to administer and have lower administrative complexity (Kuhl, 2023). Typically, borrowers can plan on regular interest rate repayments occurring over a predetermined time. Because of their straightforward nature, bilateral loans, which are typically classic bank loans, are frequently employed by smaller enterprises.

External Reserves

According to Asogwa et al. (2018), foreign reserves are funds or other assets that a central bank or other monetary authority holds to cover its obligations. The Central Bank of Nigeria (2021) defines external reserves as assets kept in foreign currencies on reserve by a monetary authority. According to Nzotta (2014), a nation's external reserves are the cumulative sum of its foreign exchange surpluses. Official international reserves, or external reserves, are the assets of central banks denominated in several foreign currencies, including the US dollar, the British pound sterling, the euro, and the Japanese yen (Chinedu & Edet, 2019). Government reserves kept in foreign institutions under the jurisdiction of the monetary authorities (IMF, World Bank) are referred to as external reserves. These reserves are used for the direct financing of balance of payments and balance of payments regulation through exchange market intervention (Osadume & Okene, 2019). Foreign cash, foreign deposits, and bonds held by a country's central bank and monetary authorities are all considered external reserves, according to Umeora (2013). According to Adhikari (2018), external reserves are the assets held by a nation's monetary authorities outside of its borders. These assets include foreign currency banknotes, foreign bonds, treasury bills, and other securities issued by the government. Although there are numerous uses for these assets, their primary aim is to guarantee that a government or its agency has reserves in case the value of its national currency declines quickly (CBN, 2021). This study adopts the definition of Adhikari (2018) as it considered not only foreign banknotes but also foreign securities and investments.

Many transactions between other countries are carried out using these currencies because most currencies are dependent on the strength of stronger currencies like the American Dollar, British Pound Sterling, and European Euro. Reserves are still maintained by nations as a crucial tool for monetary policy that can help them protect themselves from severe financial catastrophes. In the event of an internal liquidity crisis, a higher stock of external reserves acts as a buffer. As a result, reserves become a major source of funding for external imbalances (Senibi et al., 2016). When a nation's internal resources cannot be used to pay payments, a reserve may be used to ease the situation. Chinedu and Edet (2019) stated that external reserves are managed to optimize a nation's external resources to meet the economic needs of a country.

Most countries use currencies that have been authorized by monetary authorities for local transactions. But in the global arena, it is important to choose your currency carefully to protect it and satisfy the needs of your trading partners. According to Yugudo (2011), as currency risk usually accounts for a sizable portion of the overall market risk on reserve holdings, selecting the right currency composition for reserves is a crucial choice. Thus, the following factors determine the currency composition: currency used for debt payments; currency used for involvement in the nation's foreign exchange market; and currency utilized for dividend payments abroad by foreign corporations with permanent operations. As a result, the United States dollar is the dominant currency in Nigeria's external reserves followed by the euro and the Great Britain pound sterling.

Empirical review

Multilateral Debt and External Reserves

Osadume and Ovuokeroye (2021) used profligacy theory to investigate the effects of external debt (EXDT), external reserves (EXRS), total debt servicing expenses (TDS), and Nigeria's economic growth (RGDP) on the country's transport economy. The International Debt Office of the World Bank Group provided secondary data for Nigeria from 1979 to 2019 for the study. OLS, Granger causality, and Engle-Granger cointegration were utilized as econometric methods with a 0.05 level of confidence. The findings indicate that EXDT and EXRS have a statistically significant negative association, but RGDP and TDS do not have a statistically significant link in the short run. The association between EXRS and EXDT is adversely significant in the short run whereas the other factors are inconsequential, according to the analysis of the long-term cointegration of all the variables. The study makes several recommendations, including that the government and monetary authorities work to reduce the issuance of foreign debt for non-productive projects in important sectors due to its negative impact on external reserves and instead pursue aid, grants, and domestic long-term loan options necessary for efficient growth of the transportation sector and other important sectors of the economy. After doing cointegration, using ordinary least squares regression will result in inconsistent and ineffective estimate parameters. This is due to the issue with serial correlation and endogeneity that time series data typically have. Therefore, the Dynamic Ordinary Least Squares regression method was adopted in this investigation. The problem of serial correlation and endogeneity is lessened by this method.

In Nigeria from 1981 to 2018, Aderemi et al. (2020) looked at the connection between external debt and currency rate changes. To achieve the study's goal, the Autoregressive Distribution Lag Model was used. The main conclusions of this study are as follows: short-term currency rate swings in Nigeria are significantly influenced favourably by external debt, debt service payments, and foreign reserves. Additionally, based on these findings, policymakers are advised to minimize, if not completely discourage, the use of external debt in Nigeria to finance budget deficits because it puts pressure on the foreign exchange market in the short term and causes fluctuations in exchange rates that result in the depreciation of the naira. Additionally, a vigorous export promotion strategy should be implemented in Nigeria to boost the nation's foreign exchange reserves. The study used data from the Central Bank of Nigeria Statistical Bulletin, which publishes data on a quarterly and annual basis. As a result, by the time the report was published in 2020, annual data for 2019 were already accessible, but the analysis only covered 2018.

External Reserves (EXTRS), External Debts (EXTDT), and Economic Development: Lessons from Nigeria, 1980 to 2018 were examined by Osadume and Okene (2019). This study's goal was to determine how EXTRS and EXTDT impacted Nigeria's economic growth from 1980 to 2018. The external reserves theory of elasticity model, on which this study was based, contends that the flow of a nation's foreign resources is affected by the appreciation or depreciation of its currency. The study employed secondary data from the CBN and the World Bank and covered the 38 years from 1980 to 2018 with Nigeria as its sample. The economic development proxy measured by the Human Development Index (HDI) was used as the dependent variable. The

effect of the independent variables (EXTRS and EXTDT) on this variable was tested at the 5% level of significance using econometric techniques like unit root tests, OLS, FMOLS, Johansen cointegration, and Granger-causality. The results showed that, although EXTDT had a positive but minor effect on HDI in both periods, EXTRS had a negative and significant effect on HDI in the short run and a positive and significant effect in the long run. The study finds that while EXTRS have a significant impact on economic development, EXTDT has a negligible impact. It advises that monetary and fiscal authorities invest some EXTRS in infrastructure development to spur economic growth while paying adequate attention to factors that favourably affect EXTRS levels and putting in place a suitable action plan to increase them, such as the development of agricultural exports and local petroleum production. Both Ordinary Least Squares (OLS) and Fully Modified Ordinary Least Squares (FMOLS), which serve the same objective of determining cause-and-effect linkages among variables, are used, which demonstrates a repetition of analysis. However, the study used time series data it would have been appropriate to use FMOLS since it will take care of the issue of serial correlation and endogeneity associated with time series data.

Ndubuisi (2017) examined how Nigeria's external debt affected the country's economic expansion. The study's data are gathered from secondary sources. Gross domestic product, foreign debt services, external debt stock, external reserve, and exchange rate are among the factors for which data are gathered. The study's scope spans the years 1985 through 2015. The ordinary least squares regression, ADF unit root test, Johansen cointegration, and error correction test are used to analyze the data. Results show that whereas external debt stock has a positive and large impact on Nigeria's growth index, debt service payment has a negative and small impact on the country's economic growth. External reserve and exchange rates, which serve as controls, have a favourable and considerable impact on growth. All variables are not stationary at levels but rather at the first difference, according to the ADF unit root test. The long-term correlation between the growth index and external debt is demonstrated by Johansen's cointegration test (GDP). Additionally, was demonstrated that the variables' correlation is driven by at least one shared stochastic trend. The causality test reveals a one-way relationship between GDP and external debt. According to the study's results, the government should use external loans for infrastructure development, pass legislation to improve the business climate, implement effective debt management plans, and stop using external loans for the advancement of human capital. After doing cointegration, using ordinary least squares regression will result in inconsistent and ineffective estimate parameters. This is because of the problem of serial correlation and endogeneity usually associated with time series data. This study, therefore, used the Dynamic Ordinary Least Squares regression approach. This approach helps to eliminate the issue of serial correlation and endogeneity.

The impact of foreign reserves and external debt on the USD/Naira exchange rate was studied by Onwuka and Igweze (2014). According to the study models, the USD/Naira exchange rate is significantly influenced by both foreign debt and external reserves. The exchange rate between the US dollar and the naira, as well as external reserves and foreign debt, are directly correlated. To decrease the demand for the US dollar's exchange rate, it was advised that contributions to foreign reserves be distributed among other major international currencies. To lessen the demand

for foreign currency, foreign borrowing should be cut as far as practicable. By borrowing from other non-USD-dominant economies, the demand for foreign exchange may become more diverse. The focus of the recent study was on the relationship between external debt and external reserves.

Bilateral Debt and External Reserves

The effect of Nigeria's external debt and external debt servicing on the country's foreign reserves was studied by Peter and Dumani (2020). The dual gap theory and the self-insurance idea of external reserves served as the study's theoretical pillars. The study's components will be evaluated using the after-effect research design. The World Development Indicators were used to compile historical data from 1981 to 2018, which was then analyzed using the error correction mechanism as the unit of analysis and approximated using the least square method. The empirical results show that Nigeria's foreign exchange reserve portfolios are negatively and statistically significantly impacted by the stock of external debt. It also came to light that Nigeria's foreign reserves are positively impacted by payments made to repay its external debt, but this effect is statistically small. According to the study's findings, Nigeria's international reserve portfolios are not significantly impacted by the country's external debt stock or external debt service payments. According to the report, Nigeria's fiscal management should use caution while borrowing from abroad to prevent the country's foreign reserves from being depleted by concurrent payments for external debt service. It would have been more appropriate to source the data from the CBN statistical bulletin rather than the World Development Indicators, which only had data up to 2018 in 2020, given that the study's focus was Nigeria and that data on external debt stock, external debt service, and foreign exchange reserve were available up to 2019 in the CBN statistical bulletin as of 2020.

The effect of Nigeria's public foreign debt on the country's exchange rate was investigated by Aigbedion et al. (2020). The primary source of the secondary data used in this study, which was issued in December 2018 by the Central Bank of Nigeria (CBN), is the Statistical Bulletin. The influence and link between the economic factors were examined using the analysis techniques of Ordinary Least Squares (OLS) and Error Correction Model (ECM). Both the long-run and short-run outcomes supported the idea that Nigeria's public foreign debt affected the country's exchange rate. All independent variables, except the Foreign Reserve in Nigeria (FRN) at a 5% significance level, were statistically significant in explaining fluctuation in the Exchange Rate in Nigeria based on the short-run probability value. While over the long term, at the 5% level of significance, the External Debt in Nigeria (EXDTN), Debt Service Payment in Nigeria (DSPN), and Foreign Reserve in Nigeria (FRN) were statistically significant in explaining the fluctuation in Exchange Rate in Nigeria (EXCHR). To decrease Nigeria's budget deficit and exchange rate, the report advises that the government strengthen the systems in place to monitor and regulate the distribution and use of public funds. The study sourced data from the Central Bank of Nigeria Statistical Bulletin, wherein data are released quarterly and annually, therefore when the study was published in 2020 the annual data for 2019 was available, but the study only covered 2018 even when data for 2019 was accessible.

Asogwa et al. (2018) assessed how Nigeria's economic growth was impacted by the Federal Government's external debt and external reserve. The research took place from 2007 to 2016. Economic growth was based on gross domestic product. Ex post facto was used as a research design in this study. Ordinary least squares and the unit root test were the analytical tools employed. According to the analysis, external debt service payments had a negative and nonsignificant impact on real gross domestic product during the sampled period, while the stock of external debt had a negative and significant impact during the study period. Therefore, the study advised against contracting external debts for social or political grounds, but only for economic ones. This is done to prevent the stock of foreign debt from rising over time and to keep the purpose of external debt from being obscured. To prevent a debt overhang, the authorities in charge of managing Nigeria's external debt should properly monitor the debt payment obligations and prevent the debt from rising above a certain threshold. The study used Ordinary Least Squares, which will produce inconsistent and ineffective parameters in the estimate, like previous empirical literature mentioned above. This is due to the issue with serial correlation and endogeneity that time series data typically have.

Nwanne and Eze (2015) investigated the connection between Nigeria's 1981–2013 currency rate changes and the service and payment of external governmental debt. Exchange rates, external public debt servicing, and external public debt receipts were the variables considered in the study. The monetary model of exchange rate determination and the monetary approach to global capital movements were the theoretical frameworks used in the study. Based on secondary data sourced from Central Bank of Nigeria (CBN) and Debt Management Office (DMO) statistical publications for the period under consideration, the strategies for achieving stated objectives were specified to include the use of Ordinary Least Square (OLS) multiple regression and cointegration test, which would have helped in determining the short-run and long-run relationships, respectively, between the specified variables. The study's conclusions demonstrated that there are both short- and long-term correlations between the servicing of external debt and changes in the value of the naira. According to the study's findings, foreign public debt servicing hurts the exchange rate whereas external public debt receipts have a positive impact. The policy implication of this study is that to improve the value and exchange rate of the naira, the Nigerian government should develop more effective external debt management strategies that will guarantee that foreign loan receipts are secured net of the effects of the servicing obligations. The study advised the Nigerian government to always seek self-liquidating, production/project-based loans from abroad to finance projects, impose and enforce an embargo on certain classes of foreign loans as well as the frequency of contracting loans, contract foreign loans with concessionary low-interest rates and lengthy maturity periods, and promptly and consistently service foreign loans to avoid the burdensome effect of accumulated compound interest. Because Ordinary Least Squares were used in the investigation, the parameters of the estimate will be inconsistent. This is because time series data often suffers from serial correlation and endogeneity problems.

Using quarterly data, Odera (2015) examined the impact of foreign public debt on Real Effective Exchange Rate (REER) volatility for the years 1993 to 2013 under the entire float regime. British Sterling Pounds and US Dollars were used to create the REER index. The second-order moving

average's standard deviation was used to calculate the REER volatility. Using the Ordinary Least Squares method, a linear model was created and exchange rate volatility was regressed against inflation, interest rates, GDP growth rate, money supply to GDP ratio, and external debt to GDP ratio. The findings revealed that whereas interest rates had a positive and significant impact on REER volatility, the external debt to GDP ratio had a negative and insignificant impact. Money supply to GDP ratio, GDP growth rate, and inflation were found to have no appreciable impact. There is evidence that Kenya's enormous and unsustainable foreign public debt causes substantial REER volatility. The goal of monetary authorities should be to prevent the excessive buildup of external public debt by ensuring that metrics of debt sustainability, such as the external debt to GDP ratio, are at low levels. The Central Bank of Nigeria Statistical Bulletin was used for the study's quarterly data. As a result, by the time the report was published in 2015, quarterly data for the whole of 2014 and maybe the first quarter of 2015 were already accessible, but the analysis only covered 2013.

Theoretical Framework

The theoretical underpinning of this study is the dual gap theory of debt and the self-insurance theory of external reserves.

Chenery introduced the twin gap theory of debt in 1966. One characteristic shared by developing countries is the inability to build up a collective savings pool large enough to invest in infrastructure and public works projects that would promote capital creation and boost national productivity. They are confounded by the best way to raise money for public spending because they are unable to increase aggregate investment due to low aggregate savings brought on by fiscal irresponsibility. Due to this, there is a clear divide between savings and investment that must be filled. In other words, the deficit must be covered to raise public capital. Due to these factors, Chenery's twin gap hypothesis of 1966 contends that a gap is created when domestic savings are insufficient and that the requirement to raise total public spending through investments necessitates borrowing from abroad (Chenery & Strout, 1966; Rahaj, 2018).

Barnichon introduced the self-insurance notion of external reserves (2008). Self-insurance means saving money to lessen potential unfavourable circumstances. It simply implies keeping a buffer stock on hand to react to outside shocks. This means that according to the self-insurance theory of external reserves, countries should build up foreign reserves in the form of hard foreign currency, bank deposits, and nearby money instruments with foreign denominations, such as treasury bills and certificates, gold holdings, and special drawing rights. According to the argument, doing so would help the nation lessen the impact of outside shocks and act as a reserve to interfere in the nation's foreign currency rate (Akamobi & Ugwunna, 2017). Thus, the theory holds that reserve accumulation help ensure that the price of foreign to that local currency at other time is stable.

Methodology

The research design adopted for this study is ex post facto design. This study uses quarterly time series data covering the period 2009Q1 to 2022Q4. The variables of the study are multilateral debt, bilateral debt and external reserves. Data for the study was obtained from the Central Bank

of Nigeria Statistical Bulletin 2022 and Debt Management reports. Descriptive statistics were used to explain the data. A stationarity test was conducted to test for the presence of unit roots in the time series data. In addition, the co-integration test was conducted to investigate possible correlations among the variables of this study. A vector error correction model was also used: The vector error correction model is a restricted type of VAR designed for the use of non-stationary series that are known to be co-integrated. The data obtained was also analyzed using dynamic ordinary least squares through the Eviews 10 Statistical Package. The analysis process of this study follows the following steps:

The Phillips-Perron (PP) unit root test was employed to determine the order of integration of the variables in an attempt to establish the stationarity level of the variables. The PP unit root test is conventionally said to have greater unit root detection ability when compared with the ADF unit root test. The PP test is thus preferred to the Augmented Dickey-Fuller (ADF) because it deals with the potential correlated error by employing a correction factor that estimates the long-run variance of the error process.

$$\Delta y_{t-1} = \alpha_0 + \lambda y_{t-1} + \dots + \lambda y_{t-p} + \varepsilon_t$$

Cointegration

Johansen (1990) developed two likelihood ratio tests: The Trace Test and the Maximum Eigenvalue Test. The two procedures test for the presence of cointegrating vectors between multilateral debt, bilateral debt and external reserves.

$$\Delta Y_t = \mu + \sum_{i=1}^{n-1} \Gamma_i \Delta Y_{t-i} + \sum_{i=0}^{m-1} \gamma_i \Delta X_{t-i} - ECM_{t-1} + \varepsilon_t$$

where Δ is the first difference operator, Y_t is a $p \times 1$ vector of stochastic variables, X_t is the independent variable, ECM is the error-correction coefficient and is also called the adjustment coefficient, 1 is a vector of constants, and ε_t is a vector of normally, independently, and identically distributed errors with zero means and constant variances and p is the number of variables.

Error Correction Model

Granger (1987) showed that if two variables are cointegrated, then they have an error correction representation. The Error Correction Model (ECM) provides information about the long-run, and short-run relationship as well as the speed of adjustment between the variables in incorporating into the estimated equation, the error correction term (ECT).

$$\Delta Y_t = a_0 + b_1 \Delta X_t - \lambda \hat{u}_{t-1} + Y_t$$

The model is specified as follows:

$$EXR = f(MLD, BLD) \dots \dots \dots (1)$$

The econometric form of equation (1) is represented as:

$$EXR_t = \alpha + \beta_1 MLD_t + \beta_2 BLD_t + \mu_t \dots \dots \dots (2)$$

Where: EXR = External Reserves; MLD = Multilateral Debt; BLD = Bilateral Debt; α = Intercept or Constant; β = Slope of the regression line concerning the independent variables; μ = Error Term. The Cointegration model of the study is represented by:

$$\Delta EXR_t = \mu + \sum_{i=1}^{n-1} \Gamma_i \Delta EXR_{t-i} + \sum_{i=0}^{m-1} \gamma_1 \Delta MLD_{t-i} + \gamma_2 \Delta BLD_{t-i} + ECM_{t-1} + \varepsilon_t \dots \dots \dots (3)$$

Where: EXR = External Reserves; MLD = Multilateral Debt; BLD = Bilateral Debt; and ECM = Error-correction coefficient; ε = Error term; Δ = First difference operator; μ = Intercept or Constant; $t-i$ = Time lagged; $\gamma_1 - \gamma_2$ = Coefficient of independent variables.

Results and Discussion

The data were analyzed using descriptive statistics, unit root test, Johansen cointegration, error correction model, and Dynamic Ordinary Least Squares regression, while post-estimation analysis such as serial correlation test, heteroskedasticity test, and stability test was also carried out.

Table 1: Descriptive Statistics

	EXR	MLD	BLD
Mean	9285.334	2837.781	648.2139
Maximum	17056.73	9061.360	2272.890
Minimum	4935.924	469.1000	24.34000
Std. Dev.	4020.139	2558.753	669.1045
Observations	56	56	56

Source: *Eview Version 10 Output, 2023*

Table 1 reveals that external reserves have a mean value of N9,285 billion, while the deviation from the mean (standard deviation) was N4,020 billion. This means that external reserves data is normally distributed because the standard deviation value was lower than the mean value. The maximum external reserves within the period of this study were N17056.73. This implies that the highest external reserves are not more than N17,057 billion within the 56 quarters. The table shows the minimum value to be N4,936 billion.

Table 1 also shows that the multilateral debt had a mean value of N2,838 billion while the deviation from the mean was N2,559 billion. This indicates that the multilateral debt is normally distributed because the standard deviation value was lower than the mean value. The maximum value within the period under consideration was N9061.360, implying that the highest multilateral debt was not more than N9,061 billion. While the minimum value was N469 billion indicating the lowest multilateral debt.

Finally, the bilateral debt had a mean value of N648 billion while the deviation from the mean was N669 billion. This indicates that the bilateral debt was not normally distributed because the standard deviation value was greater than the mean value. The maximum value within the period under consideration was N2,272.890, implying that the highest bilateral debt was not more than N2,273 billion. While the minimum value was N24 billion indicating the lowest bilateral debt.

Table 2: Unit Root Test

Variables	Adj. T-Statistic	Prob. Values	Order of Integration
EXR	-5.817585	0.0001	I(1)
MLD	-5.618344	0.0001	I(1)
BLD	-13.10482	0.0000	I(1)

Source: Researcher's Computation 2023.

To examine the existence of stochastic non-stationarity in the series, the research establishes the order of integration of individual time series through the unit root tests. The test of the stationarity of the variables adopted was the Phillips-Perron (PP) test. The variables tested are EXR, MLD and BLD with results presented in Table 2 above.

From Table 2, it can be seen that EXR, MLD and BLD were found to be stationary at the first difference, that is, at order I(1). The PP test statistics are greater than their respective tabulated values and their p-values are all below the 0.05 significant level for this study. Since the variables were found stationary at first order I(1), the Johansen cointegration test approach was applied to determine the long-run relationship among the variables.

Table 3: Johansen Cointegration Analysis

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.438092	54.26407	29.79707	0.0000
At most 1 *	0.324801	23.13751	15.49471	0.0029
At most 2	0.035093	1.929087	3.841466	0.1649
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.438092	31.12656	21.13162	0.0014
At most 1 *	0.324801	21.20842	14.26460	0.0034
At most 2	0.035093	1.929087	3.841466	0.1649

Source: Researcher's Computation 2023.

The Trace test of Johansen cointegration shows that there is an indication of cointegration at a 0.05 significance level as shown in its Trace statistics of None and At most 1(54.26407 and 23.13751) are greater than their respective 0.05 critical values (29.79707 and 15.49471), while the p-values (0.0000 and 0.0029) are below the 0.05 level of significance for this study. Also, the maximum Eigenvalue test of Johansen cointegration shows that there is an indication of

cointegration at 0.05 significance level as shown in its Max-Eigen statistics of none and At most 1 (31.12656 and 21.20842) which are greater than their respective 0.05 critical values (21.13162 and 14.26460), while its p-values (0.0014 and 0.0034) are below the 0.05 level of significance for this study. Since there is cointegration in the two criteria of the Johansen cointegration test, it implies that there is a long-run relationship between external reserve, multilateral debt and bilateral debt. This suggests the use of the Vector Error Correction Model.

Table 4: Dynamic Ordinary Least Square Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MLD	7462.435	3050.319	2.446444	0.0185
BLD	-21578.14	12575.30	-1.715914	0.0932
C	-4403773.	1591098.	-2.767757	0.0082
R-squared	0.739362	Mean dependent var		1817367.
Adjusted R-squared	0.691973	S.D. dependent var		5126171.
S.E. of regression	2845032.	Sum squared resid		3.56E+14
Long-run variance	1.78E+13			

Source: Eview Version 10 Output, 2023

Multilateral debt has a significant effect on external reserves because the p-value is 0.0185 which is lower than the 5% significant level, indicating that an increase in multilateral debt will automatically increase external reserves to the extent of 7462. Therefore, the study rejects H_{01} , which states that multilateral debt has no significant effect on external reserves in Nigeria.

However, bilateral debt has an insignificant effect on external reserves because their p-value is 0.0932 which is greater than the 5% significant level, indicating that an increase in bilateral debt will not automatically decrease external reserves to the extent of 21578.14. Therefore, the study accepts H_{02} , which states that bilateral debt has no significant effect on external reserves in Nigeria.

The coefficient of determination (R^2) is 0.739362 implying that the external debts explain variation in external reserves to the extent of 74%, while the remaining variation was explained by other variables not captured in the model.

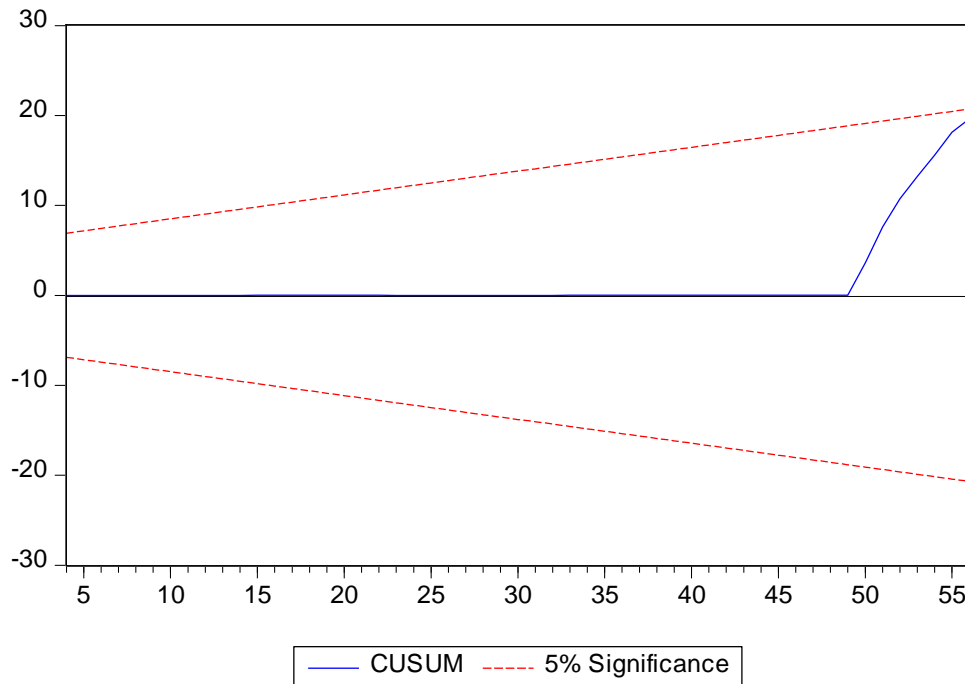
Table 5: Post-Estimation Test

Description	Probability values
Serial Correlation	
F-statistics	1.816780
P-value	0.1838
Heteroskasticity Test	
F-statistics	0.845207
P-value	0.3622

Source: Researcher's computation, 2023

Table 5 indicates that the Breusch-Godfrey Serial Correlation LM Test indicates that there is no autocorrelation. This is given by the F-statistic of 1.816780 and its corresponding P-value of 0.1838. The ARCH Test of Heteroskedasticity given the F-statistics 0.845207 and its corresponding P-value of 0.3622 indicates that there is no problem with heteroskedasticity.

Figure 1: CUSUM Stability Test



Source: *Eview Version 10 Output, 2022*

The stability of the model was checked using the CUSUM test and it shows that the model is stable as it is within the critical bound at a 5% significance level. Therefore, can be reliably deployed for policy purposes.

Conclusion and Recommendations

This study examined the effect of external debts on external reserves in Nigeria for the period 2009Q1 to 2022Q4. Based on the findings of the study, it can be concluded that there is an existence of equilibrium relationship between external debts and external reserves in Nigeria. This is in line with the dual gap theory of debt and the self-insurance theory of external reserves. The study concludes that multilateral debt has a significant effect on external reserves. This means that an increase in multilateral debt to fund the budget deficit in Nigeria influences a proportionate effect on external reserves. The study also found that bilateral debt has an insignificant effect on external reserves. This implies that an increase in bilateral debt will not deplete the external reserve in Nigeria.

Based on the findings of this study, the following recommendations were made:

The debt Management Office should prioritize implementing effective debt sustainability measures to ensure that external borrowing remains within manageable levels. This includes conducting regular debt sustainability assessments, establishing clear borrowing guidelines, and adopting a prudent debt-to-GDP ratio and debt-to-revenue ratio target. By carefully managing the size and terms of multilateral debt, Nigeria can minimize the impact on external reserves. Also, the Nigerian government needs to strengthen its capacity in debt negotiation and contracting. This involves conducting comprehensive assessments of loan terms, interest rates, grace periods, and repayment schedules before accepting multilateral debt. Negotiating favourable terms and conditions can reduce the burden on external reserves and provide more flexibility in managing debt repayment obligations.

Although bilateral debt has been found to have an insignificant effect on external reserves in Nigeria, it is still important to focus on strengthening debt management practices and promoting economic diversification. Therefore, it is recommended that the Ministry of Finance through the Debt Management Office should continue to improve its debt monitoring and evaluation mechanisms for bilateral loans. This involves establishing transparent processes to track the utilization and impact of borrowed funds. By effectively monitoring and evaluating bilateral debt projects, Nigeria can ensure that funds are used efficiently and in line with their intended purpose, reducing the risk it can have on external reserves.

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