



Analysis of the Impact of Foreign Reserve Accumulation on Economic Growth in Nigeria

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Abstract

This paper examined the impact of foreign reserve accumulation on economic growth in Nigeria. The data were sourced from the Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicators (2022). The data covers 1992-2022 and were analyzed using the Autoregressive Distributed Lag model. Findings from the study shows the existence of a long run cointegrating relationship among the variables of the study. Furthermore, result revealed that the explanatory variables, except foreign reserve accumulation, have significant short and long run impact on economic growth over the period of the study. Therefore, the paper concludes that foreign reserve accumulation has no significant impact on economic growth in Nigeria due to mismanagement of foreign reserve and neglect of non-oil sectors. The study recommends the need for government to implement policies that will promote foreign direct investment which will enhance increase investment in the Nigerian economy. This is predicated on the argument that significant foreign reserve accumulation will help restore investors' confidence in financial and real sectors which can translate into positive and significant impact on economic growth. Additionally, high reserve accumulation cannot translate into economic growth unless government encourages diversification for domestic investors to invest more on agricultural sector, infant industries and SMEs to boost aggregate outputs for export promotion.

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1. Introduction

Nigerian foreign reserve had exhibited a degree of volatility influenced by fluctuations in Global oil prices and external shocks. Nigerian foreign

reserve was estimated around \$5.3 billion us dollar in 1992 and rose to \$64 billion dollar in 2008, later on declined to \$36 billion dollar in 2022. A nation's ability to maintain economic

stability is believed to be greatly influenced by its foreign reserves, as it is a measure of a country's ability to meet its external obligations and maintain a stable exchange rate (Nzotta, 2019). Nigeria, as a resource dependent economy with a significant reliance on oil exports, has experienced fluctuations in foreign reserve levels over the years. The country's foreign reserves, while serving as a crucial indicator of its economic health, raise pertinent questions regarding their short run impact on economic growth. The dynamics of foreign reserve accumulation and its subsequent influence on broader economic landscape remain inadequately understood, prompting the need for in-depth investigation (Onoh, 2019).

Foreign reserves are often used to facilitate economic growth through the external balance. Intervening variables such as terms of trade, balance of trade and exchange rate cause changes in the foreign reserve which in turn translate into increase or decrease in economic growth. A decline in exports or an increase in imports may lead to a reduction in foreign reserves, affecting the overall economic growth (Waheed et al, 2021).

Nigeria, like many other countries, is susceptible to external shocks such as changes in global oil prices. Given that oil exports are a significant source of revenue for Nigeria, fluctuations in oil prices can affect foreign reserves and, consequently, economic growth. Nigeria's foreign reserves have over the years exhibited a high degree of volatility, believed to have been influenced by fluctuations in global oil prices, trade imbalances, and external shocks (Aluko, 2007). In the same light, Nigeria's export performance has been argued to perform below full capacity despite a rise in the level of foreign reserve accumulation (Onoh, 2019). Moreover, efforts overtime to diversify the Nigerian economy has been in successful, the consequence of which petroleum continues to make up the majority of the country's exports sector (Balami, 2020).

Due to its reliance on oil exports, Nigeria has become heavily dependent on the growth of the global oil market and is unable to take advantage of exciting potential in other areas. Like many other emerging nations, Nigeria has long pursued a strategic economic policy of building up its foreign reserves through several economic plans and programmes. While the nation has managed to accumulate sizeable foreign exchange reserves over the years, however due to increase in import bills, debt servicing and exchange rate volatility which continue to make Nigerian foreign reserve unstable, there is still a pressing question regarding how much this accumulation helps to sustain long-term economic growth (Ifurueze, 2020).

The theorized relationship between foreign reserve accumulation and economic growth has been empirically questioned with mixed findings. While studies by Chahal (2017), Hidenko (2017), Hoang and Nguyen (2018), Ladislav (2013) and Priyara, (2012) found foreign reserve accumulation to strongly determine economic growth, Ifurueze (2020) and Drama and Guy (2016) showed economic growth to weakly respond to foreign reserve accumulation. Hence, researchers are inconclusive as to the extent to which foreign reserve accumulation impacts on economic growth in the context of Nigeria. Furthermore, past studies conducted in Nigeria did not pay enough attention in investigating oil revenue performance as an intervening variable in foreign reserve accumulation. This paper deems this necessary as petroleum still serves as the major source of foreign reserve accumulation in Nigeria. This paper therefore contributes to the debate by investigating the dynamic impact of foreign reserve accumulation on economic growth in Nigeria during the period 1992 to 2022.

Following this introduction, the remaining part of his paper is sectioned as follows: section 2 is literature review, section 3 introduced the methodology of analysis. While section 4

presents result and discussion of findings, section 5 concludes the paper with policy recommendations.

2. Literature Review

Scholars have attempted to conceptualize economic growth from different perspectives. Pokrovskii and Vladdimir (2021) conceptualized economic growth as an improvement or increase in the market value of the goods and services produced by an economy within a certain fiscal year, after inflation has been taken into account. According to Acemoglu and Restrepo (2020), economic growth is the accumulation of information, skills, inventions, and technological developments that can raise an economy's productivity and output. Economic growth is described as the building up of tangible assets like infrastructure and machines that can boost an economy's productivity and production. Jones (2020) also saw economic growth can be referring to the rules that influence economic behavior, such as property rights and the rule of law. Its exchange of goods and services between countries that can increase productivity and output in an economy, (Lopez-de-Silanes, & Shleifer, 2020).

The concept of foreign reserve accumulation has been defined by many scholars. Foreign reserves, according to Krugan and Obstfeld (2010), are assets kept by central banks of respective economies and utilized for a variety of activities, such as the purchase of commodities and assets from other countries or the payment of debt owed to international organizations. However, the most accepted definition of foreign reserves accumulation is one provided by the International Monetary Fund (IMF) (2001) which characterizes reserves as external securities that are readily available to monetary authorities for a variety of purposes, including the direct financing of imbalances in external payments, the direct control of the magnitude of such imbalances through manipulation of exchange markets to influence the exchange rate, and other purposes.

This study is built on foreign reserve precautionary theory postulated by Keynes (1936). With the main assumption of precautionary motive as a major reason why countries maintain foreign reserve, the theory suggests that countries accumulate foreign reserves to protect themselves against unexpected external shocks and crises. The precautionary theory is based on the idea that countries face various risks and uncertainties in the international economic environment. These risks can include sudden balance of payments deficits, currency depreciation, financial crises, commodity price shocks, and external economic shocks. To safeguard their financial stability and economic well-being, countries hold foreign exchange reserves. Overall, the precautionary theory of foreign reserves highlights the importance of maintaining a financial safety net to navigate the uncertainties of the global economy. Central banks and policymakers often weigh the benefits and costs of holding reserves carefully and adjust their reserve management strategies based on evolving economic conditions and risks. Accordingly, countries hold foreign reserves because of the following reasons: buffer against shocks, liquidity management, reducing vulnerability, and preventing contagion. In view of these arguments, the theory suggests that accumulating foreign reserve beyond a certain threshold allows a country to achieve and maintain economic growth even in times of economic adversities. The theorized impact of foreign reserve accumulation has received considerable empirical attention. Scholars are not conclusive on the nature of relationship and the extent to which foreign reserve accumulation affect economic growth. For example, Ifurueze (2020) examined short run impact of foreign reserve accumulation on economic growth in developing country with a particular focus on Nigeria using decomposed ARDL technique during the period 1980 to 2016 found a significant short run relationship between foreign reserve

accumulation and economic growth in Nigeria, however a negative impact in a long run.

Hoang and Nguyen (2018) examined how Vietnam's economic growth were affected by the growth of its foreign reserves and inflation between Q1 of 2004 and Q1 of 2017 while relying on Error Correction Mechanism (ECM) and ARDL Bound Test Approach. They found that while building of foreign reserves has a large long-term impact on macroeconomic variables lasting more than a year, it also has a considerable short-term impact. Another study by Hidenko (2017) used a panel regression estimate to examine the relationship between the expansion of the East and South East Asian economies, the accumulating of external reserves, and foreign direct investment during 1994 to 2015. Findings indicate a strong negative correlation between exchange rate and economic growth, but a positive correlation between foreign reserve accumulation and economic growth.

Chahal (2017) conducted research on India's external reserves and macroeconomic stability, using time series data from the period 1991 to 2015. The results show that exchange rates, GDP, and inflation are all highly impacted by external reserves. Furthermore, Drama and Guy (2016) looked into how foreign reserve accumulation affected economic growth and inflation in four West African nations: Nigeria, Senegal, Ghana, and Cote d'voire. The long-term association between the change in foreign reserve and economic growth for Cote devoir and Nigeria is positive, according to a comparison of empirical data using the ARDL approach. However, the overall short-term estimation of our model is negligible at the conventional level.

Ladislav (2013) used panel data samples of 122 emerging economies to assess the growth of foreign reserves in a few particular Asian nations between 2008 and 2013. Fixed effects linear regression with the error correction mechanism (ECM) was used to estimate panel data. The results showed a correlation between state-level economic growth and the buildup of foreign reserves that is positive. Priyara (2012) uses time series data from 1990 to 2010 to analyze the relationship between India's external reserves and exchange rate. For the estimate and to determine the causality between the two variables in this study, basic OLS is used. The result illustrates a favorable correlation between foreign exchange reserves and the Indian rupee exchange rate.

3. Methodology

This paper employs the Autoregressive Distributed Lag (ARDL) technique of cointegration developed by Pesaran and Shin (1999) and its corresponding error correction mechanism to investigate the short run dynamic relationship between foreign reserve accumulation and economic growth in Nigeria. The choice of this methodology is anchored on the fact that it accommodates variables of different stationarity orders I(0) and I(1) as against the methodologies of Engel Granger and Johansen cointegration approach. However, if the variables of this research are not integrated to different orders the ARDL model cannot be used. Annual time series data are used in the study spanning the period 1992 to 2022.

The baseline model of this paper was adapted from the work of Khan (2020). The model as modified o suits the peculiarity of this study is given in equation 1.

$$RGDP_t = a_0 + \sum_{i=1}^n \beta_{1i} RGDP_{t-i} + \sum_{i=1}^n \beta_{2i} NFR_{t-i} + \sum_{i=1}^n \beta_{3i} COR_{t-i} + \sum_{i=1}^n \beta_{4i} IFL_{t-i} + \sum_{i=1}^n \beta_{5i} EXR_{t-i} + \sum_{i=1}^n \beta_{5i} ITR_{t-i} + \mu_{it}$$

Where: α_0 = intercept, $\beta_{1i}, \beta_{2i}, \beta_{3i}, \beta_{4i}$, and β_{5i}, β_{6i} = partial slopes, RGDP = real gross domestic product, NFR = Nigerian foreign reserve, COP = crude oil price, IFL = inflation, EXR = exchange rate, ITR = real interest rate,

If the investigation uncovers evidence of a long-term association, the error correction model (ECM) is used to show how quickly long-term equilibrium will return following a short-term disturbance. The ECM in equation 2 is estimated.

$$\begin{aligned} \Delta RGDP = c + v(ECM)_{t-1} + \sum_{j=0}^p \alpha_j L_n RGDP + \sum_{j=0}^p \varphi_j L_n NFR_{t-j} + \sum_{j=0}^p \omega_j L_n COR_{t-j} \\ + \sum_{j=0}^p \theta_j L_n IFL_{t-j} + \sum_{j=0}^p \gamma_j L_n EXR + \sum_{j=0}^p \gamma_j L_n ITR + \varepsilon_t \end{aligned} \quad 2$$

The short-run dynamics of the model are represented by the parameters $\alpha_j, \varphi_j, \omega_j, \theta_j$, and γ_j while the error correction coefficient is represented by the parameter v .

Data for this paper are sourced from the CBN Statistical Bulletin 2022 and World Bank Development Indicators.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 describes the properties of the data. It is observed that RGDP range between 2.19 and 7.58 with a mean growth rate of 4.62 billion Naira and a standard deviation of 2.00. The mean

of crude oil price (COP) is 4197.52 with a range between 44.33 and 13423.87 Naira and a standard deviation of 4415.68.

Table 1: Summary Statistics

Statistic	RGDP	COP	INR	NFR	INF	EXR
Mean	4.62	4197.52	2.67	2.54	18.59	112.13
Median	4.38	2460.55	5.68	2.90	12.87	100.63
Maximum	7.58	13423.87	18.18	5.36	72.83	273.00
Minimum	2.19	44.33	-31.45	1.20	5.38	49.77
Std. Dev.	2.00	4415.68	10.12	1.75	16.48	49.03
Skewness	0.10	0.76	-1.44	-0.10	2.10	1.79
Kurtosis	1.39	2.12	5.58	1.48	6.37	6.160
Jarque-Bera	3.36	4.02	19.45	3.03	37.59	29.48
Probability	0.18	0.13	0.00	0.21	0.00	0.00
Sum	1.43	130123.40	82.87	7.86	576.42	3476.20
Sum Sq. Dev.	1.20	5.85	3073.90	9.15	8154.13	72137.60
Observations	31	31	31	31	31	31

Source: Extract from E-views 9 Output, 2024

The maximum and minimum values for each measure indicate that the performance varies

substantially. The Jarque- Bera statistics test of normality indicates that variables INT, INF and

EXR are not normally distributed at 5 per cent level. Finally, the kurtosis statistic shows that RGDP, COP and NFR are platykurtic in nature while INR, INF and EXR are leptokurtic.

4.2 Inferential Results

4.2.1 Formal Diagnostic Tests

The stationarity tests adopted are unit root test. The conventional Kwiatkowski-Phillips-Schmidt-Shin (KPSS) is used. Summary outcomes of the tests are presented on Table 2.

Table 2: Unit root test

Kwiatkowski-Phillips-Schmidt-Shin (KPSS)					
	Level		First Difference		
LRGDP	0.6986 (0.4630)	0.1167 (0.1460)	0.1908** (0.4630)	0.1894 (0.1460)	I(1)
LCOP	0.7056 (0.463)	0.1708 (0.1460)	0.3485** (0.4630)	0.3323 (0.1460)	I(1)
LEXR	0.1148** (0.4630)	0.0688 (0.1460)	0.0868 (0.4630)	0.0757 (0.1460)	I(0)
LINF	0.3091** (0.4630)	0.1491 (0.1460)	0.1915 (0.4630)	0.1679 (0.1460)	I(0)
LINR	0.3147** (0.4630)	0.1110 (0.1460)	0.5000 (0.4630)	0.5000 (0.1460)	I(0)
LNFR	0.6129 (0.4630)	0.1809 (0.1460)	0.3573** (0.4630)	0.5000 (0.1460)	I(1)

Source: Extract from E-views 9 Output, 2024

NB: ***, ** and * indicate significance at 1%, 5% and 10% respectively.

Table 2 presents unit root stationarity test of the variables employed in this study. It shows KPSS unit root results at level I(0) and first difference I(1) for all the variables. The results reveal a mixed order of integration where LEXR, LINF and LINR are stationary at levels while LRGDP, LCOP and LNFR became stationary after taking their first difference.

From result on Table 3, it is established that the F-statistic derived from the bound test is 7.61 which is the value obtained from the Pesaran

Table at 5% level of significance. Comparing this to the critical value, it is observed that the F-statistic is greater than the critical values at upper bound (3.76). This informs the rejection of the null hypothesis at 5% level of significance and the conclusion that variables are cointegrated. In other words, there is a long run cointegrating relationship among the variables employed. Existence of cointegration necessitates the interest in the error correction components of the models.

4.2 Cointegration Test

Table 3: ARDL Bound Test

Bound Cointegration Test			
F-Statistic	I(0)	I(1)	Significance
7.61***	2.26	3.35	10%
	2.62	3.79	5%
	3.41	4.68	1%

Source: Extract from E-views 9 Output, 2024

NB: ***, ** and * indicate significance at 1%, 5% and 10% respectively.

4.3 Regression Analysis

The long run results as seen on panel A of Table 4 shows that holding other explanatory variables constant, there is a positive long run relationship between LCOP and LRGDP. This implies that a percentage increase in crude oil price resulted in 0.26% increase in economic growth at 1% level of significance. On the contrary, LINFR and LEXR are found to impact negatively on LRGDP

in the long run. A percentage increase in inflation was found to decrease economic growth in the long run by 0.28%, while a percentage increase in exchange rate reduced economic growth by 0.17% both at 10% level of significance. Interestingly, the major explanatory variable of this study (LNFR), together with LINR found to exert no significant long run impact on economic LRGDP during the period examined.

Table 4: ARDL Estimation

Panel A: Result of Long Run ARDL Model			
Variable	Coefficient	t-statistic	Prob.
C	31.7358***	19.8625	0.0000
LNFR	-0.0220	-0.4360	0.6690
LCOP	0.2557***	8.7176	0.0000
LINF	-0.2814*	-1.9894	0.0652
LEXR	-0.1719*	-1.8487	0.0843
LINR	-0.0418	-1.2576	0.2278
Panel B: Result of Short Run ARDL Model			
D(LNFR)	-0.0042	-0.4395	0.6666
D(LCOP)	0.0265**	2.1581	0.0475
D(LINF)	-0.0533***	-4.0019	0.0012
D(LINF(-1))	0.0293**	2.4161	0.0289
D(LEXR)	0.0796***	4.1836	0.0008
D(LEXR(-1))	0.0734***	3.1665	0.0064
D(LINR)	-0.0142***	-3.0510	0.0081
ECT(-1)	-0.1935***	-3.6818	0.0022

Source: Extract from E-views 9 Output, 2024

NB: ***, ** and * indicate significance at 1%, 5% and 10% respectively.

From panel B of Table 4, the dynamic relationship between economic growth and the predictor variables employed are displayed. It is observed that 1 lag was applicable LINR and LEXR and lag for the rest of the predictor variables. This implies that lags impact plays a major role in determining economic growth in Nigeria. From the short run regression results, it is inferred that all explanatory variables with the exception of LNFR have short run significant impact on the economic growth. Specifically, a percentage point change in crude oil price is associated with 0.02 percentage point change in economic growth in the short run on average ceteris paribus. The short run impact of crude oil price is found to be significant at 5% statistical significance level. Similarly, a percentage point change in the first lag of inflation is associated with a 0.05 percentage point change increase in economic growth on average ceteris paribus at 5% statistical significance level. Moreover, a percentage point change in the first lag of exchange rate is associated with a 0.07 percentage point change increase in economic growth on average ceteris paribus at 1%

statistical significance level. However, a negative short run impact of interest rate on economic growth was observed, as a percentage point change in LINR was found to reduce LR GDP by 0.01% point on average, holding other variables constant. It is worthy of note that similar to what holds in the long run, the major explanatory variable of this study (NFR) has a negative but insignificant short run impact on economic growth during the period investigated. The error correction coefficient (ECT) parameter is -0.19 which indicates that 19% errors generated in one period is corrected in the next period. This highly significant and negative ECT coefficient also supports evidence that there is a stable long-run relationship between the dependent variable and the independent variables.

4.4 Diagnostic Tests

A summary of the primary and secondary diagnostics is presented in Table 5. The adjusted R² in panel A shows that the explanatory variables used in the regression model jointly explain 75 percent of the variation in economic growth, indicating the model's goodness of fit.

Table 5: Post Estimation Diagnostics

Post Estimation Test (Robustness Check)			
Diagnostic Test	F-statistic	Df	Prob.
Panel A: Primary Diagnostics			
R ²	0.7794	-	
Adj R ²	0.7589	-	
DW	1.7961	-	
F-Stat	1961.391***	-	0.0000
Panel B: Secondary Diagnostics			
Linearity (RESET)	0.8034		0.3852
Serial Correlation	0.5375		0.5966
Heteroscedasticity	0.3756		0.9581
JB-Normality	2.0726	-	0.3547

Source: Extract from E-views 9 Output, 2024

NB: ***, ** and * indicate significance at 1%, 5% and 10% respectively.

The regression model appears not to have first-order serial correlation, according to the Durbin Watson statistic. Furthermore, the F-statistic

suggests that the model's specifications are sufficient. Additional reliability tests of the regression model on panel B showed that the

residuals were normally distributed, there was no heteroscedasticity, no second-order serial correlation, and no specification error.

4.5 Discussion of Findings

The paper's primary conclusions point to the possibility of a long-run equilibrium relationship between the variables in the ARDL model. In particular, it was discovered that the main explanatory variable of this study foreign reserve accumulation, had no significant impact on Nigeria's economic growth both in the long run and short run are investigated. A plausible explanation to this is the argument that over the years, the Nigerian foreign reserve has gone undergone significant depletion due to fiscal deficits, debt servicing, exchange rate instability and other forms of managerial inefficiency (Newman & Toyin, 2010). This finding supports that of Ifurueze (2020) and (Drama & Guy, 2016) who also found an insignificant relationship between foreign reserve accumulation and economic growth in Nigeria. However, the major empirical finding of this study contradicts that of Chahal (2017), and Hidenko (2017), all of whom found foreign reserve accumulation to be a strong determinant of economic growth in developing economies. Hence, significant variation in economic growth not due to foreign reserve accumulation but due to changes in crude oil prices, inflation and exchange rates both in the short and long run. This supports the findings of Hoang and Nguyen (2018) who also found a significant impact of inflation on economic growth in Vietnam and Chahal (2017) who demonstrated exchange rate to positively impact on economic growth in India. Moreover, when compared to other explanatory variables, crude oil price is seen to have caused the most variation in economic growth. This is not surprising as crude oil is the major source of foreign earnings in Nigeria, hence when economic growth is considered in real terms as done in this paper, crude oil is expected to have a significantly large effect on the Nigerian economic growth.

However, crude oil revenue which is a major source of Nigerian foreign reserve was not able to trigger a significant impact of foreign reserve accumulation in Nigeria. This supports the argument of Newman and Toyin (2010) who submits that surges in crude oil inflow in Nigeria have been effective in filling the reserve gaps in Nigeria.

5. Conclusion and Recommendation

This paper examines the impact of foreign reserve accumulation on economic growth in Nigeria over the period 1992-2022. The study, based on its major findings, concludes that foreign reserve accumulation impact on economic growth in Nigeria. The findings of the paper demonstrated that a significant variation in economic growth is not due to foreign reserve accumulation. Also, in comparison with other explanatory variable of this paper, crude oil prices have the most impact on economic growth during the period investigated.

Based on the empirical findings and conclusion of this study, there is need for protecting the foreign reserves from depletion, to an extent it remains at the threshold of recommended global trends. This will go a long way in restoring investors' confidence in financial and real sectors which can translate into positive and significant impact on economic growth. Accumulation of foreign reserve could be improved by curtailing fiscal factors that lead to huge outflows of reserves. This is predicated on the argument that significant foreign reserve accumulation will help restore investors' confidence in financial and real sectors which can translate into positive and significant impact on economic growth. Additionally, high reserve accumulation cannot translate into economic growth unless government encourages diversification for domestic investors to invest more on agricultural sector, infant industries and SMEs to boost aggregate outputs for export promotion

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