ISRG Journal of Economics, Business & Management (ISRGJEBM)

ISRG PUBLISHERS
Abbreviated Key Title: Isrg J Econ Bus Manag
ISSN: 2584-0916 (Online)
Journal homepage: https://isrgpublishers.com/isrgjebm/
Volume – II Issue - III (May – June) 2024
Frequency: Bimonthly

Analysis of the Effect of Relationship between Exchange Rate, Inflation Rate and Oil Price on Nigerian Economic Growth. Application of ARDL Modeling

Ali Salisu[1], Ibrahim Musa[2*], Sule Magaji[3]

[1]Department of Economics Bayero University Kano
[2, 3] Department of Economics, University of Abuja

| **Received:** 24.05.2024 | **Accepted:** 29.05.2024 | **Published:** 30.06.2024

***Corresponding author:** Ibrahim Musa
Department of Economics, University of Abuja

Abstract

This study investigated the impact of the relationships between exchange rate, inflation rate and oil price on Nigeria's economic growth covering a period of 42 years (1976-2020). The study employed econometric techniques to capture the objectives for which the study is poised to achieve. These included Autoregressive Distributive Lag (ARDL), and Johansen Co-integration test. From the ARDL test, the result of the study revealed that inflation hurts RGDP while oil price and exchange rate revealed a positive impact on RGDP which is the proxy for economic growth. The Johansen co-integration result highlighted the existence of a long-run equilibrium relationship among the variables namely: exchange rate, inflation, oil price and RGDP. Therefore, the study recommended that the government should provide effective and efficient policy(s) on exchange rates that would absorb any shock (positive/negative) in the economy.

Key Words: *Exchange Rate, Inflation Rate GDP and ARDL*

Introductions

The Nigerian exchange rate had undergone a substantial transformation from the immediate post-independence period when the country held a fixed parity with the British pound, through the oil boom of the 1970s, to the floating of the currency in 1986, following the near collapse of the economy between 1982 and 1985 period (Atan and Akpan 2012). The exchange rate system over the last few years has experienced many ups and downs at the international level and has affected the economic structures of some countries including Nigeria (Magaji, Musa & Titus, 2023).

Furthermore, inflation has since become a macroeconomic problem that has been a priority over the years for all governments in the global economy. Inflation which refers to a sustained rise in the general level of prices is one of the causes of economic retardation

DOI: 10.5281/zenodo.12599992

(Musa, Magaji, Abdulmalik & Eke, 2022). It is a cause of economic, social and political unrest in many developing economies (Magaji & Musa, 2015; Akinbobola, 2012). Inflation has beset the Nigerian economy over the years. Specifically, Nigeria's inflation rate has been volatile and recurrently double-digit (Umo, 2007). Whereas economic literature views inflation as being a monetary phenomenon, a wide range of empirical studies has identified exchange rate fluctuations as one of the key factors that account for the variations in the general price level (Chinedu, Magaji, & Musa, 2021; Magaji, Igwe & Darma, 2021).

In recent times, the fall in the exchange rate has been attributed to a fall in the oil price which resulted in a continuous and heavy depletion of the country's external reserve and turn affects the Nigerian economy at large. The CBN governor revealed that Nigeria is being faced with several challenges which compelled the fluctuations of the naira. These factors include a fall in global oil prices, the end of the United States Quantitative Easing Programme, the discovery of shale oil by the US and the global fall in the price of other export commodities apart from crude oil (Gabriel & Ujah, 2014; Magaji, Ayo, Ibrahim & Ali, 2019). The fall in global oil prices has led to a decline in oil revenue from which the nation derives 95 per cent of its foreign exchange. It has also been observed that Nigeria has faced a simultaneous dwindling in the supply of the dollar and a rise in its demand. Consequently, this has led to a rise in the price of the dollar at both the interbank and Bureau De Change segments of the market.

Acknowledgement had been observed that no significant economic growth by any country without a favourable exchange rate. However, different exchange rate policies adopted in Nigeria failed to translate into significant economic growth (Musa, Magaji & Salisu, 2022). Therefore, various macroeconomic variables (GDP, Inflation, Oil price and so on, were seriously affected as well as overall macroeconomic performance (Nazifi, Magaji & Amase, 2022; Magaji, Musa & El-Yaqub, 2019). The regular fluctuations (mostly negative) of the Nigeria exchange rate in the foreign exchange market have eroded the purchasing power of the naira and high inflation rate which in turn distort economic growth and development. Despite some government policies to ensure a favourable exchange rate, the inflation rate and oil price as well as economic growth continue to depreciate regularly with exceptions in 2013, 2014 and 2015. However, unfavourable exchange rates, hyperinflation and low oil prices in a developing country like Nigeria become a setback to economic growth.

It is now generally accepted that the Nigerian currency has technically devalued due to instability of the exchange rate and depreciation in the value of naira which directly or indirectly lead to distortions in the country's economy (Igwe, Magaji & Nazifi, 2021). As such, the CBN attempted the introduction of some exchange rate policies which in turn generated new dimensions and phenomena in the Nigerian economy. Also, a few researches were conducted when the Nigerian exchange rate fluctuations were not as volatile as it is in recent and present times. Moreover, the study would aim at expanding the period under which most researches in the field were conducted, thereby examining the effects of various exchange rate regimes in Nigeria. Furthermore, almost all the research in the area of interest used annual data while this study aimed at considering quarterly data. In the process, the study wants to examine the effects of key variables (inflation and oil price) related to the exchange rate on economic growth and the long-run equilibrium relationship between Nigerian economic growth and key factors related to the exchange rate namely: (inflation and oil price). The study still wants to find the causality relationship among the variables of interest (exchange rate, inflation and oil price). Finally, the study aimed to include another variable (oil price) which the majority of the researchers in the field failed to consider. However, the consideration of oil price in the model is important because globally the price of crude oil is regularly fluctuating and mostly depreciating especially within the period under study.

Literature Review and Theoretical Framework

Conceptual Literature

There are three important concepts to be reviewed in this study; the concept of exchange rate, inflation rate and economic growth as follows:

Exchange Rate

The exchange rate is the rate at which one currency is exchanged for another. It is the price of one currency in terms of another currency. It is customarily defined as the price of one unit of the foreign currency to a unit of the domestic currency. The exchange rate translates all prices (including wages and interest rates) in one currency into their value in another currency. The exchange rate has been defined as the price of one currency in terms of another (Mordi, 2006). An exchange rate is the value of one nation's currency versus the currency of another nation or economic zone (Chen, 2019). Therefore, the exchange rate is the price at which one country exchanges its currency for other currencies.

Inflation

Generally, inflation means the persistent increase in the general price level of goods and services. Some scholars further viewed inflation as price and monetary inflation: price inflation is when prices get higher or it takes more money to buy the same item and monetary inflation **is a**n increase in the money supply which generally results in price inflation. Inflation is a sustained increase in the price level of goods and services in an economy over some time. When the price level rises, each unit of currency buys fewer goods and services; consequently, inflation reflects a reduction in the purchasing power per unit of money – a loss of real value in the medium of exchange and unit of account within the economy (Marc 2011). Inflation can be defined as a sustained or continuous rise in the general price level or as a sustained or continuous fall in the value of money (McMahon 2010).

Economic Growth

Economic growth is an increase in the capacity of an economy to produce goods and services, compared from one period of time to another. Traditionally, aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used. It can be measured in nominal or real terms. Real GDP, also known as inflation-adjusted gross domestic product, measures the value of finished goods and services at constant base-year prices. The real gross domestic product is adjusted for inflation or deflation with the use of nominal GDP and the GDP deflator. Nominal GDP, or gross domestic product, measures the value of all finished goods and services produced by a country at their current market prices. Typically, economists use a gross domestic deflator to convert nominal GDP to real GDP (Karen and Louise, 2018).

DOI: 10.5281/zenodo.12599992

Theoretical Framework:

Mundell's (1963) and Fleming's (1962) Theory

Mundell and Fleming's Theory is used to underpin this study. The model is based on the assumption of a fixed price level and shows the interaction between the goods market and the money market. The model explains the causes of short-run fluctuations in aggregate income in an open economy. This means that the economy can borrow or lend freely from the international capital markets at the prevailing rate of interest since its domestic rate of interest is determined by the world rate of interest. So, the rate of interest is not a policy variable in the small economy being studied.

The modernism in this approach is that the exchange rate system in a country is an essential determinant of the policies' effects on economic variables, specifically on the level of Gross Domestic Product (GDP), (Rosenberg, 2003; Landry 2009). The theoretical foundation of Mundell-Fleming's model reveals that exchange rates have great usefulness on GDP through investment as well as trade channels. For example, when the exchange rate appreciates, foreign goods become cheaper compared to domestic goods, and this causes a fall in exports and a rise in imports. If a decrease in the exchange rate occurs, that is depreciation, foreign goods become more expensive compared to domestic goods. Therefore, an increase in exports (could lead to sound and required exchange rate and reasonable oil prices) and a decrease in imports, could also decrease inflation as well as an increase in the level of GDP.

Empirical Literature Review

Ogochukwu, Nwoha, and Duru (2024) looked at how Nigeria's inflation and exchange rate were affected by the shock to the price of crude oil. The research design used in the study was ex-post facto, and it covered the years 1990–2022. World Development Indicators and the CBN Statistical Bulletin provided secondary data that was taken out. To evaluate the hypotheses, the multiple regression technique was employed. The results showed that oil price shocks had a significant negative impact on Nigeria's inflation rate, as evidenced by a likelihood value of 0.0180. Furthermore, a probability value of 0.047 indicates that the effect of oil price shocks on currency rates in Nigeria was negative and statistically significant. These results also conform to accepted economic theory. The persistent depreciation of the Naira about the US Dollar following sudden, especially negative, fluctuations in oil prices explains the detrimental impact of oil price shocks on the exchange rate. As a result, the study suggested that the government increase the percentage of money allotted to the excess crude accounts in comparison to its revenue expenditures.

From 1990 to 2021, Bamaiyi (2024) looked into how changes in oil prices affected a few key macroeconomic indicators in Nigeria. Ex-post facto technique and econometric analysis are used in the study, which focuses on variables including real GDP (gross domestic product), balance of payments, unemployment, oil price, and currency rate. Assuming these variables to be endogenous, the study investigates the correlations between them using the annual Vector Autoregressive (VAR) model. For the analysis, time series data is gathered from the statistical bulletin published by the Central Bank of Nigeria. The unit root test result shows that all the variables are integrated of order one (I (1)), requiring more research to be done on the linkages between them. Over ten years, the impulse response function showed how macroeconomic variables dynamically responded to shocks in the price of oil. The Granger causality test emphasizes the causal relationship between the variables, highlighting the impact of shocks to the oil price on real GDP, the balance of payments, and unemployment. According to the results, shocks to the price of oil have a major impact on several macroeconomic indicators, including currency rates, unemployment rates, and balance of payments. The research suggests implementing policy strategies, like diversification, promoting domestic production, and fostering an atmosphere that is conducive to foreign direct investment, to safeguard the economy from shocks to the global oil price. Furthermore, it is recommended that the government develop and strategically execute fiscal and monetary policies to stabilize the economy in the face of changes in the price of oil and therefore foster sustained economic growth.

Gylych, Ahmad, Celik, and Isik (2020) looked at empirical short-term studies of how changes in oil prices affect Nigeria's monetary instruments (interest rate, inflation, and exchange rate). Using the TY Modified Wald (MWALD) test approach to causality, Forecast Error Variance Decomposition (FEVD), and Impulse Response Functions (IRFs), we investigated the widely used Toda–Yamamoto model (TY) model. The research was conducted every month from 1995 to 2018, and the results of the MWALD test showed that the log of oil price (boiler) and the log of the exchange rate (lnexchr) had a unidirectional causal relationship at the 10% significance level. Additionally, the log of a consumer price index (lncpi) responded contemporaneously to the logs of the exchange rate (lnexchr) and interest rate (lnintr), and the three variables together (lnoilpr, lncpi, and lnintr) granger cause lncpi. Positive changes in lnoilpr and lnexchr also caused lnintr to respond at the 5% significance level, and they both caused lnintr together. Our findings in FEVDs and IRFs complement this. Based on empirical assessments, it can be inferred that the price of oil has a significant impact on the exchange rate, borrowing costs, and the degree of inflation or deflation in Nigeria.

Nwagu, Edeh, & Onoriode (2023) examined the transmission effect of oil prices on Nigeria's exchange rate. E-GARCH (Exponential GARCH) model is employed in this study. Approach/Methodology/Design: We used Augmented Dickey Fuller to determine a unit root, integrating exchange rates, crude oil prices, external reserves, GDP, inflation, and interest rates to one I(1) and zero I(0). We used Johansen Cointegration to determine long-term relationships. Interest rates, inflation, and crude oil prices all correlated positively with each other. Findings: A statistically insignificant result is shown by the variance equation, indicating there is no correlation between crude oil prices and exchange rates. The Nigerian exchange rate is not affected by volatility transmission or leverage due to fluctuations in crude oil prices. Originality/value: According to the study, governments should take monetary policy measures to stabilize exchange rates during unpredictable oil price fluctuations. It is necessary to adjust the naira exchange rate when oil prices fluctuate.

Musa & Yohanna (2017) investigated exchange rate dynamics, inflation and economic growth: empirical evidence from the Turkish economy. Using ARDL and granger causality, the study revealed that a real effective exchange rate negatively affects economic growth in the short run; whereas, it exerts a significant positive impact on growth in the long-run. Also, the study found a uni-directional causality running from the real exchange rate to GDP growth rate.

Masoud & Masoud (2016), examined the effect of exchange rate fluctuations and economic growth of Nigeria. Using OLS,

DOI: 10.5281/zenodo.12599992

cointegration and ECM, The study reveals that economic growth is determined by money supply and lag of the growth rate of GDP in Nigeria. Money supply has a significant impact on imports and investment. Expected fluctuations and positive and negative exchange rate shocks have negative impacts on GDP in Iran. Also, the result shows the existence of a long-run equilibrium relationship among the key variables namely: money supply, private consumption, government expenses, positive exchange rate and negative exchange rate.

Ismail Muhammad (2016), examined the exchange rate depreciation and Nigerian economic performance after SAP. The study employed Johansen cointegration and ECM. The findings revealed that the exchange rate has no significant effect on the economic growth of Nigeria. The results show that broad money supply, net export and total government expenditure have a significant impact on real output performance in the long run while the exchange rate has a direct and insignificant effect on Nigeria's economic growth in both the short and long run.

Foluso & Nicholas (2017) investigated inflation and economic growth: a review of international literature. The study applied theoretical and empirical review revealed and the findings revealed that the impact of inflation on economic growth varies from country to country over time. Also, the study revealed overwhelming support in favour of a negative relationship between inflation and economic growth, especially in developed countries.

Methodology

Model Specification

Log (RGDP) = α + Log $\beta_1(EXR_1)_t$ + Log $\beta_2(OILP)$ + $\beta_3(INF_3)_t$ + ε_t

Where:

RGDP: Real Gross Domestic Product

INF: Inflation rate

OILP: Oil price

α: Intercept

β: Coefficient of each independent variable

Ɛ: Error term

Log: Natural Logarithm

Econometric Model

To make the model significant and to fit in this study, the model was transmutated to include an important variable (oil price) that consistently fluctuates especially within the period under study. Therefore, the model is specified as follows:

RGDP = f (EXR, INF, OIL) ---------- (3.1)

Log (RGDP) = $\beta_0 + \beta_1(EXR)_t + \beta_2(INF)_t + \beta_3(OIL)_t + \varepsilon_t$ ---------- (3.2)

Where; log represents the logarithm of RGDP (note: the log of EXT, INF and OIL was not taken as the series was in small decimal places and rates). Where "t" is the country`s period; β_0 is a constant or intercept while β_1, β_2 and β_3 are the coefficients of the explanatory variables and the "β" is the elasticity of the exchange rate concerning RGDP;

RGDP= f (exchange rate, inflation, oil price)

$$(\log\_rgdp)_t = \beta_0 + \beta_1 (\text{exr})_t + \beta_2 (\text{inf})_t + \beta_3 (\text{oil})_t + \mu_t \quad \text{---------- (3.4)}$$

ARDL Model Specification:

$$\Delta(\log\_rgdp) = \Theta_0 + \Theta_1 (\log\_rgdp)_{t-1} + \Theta_2 (\text{exr})_{t-1} + \Theta_3 (\text{inf})_{t-1} + \Theta_4 (\text{oil})_{t-1} + \sum_{i=1}^{\rho} \Theta_5 \Delta(\log\_rgdp)_{t-i} + \sum_{i=1}^{\rho} \Theta_6 \Delta(exr)_{t-i} + \sum_{i=1}^{\rho} \Theta_7 \Delta(\text{inf})_{t-i} + \sum_{i=1}^{\rho} \Theta_8 \Delta(\text{oil})_{t-i} + \mu_t$$

Table 1 Unit Root Test Results

Variable	LEVELS		FIRST DIFFERENCE		Order of Integration
	ADF	Prob.	ADF	Prob.	
$LOGGDP_t$	-0.727	0.969	-16.608	0.000*	I (1)
INF_t	3.821	1.000	- 12.526	0.000*	I (1)
EXC_t	-1.678	0.757	-12.121	0.000*	I (1)
OIL_t	-2.229	0.470	-11.066	0.000*	I (1)
Variable	**LEVELS**		**FIRST DIFFERENCE**		**Order of Integration**
	PP	Prob.	PP	Prob,	
$LOGGDP_t$	-2.435	0.897	-16.930	0.000*	I (1)
INF_t	3.261	1.000	-19.619	0.000*	I (1)
EXC_t	-1.837	0.683	-12.121	0.000*	I (1)
OIL_t	-2.435	0.360	-10.708	0.000*	I (1)

DOI: 10.5281/zenodo.12599992

Source: Computed and Compiled by the Researcher using E-views 10 (2024)

ARDL Model

Table 2 ARDL Model

Dependent Variable: LOG GDP_t

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
EXC	0.001014	0.001504	0.674261	0.5011
INF	-0.003328	0.002202	-1.510992	0.1327
OIL	0.005547	0.002783	1.993443	0.0479
R-squared 0.931605				
Adjusted R-squared0.929957				

Source: Computed and Compiled by the Researcher using E-views 10 (2024)

Table 2 below presents the long-run estimates of the variables under study. From the Long-Run coefficients, only oil posits positive effects on LOGRGDP; however, OIL (0.001243) is statistically insignificant; while inflation and exchange rate denote negative effects on LOGRGDP; whereas, INF (-0.000716), EXC (-0.000442) are statistically insignificant. Also, the adjusted R-square shows 0.92%, signifying that 92 per cent of the changes in the Nigerian Gross Domestic Product (GDP) are explained by all the variables (exchange rate, inflation and oil price) in the model while only 0.08 per cent of the change in the GDP is not explained by the model. For the Error Correction Terms (ECT), as expected, the coefficients signed negative and lie between 0-1 in all the estimators.

ARDL BOUNDS TEST

Table 3 ARDL BOUNDS TEST

		1%	2.5%	5%	10%
F-statistic	5.714				
	(0) BOUND	3.65	3.15	2.79	2.37
	(1) BOUND	4.66	4.08	3.67	3.2

Source: Computed and Compiled by the Researcher using E-Views 10(2024)

Table 3 shows that the F-statistics of the bound test is 5.283 which is greater than the upper and lower bound test at all levels, this indicates that there exists a long run and it paves ways to employ the ARDL model.

ARDL Diagnostic

Breusch-Pagan-Godfrey ARDL Heteroskedasticity Test Results

Breusch-Pagan-Godfrey's ARDL Heteroskedasticity diagnostic test was conducted to test for heteroskedasticity of the ARDL model. From the ARDL model, the response of the change in the Nigerian economic growth proxied by GDP is explained by inflation, exchange rate and oil price for which the joint test result shows that the probability of (0.2188) exceeds 0.05 (5% significant level). This leads to the rejection of the presence of heteroskedasticity; implying homoscedastic in the residuals, which means that, the estimated model is valid without re-specifying and can be used for policy making (see Table 4.6).

Table 4 Breusch-Pagan-Godfrey ARDL Heteroskedasticity Test Results

F-Statistic	**P-value**
3.042	0.2188

Source: Computed and Compiled by the Researcher using E-Views 10 (2024)

Breusch-Godfrey ARDL Serial Correlation LM Test Results

Breusch-Godfrey ARDL serial correlation diagnostic LM test was conducted to test for serial correlation of the ARDL model. From the ARDL model, the response of the change in the Nigerian economic growth proxied by GDP is explained by inflation, exchange rate and oil price for which the joint test result shows that the probability of (0.3320) exceeds 0.05 (5% significant level). This leads to the rejection of the presence of serial correlation; implying the residuals are not serially correlated, which means that, the estimated model is valid without re-specifying and can be used for policymaking (see Table 4.7).

DOI: 10.5281/zenodo.12599992

Table 5 Breusch-Godfrey ARDL Serial Correlation LM Test Results

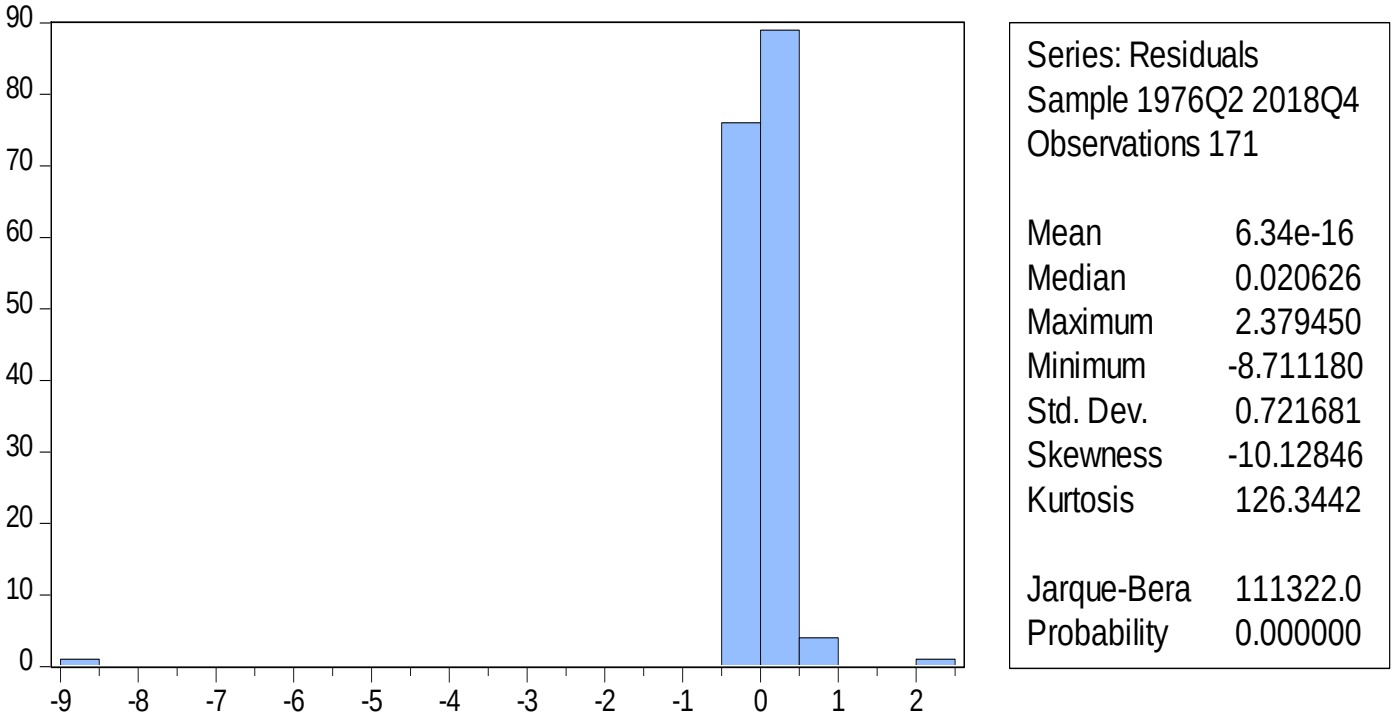
F-Statistic	**P-value**
6.440	0.3320

Source: Computed and Compiled by the Researcher using E-Views 10 (2024)

ARDL Normality Test

Based on the ARDL normality test in Figure 1, the p-value of 0.0000 is significant at a 5% level of significance which reveals that the residuals are normally distributed as expected.

Figure 1 ARDL Normality test



Source: Computed and Compiled by the Researcher using E-views 10 (2024)

Johansen Co-integration Test

Based on the trace test as shown in Table 4.8 the null hypothesis (H_0) at r=0 (no cointegrated vectors) is rejected because the t-statistic is higher than the critical value at 5% significance level, (95.76108 > 63.87610 and 43.96068 > 42.91525). Consequently, the alternative hypothesis is considered, which indicates the existence of two cointegrated vectors (see Table 4.8)

Table 6 Johansen Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.266687	95.76108	63.87610	0.0000
At most 1 *	0.151727	43.96068	42.91525	0.0391
At most 2	0.055390	16.48041	25.87211	0.4546
At most 3	0.040845	6.964289	12.51798	0.3483

Source: Computed and Compiled by the Researcher using E-views 10 (2024)

Note: *, **, *** denote significance at 1%, 5% and 10% respectively.

Table 7 Johansen Unrestricted Cointegration Rank Test (Trace)

Hypothesized		**Max-Eigen**	**0.05**	
No. of CE (s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****

DOI: 10.5281/zenodo.12599992

None *	0.266687	51.80040	32.11832	0.0001
At most 1 *	0.151727	27.48026	25.82321	0.0300
At most 2	0.055390	9.516126	19.38704	0.6705
At most 3	0.040845	6.964289	12.51798	0.3483

Source: Computed and Compiled by the Researcher using E-views 10 (2024)

Note: *, **, *** denote significance at 1%, 5% and 10% respectively.

Based on the maximum eigen test as shown in Table 7 the null hypothesis (H_0) at r=0 (no cointegrated vectors) is rejected because the t-statistic is higher than the critical value at 5% significance level, (51.80040 > 32.11832 and 27.48026 > 25.82321). Consequently, the alternative hypothesis is considered, which indicates the existence of two cointegrated vectors (see Table 4.9)

Summary and Conclusion

The study used inflation and oil price as key variables related to the exchange rate as the explanatory variable while real GDP was the dependent variable. From The ARDL test, the result of the study revealed that inflation has negative effects on RGDP while oil price reveals a positive effect on RGDP. However, the exchange rate reveals a positive effect on RGDP. The Johansen cointegration test, the result highlighted the existence of long-run equilibrium relationship among the variables namely: exchange rate, inflation, oil price and RGDP

it becomes expedient that deductions from the findings be made to advise policymakers and implementers on the best way to handle policy issues and programs regarding exchange rate, inflation, oil prices RGDP. In light of this, the following policy recommendations and suggestions are germane and apropos to ensure the progress and growth of Nigeria's economy:

Reference

1. Akinbobola (2012), The dynamics of money supply, exchange rate and inflation in Nigeria *Journal of Applied Finance & Banking, vol.2, no.4, 2012, 117-141 ISSN: 1792-6580.*
2. Akpan, E.O., & Atan, J.A. (2012). Effects of Exchange Rate Movements on Economic Growth in Nigeria. CBN Journal of Applied Statistics, 2(2), 1-14.
3. Bamayi, G. (2024), Effect of Oil Price Shocks on Selected Macroeconomic Variables in Nigeria, *International Journal of Development and Economics Sustainability, 12(1), 12-55*
4. Chen, J., Wang, M., Kirschner, P. A., & Tsai, C. C. (2019). A meta-analysis examining the moderating effects of educational level and subject area on CSCL effectiveness.
5. Chinedu, C. J., Magaji, S. & Musa, I. (2022), Empirical Analysis of the Role of Money Market instruments on Economic Growth in Nigeria, *Lapai Journal of Economics*, 5(2), 24-37
6. Foluso A. A. and Nicholas M. O, (2017), Inflation and Economic Growth: a Review of The International Literature. *Comparative Economic Research, Volume 20, Number 3, 2017*
7. Gylych, J. Ahmad, A. J. Celik, B. & Isik, A. (2020), Impact of Oil Price Fluctuation on the Economy of Nigeria, the Core Analysis for Energy Producing Countries, Global Trade in the Emerging Business Environment
8. Magaji, S. & Musa, I. (2015) Eudemic Corruption and Nigeria's Underdevelopment, *Abuja Journal of Business and Management*, 1(4) 119-125
9. Magaji, S., Ayo, A. A., Ibrahim, I. & Salisu, A. (2019), Relative Impact of Monetary Policy Instrument on Economic Growth in Nigeria, *Lapai Journal of Economics*, 3(2), 93-118
10. Magaji, S., Igwe, G. U. & Darma, N. A. (2021), Analysis of the Financial Development Indicators of the Banking, Insurance and Pension Sectors on Economic Growth in Nigeria, *Focus of Research in Contemporary Economics*, 2(2)
11. Magaji, S., Igwe, G. U., & Darma, N. A. (2021), Testing the Supply-Leading and Demand-Following Hypothesis for Financial Development and Economic Growth- A Case of the Nigerian Banking System, *Global Scientific Journal*, 9(12)
12. Magaji, S., Musa, I. & El-Yaqub, (2024), Impact of Commercial Banks Credit Manufacturing Sector Output: An Ex-Post Factor Design Approach, *International Journal of Entrepreneurship and Business Innovative*, 7(2), 85-101
13. Magaji, S., Musa, I. & Titus, A. A. (2023), Impact of Banking Sector Credit on the Real Sector, *International Journal of Management and Business Applied*, 2(2), 12-20
14. Masoud N. Masoud M. (2016)The Effect of Exchange Rate Fluctuation on Economic Activities of Iran www.irmbrjournal.com
15. Micheal Kramer, (2010), Exchange rates definitions. Article on forex and currencies trading, university of IOWA
16. Micheal Kramer, (2010), Exchange rates definitions. Article on forex and currencies trading, university of IOWA
17. Mordi, C. N. (2006). Challenges of exchange rate volatility in economic management in Nigeria. CBN Bullion, 30(3), 1-12
18. Musa, I., Magaji, S. & Salisu, I. (2022), The Monetary Policy Shocks and Economic Growth: Evidence from SVAR Modeling, *International Journal of Indonesian Business Review*, 1(1), 1-11
19. Musa, I., Magaji, S., Abdulmalik, Y. O. & Eke, C. I (2022), Poverty and its Intractability: Causes and Consequences, *Inclusive Society and Sustainability Studies*, 2(2), 48-58
20. Nasifi, D. A., Magaji, S. & Amase, J. (2022), Macroeconomic Impact of Oil Price Shocks on

DOI: 10.5281/zenodo.12599992

Government Expenditure and Economic Growth in Nigeria, *SDMIMD Journal of Management,* 13(Special)

21. Nwagu, U. G, Edeh, C. C. & Onoriode H. (2023) Oil Price Fluctuation and Exchange Rate in Nigeria: is there a Volatility Transmission Effect, *Journal of Advanced Research in Economic and Administrative Sciences 4(4),* DOI: https://doi.org/10.47631/jareas.v4i4.640
22. Ogochukwu, O. S., Nwoha, C. E. & Duru, N. A. (2024), Effect of Crude Oil Price on Inflation and Exchange Rate in Nigeria, *European Journal of Business and Innovation Research, 12(2),56-66*
23. Umar M. G. Aliyu I. B. and Ahmad M. (2017), Oil Price Fluctuations and Economic Growth in Nigeria (Evidence From Granger Causality Test) *Australasian Journal of Social Science ISSN 2251-3205.*
24. Umo, J. U. (2007): Economics-An African Perspective. (2nd Ed.), Lagos: Millennium Text Publishers.
25. Yacub, J.O. (2010) "Exchange Rate Changes and Output Performance in Nigeria: A sectorial Analysis" *Pakistan Journal of Social Sciences. 7(5): 12-19.*

DOI: 10.5281/zenodo.12599992