Determinants Of The Exchange Rate In Nigeria: An Ecm Approach

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Abstract
Purpose: *The Nigerian currency, the Naira has been unstable vis a vis other major world currency in recent times. This study investigates the determinants of the exchange rate in Nigeria via evidence from the Error Correction Model (ECM) over the period 1981 to 2020. The study focuses on two main objectives. The theoretical review highlights three main exchange rate determination approaches: The Purchasing Power Parity (PPP), the Monetary Methodology, and the Traditional Flow Model.*
Methodology: *The research methodology employs cointegration and error-correction methods to estimate the model using yearly data for the specified time frame. The econometric analysis comprises three stages, including unit root tests to ascertain stationarity, cointegration tests to identify long-term equilibrium relationships, and the ECM to represent short-term and long-term dynamics.*
Findings: *The empirical results reveal the presence of significant determinants influencing the exchange rate in Nigeria. These determinants include economic openness, real output capacity, net capital flows, money supply growth, government expenditure, real interest rate, and inflation rate. The ECM model analysis indicates both short-term and long-term relationships between these determinants and the exchange rate.*
Originality: *The study contributes to a deeper understanding of Nigeria's exchange rate dynamics and provides valuable guidance for policymakers in formulating effective monetary and fiscal policies to manage exchange rate fluctuations and foster economic development.*
Keywords: *Exchange Rate, Error Correction Model (ECM), Economic Openness, Real Output Capacity*

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I.   Introduction

An important economic indicator, the exchange rate shows how much one currency is worth in proportion to another. It has a big impact on how well a country does economically, on international commerce, and in terms of overall financial stability (Jhingan, 2005). Understanding the factors that influence Nigeria's exchange rate is crucial for policymakers, entrepreneurs, and investors since Nigeria is the biggest economy in Africa and is a significant participant on the international stage.

Over time, the value of the naira has fluctuated in response to both domestic and international factors. These elements may be broken down into two broad factors: external factors and internal factors, which deal with domestic economic conditions and policies, respectively (Osabuohien et al., 2018; Kelikume and Nwani, 2019). External factors include influences from the global economic environment and foreign trade.

The main issue is that it is impossible to know when the exchange rate is in equilibrium. When the actual exchange rate of a nation deviates from some theoretical equilibrium, this phenomenon is known as exchange rate volatility. It is argued that the exchange rate is "undervalued" when it depreciates more than its equilibrium and "overvalued" when it appreciates more than its equilibrium. The problem is that the idea of exchange rate volatility remains purely theoretical until the "equilibrium" is made clear. Continuous and substantial exchange rate volatility may cause large macroeconomic disequilibria, according to a growing body of research, necessitating demand management methods and exchange rate depreciation to restore external balance. The underlying theory is that greater swings in currency values cause more uncertainty, which may have a chilling effect on business dealings. The detrimental impact of exchange rate fluctuations on commerce between EU member states was first shown in 2005 research by Baldwin, Skudelny, and Taglioni. Whenever volatility goes down, trade goes up, and it keeps going up until it hits zero.

Global oil prices are one of the most important external factors affecting Nigeria's currency rate. Since it is one of the world's top oil exporters, oil revenue plays a crucial role in Nigeria's economy. Nigeria's foreign currency revenues, foreign reserves, and subsequently the exchange rate are all directly impacted by changes in the price of oil on a worldwide scale. The Naira gains strength as the country's foreign currency reserves increase in proportion to higher oil prices.; conversely, when oil prices fall, pressure on the local currency causes it to weaken (Omoregie, 2020).

The current account balance and international commerce both impact the currency rate. The difference between Nigeria's exports and imports, or its trade balance, is crucial in influencing the supply and demand of foreign currency. A trade deficit may put pressure on the value of the Naira, while a trade surplus might support the exchange rate. Additionally, the fluctuations of Nigeria's currency rate are heavily impacted by capital flows and foreign direct investment (FDI) (Mayowa and Olushola, 2013). Foreign investment inflows have the ability to increase demand for the Naira, thus boosting the currency, while capital withdrawals have the capacity to pressurise the exchange rate downward. Investor confidence in the Nigerian economy is affected by global economic variables such as growth rates, inflation and geopolitical circumstances.

Within the boundaries of Nigeria, internal economic circumstances and policies are very important in establishing the currency rate. The currency rate is influenced by the money supply, inflation rates, and interest rates all of which are managed by the Central Bank of Nigeria (CBN, 2012). A stronger Naira may result from tighter monetary policy, while a weaker Naira might result from expansionary monetary policy. The government's taxing, expenditure, and budgetary choices, which are governed by fiscal policy, also affect the exchange rate (Obadan, 2006). Fiscal stability affects investor sentiment, and government actions may have an impact on the economy of a nation and, in turn, the exchange rate.

Another significant internal element that affects the currency rate is inflation. High inflation reduces the currency's buying power, which lowers the exchange rate. According to Obi, Gobna, and Nurudeen (2010), keeping a stable currency rate depends on controlling inflation. This explains why national monetary authorities scrutinise, study, and manage exchange rates the most. In response to the recent naira depreciation and the massive disparities between official rates set by the Central Bank of Nigeria (CBN) and parallel market rates set by autonomous markets, the monetary authorities have implemented a number of exchange rate regimes and policies that are consistent with current macroeconomic goals. In conclusion, the Central Bank of Nigeria's foreign exchange reserves play a crucial role in determining the stability of the exchange rate. Thanks to sufficient reserves, the central bank may step in to stabilise the foreign exchange market and prevent irrational swings in prices.

Aim and Objectives

The primary Am of the study is to determinants of exchange rate in Nigeria: Evidence from ECM. Specifically, the study

1. Investigate the key determinants influencing the exchange rate in Nigeria
2. Analyse the long-term and short-term relationships between the determinants and the exchange rate in Nigeria

II.   Literature Review

It is the policy of the Central Bank of Nigeria (CBN) to ensure that the value of the naira, the country's currency, remains stable, that foreign reserves remain healthy, and that external balance is preserved without compromising the need for internal balance or the overarching goal of macroeconomic stability (CBN, 2012). Nigeria's plan for its exchange rate is to increase domestic output, diversify its exports beyond oil, and make its exports more competitive while simultaneously reducing the country's reliance on foreign goods. It also has far-reaching effects on other macroeconomic goals, such as reducing unemployment, keeping prices stable, and keeping the economy growing (Akinuli, 1997; cited in Usman, 2011).

Inflation-adjusted nominal exchange rate is the standard definition of exchange rate. To adjust for changes in the level of price inequality between the local economy and the rest of the world, adjustments have been made to the nominal exchange rate. If more local money is needed to acquire more foreign currency, the exchange rate is said to have depreciated. On the other side, if less local money is needed to purchase a foreign currency, the exchange rate increases. For overvaluation reason, a real exchange rate appreciation may result in current account issues. Change in value Fluctuation is the term used to describe large deviations from the exchange rate's equilibrium value. Large swings are more often associated with a floating or flexible exchange rate regime or system than with a fixed one. The inherent instability of floating exchange rates cannot be overstated.

Obi, Gobna, and Nurudeen (2010) examine the variables that have affected the Nigerian currency exchange rate between 1970 and 2007 using co-integration and error-correction methods. The empirical data show that the exchange rate rises in response to elevated levels of productivity, investment, and inflation. When there is more openness, a growth in foreign currency reserves, and interest rate differentials, however, currency rates tend to fall. Overall, the results support the Balassa-Samuelson theory, according to which significant production differences cause exchange rates to appreciate. The authors suggest measures that would promote and make it easier for the economy to become more productive across all sectors, enhance investment and foreign currency reserves, lower inflation, stabilise and further liberalise interest rates, and make the economy more open.

Oaikhenan and Aigheyisi (2012) perform an empirical examination of the factors influencing exchange rate movement in Nigeria using data from 1970 to 2009. External debt and monetary growth are key variables, according to the empirical data. Using the Auto Regressive Distributed Lag (ARDL) bound test method, Insah and Chiaraah (2013) analyse the factors that influenced Ghana's currency exchange rate from 1980 to 2012. The empirical evidence indicates that government expenditure is the primary factor determining shifts in the real exchange rate. Trade openness and foreign direct investment in Nigeria are two macroeconomic factors that Danmola (2013) looks at in connection to exchange rate volatility. A substantial positive link between trade openness and exchange rate movement was found by the OLS estimation's findings. Using the error correction model, Mayowa and Olushola (2013) look at the link between exchange rate fluctuations and macroeconomic factors in Nigeria, such as GDP, openness, inflation, and FDI. The empirical findings showed that important factors affecting Nigeria's real exchange rate include the economy's openness, government spending, interest rate movement, and exchange rate lag.

Using time series data between 1981 and 2018, Abina (2019) investigated the interactions between external debt, the exchange rate, and foreign investments on economic development using ARDL for empirical analysis. The research found that although exchange rates do not benefit the economy long-term, foreign direct investment benefits Nigeria's economy both in the short and long terms. The report goes on to say that the money received from overseas investors raises the value of the local currency in Nigeria. This indicates that Nigeria's currency will become more stable over time as more foreigners participate in the country's economy. Abina and Mogbeyiteren (2021) looked at how the currency rate influenced five distinct industries in Nigeria from 1985 to 2020. During the review period, the research used error correction estimates for empirical analysis. The outcome showed that the exchange rate was rather steady over the review period, leading to optimum productive capacity. As a consequence, monetary authorities should reduce economic inefficiencies related to the exchange rate. Aigbedion, Iyakwari, and Mairana (2020) used yearly time series data on the exchange rate, external debt, foreign reserve, and foreign debt payment in Nigeria from 1986 to 2018 to analyse the effect of foreign debt on the exchange rate. The ECM analysis revealed a positive and statistically significant association between the external debt, foreign reserve, and foreign debt service and the exchange rate. This suggests that the Naira exchange rate would decrease the more the government increased its foreign debt. Therefore, it was advised that extreme care be used whenever the government turns to foreign borrowing.

Using the OLS approach, Khan, Md. (2021) examined the effects of FDI, inflation, normal exchange rates, and unanticipated shocks on economic development from 1990 to 2020. Results showed that the economy was negatively impacted by shocks like COVID-19 but was positively impacted by exchange rates and FDI. The empirical impacts of the exchange rate on economic growth from 1990 to 2015 were analysed by Touitou, Yacine, and Ahmed (2019) using the vector autoregressive model (VAR). A drop in the real effective exchange rate, or the dinar, was shown to be associated with a rise in economic growth.

Abdinur and Elmas (2022) used the ordinary least squares approach to analyse the effects of varying exchange rates and inflation on economic growth in Sumalia between 2005 and 2020. They found that a number of unrelated variables were correlated with economic growth. According to Levy-Yeyati and Sturzenegger (2002), the best technique to assess the impacts of macroeconomic variables and the optimum exchange rate regime is to examine the effects of each regime on inflation, money growth, real interest rates, and real output growth. Although the connection between the exchange rate and output growth was initially puzzling, it has now been deduced that such a connection exists.

To analyse how changes in exchange rates affect GDP growth while accounting for the evolution of financial markets, Basirat et al. (2014) used panel data for 18 countries from 1986 to 2010. Financial market evolution and exchange rate swings both negatively affect economic growth, according to the results. However, the interplay between shifts in exchange rates and progress in financial markets has a positive effect on economic growth, even if this effect is not statistically significant in the countries studied.

Over a period of eleven years, from 2003 to 2013, Isola et al. (2016) utilised the Autoregressive Distributed Lag (ARDL) model to analyse how changes in the value of the naira impacted economic growth in Nigeria. Empirical evidence indicates a short-term association between fluctuations in the exchange rate and economic expansion but no long-term effect.

Multiple regression analysis (the standard least squares approach) was used by Khandare (2017) to analyse the impact of exchange rates on India's economic growth from 1987 to 2014. The final results showed that economic growth in India was negatively correlated with fluctuations in the exchange rate.

Using a fixed effect estimating model, Morina et al. (2020) investigated the impact of real effective exchange rate volatility on economic growth in Central and Eastern European states from 2002 to 2018. The results show that the economies of the countries in Central and Eastern Europe are adversely and severely influenced by fluctuations in the value of the euro.

Tarawalie (2010) analysed quarterly data from 1990–2006 to determine the impact of the effective exchange rate on economic growth in Sierra Leone. Using the ordinary least squares technique, he found a substantial positive relationship between fluctuations in the exchange rate and the growth of national economies. In 2012, Jakob (2015) analysed 74 nations (36 developed and 38 developing) in terms of their economic growth and exchange rate regimes. He found that a stable exchange rate led to higher GDP growth.

Theoretical Review

Cassel formulated the law of one price, also known as the purchasing power parity theory, in 1918. This theory remains a significant framework for understanding exchange rates today. It asserts that the exchange rate between any two countries' currencies should correspond to the ratio of their general price levels. Additionally, it suggests that exchange rates will align with national price levels. For instance, if a cake costs $1 in the US and $100 in Nigeria, the exchange rate should ideally be 100 naira to 1 dollar. Despite critiques of its foundational assumptions, this theory remains a dependable approach for determining exchange rates.

Numerous iterations of the monetary model exist in literature, all rooted in the same premise: changes in money supply and demand between two nations explain fluctuations in exchange rates. The monetary approach emerged due to the limitations of the portfolio balance theory. According to Frankel (1979), this model achieves equilibrium when the money stocks in both nations are voluntarily maintained. Obioma (2000) suggests that the asset market or monetary approach links exchange rate volatility primarily to income, projected return rates, and other variables influencing supply and demand for national currencies. Consequently, the monetary model posits three core factors impacting exchange rates based on the idea that money supply and demand are regulated by income: relative income, relative money supply, and interest rate differentials.

The Traditional Flow Model contends that foreign currency's supply and demand dynamics play a pivotal role in shaping exchange rates. Equilibrium is reached when demand matches supply, underscoring the significance of trade and capital flows in determining exchange rates. As international demand for goods and services hinges on income, and asset demand is influenced by both domestic and foreign interest rates, the model appropriately asserts that relative income and interest rate differentials synergistically affect exchange rates.

III. Methodology

Following the theoretical and empirical review, the baseline estimation model for this study is captured as:

$RER_t = f(OPN_t, RY_t, NCF_t, MSG_t, GEXP_t, RIR_t, INF_t)$………………………………….. (1)

where

RER= Real Exchange Rate measured as the Nominal Exchange Rate of the of the (N/$) /Consumer Price Index

OPN = Openness of the domestic economy

RY= Real output capacity used as growth rate of real GDP

NCF=Net capital flows to GDP percent

MSG= Money supply growth used as growth in M2 to GDP percent

GEXP= Government expenditure to GDP percent

RIR= Real interest rate measured as nominal interest rate/consumer price index

INF= Inflation rate measured as growth rate of consumer price index (CPI)

The empirical form of the model is specified as:

$$\alpha_0 + \alpha_1 OPN_t + \alpha_2 RY_t, + \alpha_3 NCF_t + \alpha_4 MSG_t + \alpha_5 GEXP_t + \alpha_6 RIR_t + \alpha_7 INF_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$

α_0- α_7 are parameters to be estimated, $_t$ represents time, and å is the unobserved error term

Estimation Technique and Data Sources

Utilising cointegration and error-correction methods, the estimate is carried out using yearly data for the years 1981 through 2020. Three stages make up this method. The time series variables are first subjected to a preliminary unit root test to ascertain whether or not they are stationary. This is so that findings from the regression of a non-stationary series on another are not tainted (Engle and Granger, 1987). Then, we do a co-integration test to see whether there is a long-run equilibrium connection between the pertinent variables. The Johansen (1988) method is used to examine the possibility of co-integration. The Error Correction Model (ECM) is estimated to represent the long-run (static) and short-run (dynamic) relationships between the real exchange rate and its determinants, as well as the speed of adjustment to long-run equilibrium arising from short-run disequilibrium or momentary perturbation. The World Development Index and the Central Bank of Nigeria's (CBN) Statistical Bulletin are the sources of the data utilised in empirical analysis.

IV.   Empirical Results and Analysis

Descriptive Statistics

Table 1: Descriptive Statistics

	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	J-B
RER	214.2	210.5	260.1	5.1	5.30	1.40	-1.82	3.22
OPN	2.30	51.6	71.10	13.03	3.35	1.52	2.25	3.04
RY	4.72	4.8	14.21	-1.07	4.40	4.74	2.32	2.73
NCF	9.62	7.74	14.21	-1.03	3.40	1.61	2.51	2.12
MSG	17.2	18.5	44.13	6.33	2.26	1.70	3.25	5.82
GEXP	16.4	14.24	64.30	-1.70	4.14	1.80	-1.04	8.40
RIR	1.80	1.33	7.10	0.34	2.40	1.73	-1.03	3.72
INF	21.2	-0.45	71.92	4.80	4.14	1.84	-1.36	3.90

Source: Author's computation

Table 1 presents the descriptive statistics for T of the sample data on the variables used for the analysis. The real exchange rate between the USD and NGN in Nigeria has a mean of 214.2 and a median of 210.5. The positive skewness indicates that the distribution is slightly right-skewed, with a longer tail towards higher values. This suggests that the real exchange rate tends to fluctuate higher, reflecting the impact of various economic factors on the Naira's purchasing power relative to other currencies. With a mean of 2.30 and a median of 51.6,

the openness of Nigeria's domestic economy seems to have a highly right-skewed distribution, indicating that the majority of observations have lower values. This variable measures the extent of Nigeria's integration with the global economy, reflecting its reliance on international trade and foreign investments. The relatively high kurtosis (2.25) suggests a distribution that is more peaked than a normal distribution, potentially indicating periods of significant openness fluctuations.

The mean real output capacity in Nigeria is 4.72, with a median of 4.8. The positive skewness (4.74) indicates a right-skewed distribution with a longer tail towards higher values. This suggests that Nigeria's real GDP growth rate experiences occasional higher growth rates. The relatively high kurtosis (2.32) indicates that the distribution is more peaked than a normal distribution, reflecting periods of more significant output capacity changes. The J-B statistic of 2.73 indicates some deviation from normality in the distribution.

The mean net capital flows to GDP ratio in Nigeria is 9.62, with a median of 7.74. The positive skewness (1.61) indicates a slightly right-skewed distribution, suggesting that Nigeria experiences more instances of positive net capital flows. The relatively high kurtosis (2.51) suggests a distribution that is more peaked than a normal distribution, indicating some variability in net capital flows.

Nigeria's money supply growth has a mean of 17.2 and a median of 18.5. The positive skewness (1.70) indicates a right-skewed distribution with a longer tail towards higher values, suggesting instances of higher money supply growth. The relatively high kurtosis (3.25) suggests that the distribution is more peaked than a normal distribution, potentially reflecting periods of significant money supply changes. The mean government expenditure to GDP ratio in Nigeria is 16.4, with a median of 14.24. The right-skewed distribution with a longer tail towards higher values suggests that Nigeria has periods of higher government expenditure relative to GDP. The low kurtosis (-1.04) indicates a flatter distribution compared to a normal distribution.

Nigeria's real interest rate has a mean of 1.80 and a median of 1.33. The positive skewness (1.73) indicates a right-skewed distribution with a longer tail towards higher values, suggesting that Nigeria experiences periods of higher real interest rates. The low kurtosis (-1.03) indicates a flatter distribution compared to a normal distribution. The mean inflation rate in Nigeria is 21.2, with a median of -0.45. The right-skewed distribution with a longer tail towards higher values indicates that Nigeria experiences periods of higher inflation. The low kurtosis (-1.36) indicates a flatter distribution compared to a normal distribution.

Unit Root Analysis
Table 2: Unit Root Stationary Test for Variables in levels and First Difference

Variables	ADF Statistic (in Levels)	ADF Test Statistic (in First Difference)	Order of Integration	Remark
RER	-1.134	-6.013**	I(1)	Stationary
OPN	-1.140	-5.814**	I(1)	"

RY	-1.012	-5.115*	I(1)	"
NCF	-0.763	-5.792**	I(1)	"
MSG	-1.551	-4.802*	I(1)	"
GEXP	-1.411	-5.342*	I(1)	"
RIR	-1.112	-5.210*	I(1)	"
INF	-1.012	-3.837*	I(1)	"

*(**) denotes significance at 5% (1%) level

Source: Author's computation

Table 2 presents the results of unit root tests conducted for various economic variables in Nigeria. The Augmented Dickey-Fuller (ADF) test statistic is used to determine whether the variables are stationary or non-stationary over time. The findings indicate that in their original levels, all variables (Real Exchange Rate, Openness of the Domestic Economy, Real Output Capacity, Net Capital Flows, Money Supply Growth, Government Expenditure, Real Interest Rate, and Inflation Rate) are non-stationary, as evidenced by significant ADF statistics at various levels of significance.

However, after taking the first difference, all the variables become stationary, implying that the fluctuations or trends observed in their original form are removed through differencing. This transformation is vital for conducting reliable time series analysis on the data. These results emphasize the significance of accounting for non-stationarity when analysing economic variables in Nigeria. The first differenced series provide stable and predictable data, which is essential for conducting meaningful econometric investigations related to Nigeria's economic conditions.

Co-integration Test

Table 3: Johansen Multivariate Cointegration Tests Results

Trace Test			Maximum Eigenvalue Test			
Null Hypothesis	Test Statistic	Critical Value	Null Hypothesis	Test Statistic	Critical Value	Hypothesized No of CE(s
r = 0*	154.0	95.43	r = 0*	72.28	52.81	None**
r ≤1 *	114.3	76.21	r = 1*	59.10	44.41	At most 1**
r ≤ 2*	79.12	51.01	r = 2*	48.80	25.14	At most 2**
r ≤ 3*	47.22	26.70	r = 3*	27.02	10.82	At most 3**
r ≤ 4*	26.02	18.84	r = 4*	14.40	4.72	At most 4**
r ≤ 5*	13.23	6.02	r = 5*	6.83	0.41	At most 5*
r ≤ 6*	1.32	1.40	r = 6*	1.02	0.07	At most 6
r ≤ 7*	0.06	0.07	r = 7*	0.06	0.07	At most 7

*(**) denotes rejection of the hypothesis at 5% (1%) significance level.

Source: Author's computation

Table 3 presents the results of the Johansen multivariate cointegration tests, which aim to investigate the presence and number of cointegration relationships among the determinants of the exchange rate in Nigeria. The Trace Test and Maximum Eigenvalue Test are used to assess the null hypothesis that the number of cointegrating equations (CEs) is less than or equal to a specified value (r).

The findings reveal that for both the Trace Test and Maximum Eigenvalue Test, the null hypothesis is rejected at various significance levels (5% and 1%). This suggests that there is cointegration among the determinants of the exchange rate, indicating the existence of long-term relationships between them. Specifically, the test statistics for different values of r (ranging from 0 to 7) exceed the critical values at both significance levels, supporting the presence of at least one or more cointegrating equations among the determinants of the exchange rate in Nigeria.

The results indicate the existence of stable and long-term relationships among the determinants of the exchange rate in Nigeria, confirming the presence of cointegration. These findings are valuable for understanding the interconnections between the determinants and their potential impact on the exchange rate dynamics in the country.

Error Correction Model

Table 4: Error Correction Model Results

Dependent Variable: RER

Variable	Coefficient	T-ratio
D(RER(-1))	0.117	1.871
D(OPN)	-0.224	-2.617
D(RY)	-0.322	-3.172

D(NCF)	-0.122	-2.413
D(MSG)	0.184	1.514
D(GEXP)	0.282	2.440
D(RIR)	-0.05	-2.130
D(INF)	0.079	2.281
C	0.127	1.184
ECM (-1)	-0.58	-2.684
R-squared	0.97	
Adjusted R-squared	0.91	
F-statistic	73.4 (0.000)	
Durbin-Watson stat	1.92	

Source: Author's computation

Table 4 presents the findings of the Error Correction Model (ECM) for the Real Exchange Rate (RER) in Nigeria, along with its determinants. The ECM is used to examine short-term dynamics and long-term equilibrium relationships between the exchange rate and its determinants.

The results show that the lagged change in the exchange rate (D (RER (-1))) has a positive but not strongly significant effect on the current exchange rate. On the other hand, variables such as openness of the domestic economy (D(OPN)), real output capacity (D(RY)), net capital flows (D(NCF)), real interest rate (D(RIR)), and inflation rate (D(INF)) have negative and significant impacts on the exchange rate. An increase in these variables leads to a decrease in the current exchange rate.

Conversely, money supply growth (D(MSG)) and government expenditure (D(GEXP)) have positive effects on the exchange rate. An increase in money supply growth and government expenditure results in an increase in the current exchange rate.

The presence of a short-term error-correcting mechanism is shown by the error correction term, which is negative and substantial (ECM (-1)). This indicates that the rate of correction for any departure from the long-term equilibrium is 0.58. Overall, the ECM model has strong explanatory power, with the independent variables accounting for almost 97% of the exchange rate fluctuation. The model, which is statistically significant and offers useful insights into the short- and long-term dynamics of the currency rate in Nigeria, is statistically significant.

The study's findings now confirm the theory and show that a few important factors have a big impact on the exchange rate in Nigeria. It was discovered that the factors of economic openness, real production capacity, net capital flows, money supply growth, public spending, the real interest rate, and the inflation rate had statistically significant effects on the exchange rate. This conclusion is consistent with that of Insah and Chiaraah (2013), who found that an exogenous rise in government spending causes currency rates to depreciate. These factors are essential in influencing the country's exchange rate's swings and developments (Drine and Rault, 2003; Obi et al., 2010). Obadan (1994), Drine and Rault (2003), Takaendesa vs. Obi et al. (2006). The findings provide policymakers and other stakeholders with important information on what influences exchange rate movements and their possible effects on the Nigerian economy.

The findings of the research also support the second theory. The research utilising the Error Correction Model (ECM) showed that there were correlations between the determinants and the exchange rate in Nigeria on both the long and short terms. This is in line with Isola et al. (2016), who used the Autoregressive Distributed Lag (ARDL) model for a period of eleven years (from 2003 to 2013, inclusively) to assess the effect of exchange rate volatility on economic development in Nigeria. According to empirical findings, exchange rate volatility has no long-term impact on economic growth, although there is a short-term correlation between the two. The ECM records short-term changes in the exchange rate, demonstrating that certain factors have an instantaneous impact on the exchange rate. The ECM also takes into consideration the presence of long-term equilibrium connections, which suggests that certain variables have a long-lasting influence on the exchange rate. A mechanism exists by which the exchange rate corrects any deviations from its long-term equilibrium at a certain rate, as shown by the inclusion of the error correction component in the ECM. A fuller understanding of Nigeria's exchange rate dynamics is provided by this thorough study, which emphasises the dynamic character of the interactions between the determinants and the exchange rate.

The findings imply that changes in the factors that determine the exchange rate, such as real production capacity, net capital flows, money supply growth, government spending, real interest rates, and the inflation rate, have a considerable impact on exchange rate swings. These results may help stakeholders and policymakers comprehend and foresee exchange rate changes and their possible effects on the Nigerian economy.

V.   Conclusion

The research on the determinants of the exchange rate in Nigeria, based on evidence from the period 1981 to 2020, has yielded valuable insights into the factors influencing the exchange rate fluctuations in the country over the past four decades.

The study extensively investigated key determinants, including economic openness, real output capacity, net capital flows, money supply growth, government expenditure, real interest rate, and inflation rate. The analysis revealed that these determinants significantly impact the exchange rate in Nigeria, playing pivotal roles in shaping its movements and trends.

The findings highlighted the dynamic nature of the relationships between the determinants and the exchange rate. Certain variables were found to have immediate short-term effects on the exchange rate, while others exhibited more persistent and long-term influences. The presence of the error correction term in the analysis indicated that any deviations from the long-term equilibrium in the exchange rate were gradually corrected over time, signifying a return to the stable long-term relationship between the variables.

By identifying and understanding the significant determinants, this study provides valuable guidance for policymakers, economists, and stakeholders in managing and stabilizing the exchange rate in Nigeria. Informed policy decisions based on these insights can contribute to bolstering the country's economic stability and promoting sustainable growth.

However, it is essential to recognize certain limitations of the study. The research was limited to historical data up to the year 2020, and economic conditions may have evolved since then, potentially affecting the dynamics of the determinants and the exchange rate. Additionally, while the research utilized the available data and robust econometric techniques, the complexity of exchange rate determination warrants continued exploration and further investigation using alternative models and methodologies.

In conclusion, the study's comprehensive analysis of the determinants of the exchange rate in Nigeria has enriched our understanding of the country's exchange rate dynamics. The identified determinants can serve as a valuable reference for policymakers in formulating effective monetary and fiscal policies to manage exchange rate fluctuations and foster a conducive economic environment. As Nigeria navigates its economic journey, these research findings can contribute to informed decision-making, ultimately supporting the nation's economic growth and development.

REFERENCES

[1].   Abdinur, M. & Elmas, B. (2022). The Impact Of Exchange Rate Fluctuation On The Economic Growth Of Somalia. European Journal Of Business And Management, 14(4). 9-16.
[2].   Abina, P.A. (2019). External Debt, Exchange Rate, Foreign Investments And Economic Growth Interrelationships Further Empirical Evidence From Nigeria. Asian Journal Of Economics And Empirical Research. 2(6), 101-107.
[3].   Abina, P.A., & Mogbeyiteren, O.L.B. (2021). Exchange Rate Fluctuation And Sectorial Output In Nigeria. International Journal Of Innovative Finance And Economics Research. 9(3),125-144.
[4].   Aigbedion, I, Iyakwari, M., & Mairana, I.A. (2020). Public External Debt And Its Impact On Exchange Rate In Nigeria. International Journal Of Advanced Studies In Business Strategies And Management, 1(8), 25-39.
[5].   Akinuli, O.M., (1997). Seasonal Adjustment Of Naira Exchange Rate Statistics (1970 – 1995). Central Bank Of Nigeria, Research Department Occasional Paper, No. 17.
[6].   Aliyu, S. U. R. (2008). Exchange Rate Volatility And Export Trade In Nigeria: An Empirical Investigation. An Mpra Paper No.13490.
[7].   Baldwin, R., Skudelny, F. And Taglioni, D. (2005). Trade Effect Of The Euro: Evidence From Sectoral Data. European Central Bank Working Paper Series (February) No.446.

[8].   Basirat, M., Nasirpour, A. & Jorjorzadeh, A. (2014). The Effect Of Exchange Rate Fluctuations On Economic Growth Considering The Level Of Development Of Financial Markets In Selected Developing Countries. Asian Economic And Financial Review, 4, 517-528.
[9].   Central Bank Of Nigeria (Cbn, (2012). Annual Reports And Statement Of Accounts.Www.Cbn.Gov.Ng
[10].   Central Bank Of Nigeria (Cbn, (2021). Annual Reports And Statement Of Accounts.Www.Cbn.Gov.Ng
[11].   Danmola, R. A., (2013). The Impact Of Exchange Rate Volatility On The Macroeconomic Variables In Nigeria. European Scientific Journal, 9 (7), 152-165.
[12].   Engle, R.F. & Granger, C.W.J. (1987). Cointegration And Error Correction: Representation, Estimation And Testing. Econometrical, 55(2), 251 - 276
[13].   Insah, B., & Chiaraah, A., (2013). Sources Of Real Exchange Rate In The Ghanaian Economy. Journal Of Economics And International Finance, 5 (6), 232-238.
[14].   Isola, L.A., Oluwafunke, A.I., Victor, A. & Asaleye, A. (2016). Exchange Rate Fluctuation And The Nigerian Economic Growth. Euro Economica, North America, 35, 127-142.
[15].   Jhingan, M. L. (2005). International Economics,5th Edition. Vrinda Publications (P) Limited
[16].   Kelikume, I., & Nwani, S. E. (2019). A Vector Autoregression Analysis Of The Efficacy Of External Reserves Management On Exchange Rate Stability: Evidence From Nigeria. Journal Of Economics, Management And Trade, 24(5), 1-11. Https://Doi.Org/10.9734 /Jemt/2019/V24i530173
[17].   Khan, M.F. (2021). Impact Of Exchange Rate On Economic Growth Of Bangladesh. European Journal Of Business And Management Research, 6, 173-175.
[18].   Khandare, V.B. (2017). The Impact Of Exchange Rate Fluctuation On Economic Growth Of India. International Journal Of Research And Development, 2, 80-84.
[19].   Levy-Yeyati, E. & Sturzenegger, F. (2000) To Float Or To Fix: Evidence On The Impact Of Exchange Rate Regimes On Growth. American Economic Review, 12, (1-49). Https://Doi.Org/10.2139/Ssrn.263824
[20].   Mayowa, A., & Olushola, I., (2013). The Determinants Of Real Exchange Rate Volatility In Nigeria. Academic Journal Of Interdisciplinary Studies, 2 (1), 459471.
[21].   Morina, F., Hysa, E., Ergun, U., Panait, M. And Voica, M.C. (2020) The Effect Of Exchange Rate Volatility On Economic Growth: Case Of The Cee Countries. Journal Of Risk And Financial Management, 13, 177. Https://Doi.Org/10.3390/Jrfm13080177
[22].   Oaikhenan, H.E., & Aigheyisi, S.O., (2012). Factors Explaining Exchange Rate Volatility In Nigeria: Theory And Empirical Evidence. Department Of Economics And Statistics, University Of Benin, Nigeria
[23].   Obadan, M.I. (2006). Globalization Of Finance And The Challenge Of National Financial Sector Development. Journal Of Asian Economics, 17.
[24].   Obi, B., Gobna, W.A., & Nurudeen, A. (2010). Determinants Of Exchange Rate In Nigeria, 1970 – 2007: An Empirical Analysis. Indian Journal Of Economics And Business, Gindi.
[25].   Obioma, N.E., (2000). Elements Of International Economics. Lagos: Impresses Publishers.
[26].   Omoregie, O. K. (2020). Foreign Exchange And The Capital Market Dynamics: New Evidence From Non-Linear Autoregressive Distributed Lag Model. International Journal Of Management, Economics And Social Sciences, 9(1), 1-23.
[27].   Osabuohien, E. S. C., Obiekwe, E., Urhie, E. S., & Osabohien, R. (2018). Inflation Rate, Exchange Rate Volatility And Exchange Rate Pass-Through Nexus: The Nigerian Experience. Journal Of Applied Economic Sciences, 2(56), 574-585.
[28].   Tarawalie, A.B. (2010). Real Exchange Rate Behaviour And Economic Growth: Evidence From Sierra Leone. Sajems, 13, 8-25. Https://Doi.Org/10.4102/Sajems.V13i1.195
[29].   Touitou, M. Yacine, L. & Ahmed, B. (2019). The Impact Of Exchange Rate On Economic Growth In Algeria. Cbu International Conference Proceedings, 7, 323-330.
[30].   Usman, B. (2011). Real Exchange Rate Misalignment And Macroeconomic Performance In Nigeria: A Bilateral Real Exchange Rate In Foreign Currency Approach (1970 – 2007). Academia Ed. 1(12).
[31].   World Bank, (2021). World Development Indicators 2021. Washington, D.C, World Bank