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EFFECT OF INTEREST RATES AND EXCHANGE RATE ON ECONOMIC GROWTH OF NIGERIA

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ABSTRACT: This study investigated the effect of interest rates and exchange rate on economic growth of Nigeria. The dependent variable is real gross domestic product while the independent variables were savings deposit rate, prime lending rate, exchange rate and total investment. The data spanned the period 1981-2021. The data were sourced from the CBN Statistical bulletin 2021 edition and analysed using the Error Correction Model (ECM) technique. The variables were found to be stationary at first difference and cointegrated hence the adoption of the ECM technique in estimating the model parameters. The result revealed that prime lending rate and exchange rate decreased economic growth of Nigeria for the period reviewed but only exchange rate decreased growth significantly. However, savings deposit rate and investment increased economic growth but only investment increased growth significantly. The model estimated a speed of adjustment of 16.4 percent and a model fitness of 90.03 percent. The conclusion emanating from the study was that both prime lending rate and exchange rate had decreasing effects on the Nigerian economy. The positive and significant effect of investment on growth proved the doggedness of public and private investors in the face of rising prime lending rate and risings exchange rate of the local currency. Part of the recommendations Were that savings deposit rate should be relatively increased through the monetary policy rate to discourage stacking there by making funds available in deposit money banks for investment in the real sector and that the CBN should maintain a single digit prime lending rate while ensuring that bank rate is also stabilized to avoid sudden changes or volatility to both prime lending rate and exchange rate.

Keywords: Economic Growth, Error Correction Model, Exchange Rate, Prime Lending Rate, Savings Deposit Rate.

INTRODUCTION

Savings deposit rate has the potential of attracting foreign financial investment, spurs capital accumulation from both local and international investors and motivates foreign investors to invest into the financial market of an economy, making them demand for the country's currency in the international foreign exchange market. When the demand gains momentum, all things being equal, it strengthens the currency of the country and thus, makes the currency appreciate (Babalola, 2021). In theory, interest rates are in relationship with the exchange rate through the inflow and outflow of capital. In this regard, interest rates would have significant impact on foreign exchange which has direct effect on economic growth. Interest rates are under strict control, worldwide and vary from one country to the other. Also, many countries run floating exchange rate policy while others like Nigeria run a managed-floating system. Some researchers submitted that increase in the savings deposit rate in a local market will make the foreign exchange rate of the local currency to increase.

In Nigeria, prior to the dramatic change in exchange rate management policy in the wake of the economic reform programme that began in July 1986, the supply of foreign exchange to the economy was heavily subsidized through the overvaluation of the domestic currency. In the years of abundant foreign exchange earnings, for example 1974 – 1980, the impact of this subsidy was felt mainly on the consumption side (CBN, 2021). During this time, the Nigerian government employed the use of administrative fiat in managing the interest rate. Also, the apex bank fixed interest and other banking charges. Consequently, prime lending rate increased from 6.25% in 1981 to 21.75% in 1990. Osahon (2021) attributed this increase to the spike in inflation rate above 50% at the period. Similarly, exchange rate followed a gradual increase from an average of N21.89 in the early 1990s to N101.7 in the year 2000. At this period, prime lending rate had reached 16.3%.

According to Elumelu (2020), CBN's monetary policy pronouncements tend to be more reactionary to development in the Nigerian economy. The policy pronouncements were also anchored on Demand Management Techniques with the rapid case of structural rigidities/bottlenecks in the Nigerian economy. The pressure on the daily Inter-Bank Foreign Exchange Market has continued to be on the increase and this has resulted in the instability of the naira exchange rate, while the gap between the official and the parallel markets continues to widen. The pressure on the official exchange rate put the naira at ₦148.3 in 2010 while prime lending rate dropped to 5.67% same year. With a fairly constant monetary policy rate at 13.5%, banks have adjusted savings deposit rate to below 10% while official exchange rate has continued to increase with the exchange rate ending at ₦401 to one dollar as at the end of the year 2021.

Statistical evidence has shown that exchange rate and prime lending rate volatility have grown overtime and such economic variations can result in significant depreciation in the value of assets invested by investors in the host country as well as the future profits created by the investment. Due to the high degree of volatility in the prime lending rate and exchange rate, investments in a country like Nigeria would have a more uncertain stream of returns. (Monogbe & Okah, 2017). Thus, there is a very interesting relationship existing between exchange rate, prime lending rate and economic growth and it is the aim of this research to investigate the interplay of these variables in order to ascertain their possible outcome and effect on the economy of Nigeria.

Academicians have linked the effects of change in interest rates to changes in other variables like money supply, investment, savings, consumption, unemployment, employment and exchange rate among others. There are series of nagging questions which seem to have no clear answers. Does the interest rate and exchange rate have positive influence on the economy of Nigeria? Just as Musa and Sanusi (2020) rightly put it that, the argument still continues on whether monetary policy could be used to regulate economic growth or not, in a floating exchange rate policy or managed-floating like what is obtainable in Nigeria. Various literature has confirmed the positive effect of interest and exchange rates on other economic indicators like private capital flows (Karimo, 2020), on the manufacturing sector (Douglas, Eche & Adi, 2022), on the informal sector (Osahon, 2021), on the capital market (Owolabi & Adegbite, 2016; Adedoyin & Iyiola, 2018) etc. There has been little or no study linking interest rate, exchange rate and economic growth in Nigeria especially using other varieties of interest rates such as Prime lending rate and savings deposit rate. Thus, this study is very important, especially when the interest rates are put into play fully, as this study will do.

The impact of savings deposit rates on the Naira exchange rate is important because it sensitizes the government on how significant the influence of the money market rates is on the exchange rate, bearing in mind the present rate of rapid depreciation of the naira against stable currencies such as the US dollar, the Pound and the Euro. In essence, this study will indicate the mechanism that, when money market rates (Savings deposit rates) increase, there will be sustained growth in the economy. However, this rate had been on the decline which made supposed savers stack money outside money deposit banks.

Generally, high interest rates on loanable fund which is referred to as prime lending rates are believed to increase the cost of capital which invariably discourages investors from borrowing more capital, and consequently discourages Local and Foreign Direct Investment. This seemingly suggest that a reasonable level of economic growth could be attained with a minimal level of prime lending rates which further encourages currency exchange and thus attract foreign investors. However, the application of this economic analogy is subject to empirical investigation which this study intends to solve. Thus, knowledge of the nexus between prime lending rate, savings deposit rate, exchange rate and economic growth with the intervening effect of investment is very exigent at this point so as to solve myriads of policy inconsistencies and findings which have been seen in this area of research. This raises the following critical research questions:

a. What is the effect of savings deposit rate on Nigeria's economic growth?
b. What is the effect of prime lending rate on Nigeria's economic growth?
c. To what extent has exchange rate affected economic growth of Nigeria?
d. How has total investment affected the growth of the Nigerian economy?

In order to address these critical research questions, this study aims at achieving the following objectives:

i. To determine the effect of savings deposit rate on Nigeria's economic growth;
ii. To ascertain the effect of prime lending rate on Nigeria's economic growth;
iii. To investigate the extent to which exchange rate has affected economic growth of Nigeria.
iv. To analyse the effect of total investment on the growth of the Nigerian economy.

The significance of this study is anchored on its relevance to current economic realities in Nigeria. Economic stakeholders, the academic community and numerous researchers, government and key policymakers as well as the general public will see useful insight from this study because it will serve as knowledge frontier, reference material, policy guide and knowledge tool to these categories of persons. The scope is within the period of 1981- 2021 focusing specifically on savings deposit rates, prime lending rate, exchange rate, investment and gross domestic product (GDP) of Nigeria.

LITERATURE REVIEW

Conceptual Literature Review

Interest Rate

Interest rate is the reward for not hoarding but for parting with liquidity for a specific period of time (Keynes, 1923 in Owolabi et al, 2016). Keynes' definition of interest rate focuses more on the savings deposit rate. Interest rate is seen from the angle of prime lending rate which is the cost of borrowing and savings deposit rate which is the reward of not using one's money for current consumption. Babalola (2021) also referred to interest rate as the reward for not using up all one's money for current consumption or the cost of obtaining loan. The Neo-classicals on the other hand believed that interest rate is determined by the demand and supply for Loanable funds or credits. They are of the opinion that the price of credit is determined by the demand and supply of loanable funds and Keynes on the other hand defines interest as a reward of not hoarding but the reward of parting with liquidity for the specific period (Jhingan, 2013).

Adebiyi (2017) defines interest rate as the return or yield on equity or opportunity cost of deferring current consumption into the future. Some examples of interest rate include the savings deposit rate, prime lending rate, and the discount rate (Owolabi et al 2016). According to Mundell-Fleming model, an increase in interest rate is necessary to stabilize the exchange rate depreciation and to curb the inflationary pressure and thereby helps to avoid many adverse economic consequences.

The high interest rate policy is considered important for several reasons.

1. It provides the information to the market about the authorities' resolve not to allow the sharp exchange rate movement that the market expects given the state of the economy and thereby reduce the inflationary expectations and prevent the vicious cycle of inflation and exchange rate depreciation.
2. It raises the attractiveness of domestic financial assets as a result of which capital inflow takes place and thereby limiting the exchange rate depreciation.
3. It not only reduces the level of domestic aggregate demand but also improves the balance of payment position by reducing the level of imports. The behaviour of interest rates, to a large extent, determines the investment activities and hence economic growth of a country. Investment depends upon the rate of interest involved in getting funds from the market, while economic growth to a large extent depends on the level of investment.

The behaviour of that of the prime lending rate to a large extent determines the level of investment and subsequently level of economic growth. This is because the investment depends on the cost of the fund from the market. Meanwhile, the economic growth to a large extent depends on the level of investment. According to Jhingan (2003), if the prime lending rate is on the high side, the investment will be low. Vice versa, if the prime lending rate falls, the investment will rise. Therefore, to achieve the desired growth in the economy, there is the need to promote the interest rate regime that will ensure the moderate cost of fund for necessary investment in the economy.

Exchange Rate

According to Babalola (2021), the exchange rate is the amount of Nigerian naira that can be exchanged for the US dollar. The rate or value of Nigerian naira has effect on the prices of goods and services that would be sold to international trading partners. Devereux and Engel (2003) assert that free exchange rates allow for the adjustment of relative prices when goods prices are sluggish.

The concept of exchange rate has been described from different perspectives by researchers. However, the price which a unit of domestic currency is converted to a unit of foreign currency is referred to the foreign exchange rate (Jhingan 2003). Due to some factors, the foreign exchange rate of a country's currency can appreciate or depreciate in relation to another currency over time. Even though the depreciation will reduce the purchasing power of the currency in the international market, appreciation can lead to the current account problems. This can result in the overvaluation of the currency.

In the real sense of the world, the perfect situation described in economic theory does not exist and so Elumelu (2020) outlined four major mechanisms for managing/ determining the exchange rate:

a. Monetary unification: Integration with other nations e.g., the EU. The power to issue currency is surrendered to the supernatural body and member countries are usually made to align their economies to meet the set conditions, i.e., convergence test.
b. Fixed Exchange Rate system: In a fixed rate regime, the government sets the rate at which the currency will exchange for other currencies. The currency is supported by the government and is usually protected with Exchange Controls. Nigeria practiced this in the 1980s. The assumption here is that market failure exists and the forces of demand and supply cannot be trusted to effectively allocate resources in ways that best promote the stated economic objectives.
c. Freely floating rate system: Here the external value of the national currency is left to be determined exclusively by the forces of demand and supply. lf demand for the country's currency (represented by the demand for its exports by other nationals) is high, its price - exchange rate -must be high. The reverse holds if the supply of the national currency (which is mirrored by demand for imports the residents of the importing country) is relatively high, the currency will be cheap.
d. Managed-Floating Exchange Rate system: This is an exchange rate management system within set limits or boundaries (dirty float). Here, the government sets the exchange rate with upper and lower limits. Under this situation, the government sets the exchange rate, but allows some degree of flexibility for rate adjustment. Therefore, the dirty float system tries to combine the features of both fixed and floating exchange rate regimes.

Interest Rate, Exchange Rate and Investment Nexus

According to Jhingan (2013), if interest rate such as the prime lending rate is high, investment is at low level and when prime lending rate falls, investment will rise. There is therefore a need to promote an interest rate regime that will ensure "inexpensive" spending for investment and consequently enhancing economic growth at low financial cost. Additionally, financial repression, largely manifested through indiscriminate distortion of financial prices including

prime lending rates has tended to reduce the real rate of growth and the real size of the financial system. The resulting low or negative savings deposit rate discourages savings mobilization and channelling of mobilized savings through the financial system and this invariably has negative impact on the quantity and quality of investment and hence economic growth in view of the empirical link between savings, investment and economic growth. It is a known fact that the investment that promotes economic growth and development requires long term funding, far longer than the duration for which most savers are willing to commit their funds.

According to Vaish (2000) the demand for capital consists of the demand for productive and consumptive purpose. Capital is demanded by the investors because it is productive. But the productivity of capital is subject to the law of variable proportions (additional units of capital are not productive as their earlier units). However, according to Jhingan (2013), the supply of capital depends upon savings rather upon the will to save and the power to save of the community. Some people save irrespective of the rate. They would continue to save even if the rate of interest were zero. There are others who save because the current rate of interest induces them to save and reduce when the rates are low. The higher the rate of interest, the larger the community savings and more will be the supply of funds. The supply curve of capital or the savings curve moves upward to the right. If the rate of interest paid by banks to depositors is increased, investors will patronize the banks there by leading to the availability of funds for borrowers willing to invest in the real sector that will lead to increased output.

Interest and exchange rates are financial prices for credit and foreign currencies, respectively. They both affect resource allocation, production levels, prices and profitability (Akingunola & Adekunle, 2012). According to them, fluctuations in these reflect in share prices – an indicator of market performance. For instance, lowering of interest rate on demand and savings deposits will improve returns to investing on the exchange relative to investing in deposit money banks (DMBs) holding factors such as risk, transaction costs, etc. constant. This will therefore increase the demand and share price of affected equities on the exchange thereby affecting its performance (Akingunola & Adekunle, 2012).

Theoretical Literature Review

The Resource Gap Theory and Interest Rate Parity Theory

Two theories of interest rate in this regard are considered and they are the Resource Gap (RG) and Interest Rate Parity (IRP). The Resource Gap, developed by Chery and Stout (1966) contends that it is the deficits in domestic resources in meeting investment and consumption requirements that push economies to seek capital somewhere else. Interest rate parity (IRP) is the main theory that explains the relationship between exchange rate and interest rate. The Interest Rate Parity theory, formulated by Keynes (1923) basically suggests that the difference in interest rates between two countries is equal to the difference between the forward and spot exchange rate. IRP is either uncovered or covered, depending on the existence or non-existence of a forward contract. One of the traditional and an important approach to short-term exchange rate determination is the uncovered interest rate parity theory (Kurihara, 2015). This theory in general assumes that exchange rates rapidly modify to changes in relative interest rates between two currencies so as to eliminate arbitrage opportunities. IRP is covered when there is no arbitrage even with the use of a forward contract. In the covered IRP, investors would be indifferent on whether to invest in the interest rate of their home economy or foreign country interest rate. The change in interest rates differences among international financial markets, in

turn, tends to reflect changes in expected future economic fundamentals that are related to exchange rate determination.

The Resource Gap Theory which is attributed to Chenery and Stout (1966) and expanded by Thirlwall (1976) argues that domestic savings do not always equal investment. Thus, when savings fall short of investment, a savings-investment gap emerges. To bridge this gap, the government would either borrow from the home economy or from overseas thereby creating a foreign exchange gap. This is the amount by which the investment requirement falls short of the foreign exchange earnings. The difference between these two gaps determines the source of funding the deficit. The gap may be financed through domestic sources if the saving-investment gap is larger relative to the foreign exchange gap otherwise financing will be from international sources. If domestic sources are preferred, then the rate of interest determines the quantum of funding which has direct bearing on the rate of growth of the local economy. However, if the government opts for financing from international sources, then interest rate parity theory assumes control.

In its simplest form the Interest Rate Parity theory holds when the interest rate differential between any two countries equals the difference between the exchange rate futures and spot rate. In which case there is no arbitrage for investors to take advantage of and the yield from investing in any of the country's assets is equal. Therefore, there is no economic incentive to seek investment outside one's domestic economy. Any deviation from parity creates arbitrage opportunities. To take advantage of the opportunity, international investors borrow from countries with lower lending rate and invest in countries with higher lending rate (Teall, 2018). The result is capital outflow for the lower interest rate economy and inflow for the higher interest rate economy. Thus, interest rate differentials and movements in exchange rates represent the main drivers of international capital flows and economic growth stimulus for dwindling economies (Keynes, 1923; Levich, 2011). Therefore, these two theories serve as complementary theories in this study and they are the theoretical foundation of this study.

Empirical Literature Review

Some studies have examined the combined effects of exchange rate and interest on various sectors of the Nigerian economy as well as the entire economy. Most of these studies were in Nigeria while others were carried out outside Nigeria. One of such studies is that of Owolabi and Adegbite (2016) where they empirically investigated the impact of interest rate and exchange rate on capital market performance in Nigeria. They used secondary data obtained from the Central Bank of Nigeria statistical bulletin and Security exchange commission (SEC) covering the period of 1978 to 2012. Multiple regressions and Unit roots were employed to analyse data on variables such as interest rate, exchange rate, and market capitalization. They found that interest rate and exchange rate accounted for 92.6% of the variation in the influence of the market capitalization in Nigerian capital market. They concluded that exchange rate had positive impact on capital market but there was a negative relationship between interest rate and capital market performance. This study is relevant to this research because it used both interest and exchange rate, but the work reviewed here is on the capital market while this study relates interest and exchange rates to economic growth.

Also, Sarac and Karagoz (2016) studied the impact of short-term interest rates on exchange rate in order to curb the sudden increase in Dollar rate after the crisis in Turkey. They used Granger Causality tool to analysis monthly data between 2003 and 2015. The data used were

short term interest rate, lending rate and exchange rate. They found no significant evidence that higher interest rates would lead to dwindling exchange rate. This research work was carried out in Turkey which has dissimilar economic environment as Nigeria. Moreover, they used monthly figures on interest and exchange rate and they did not explore other forms of interest rate. This is the point of deviation of this work.

Going further, Adamu and Sanusi (2016) employed the General Autoregressive Conditional Heteroskedasticity technique to determine the influence of additional monetary tightening on exchange rate movement between 2007 and 2016. Their result divulged that monetary tightening had significant effect in suppressing exchange rate mobility or volatility. In a similar vein, using Autoregressive Conditional Heteroskedasticity and Autoregressive Distributed Lag tools, an investigation was carried out to examine the sources of exchange rate and they found that Nigeria's exchange rate was mainly determined by the parallel market rate which exerts more than usual pressure on the official rate. Again, this study failed to relate exchange rate to growth which is the gap this work intends to fill.

Monogbe and Okah (2017) researched on foreign direct investment, exchange rate, interest rate and economic development in Nigeria between the periods 1986 to 2015 using Auto Regressive Distributive Lag model. They discovered that foreign direct investment and interest rate exhibited a direct relationship to economic development in Nigeria. They further found that the low rate of interest promotes investment paradox and thus stimulate economic development in Nigeria while the report from the exchange rate showed that if exchange rate was appreciating, economic development is stimulated. This therefore suggested that an appreciating exchange rate is capable of attracting foreign investors and thus promote economic development as the case may be. The interrelationship between exchange rate, foreign investment and economic development was expected to be direct accordingly such that rise in exchange rate attract foreign investment and thus promote economic development in Nigeria. This is a very similar study to this paper and that is the reason for including savings deposit rate to find the effect in the modified model.

A rather dissimilar work was done by Adam and Oferi (2017) where they investigated the validity of the International Fishers Effect (IFE) theory in the West African monetary zone (WAMZ) using monthly data of nominal interest rate and exchange rate from 1998 to 2012. They applied Engel Granger Co integration test and Fractional Co integration. They observed Co integrating relationship in fifteen out of the twenty country pairs; indicating evidence of common stochastic drift in nominal exchange differentials and exchange rates changes. Evidence of weak IFE was shown in the case of Ghana/Sierra Leone and Ghana/Cape Verde.

Oyedele (2019) measured the impact of the exchange rate on the level of private investment in Nigeria from 1980 to 2010 using data from World Development Indicators 2018. The relationship between private investment and the exchange rate as well as other supporting, important variables such as the real GDP per capita, the inflation rate and the public investment rate was established it the study. The study concluded that an appropriately significant adjustment of the exchange rate to increase the price of exports relative to imports would induce the necessary industrial development only if there are deliberate attempts towards export expansion as well as efficiency in production. In addition to conscientious efforts to discover an appropriate exchange rate, the study also noted that it is important to support such policy with an improved real income per capita by controlled price induced distortions which would increase the domestic demand.

Uduakobong and Isaac (2020) examined the long run relationships among inflation, interest rate and exchange rate in Nigeria along with money supply and output using quarterly data from 2010 to 2018. The study employed Vector Autoregression Cointegration technique in the analysis. The Study revealed that on the average a long run relationship existed among the variables. However, the interactions among inflation, interest rate and exchange rate were weak while money supply and output had significant links with inflation, interest rate and exchange rate. Money supply and output also had significant long run interactions with each other. The findings indicated that the long run path to price stability and economic growth using monetary policy would be through changes in monetary aggregates and increase in domestic production. The study concluded that money supply and output were optimal targets for achieving price stability and economic growth in Nigeria in the long run.

Babalola (2021) examined the impact of interest rates on the exchange rate in Nigeria. The study used monthly data set from the Central Bank of Nigeria online database. Interest rates were represented by short term interest rates proxied by Lending Rate, Treasury bill rate, Saving/deposit rate and Time deposit rate. Price level (inflation rate) was included as a macroeconomic variable, between January 2007 and April 2021. Auto-Regressive Distributed Lag and Cointegration techniques were employed. Results of the study showed that, in the short run, only Treasury bill rate and Price level had significant impact on the foreign exchange rate. However, in the long run, all the four variables used to proxy short term interest rate had significant impact on the foreign exchange rate in Nigeria. Although the speed of adjustment or switch was quite low, it was correctly signed and significant. The study concluded that the monetary authority should use Treasury bill rate to influence local currency to achieve short term goal.

Osahon (2021) investigated the joint impact of interest rate and exchange rate volatility on the performance of the informal sector in Nigeria, focusing on Small and Medium-sized Enterprises (SMEs). They used annual time-series data on the exchange and interest rates for the period 1981-2018. The data analysis was carried out using descriptive statistics, correlation, a unit root test, an Autoregressive Distributed Lag (ARDL) bound test for cointegration and the ARCH regression model. The results obtained by the ARDL bound test confirmed the presence of the long-term relationship between interest and exchange rates volatility and SMEs' performance, which suggested that all the variables of interest moved together in the long run. Moreover, the ARCH regression model showed a positive impact of exchange and interest rates volatility on SMEs' performance. However, only exchange rate volatility was significant in their ARCH analysis.

Douglas, Eche and Adi (2022) evaluated the impact of interest and exchange rates on the performance of the manufacturing sector. In pursuance of this, they employed the multiple regression analysis. Using data on total GDP, manufacturing output, interest rate and exchange rate, they found that interest rates do not have a significant impact on the performance of the manufacturing sector. But this is contrary to economic reasoning and so they advocated for more extensive study on this area. However, their analysis showed that exchange rates showed a significant inverse relationship with the performance of the manufacturing sector within the period covered.

Gap in Literature

Empirical evidence showed that out of all the available works reviewed relating to interest rate and exchange rate in Nigeria, none of the researchers have investigated the effect of interest rate and its varieties in addition to exchange rate on the growth of the Nigerian economy. Adamu and Sanusi (2016), Yusuf et al. (2019) and Musa and Sanusi (2020) related interest rate to exchange rate but did not consider their interplay with economic growth. Also, most of the previous studies used monetary policy rate (MPR) to represent interest rate only. This study is quite different from the previous works in the sense that MPR is just one of the interest rates used in the money market, though it affects the other rates like the savings deposit rate. This paper, therefore explored the variable gap in literature by including savings deposit rates, prime lending rate and exchange rate while introducing investment as intervening variable. This is the gap this study intends to fill.

In addition, the use of robust econometric procedures to study interest rate, exchange rate and economic growth has been found to be lacking in recent economic literature in this topic, to the best of my knowledge. This is a gap this study intends to fill by adopting econometric procedures in the analysis of data. In addition, the time gap in the scope of the study is updated to 2021 to incorporate the most recent available data from the CBN Statistical Bulletin.

METHODOLOGY

The research design employed in this research is the *ex-post facto* research design. The desire of the researcher to use secondary data to test the hypotheses formulated formed the basis for adoption of the *ex-post facto* design. The data used in the estimation are time series and annual in nature. They were therefore subjected to stationary/unit root test using the Augmented Dickey-Fuller (ADF) unit root test to ensure their stationarity at levels or at first differencing, to avoid spurious regression. Moreover, to confirm the existence of long-run relationship among the variables, Johansen co-integration (Johansen, 1988) test was carried out at 5% level of significance. Also, to ensure that there is no autocorrelation in the error term, a test of autocorrelation was carried out using Durbin- Watson techniques and other diagnostic tests were carried out to ensure high quality results. Furthermore, the model was estimated using the error correction model (ECM) technique.

Model Specification

The model is a modification of the specification made in the work of Osahon (2021). The model of Osahon (2021) examined the interest rate, exchange rate and SMEs growth in Nigeria. We modify their specification to suit our purpose by disaggregating interest rate into savings deposit rate and prime lending rate alongside exchange rate while introducing total investment as an intervening variable in the model. The model is a functional model of the form:

$$Y = f(x) \qquad [i]$$

Where Y is dependent on the outcome of x and x is known as the independent variable. In relation to this study, economic growth proxied with real GDP is dependent on the interactions of interest and exchange rates and is specified thus:

$$RGDP = f\ (INT, EXR) \qquad [ii]$$

Where:

RGDP = Real gross domestic product at 2010 constant price
INT = Prime lending rate (12-month interest rate)
EXR = Exchange rate of the naira to the US dollar

By modifying the model of Osahon (2021), we introduced prime lending rate, savings deposit rate, exchange rate and also total investment as follows:

$RGDP = f\ (INT, EXR, SAVR, INV)$ [iii]

Where:

SAVR = Savings deposit rate (weighted average)
INV = Total investment

We go further to put the functional equation (iii) in a linear econometric form thus:

$RGDP_t = \beta_0 + \beta_1 INT_t + \beta_2 EXR_t + \beta_3 SAVR_t + \beta_4 INV_t + \varepsilon_t$ [iv]

Where:

$\beta_1 - \beta_4$ = Unknown coefficients of the model to be estimated
ε_t = Stochastic error term, and other variables are as previously defined.

The a-priori expectation of the model is such that $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$ and $\beta_4 > 0$, i.e., interest rate, exchange rate, savings rate and investment are all expected to have coefficients greater than 0 or positive coefficients and thus contribute positively to the growth of GDP.

DATA ANALYSIS AND INTERPRETATION

The analysis starts with the test of stationarity of the data using the Augmented Dickey Fuller (ADF) unit root test. The test is done at 5% critical value as follows:

Table 1: Summary of Unit Root Test Result

		ADF Test statistics			
Variable		**At Level**	**1st Difference**	**Decision**	**Order of Integration**
lnRGDP		-0.9199	-3.9874	Stationary at 1st difference	I(1)
lnINTR		-2.5775	-5.9726	Stationary at 1st difference	I(1)
lnEXR		-1.2356	-5.5968	Stationary at 1st difference	I(1)
lnSAVR		-0.3965	-4.9336	Stationary at 1st difference	I(1)
lnINV		0.6678	-3.9279	Stationary at 1st difference	I(1)
Critical Values	1%	*-3.156*	*-3.6105*		
	5%	*-2.9369*	*-2.9411*		
	10%	*-2.6069*	*-2.6079*		

Source: Researcher's Computation using E-Views 9.0

The unit root test above reveals that real gross domestic product (RGDP), prime lending rate (INT), exchange rate (EXR), savings deposit rate (SAVR) and investment (INV) are all stationary at first difference and are said to be integrated of order one, I(1). This implies that the data have statistical properties that do not vary over time and so can be used for forecasting purposes. Based on this result, we test for the existence of a long-run relationship or cointegration amongst the variables.

Secondly, we subjected the data to Johansen cointegration test in order to ascertain if there is long run relationship amongst the variables. The hypothesis of the Johansen test is given as:

Null hypothesis (H_0): No long run relationship exists amongst the variables (no cointegration)

Alternate hypothesis (H_1): There is long run relationship amongst the variables

Table 2: Summary of the Johansen Cointegration Test

Trace Statistic					Max-Eigen Statistic		
Hypothesized No of CE (S)	**Eigen-Value**	**Trace statistics**	**5% Crit.**	**Prob.**	**Max-Eigen**	**5% Crit.**	**Prob.**
None *	0.611705	98.3485	69.81889	0.0001	36.89365	33.87687	0.0211
At most 1*	0.547114	61.4548	47.85613	0.0016	30.89249	27.58434	0.0181
At most 2*	0.402231	30.5623	29.79707	0.0408	20.06748	21.13162	0.0699
At most 3	0.220295	10.4949	15.49471	0.2446	9.704751	14.26460	0.2321
At most 4	0.020057	0.79016	3.841466	0.3741	0.790162	3.841466	0.3741

Note: **Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

**Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

Source: Researcher's Computation using E-view 9

The Table 2 above summarizes the Trace and Max-eigen statistics for the Johansen cointegration test. Both statistics show that at least one cointegrating equation existed at 5% level. The criteria for decision here is that there must be at least one co-integrating equation to reject the null hypothesis of no cointegration. Therefore, the Trace test indicated 3 cointegrating equations while the Max-eigen statistics showed 2 cointegrating equations. This surpasses the decision criteria and so we reject the null hypothesis and conclude that there is long run relationship between savings deposit rate, prime lending rate, exchange rate and economic growth of Nigeria. In other words, interest rate and exchange rate have long run effect on the growth of the Nigerian economy. Consequently, the result of the long run estimated relationship between savings deposit rate, prime lending rate, exchange rate and economic growth (real GDP) in Nigeria for the period under review is shown below:

Table 3: Long Run Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTR	-0.158340	0.147781	-1.071452	0.2911
EXR	-0.045765	0.010179	-4.496021	0.0017
SAVR	0.017043	0.098493	0.173042	0.8636
INV	0.289843	0.076433	3.792129	0.0006
C	8.707450	0.517003	16.84216	0.0000
R-squared	0.910295	Durbin-Watson stat		1.831989
Adjusted R-squared	0.900328			
F-statistic	91.32938			
Prob(F-statistic)	0.000000			

Source: Researcher's Computation using E-view 9

The long run estimates above shows that prime lending rate decreases real GDP by 0.1583 units likewise exchange rate which shrinks real GDP by 0.046 units. This implies that both prime lending rate and exchange rate have negative effects on Nigeria's economic growth.

However, savings rate has positive effect on real GDP increasing economic growth by 0.01704 units while investment also followed similar trend increasing growth by 0.2898 units for the same period. The implication is that savings rate has been favourable to the Nigerian economy as a result of banks adjustment of the rate to suit current economic realities while the 12-month interest rate has been on the high side as a contractionary monetary policy tool. However, notwithstanding, investment still surges the economy by 0.2808 units implying an open economy. We went further to estimate Error Correction Model which became necessary in order to reconcile the short-run behaviour with its long-run behaviour, and to investigate the adjustment mechanisms towards the long-run equilibrium, The speed of adjustment is our focus here as we try to show the dynamics of short run adjustments of prime lending rate, saving rate and exchange rate towards the long run equilibrium in relation with Nigeria's economic growth. The ECM result is summarized below:

Table 4: Error Correction Model Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTR	-0.150981	0.156557	-0.964385	0.3421
EXR	-0.046997	0.017720	-2.652201	0.0458
SAVR	0.049407	0.117481	0.420548	0.6769
INV	0.303500	0.082269	3.689110	0.0008
C	8.531978	0.596849	14.29503	0.0000
ECM(-1)	-0.163516	0.037653	-4.342708	0.0302
R-squared	0.902228	Durbin-Watson stat		1.852713
Adjusted R-squared	0.886952			
F-statistic	59.05872			
Prob(F-statistic)	0.000000			

Source: Researcher's Computation using E-view 9

The Table 4 above represents the error correction model estimates. The result shows that the model has similar coefficients as the long run estimates. The speed of adjustment shows negative and significant coefficient thus the short run model has good predictive properties. The adjustment mechanism is therefore estimated at 16.35% annually. This implies holding prime lending rate, savings deposit rate, exchange rate and investment at a constant returning or decreasing rate of 16.35% annually. There will be long run equilibrium growth in the economy.

Test of Hypotheses

The hypotheses are tested at 5% level of significance using the t-statistic from the least square regression result. The t-statistic values are compared with the t-table value of 1.96 and if the t-statistic is greater than the t-table, we reject the null otherwise, we accept the null hypothesis.

Test of Hypothesis One

H_{01}: There is no significant effect of interest rate on Nigeria's economic growth.

t-statistic = -1.0715

t-table = $t_{0.025,36}$ = 1.960

Decision Rule: Since the t-statistic is less than the t-table value at 5% level of significance, we accept the null hypothesis and conclude that there is no significant effect of prime lending rate on Nigeria's economic growth. Therefore, even though interest rate decreases economic growth by 0.1583 units, the decrease was not found to be significant.

Test of Hypothesis Two

H_{02}: There is no significant effect of exchange rate on Nigeria's economic growth.

t-statistic = -4.4960

t-table = $t_{0.025,36}$ = 1.960

Decision Rule: The t-statistic is greater than the t-table value at 5% level of significance therefore we reject the null hypothesis and conclude that there is significant effect of exchange rate on Nigeria's economic growth. This implies that exchange rate decreases growth significantly by 0.0458 units based on the coefficient value.

Test of Hypothesis Three

H_{03}: Savings rate has no significant effect on Nigeria's economic growth.

t-statistic = 0.1730

t-table = $t_{0.025,36}$ = 1.960

Decision Rule: The t-statistic is less than the t-table value at 5% level of significance therefore we accept the null hypothesis and conclude that savings deposit rate has no significant effect on Nigeria's economic growth. In other words, savings rate increases economic growth by 0.0170 units but the increase was not significant at 5% level.

Test of Hypothesis Four

H_{04}: Total investment has no significant effect on Nigeria's economic growth.

t-statistic = 3.7921

t-table = $t_{0.025,36}$ = 1.960

Decision Rule: Since the t-statistic is greater than the t-table value at 5% level of significance, we reject the null hypothesis and therefore conclude that total investment has significant effect on Nigeria's economic growth. The coefficient value implied that investment increased economic growth significantly by 0.2898 units.

Diagnostic Tests

These are tests that confirm the suitability and robustness of the model. They are summarized in the Table 4.6 below:

Table 5: Diagnostic Tests

S/N	Test	Probability Stat and p-value	Decision
1.	Breusch-Godfrey serial correlation LM test	F-stat = 0.9089 *p-value = 0.0643*	No serial correlation.
2.	Durbin Watson Statistic	1.8319	No Autocorrelation
3.	White Heteroskedasticity Test	F-stat = 3.0320 *p-value = 0.0070*	Heteroskedasticity is ignored
4.	CUSUM Test	Model plot is outside the bands of 5% significance level	Model did not exhibit long run stability, there is possible volatility
5.	R-squared and Adjusted R-squared	0.9103 (91.03%) 0.9003 (90.03%)	High explanatory coefficient
6.	F-statistic	91.329 0.0000	Jointly significant

Source: *Extracted from E-Views 9.0 output*

The post-estimation test as presented in Table 4.6 above shows that the error term of the model are not serially correlated given the *p-values* of the Breusch-Godfrey Serial Correlation LM

test which is greater than 0.05 critical value. Also, the Durbin Watson statistic suggests that there is no autocorrelation in the model since the DW value of 1.8319 tends towards 2 than to 0. In addition, the Breusch Pagan Godfrey Heteroskedasticity test indicates that the variance or errors are not the same over the sample period, as indicated by the *p-value*. However, we ignore the heteroskedasticity.

Evidence from the cumulative sum (CUSUM) test showed that the model did not exhibit long run stability because the cumulative sum CUSUM line is outside the upper and lower bounds 5% critical value lines (See figure below).

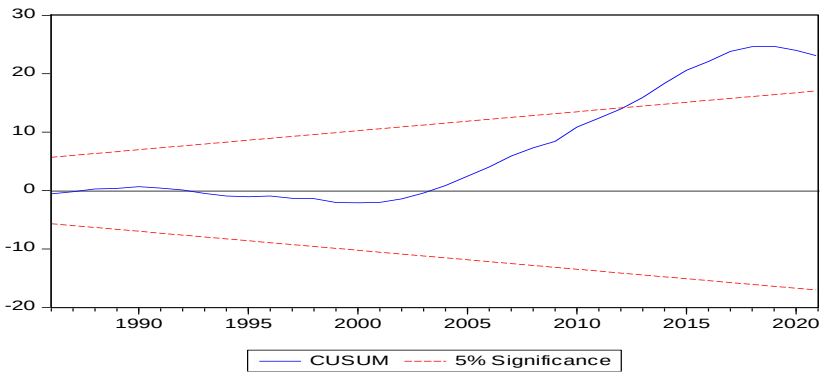

Figure 1 Cumulative Sum (CUSUM) line (Computed using Eviews v9)

The CUSUM line above gives us a hint of possible volatility in exchange rate since it is not stable, but this is outside the scope of this study hence we ignore the non-stability of the model. Finally, the adjusted R-squared is more suitable for gauging the overall fitness of the model and it has a value of 0.9003 indicating that interest rate and exchange rate account for up to 90.03% of the variations in economic growth of Nigeria and they were jointly significant given the F-statistic value.

DISCUSSION OF RESULTS

The data were tested for stationarity since they are time series in nature. The result showed that they were stationary at first difference or integrated of order 1 i.e. I(1) thereby giving the possibility of co-integration amongst the variables. The first difference stationarity of the data means that the statistical properties of the data were found to be constant and did not vary with time. The Johansen cointegration test used both the Trace Statistic and Max-Eigen Statistic to ascertain whether a long run relationship existed amongst the variables. The result showed that a significant long run relationship exists amongst the variables, thus proceeded with the Error Correction Model (ECM) estimates.

The result of the model showed that prime lending rate decreased real GDP by 0.1583 units as well exchange rate which decreased real GDP by 0.046 units. The economic implication of this is that both prime lending rate and exchange rate have negative effects on Nigeria's economic growth and as such Nigeria's economic growth trend will continue to be on a shaky trend. The interplay of interest rate and exchange rate has been a source of worry for the Central Bank of Nigeria as they strive to maintain stable macroeconomic environment. However, over the years, there have been fluctuations in these two rates owing to policy inconsistencies as pointed out by Douglas et al (2022). However, Elumelu (2020) was of the view that the apex bank need

stable policy to maintain sound economic growth trend. As a result, Karimo (2020) opined that there should be long term interest rate and exchange rate target set by the CBN.

Savings deposit rate had positive effect on real GDP increasing economic growth by 0.01704 units while investment also followed similar trend increasing growth by 0.2898 units for the same period. The implication is that savings rate has been favourable to the Nigerian economy as a result of banks adjustment of the rate to attract more funds into Deposit money banks and suit current economic realities while the 12-month interest rate has been on the high side as a contractionary monetary policy tool. The high prime lending rate is not surprising given the finding of Osahon (2021) who noted that interest rate should be set to dissuade borrowing and encourage real borrowers. When real borrowers engage in investment, there will be real growth in the economy.

The joint significance of prime lending rate, savings deposit rate, exchange rate and investment was confirmed by the F-statistic value while the model exhibited high fitness with 90.03 percent explanatory coefficient. However, there was no long stability in the model because the cumulative sum test showed that the lines were outside the 5% bands. However, we suggest that further research should be carried out by other researchers in this area as it is outside the scope of this study.

Conclusion and Recommendations

The findings emanating from the analysis led to the conclusion that both prime lending rate and exchange rate have decreasing effects on the Nigerian economy. This serves as a huge warning to the monetary authority as this goes a long way to prove that Nigeria's monetary policy has not been very effective for years leading to policy inconsistencies. Economic growth trend is inversely related to prime lending rate and exchange rate while savings deposit rate has a positive relationship with economic growth most likely that savings were not channelled to consumption of imported consumer goods but channelled into private sector investment so as to increase output and productivity, however insignificant. The positive and significant effect of investment on growth proved the doggedness of public and private investors in the face of rising interest rates and risings exchange rate of the local currency.

The following recommendations which are stemming from the findings are very necessary to be considered:

1. Savings deposit rate should be relatively increased on the basis of the monetary policy rate to discourage stacking thereby mopping up funds both locally and internationally into deposit money banks for real sector investment to engender growth.
2. Efforts should be made by the Central Bank of Nigeria to maintain a single digit interest rate while ensuring that bank rate is also stabilized to avoid sudden changes or volatility.
3. The Central Bank of Nigeria should formulate a workable and favourable monetary policy such as increased local savings that will maintain low exchange rate and stabilization of the Naira to the dollar. The stabilization of the local currency against the dollar will enhance local investments and still help Nigeria's economic growth fortunes.
4. Macroeconomic policies should be designed in a way that will make prime lending rate be at a level that will stimulate easy transfer of funds from surplus sector to deficit sector for investment purposes.

5. Investment in the real sector should be encouraged to increase output and productivity.

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