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ORIGINAL ARTICLE

IMPACT OF EXCHANGE RATE MOVEMENTS AND INFLATION IN NIGERIA

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Abstract

The research analyzed the effects of exchange rate fluctuations and inflation in Nigeria based on annual time series data of the periods 1981-2022. In order to meet this aim, the research design used was ex-post facto research design, secondary data were used as the source of data in the study based on CBN Statistical Bulletin and the study specifically applies the Autoregressive Distributive Lag (ARDL) method to analyze the time series data covering the period between January 1981 and December 2022 to determine the relationship between Real Gross Domestic Product, inflation expectation, Money Supply, Fiscal Deficit, Inflation Rate and Exchange Rate. To establish the relationship between the variables in the study, study used Augmented Dickey Fuller test to know whether there is unit root or not, Breusch-Godfrey Serial Correlation LM test to know whether there is serial correlation or not and ARDL bound test to know that there is co-integration or not. The stationarity test results depicted that the variables are of mixed order of integration whereas the result of co-integration depicted that there are long run relationship between variables. As it was found, Real Gross Domestic Product (RGDP) and exchange rate (EXR) were positively and significantly influencing inflation, which indicated that the exchange rate fluctuations and the growth in RGDP are also the factors that influence inflation in Nigeria. In the meantime, in relation to the capacity of inflation to forecast the explanatory variables, it was found out that exchange rate does not Granger cause in inflation rate. The hypothesis is significant in that the Exchange rate influences inflation in the short run as indicated by the test of the hypothesis. It was on the basis of the findings that the study suggested that the central bank should keep the money supply growth in check so that inflation is kept to the bare minimum.

Keywords: Exchange rate, Inflation, Nigeria, Breusch-Godfrey Serial Correlation LM test Money Supply.
Jel Classification: F31, E31, H50, C32, E51.

INTRODUCTION

The exchange rate refers to the rate at which one currency may be exchanged for another (Jhingan, E512012). It represents the worth of one currency in relation to another. The exchange rate enables payment in international transactions and effectively facilitates international commerce. It determines the comparative pricing of products and services domestically and internationally. Adeniji (2013) asserts that four primary relative prices influenced by exchange rates

in the economy are: the price of traded goods relative to non-traded goods; the price of exports compared to the exports of competing nations (in foreign currency); and the price of export or import substitutes relative to their production costs. The exchange rate significantly influences the imports and exports of the nations in question by affecting relative pricing. It has the capacity to promote exports and penalise imports.

The exchange rate is a crucial price that connects local and international pricing (Obadan, 2016). The appreciation of the exchange rate has significant implications for the domestic pricing levels inside an economy. In a small open economy like Nigeria, which lacks the capacity to influence global prices of traded goods, an appreciation of the domestic currency diminishes the domestic prices of these goods, whereas a depreciation elevates them (Begg, 2003). The exchange rate affects pricing and inflation rates at the national level.

Inflation is defined as the continuous rise in the general price level of goods and services (Aidi, Suleiman and Saidu, 2018). The researchers assert that inflation would be significant during periods of exchange rate volatility (Babatunde and Kehinde, 2016). This indicates that inflation rises in a particular economy as a result of exchange rate fluctuations. He argued that price volatility might lead to an increase in market risk and uncertainty. Inflation diminishes the buying power of currency as a means of exchange and engenders increased uncertainties and hazards in enterprises. Okwori and Abu (2017) contended that Nigeria has used direct monetary instruments, such as selective credit control, administered interest and exchange rates, credit ceilings, cash reserve requirements, and special deposits, to combat inflation and stabilise prices.

The Nigerian currency rate has shown considerable stability while also experiencing significant fluctuations throughout all segments of the foreign exchange markets, including official, bureau de change, and parallel markets. The official market exchange rate fell to N22.00 per US dollar in 1994 and was regulated by the Federal Government at N21.87 per US dollar from 1994 to 1998, compared to N11.08 in 1987. It depreciated to N97.95 against the US dollar in 1999, N125.00 from 2000 to 2006, and then appreciated somewhat to N117.97 against the US dollar owing to the global financial crisis and the decline in international oil prices. It depreciated in 2012 to N157.50, N158.55 in 2014, N196.49 in 2015, N253.19 in 2016, N305.30 in 2017, and N350 and N360 in 2018 and 2019, respectively. In 2020, the exchange rate was N358.8 per US dollar. In 2020, the exchange rate of the Naira increased to N358.8 per US dollar, up from N0.7 per US dollar in 1971, reflecting an average rise of 19.03 percent. In October 2021, the exchange rate was N413.7 per US dollar.

The inflation rate in Nigeria seems to be aligned with the exchange rate. Prior to 1980, Nigeria had a low inflation rate, remaining in single digits. The situation markedly changed, especially after 1986, when the inflation rate surged to double digits. Data from the Central Bank of Nigeria (2019) indicate that inflation, which was 13.7 percent in 1986, rose to 48.8 percent in 1992 and then to 76.8 percent in 1994. The percentage decreased to 16.5% in 2001, increased to 23.8% in 2003, and thereafter averaged between 11% and 13% from 2004 to 2015. It then rose to 18.55% in 2016, down to 12.09% in 2018, and further decreased to 11.4% in 2019. However, after the COVID-19 pandemic, Nigeria's inflation rate surged to 13.39 percent in 2020. The persistent increase in inflation over the years is diminishing the

buying power of typical Nigerians and might be seen as a threat to economic stability. Despite several monetary policy measures aimed at regulating and stabilising prices, Nigeria has been suffering inflation.

The primary difficulty confronting Nigeria and several emerging nations is the inflationary pressure combined with the volatility of currency rates. The influence of exchange rate volatility on inflationary pressure has been a significant worry for economists, policymakers, and researchers. This study seeks to examine the correlation between the currency rate and inflation in Nigeria from 1981 to 2021.

The exchange rate represents the quantity of domestic currency required to acquire a unit of foreign currency; hence, the appreciation of the local currency or depreciation of the exchange rate has significant repercussions on the economy. As a country's exchange rate appreciates, it will inevitably reduce the domestic prices of traded products, whereas depreciation would increase these costs (Beggs, 2003). The depreciation of the currency rate, as posited by Magda and Ida (2003), is expansionary since it first increases the prices of imported goods relative to domestic goods. Enhancing the global competitiveness of domestic companies, fluctuations in currency rates redirect spending from foreign commodities to local products, therefore introducing imported inflation into the domestic economy.

Consequently, it is evident that an appreciation of the local currency leads to domestic inflation due to an increase in the prices of goods and services, whereas a depreciation of the domestic currency imports inflation into the domestic economy. Both impacts are seen in Nigeria; however, the second is more prevalent due to the nation's status as a mono-product economy that primarily depends on imports of products and services.

Inflation in Nigeria fluctuates with the currency rate. The official market exchange rate fell to N22.00 per US dollar in 1994 and was regulated by the Federal Government at N21.87 per US dollar from 1994 to 1998, compared to N11.08 in 1987. It depreciated to N97.95 against the US dollar in 1999, N125.00 from 2000 to 2006, and then appreciated somewhat to N117.97 against the US dollar owing to the global financial crisis and the decline in international oil prices. It depreciated in 2012, declining to N157.50, N158.55 in 2014, N196.49 in 2015, N253.19 in 2016, N305.30 in 2017, and N350 and N360 in 2018 and 2019, respectively. In 2020, the exchange rate was N358.8 per US dollar. In 2020, the exchange rate of the Naira increased to N358.8 per US dollar, up from N0.7 per US dollar in 1971, reflecting an average rise of 19.03 percent. In October 2021, the exchange rate was N413.7 per US dollar.

Prior to 1980, Nigeria had a low inflation rate, remaining in single digits. The situation markedly changed, especially after 1986, when the inflation rate surged to double digits. Statistics from the Central Bank of Nigeria (2019) indicate that inflation rose from 13.7 percent in 1986 to 48.8 percent in 1992, and then to 76.8 percent in 1994. The percentage decreased to 16.5% in 2001, increased to 23.8% in 2003, and thereafter averaged between 11% and 13% from 2004 to 2015. It then rose to 18.55% in 2016, down to 12.09% in 2018, and further declined to 11.4% in 2019.

The observed patterns in currency rates and inflation in Nigeria suggest a reciprocal relationship, whereby either the exchange rate influences inflation or inflation affects fluctuations in the exchange rate. The two scenarios pose a threat to the economy that requires examination and the provision of remedies. This study aims to examine the impact of exchange rate fluctuations on inflation in Nigeria from

1981 to 2021 and to determine the association between changes in exchange rates and the inflation rate in Nigeria.

THEORETICAL UNDERPINNING OF THE STUDY AND REVIEW OF RELATED LITERATURES

A variety of researches have been undertaken on exchange rates and their effects on the inflation of various countries. Nevertheless, several studies have been deemed crucial for this study. This research examines the Keynesian theory of inflation, purchasing power parity, the balance of payments method, the monetarist theory, among others. The Purchasing Power Parity is a notion that started with Cassel (1918) and remains a significant method for adjusting exchange rates. It asserts that the exchange rates between two nations will correspond to the respective national price levels of those countries. This idea, commonly referred to as the rule of one price, posits that the exchange rate between the currencies of any two nations should correspond to the ratio of the general price levels in those countries. This indicates that exchange rates modify to account for price disparities across nations. This suggests that if cakes are priced at one dollar in the US and the same cake is sold for N100.00 in Nigeria, the exchange rate should be N100.00 per dollar. Notwithstanding the prevalent objections about the assumptions of this theory, it continues to be a legitimate explanatory framework for exchange rate setting. Criticisms include deficiencies in price level calculation, challenges in comparing general price levels, difficulties in identifying a base year, inapplicability to capital accounts, unilateral perspectives, static nature, and classification as a long-run theory.

The balance of payments approach to exchange rate setting posits the existence of both internal and external equilibrium. The internal equilibrium presupposes full employment, meaning it encompasses the natural rate of unemployment. The unemployment rate is such that there are no incentives to alter actual wages. External equilibrium pertains to the balance of payments equilibrium. This method elucidates enduring divergences in Purchasing Power Parity (PPP). The primary issue with this methodology is that, generally, it is very difficult to ascertain the precise natural rate of unemployment or the exchange rate that aligns with the balance of external accounts. Nonetheless, the model will ascertain the target convergence of the exchange rate; yet, it offers little insight into short-term volatility (Hoontrakul 1999).

Numerous variations of the monetary model exist in literature, although they all share the fundamental assumption that fluctuations in exchange rates between two currencies result from changes in the demand and supply of money in the respective nations. The deficiencies of the portfolio balance theory prompted the emergence of the monetary approach. Frankel (1979) asserts that this model of exchange rate determination reaches equilibrium when the current money supplies in both nations are voluntarily retained. Obioma (2000) posits that the asset market or monetary approach explains fluctuations in exchange rates primarily to income, anticipated rates of return, and other variables that affect the supply and demand for different national currencies. Consequently, given that the supply and demand for money is influenced by income levels, the monetary model posits three fundamental drivers of exchange rates as follows: comparative money supply, comparative

income, and interest rate differentials. The classical theory of inflation, the Keynesian theory, and the structural theory of inflation are examined.

According to early classical economics, one method to combat inflation is to decrease the money supply. The prescription stems from their conviction that the economy consistently functions in balance. This notion leads to the conclusion that an increase in the money supply will only result in more currency pursuing the same quantity of commodities. The surplus demand will thereafter elevate the price level to equilibrium swiftly, with no alterations occurring in the "real" sector of the economy. The only distinction is an elevation in the price level. It is evident that this paradigm has many issues. The primary issue is its disregard for potential rigidities inside the economy. The correction processes may operate at varying velocities. Another issue is that it fails to consider the actual impacts of alterations in the monetary sector on the products sector.

Keynesian theory posits that inflation may result from a rise in demand and/or an increase in costs. In reaction to the shortcomings of Classical theory, Keynes formulated a novel theory of inflation. This theory emphasised inflexibilities inside the economy, particularly in the job market. The root of rigidities was the workers' reluctance to decrease their nominal salaries. Rigidity shown in enterprises' reluctance to adjust pricing in reaction to demand fluctuations, frequently opting to increase production instead. Combining these rigidities, among others, results in what is termed a fixed-price model. This model presents many strategies for combating inflation. The fundamental cause of inflation is excessive aggregate demand; thus, the most apparent remedy is to diminish aggregate demand. The policy tools available for this purpose may include tax hikes or reductions in governmental expenditure. Another option in this paradigm is to diminish the rigidities. Demand-pull inflation occurs when aggregate demand consistently surpasses aggregate supply when the economy is at or near full employment. Aggregate demand may increase due to several factors. A reduction in personal income tax would augment disposable income and lead to an increase in consumer spending. A decrease in the interest rate may stimulate an uptick in investment and promote heightened consumer expenditure on durable goods. An increase in foreign revenue may result in a growth in a country's exports. An increase in government expenditure funded by borrowing from the banking system during periods of full employment is an additional factor contributing to inflation.

An rise in demand may first be addressed by employing available jobless resources. The growth in supply, along with the increase in demand, will have little or no influence on the overall price level at this juncture. If the aggregate demand for goods and services continues to rise, a state of full employment will ultimately be attained, rendering any additional production increases unfeasible. This results in inflationary pressures inside the economy.

Demand-pull inflation arises from excessive demand, which may be from elevated exports, robust investment, an increase in money supply, or government funding its expenditures via borrowing. When enterprises perform well, they will augment their demand for inputs of production. In a fully employed factor market, input prices will increase. Companies may need to increase compensation to attract employees from their current positions.

Under situations of full employment, it is probable that pay increases will surpass any gains in productivity, resulting in elevated costs. Companies will

transfer the increased expenses to consumers via elevated pricing. Workers will advocate for increased pay, so augmenting aggregate demand once again. The process continues while prices in both the product and factor markets are being elevated. The Keynesian hypothesis of cost-push inflation links the primary cause of inflation to supply-side causes. According to Keynesian theory, increasing production costs will result in inflation. Cost-push inflation is often considered a wage inflation phenomenon; given salaries generally represent the predominant component of overall expenses. Robust and assertive trade unions that advocate for salary increases above productivity are more likely to achieve their wage demands when the economy approaches full employment and when skill shortages are more pronounced.

The structuralist philosophy is said to have arisen in Less Developed Countries (LDCs), namely South America, immediately after the Second World War. Chilean economist Osvaldo Sunkel (1962) has extensively analysed inflation and economic development, while Geoff Riley (2006) posits that, rather than attributing inflation in developing nations like those in Latin America and parts of Africa to monetary factors, it is more closely associated with non-monetary imbalances.

The cost-push theory of inflation is a general phrase including Marxist, Structural, and Keynesian theories of inflation that do not rely on excess-demand factors affecting the economy. This collection of inflation ideas examines various non-monetary supply sources that affect price levels in the economy. Consequently, cost-push factors of inflation arise when production costs escalate independently of aggregate demand. Keynesians said that wage rises facilitated by trade unions result in heightened living costs.

Monetarist theory associates monetary policy with unemployment by asserting that central banks can affect short-term economic variations, such as temporarily reducing unemployment via monetary expansion; however, their principal function should be to uphold price stability through regulation of money supply growth. Monetarists assert that deviations from the natural rate of unemployment induced by monetary policy are transient, and attempts to preserve low unemployment by prolonged monetary stimulation would result in unfavourable inflationary levels in the long term. Consequently, they support a rule-based monetary policy aimed at maintaining a steady and predictable growth rate of the money supply to guarantee comprehensive economic stability.

REVIEW OF RELATED LITERATURE

Numerous studies have been conducted on currency rates and their impact on inflation across various countries. Nevertheless, some works of this kind have been selected as crucial in this research. This research covers the Keynesian theory of inflation, purchasing power parity, the balance of payments method, the monetarist theory, among others. The Purchasing Power Parity is a notion established by Cassel (1918) and continues to be a crucial mechanism for adjusting the exchange rate. It posits that the exchange rates between two nations will correspond to the national price levels of those countries. This idea, known as the law of one price, posits that the exchange rate between the currencies of two countries should match the ratio of the general price levels in those nations. This indicates that exchange rates will react to the establishment of price differentials across nations. This indicates that if cakes are priced at one dollar in the US and the

same cake is priced at N100.00 in Nigeria, the exchange rate would be N100.00 per dollar. Despite extensive criticism of its assumptions, this theory remains a credible explanatory framework for determining the exchange rate. Several of these complaints include issues with price level computation, the non-comparability of the general price level, difficulties in identifying the base year, inapplicability to the capital account, a one-sided perspective, static nature, and classification as a long-run theory.

The balance of payments technique for determining exchange rates posits the existence of both internal and external equilibrium. The internal equilibrium assumes the presence of full employment, which includes the natural rate of unemployment. The elevated unemployment rate exerts little impact on actual earnings. The external equilibrium signifies the balance of payments equilibrium. This approach examines long-term fluctuations in Purchasing Power Parity (PPP). The primary concern about this technique is that it is generally difficult to ascertain the natural rate of unemployment or the exchange rate that aligns with external accounts equilibrium. The model indicates the target convergence point of the exchange rate but provides little insight into short-term changes (Hoontrakul 1999).

The literature presents several iterations of the monetary model, all positing that fluctuations in exchange rates between two currencies can be explained by changes in the demand and supply of money within the respective economies. The shortcomings of the portfolio balance theory led to the emergence of the monetary approach. Frankel (1979) posits that this model of exchange rate determination reaches equilibrium when the monetary stocks in both nations are held willingly. Obioma (2000) posits that the asset market or monetary approach acknowledges that exchange rate fluctuations are fundamentally based on income, anticipated rates of return, and other factors influencing the supply and demand of various national currencies. Consequently, based on the premise that the supply and demand for money is contingent upon income levels, the monetary model posits three primary drivers of the exchange rate: relative money supply, relative income, and interest rate differentials. The Keynesian hypothesis, classical inflation theory, and structural inflation theory are examined.

Early classical economics assert that reducing the money supply is a method to combat inflation. They provide the prescription based on the belief that the economy would always maintain balance. The consequence of this view is that an increase in the money supply results in more currency competing for the same amount of commodities. The surplus demand will thereafter elevate the price level to equilibrium (rapidly or instantaneously), with no alterations occurring in the so-called real sector of the economy. The only alteration is an increase in the pricing level. These models evidently have certain issues. The primary concern is that it neglects the potentialities inside economic rigidities. In another instance, the adjustment processes may progress at different speeds. The second difficulty is that it neglects to account for the real ramifications of the alterations in the monetary sector on the products sector.

Keynesian theory posits that inflation may result from an increase in demand and/or an increase in costs. Keynes responded to the deficiencies of Classical theory by developing a new theory of inflation. This theory emphasised the presence of rigidities in the economy, particularly in the employment market. The root of rigidities was the workers' reluctance to reduce their nominal salaries. Firms

exhibited rigidity by failing to alter prices in response to fluctuations in demand, opting instead to increase output. By combining these rigidities (and others), one attains what is referred to as a fixed-price model. This model presents many strategies for combating inflation. The fundamental cause of inflation is excessive aggregate demand; hence, the most evident solution is to reduce aggregate demand. The policy instruments that may be used to attain this objective are tax increases or reductions in government spending. The subsequent alternative about this approach pertains to alleviating the rigidities. Demand-pull inflation occurs when aggregate demand consistently exceeds aggregate supply during periods of full employment. Aggregate demand may rise for several causes. A reduction in personal income tax would enhance disposable income, leading to an increase in consumer expenditure. A decrease in the interest rate may also encourage further investment and consequent increases in the consumption of consumer durables. An increase in foreign money may lead to a rise in a nation's exports. A further driver of inflation is an escalation in government expenditure financed by borrowing inside the banking system under circumstances of full employment.

Increasing demand may be accomplished by first using existing jobless resources. Supply will grow, and the increase in demand is unlikely to significantly affect the overall price level at this juncture. If the total demand for goods and services continues to increase, full employment will eventually be attained, and more production growth will not be possible. This induces inflation inside the economy.

Demand-pull inflation occurs due to excessive demand, which may result from elevated exports, vigorous investment, an increase in the money supply, or government financing of expenditures through borrowing. When firms are thriving, they will increase the demand for factors of production. If the factor market is at full employment, input prices will rise. Companies may be compelled to offer higher compensation to attract people from their present positions.

In a scenario of full employment, salary increases are likely to surpass productivity gains, resulting in elevated prices. The elevated expenses will be passed on to customers via higher pricing. The workers will demand higher pay, which will further stimulate aggregate demand. This is succeeded by the process of price elevation in both the product and factor markets. The main source of inflation as presented by the Keynesian theory of cost-push inflation is the supply side components. This indicates that Keynesian economics will lead to inflation due to rising manufacturing costs. Cost-push inflation is often seen as a mostly wage inflation phenomenon, since salaries constitute a significant portion of aggregate costs. Trade unions that are stronger and aggressive, negotiating salary rises above productivity gains are more likely to prevail in their wage demands when the economy approaches full employment and when skill shortages are prevalent.

The structuralist philosophy is said to have originated in Less Developed Countries (LDCs), namely South America, shortly after the Second World War. Osvaldo Sunkel (1962) is a Chilean economist who has extensively analysed inflation and economic development. Geoff Riley (2006) posits that, instead of focussing on monetary factors as the root cause, inflation in developing nations such as those in Latin America and certain African countries is attributed to non-monetary imbalances.

The cost-push theory of inflation encompasses Marxist, Structural, and Keynesian models that do not rely on excess-demand impacts on the economy.

This category of inflation theories considers several supply-oriented non-monetary variables that influence price levels in the economy. Therefore, cost-push forces produce inflation when cost in production grows without respect to the aggregate demand. Keynesians said that wage increases facilitated by trade unions lead to an escalation in the cost of living.

The monetarist school of thought links monetary policy to unemployment, asserting that while central banks can effectuate short-term economic alterations, such as decreasing unemployment through monetary expansion, their primary responsibility is to maintain price stability by regulating the growth of the money supply at an optimal level. Monetarists assert that the impact of monetary policy on the natural rate of unemployment is transient, and that efforts to maintain low unemployment rates over the long run via sustained monetary stimulation would always result in unacceptable inflation rates. Consequently, they advocate for a rule-based monetary policy that emphasises a steady and predictable growth rate of the money supply as a means to attain general economic stability.

Empirical Framework and Econometric Modeling with Data Sources

The research used secondary data. This information on the variables was obtained from the Central Bank of Nigeria Statistical Bulletin, World Bank indicators, and the National Bureau of Statistics. The period spanned from 1981 until 2021. All variable values were expressed in monetary terms, namely in Nigerian currency (Naira). The researcher successfully obtained the systematic yearly time series of variables included in the model specification. Nonetheless, this study used an ex-post facto research strategy, since it considers events that have already transpired due to the availability of data. Consequently, empirical data may be generated to illustrate the impact of effective exchange rate policy actions on inflation in Nigeria. An ex-post facto study, or after-the-fact study, is a research design in which the inquiry commences post-event, without researcher intervention. This research design examines previous occurrences to understand the current situation, including both a dependent variable and an independent variable.

Empirical Model

The exchange theory anchored on this study is balance on payment. It determines- exchange rate as a dependent variable of the relative change in the stock of money. It is on this theory that exchange rate has been highlighted as the factor that leads to inflation.

The model is in the following functional form:

INF = f (EXR, MS, FID, RGDP, INFt-1) - - - (1)

The model in its econometric form will be as shown in Equation 2

INF = 1o + 1EXR + 2INFt-1 + 3MS+ 4FID + 5RGDP + Ut - - - (2)

where; INF is Inflation rate (proxy by consumer price index) which is taken as the dependent variable and exchange rate (EXR), the inflation rate expectation (INFt-1), money supply (MS), fiscal deficit (FID), national output proxy by real gross domestic product (RGDP) are the independent variables.

A Priori Expectation: beta 1 - beta 4>0 and beta 5 < 0

The value of 1 - 4 is likely to be positive on a priori basis and the value of 5 is likely to be negative.

A Priori Expectation: β1 - β4>0 and β5 < 0

On a priori ground, the value of β1 - β4 is expected to be positive while β5 is expected to be negative.

Estimation Technique

This article examines the currency rate and inflation in Nigeria. To do this, yearly time series data on money supply, fiscal deficit, national production (represented by Real Gross Domestic Product), inflation rate expectations, and exchange rate will be used as independent factors, with the inflation rate serving as the dependent variable. To analyse this yearly time series data, Autoregressive-Distributed Lag (ARDL) methodology was used using E-Views econometric software to examine the impact of exchange rate fluctuations on inflation.

The unit root test is used to assess the stationarity of time series data to avert the emergence of false regression. A stationary time series is characterised by statistical properties such as mean, variance, and autocorrelation that remain constant across time. Consequently, data must be stationary to be considered legitimate. The research used the order of integration to assess stationarity. If a series is integrated of order (0), denoted as I(0), it is stationary; otherwise, it is non-stationary. The stationarity test was conducted via the Augmented Dickey-Fuller Unit Root Test (Gujarati, 1995).

Augmented Dickey-Fuller Test

However, because of the potential autocorrelation in the residual process while using OLS in this work, the enhanced Dickey-Fuller test was used. The rationale is that the mistakes may not be normally and identically distributed, and the residual variance might be biassed. The test is based on the Dickey-Fuller methodology and serves as an appropriate means to ascertain if a certain variable is integrated of order one. This was proposed by Dickey and Fuller (1979). The null hypothesis posits that prices follow a random walk, rendering future prices unpredictable, whereas the alternative hypothesis suggests that economic actors may forecast future prices, indicating a deviation from a random walk (Gujarati, 1995).

Cointegration Test: The cointegration test assesses the long-term link between variables. This study will use the Engel-Granger co-integration test to determine the existence of a long-term association among the variables.

Following the determination of the type and stationarity of the time series data, this article used cointegration, a statistical method used to examine the connection between two or more non-stationary time series over an extended period or specific timeframe. The approach aids in the identification of long-term parameters or equilibrium among two or more sets of data. It aids in determining the conditions under which two or more stationary time series are cointegrated, so that they cannot appreciably diverge from equilibrium in the long run. This study used the autoregressive distributed lag (ARDL) cointegration approach. The ARDL model is considered the econometric approach of choice when the variables are I(0) or I(1), indicating their integration. The F-statistic (Wald test) identifies the long-term link among the underlying variables. This approach ascertains the long-term relationship of the series when the F-statistic exceeds the critical value threshold.

The null hypothesis (no cointegration between the variables of equation 4) can be stated as;

Null Hypothesis: H 0: beta 1 = beta 2 = beta 3= beta 4 = beta 5 = beta 6 = 0
Alternative Hypothesis: Ha: 020102040506 (beta one does not equal beta two does not equal beta three does not equal beta four does not equal beta five does not equal beta six and it is not equal to zero)
It verifies if the parameter estimates are significantly different to zero (0).

RESULTS AND DISCUSSION

Descriptive Statistics

The table below displays the median, maximum, highest standard deviation, skewness, kurtosis, and Jarque-Bera test of normality for the model variables. The average numbers represent the mean of each variable. The aforementioned descriptive data reveal the averages for Inflation lag (INF 1-1), Money Supply (MS), Inflation (INF), Fiscal Deficit (FID), Exchange Rate (EXR), and Real GDP (RGDP) as 18.99905, 5925800, 18.91687, -747.7836, 108.3203, and 38124.89, respectively. The media values represent the median of each variable. The Exchange Rate (EXR) is the highest median variable at 111.9433, while the Inflation Rate (INF) is the lowest median variable at 12.87660.

The Money Supply (MS) reaches a peak value of 29,137,800, while the Fiscal Deficit (FID) has a minimum mean value of -6,171.796 in the observed data. The standard deviation indicates that the variability of the exchange rate, inflation rate, money supply, and inflation lag is below their respective means. This indicates that the series are further apart from one another.

The skewness results indicate that INFt-1, Money Supply, Inflation Rate, Exchange Rate, and RGDP exhibit positive skewness. The distribution is characterised by a lengthy right tail, with both the mean and median exceeding the mode for each variable, while the Fiscal Deficit exhibits left skewness. The kurtosis of INF t-1, MS, and INF exceeds 3, indicating a leptokurtic distribution, whereas FID, EXR, and RGDP fall below 3, suggesting a platykurtic distribution, which is flatter than typical. The Jarque-Bera statistic suggests that the series follows a normal distribution, since the p-values for all series are not statistically significant at the 5 percent level. Consequently, it enables the confirmation of the null hypothesis, which asserts that all variables are normally distributed.

Table 4.1.1: Summary Descriptive Statistics

	INFT_1	MS	INF	FID	EXR	RGDP
Mean	18.99905	5925800.	18.91687	-747.7836	108.3203	38124.89
Median	12.71580	699733.7	12.87660	-107.7350	111.9433	26935.32
Maximum	72.83550	29137800	72.83550	32.04940	403.5808	73382.77
Minimum	5.388000	16161.70	5.388000	-6171.796	0.610000	16211.49
Std. Dev.	16.86844	8810621.	16.66456	1420.962	110.0900	20553.99
Skewness	1.823485	1.350957	1.858146	-2.408610	0.983381	0.575236
Kurtosis	5.159023	4.453488	5.314459	2.154571	2.208178	1.703335
Jarque-Bera	29.93630	12.82273	32.74456	85.03265	6.682129	5.133416
Probability	0.000000	0.001643	0.000000	0.000000	0.001399	0.003788
Sum	759.9618	2.43E+08	775.5918	-30659.13	4441.132	1563121.
Sum Sq. Dev.	11097.23	3.11E+15	11108.30	80765338	484792.3	1.69E+10

Observations 41	41	41	41	41	41

Source: Author's computation (2022).

Test for Stationarity

The Augmented Dickey Fuller (ADF) unit root test was performed to ascertain the order of integration. The results of stationarity test are presented in Table 4.2.2.

Table: 4.1.2: Stationarity Test Results.

Variables	Order of Integration	Critical Values			ADF Statistics	Prob.
		1%	5%	10%		
Δ (EXR)	I(0)	-3.605593	-2.936942	-2.606857	2.785991	1.0000
Δ (FID)	I(0)	-3.639407	-2.951125	-2.614300	3.509604	1.0000
Δ (INF)	I(0)	-3.605593	-2.936942	-2.606857	-3.004296	0.0430
Δ (MS)	I(0)	-3.646342	-2.954021	-2.615817	-3.994183	0.0041
Δ (RGDP)	I(1)	-3.610453	-2.938987	-2.607932	0.614430	0.9884

Source: Author's computation (2022).

Note:

•Δ= Difference operator

• I(d) = Numbers of times of integration.

• Levels= 10%, 5%, 1% levels of significance

The table above indicates that all series are stationary and so lack a unit root. The regression will provide inaccurate results when estimating models based on non-stationary time series data. The Exchange Rate, Inflation Rate, Money Supply, and Fiscal Deficit were determined to be stationary at level I(0) at a 5 percent significance level, whereas RGDP was found to be stationary at the first difference at the same significance level. The computed values are more negative than the critical levels for each tested variable. The results of the unit root test indicate that the variables exhibit a combination of integration orders 1(0) and 1(1). Consequently, the most appropriate model for data analysis is the Auto-Regressive Distributed Lag (ARDL) Model, and the optimal co-integration method to employ is the Engle-Granger co-integration method.

ARDL (F-Bounds) Test for Cointegration

To investigate the presence of long-run relationships among the variables, the bound testing under Pesaran et al. (2001) procedure is used. The bound testing procedure is based on the F-test. The F-test is a test of the assumption of no co-integration among the variables against the premise of its existence, denoted as:

$H0$: $\beta1 = \beta2 = \beta3 = \beta4 = 0$, i.e., there is no co-integration among the variables. This hypothetical representation is based on the specified ARDL model in equations 9 and 10

$H1$: $\beta1 \neq \beta2 \neq \beta3 \neq \beta4 \neq 0$, i.e., there is co-integration among the variables.

Table 4.2.3 Result of the ARDL (Bounds) Test for Cointegration

ARDL Bound Test of Cointegration		
Variables	F- Statistics	Decision
F (INF, EXR, MS, FID,RGDP)	4.136971	Cointegration Exists
Critical Values Bounds (Significance)	Lower Bound I (0)	Upper Bound I (1)
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's computation (2022).

The Bound test for cointegration is used to determine the presence of a long-term link (cointegration) among the studied variables. If the F-statistic of the bound test surpasses both the lower and upper critical values at the 5 percent significance level, the null hypothesis of no long-run relationship is rejected. Conversely, if the F-statistic is below both critical values at the same significance level, the long-run relationship is accepted.

The outcomes of the ARDL bound test for cointegration, as presented in the table below, indicate that the F-statistic value of 4.136971 surpasses both the upper bound (4.01) and the lower bound (2.86) of the critical values at a significance level of 0.05, thereby providing sufficient grounds to reject the null hypothesis. In other words, there exists a long-term link between the currency rate and inflation in Nigeria. It may be inferred that cointegration is present.

Given the established long-run link among the series in the model, both short-run and long-run ARDL models were calculated.

Short-run ARDL Estimates

Table: 4.1.4: Short-run ARDL Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INF(-1)	0.748125	0.155146	4.822087	0.0000
INF(-2)	-0.434107	0.161899	-2.681344	0.0118
EXR	-0.171425	0.141820	-1.208753	0.2362
EXR(-1)	0.150332	0.147844	1.016826	0.3174
FID	0.001765	0.002825	0.624522	0.5370
MS	-2.22E-07	4.77E-07	-0.465550	0.6449
RGDP	-0.004069	0.001878	-2.166603	0.0383
RGDP(-1)	0.004308	0.001978	2.178429	0.0374
C	16.73410	8.594258	1.947125	0.0609
R-squared	0.562343	Mean dependent var		19.15593
Adjusted R-squared	0.445635	S.D. dependent var		16.99583
S.E. of regression	12.65436	Akaike info criterion		8.113055
Sum squared resid	4803.986	Schwarz criterion		8.496954
Log likelihood	-149.2046	Hannan-Quinn criter.		8.250795
F-statistic	4.818359	Durbin-Watson stat		1.891074

Prob(F-statistic)	0.000697

Source: Author's computation (2022).

The ARDL output shown in the table above demonstrates that the lagged value of the exchange rate has a beneficial influence on inflation. An increase in the exchange rate by a percentage would lead to a rise in inflation by 0.1503 percent. Moreover, a percentage rise in RGDP would result in a corresponding inflation increase of 0.0043 percent, and vice versa. The lagged values of the inflation rate at (-1) and (1) were found to have a negative and positive significant influence on the exchange rate, respectively, as stated in the table. An examination of the results reveals that RGDP (-1) had a substantial positive impact on inflation at the 5 percent significance level, since the associated probability value was 0.0374, which is below the 5 percent threshold. The exchange rate (-1) may be reported to have a positive although negligible impact on inflation, as shown by its associated probability value of 0.3174, which above the 5% significance threshold. The R-squared and modified R-squared values of 0.56 and 0.45 signify that the explanatory variables accounted for over 56 and 45 percent of the variance in the dependent variable, respectively. The F-statistic p-value is less than 5 percent (i.e., 0.0000697 < 0.05). This indicates that the F statistic is significant, leading to the rejection of the null hypothesis, and it is inferred that the explanatory factors are collectively important in influencing the dependent variable INF. The research posits that the exchange rate significantly influences inflation in Nigeria. The Durbin-Watson statistic of 1.89 indicates the absence of autocorrelation, since the ARDL model's result of 1.89 is within the acceptable range for practical study concerning autocorrelation.

A ARDL Cointegrating and Long Run Form

$INF = \beta o + \beta 1EXR + \beta 2MS + \beta 3FID + \beta 4RGDP + Ut$

INF=16.73409 -0.030748EXR -3.24E-07MS +0.002572FID +0.000349RGDP

The long run results show that Exchange rate is negatively insignificant to the Inflationrate in the long run and implies that 1% increase in EXR will lead to 3.0748% decrease in INF.

Table 4.1.4A Result of the Long-run ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.73409	8.594257	1.947125	0.0609
INF(-1)*	-0.685982	0.153478	-4.469565	0.0001
MS**	-2.22E-07	4.77E-07	-0.465550	0.6449
RGDP(-1)	0.000239	0.000398	0.601782	0.5518
FID**	0.001765	0.002825	0.624523	0.5370
EXR(-1)	-0.021093	0.062669	-0.336572	0.7388
D(INF(-1))	0.434107	0.161899	2.681344	0.0118
D(RGDP)	-0.004069	0.001878	-2.166604	0.0383
D(EXR)	-0.171425	0.141819	-1.208754	0.2362

* p-value incompatible with t-Bounds distribution.

** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS	-3.24E-07	6.90E-07	-0.469423	0.6422
RGDP	0.000349	0.000578	0.603093	0.5510
FID	0.002572	0.004177	0.615748	0.5427
EXR	-0.030748	0.090742	-0.338850	0.7371

EC = INF - (-0.0000*MS + 0.0003*RGDP + 0.0026*FID -0.0307*EXR)

Source: Author's computation (2022).

Further, FID is insignificantly negatively related with the Inflationrate since an increase of 1 percent in FID in a long run will cause an increase of 0.2572 percent in INF. It was observed that RGDP has little significance with a positive value against Inflation rate which shows that 1 percent increment in RGDP will cause 0.0349 percent rise on the Inflation rate (INF). There exists insignificant negative correlation between Money supply (MS) and Inflation rate because 1 percent rise in MS will cause 324 percent decline in INF.

Diagnostic Tests

Heteroskedasticity Test Results

The existence of heteroskedasticity in linear regression analysis implies that the coefficients calculated using ordinary least squares (OLS) are biassed. This occurs when either the variance of errors or the model differs between data. The null hypothesis posits that the residuals exhibit homoscedasticity, whereas the alternative hypothesis asserts that the residuals demonstrate heteroscedasticity.

The null hypothesis will be rejected if the p-value is below the 0.05 significance threshold. The results in Table 4.2.3 indicate that the p-values for the F-statistic (0.0212) and Obs*R-squared (0.0288) are both below the 5 percent significance threshold, leading to the rejection of the null hypothesis. This finding indicates the presence of heteroskedasticity in the model.

Table: 4.1.5.1: Test of Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.081665	Prob. F(5,34)	0.0212
Obs*R-squared	12.47428	Prob. Chi-Square(5)	0.0288
Scaled explained SS	16.00898	Prob. Chi-Square(5)	0.0068

Source: Author's computation (2022).

Serial Correlation Test

Breusch-Godfrey Test: The Serial Correlation LM Test is used to detect the existence of serial correlation. The null hypothesis posits that serial correlation is nonexistent. The null hypothesis will be rejected if the p-value is below the 0.05 significance threshold. The results from Table 4.2.5 indicate that the Serial Correlation LM test yields an F-statistic of 2.741334, an observed R^2 of 5.850883, and corresponding probability values of 0.0796 and 0.0536, respectively. Since the probability values exceed 0.05, we may infer that there is no serial connection in the estimations.

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Table: 4.1.5.2: Result of Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.741334	Prob. F(2,32)	0.0796
Obs*R-squared	5.850883	Prob. Chi-Square(2)	0.0536

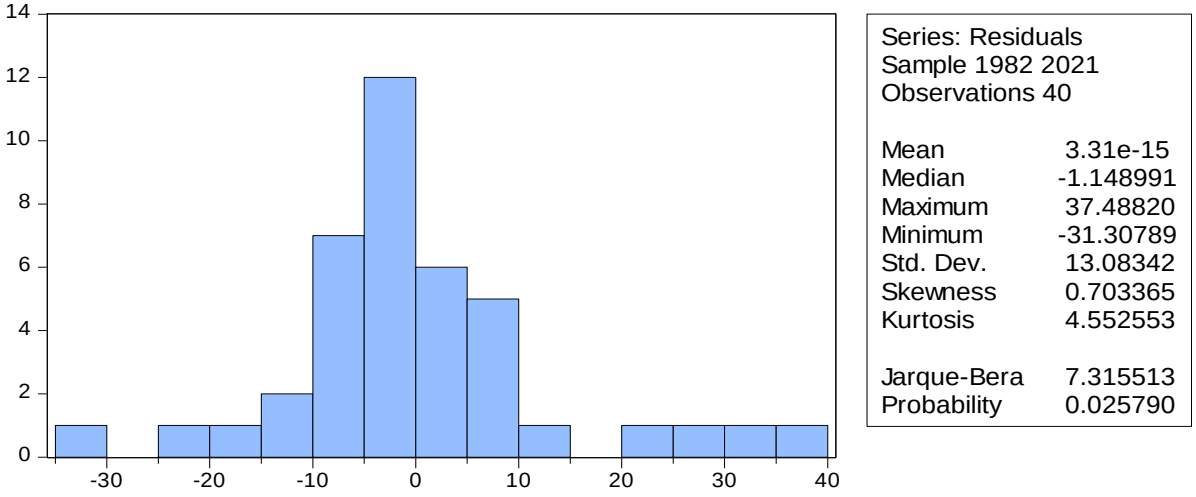
Source: Author's computation (2022).

Normality Test

About the normalcy of the models. The null hypothesis posits that the models have a normal distribution. The criterion for rejection of the null hypothesis is a p-value below the 0.05 significance threshold.

Figure 4.1: Normality test of the models of the study

NORMALITY TEST RESULT



USUM RESUL

Figure 1 above use the Jarque-Bera statistic to assess the model's normalcy. The Jaque-Bera p-value of 0.025790 is below 0.05, indicating a lack of normal distribution. The analysis contradicts the null hypothesis that the model is not regularly distributed. The standard deviation indicates that the distribution exhibits more dispersion. The distribution exhibits positive skewness and a kurtosis of 4.55, above the threshold of 3.

Stability Test

CUSUM and CUSUM of squares were used to determine the model's stability. The recursive residuals fall inside the two crucial limits, indicating the stability of the calculated model. Conversely, when residuals exceed the two key thresholds, the model becomes unstable. Figures 2a and 2b illustrate the results of the stability test. Analysis of Figures 2a and 2b indicates that the CUSUM graph is stable, since the recursive residuals remain within the critical boundaries, namely inside the 5% critical lines. This conclusion indicates that the parameters determined in the research remain stable throughout its duration. The CUSUMSQ test demonstrated relative instability during some times.

Figure 4.2: Plot of Cumulative Sum of Recursive Residuals

The straight
CUSUM RESULT

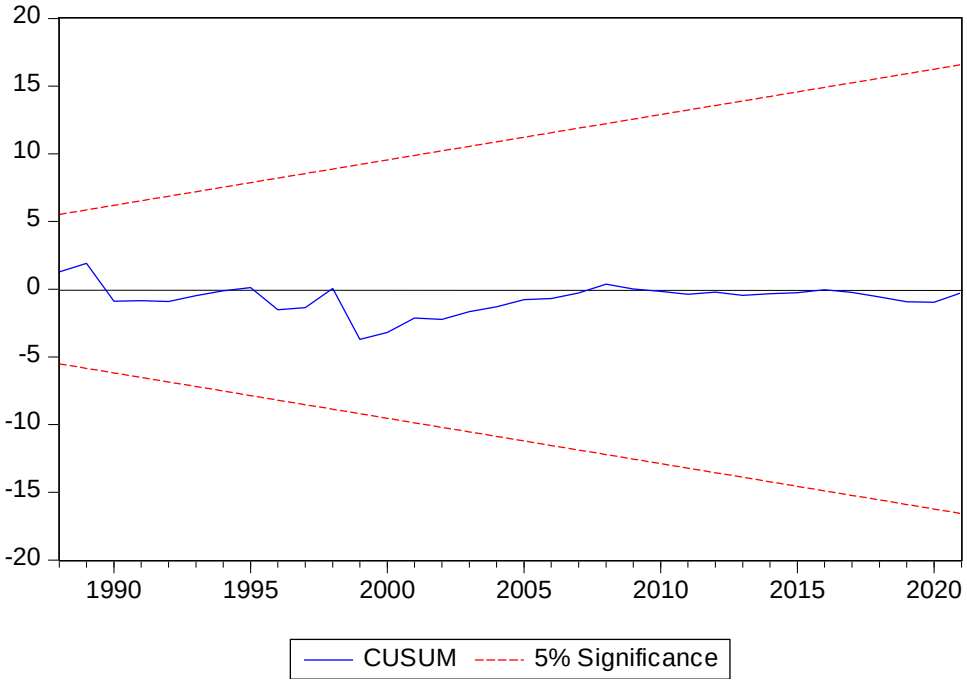


Figure-4.2a. CUSUM of squares test
CUSUM OF SQUARES

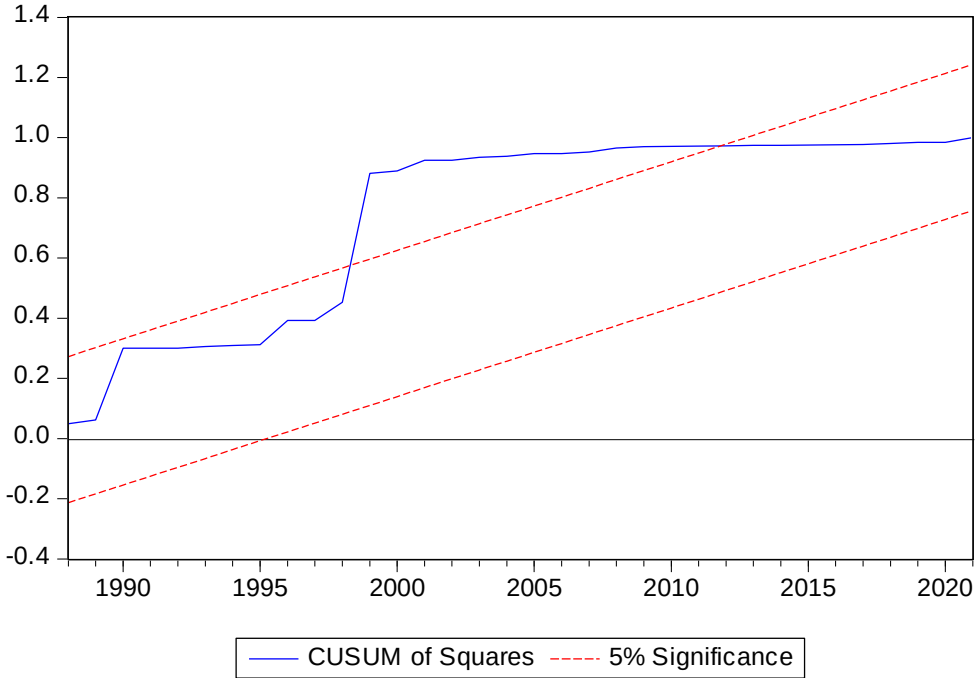


Figure-4.3b. CUSUM of squares test

Granger Causality

The correlation between two variables does not indicate the direction of a potential causal link, if one exists, among the variables. The economic theory posits that Granger Causality is always present. Order, D. and L. Fisher, (1993) in one direction at least. We assume the stationarity of the variables prior to the Granger

causality test, and the residuals of the variables are uncorrelated. To evaluate the hypothesis of the Granger causality test, the probability values of the F-statistics are specified. We shall accept the null hypothesis if the P-value exceeds 5 percent; otherwise, we will reject H0. Consequently, this element of the study aims to validate the direction of Granger Causality among INF, MS, EXR, RGDP, and FID. The results of the Granger causality estimate between the specified variables are shown below:

Table 4.1.6. Granger Causality Test Result

Null Hypothesis	F-Statistics	Decision	Probability	Type of Causality
FID does not Granger Cause EXR	2.71679	We cannot reject Ho	0.0804	No causality
EXR does not Granger Cause FID	3.23239	We cannot reject Ho	0.0519	No causality
INF does not Granger Cause EXR	0.55894	We cannot reject Ho	0.577	No causality
EXR does not Granger Cause INF	1.31019	We cannot reject Ho	0.283	No causality
MS does not Granger Cause EXR	2.31076	We cannot reject Ho	0.1146	No causality
EXR does not Granger Cause MS	0.93763	We cannot reject Ho	0.4014	No causality
RGDP does not Granger Cause EXR	2.20779	We cannot reject Ho	0.1255	No causality
EXR does not Granger Cause RGDP	1.79908	We cannot reject Ho	0.1808	No causality
INF does not Granger Cause FID	0.22323	We cannot reject Ho	0.8011	No causality
FID does not Granger Cause INF	0.30096	We cannot reject Ho	0.7421	No causality
MS does not Granger Cause FID	301.67	We cannot reject Ho	2.20E-01	No causality
FID does not Granger Cause MS	11.7187	Reject Ho	0.0001	Bi-directional causality
RGDP does not Granger Cause FID	4.03542	Reject Ho	0.0268	Bi-directional causality
FID does not Granger Cause RGDP	0.03734	We cannot reject Ho	0.9634	No causality
MS does not Granger Cause INF	0.80214	We cannot reject Ho	0.4567	No causality
INF does not Granger Cause MS	0.17994	We cannot reject Ho	0.8361	No causality
RGDP does not Granger Cause INF	1.44944	We cannot reject Ho	0.2488	No causality
INF does not Granger Cause RGDP	0.33192	We cannot reject Ho	0.7198	No causality

From the table above, it was found that, Fiscal Deficit, Money Supply, and Real GDP granger cause inflation in Nigeria. Meanwhile, in terms of the ability of inflation to predict the explanatory variables, it was revealed that exchange rate does not Granger cause in inflation rate.

Hypotheses Testing

The test of hypotheses will be based on the F-statistics for short run effect.

H0: Exchange rate has no significant impact on inflation.

The p-value of the F-statistic for the short-run ARDL model is 0.000697, and the F-statistic is 4.818359. Given that the p-value is less than 0.05, it is feasible to reject the null hypothesis in the near term, indicating that exchange rates significantly impact inflation in Nigeria. The null hypothesis is rejected in the near term. The research posits that exchange rates significantly impact short-run inflation.

SUMMARY OF MAJOR FINDINGS

The study examined the impact of exchange rates on inflation in Nigeria. The explanatory variables are Money Supply (MS), Exchange Rate (EXCHRT), Fiscal Deficit (FID), Inflation Rate Expectation (INFt-1), and Real Gross Domestic Product (RGDP) in Nigeria from 1981 to 2021, whereas the dependent variable is the Inflation Rate (INF). An ex-post facto research approach was used, using secondary data sourced from the CBN Statistical Bulletin. The research spanned 40 years, from 1981 to 2021. The findings underwent the Augmented Dickey-Fuller stationarity test to choose the best suitable econometric analysis technique. The model was estimated using the Autoregressive Distributed Lag (ARDL) approach.

CONCLUSION

The article examines the influence of currency rates on inflation in Nigeria from 1981 to 2021. The ARDL analysis indicated that the exchange rate (EXR) and real gross domestic product (RGDP) had a considerable positive influence on the inflation rate in Nigeria during the research period. This conclusion indicates that the policy consequence is that an increase in the exchange rate may induce inflationary pressure in Nigeria. The Granger Causality test findings indicate that Fiscal Deficit, Money Supply, and Real GDP are Granger causes of inflation in Nigeria. Meanwhile, regarding the ability of inflation to predict the explanatory factors, it was determined that the exchange rate does not Granger-cause the inflation rate. The hypothesis test indicates that the exchange rate significantly influences inflation in the near term.

RECOMMENDATIONS

Based on the findings, the following recommendations were made:

Central Bank ought to adopt a fixed system exchange rate in the economy. Among the reasons why a fixed exchange rate system should be selected, we should mention an attempt to tame inflationary trends. Fixing of one currency is one of the good approaches to curb or do away with this inflationary tendency. Fixed exchange rate is a restraint that does not allow domestic supply of money to increase at a high rate. Central Bank should work harder so as to maintain the exchange rate as stable. With a stable exchange rate, the prices of goods are stable

in the country. Hence the CBN ought to ensure that there is a stable exchange rate by leaving it to be determined competitively.

Monetarists believe that there should be the Control of money supply i.e. there is close relationship between money supply and the inflation hence by controlling money supply one can control inflation.

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APPENDICES

Table 4.1

ORIGINAL ARTICLE

YEAR	INF	EXRT	INF$t-1$	MS	FID	RGDP
1981	20.8128	0.61		16,161.70	-3.9	19748.53438
1982	7.6977	0.6729	20.8128	18,093.60	-6.1	18404.9648
1983	23.2123	0.7241	7.6977	20,879.10	-3.36	16394.39079
1894	17.8205	0.7649	23.2123	23,370.00	-2.66	16211.49116
1985	7.4353	0.9996	17.8205	26,277.60	-3.04	17170.08109
1986	5.7172	3.3166	7.4353	27,389.80	-8.25	17180.54544
1987	11.2903	4.1916	5.7172	33,667.40	-5.89	17730.34445
1988	54.5112	5.35	11.2903	45,446.90	-12.16	19030.69243
1989	50.4667	7.65	54.5112	47,055.00	-15.13	19395.96398
1990	7.3644	8.037808	50.4667	68,662.50	-22.12	21680.20454
1991	13.007	9.909492	7.3644	87,499.80	-35.76	21757.89611
1992	44.5888	17.29843	13.007	129,085.50	-39.53	22765.54626
1993	57.1653	22.05106	44.5888	198,479.20	-107.74	22302.24036
1994	57.0317	21.8861	57.1653	266,944.90	-70.27	21897.47154
1995	72.8355	21.8861	57.0317	318,763.50	1	21881.55979
1996	29.2683	21.8861	72.8355	370,333.50	32.05	22799.69342
1997	8.5299	21.8861	29.2683	429,731.30	-5	23469.34308
1998	9.9964	21.8861	8.5299	525,637.80	-133.39	24075.14646
1999	6.6184	92.69335	9.9964	699,733.70	-285.1	24215.77587
2000	6.9333	102.1052	6.6184	1,036,079.50	-103.78	25430.42339
2001	18.8736	111.9433	6.9333	1,315,869.10	-221.05	26935.31565
2002	12.8766	120.9702	18.8736	1,599,494.60	-301.4	31064.27213
2003	14.0318	129.3565	12.8766	1,985,191.80	-202.72	33346.62477
2004	14.998	133.5004	14.0318	2,263,587.90	-172.6	36431.37371
2005	17.8635	132.147	14.998	2,814,846.10	-161.4	38777.01373
2006	8.2252	128.6516	17.8635	4,027,901.70	-100.8	41126.67897
2007	5.388	125.8331	8.2252	5,832,488.50	-117.24	43837.39199
2008	11.5811	118.5669	5.388	9,208,462.60	-47.38	46802.76044
2009	12.555	148.8802	11.5811	10,780,627.10	-810.01	50564.26325
2010	13.7202	150.298	12.555	11,525,530.30	-1,105.40	55469.35031

2011	10.84	153.8616	13.7202	13,318,576.30	-1,158.52	58180.3519
2014	8.0625	158.5526	8.4758	18,885,500.00	-835.71	67977.45922
2015	9.0094	193.2792	8.0625	20,029,831.10	-1,557.83	69780.69272
2016	15.6753	253.4923	9.0094	23,591,732.60	-2,673.84	68652.43036
2017	16.5235	305.7901	15.6753	24,140,634.20	-3,609.37	69205.69111
2018	12.0947	306.0802	16.5235	27,068,575.10	-3,628.10	70536.34862
2019	11.3968	306.9206	12.0947	29,137,800.50	-4,820.61	72094.094
2020	13.25	358.8108	11.3968	18,519.70	-6,171.80	70800.54349
2021	15.63	403.5808	13.25	18,481.48	-3.932563254	73382.77139
2022	16.54	456.7809	13.97	18,546.89	-5.004872043	88887.07154

Source: Central Bank of Nigeria Statistical Bulletin 2022