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An Assessment of the Role of Exchange Rate Movement in Influencing the Lending Rate Behaviour in Nigeria

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Abstract

This present study investigates the impact of exchange rate on the lending rate in Nigeria using annual series that covers the period from 1981-2022. The study used the auto regressive distributed lag (ARDL) bounds method with findings showing that in the long-run, exchange rate impacted negatively and significantly on the lending rate, while in the short-run the impact of inflation rate is significant and positive after one period lag. Also, it is found that while interest rate spread impacted positively and significantly on the lending rate in both the short-run and the long-run, the impact of money supply is positive and significant after one period lag, but negative and significant in the long-run. Consequently, it is suggested that measures should be carried out to improve business prospects in the economy so that the low lending rate occasioned by exchange rate depreciation can be utilized to improve the economy.

Keywords: *Exchange rate, Lending rate, Money supply, Inflation rate*

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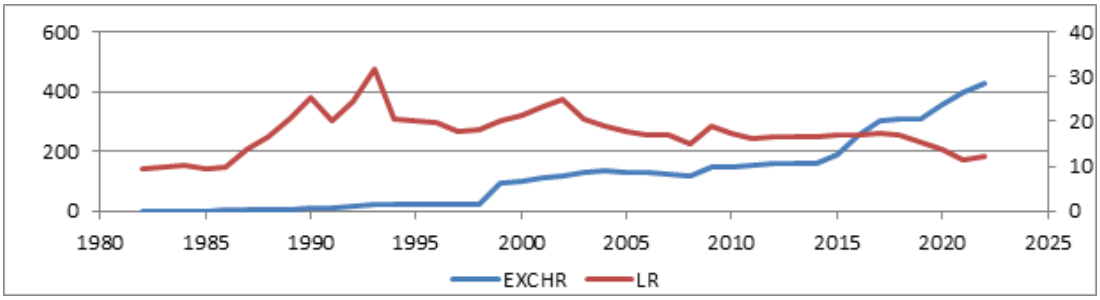
Background to the Study

The study of the link between exchange rate and interest rate has often been of immense importance to policymakers, the academia and business people alike. In particular, the role of exchange rate in facilitating trade and investment across borders has made such study significant (Hnatkovska *et al.,* 2013). Likewise, interest rate plays significant role in the economy as it facilitates investment and encourages capital inflows. The essence of the link between exchange rate and interest rate has motivated some scholars to develop theories meant to facilitate a broader understanding of the relationship such as the overshooting theory by Dornbusch (1976). Understanding the nexus between exchange rate and interest rate is paramount in developing countries because such could assist in the formation of expectations as well as create consciousness on the macroeconomic performance. As noted by Holtemöller and Mallick (2016), the fact that emerging economies have resorted to embrace either inflation-targeting or exchange-rate targeting as measures to ensure macroeconomic stability can be attributed to the knowledge of the relationship between exchange rate and interest rate. It thus presupposes that lack of adequate understanding of the relationship between the two variables could influence monetary policy setting. Analyzing the co-movement between these variables is therefore paramount, policy wise.

In Nigeria, interest rate behaviour, particularly the lending rate has always been a topical issue among policymakers and scholars. The concern of monetary policy authorities is to manipulate the monetary policy rate (MPR) in order to influence the lending rate. Apart from the MPR, other tools of monetary policy used to influence the lending rate are open market operation (OMO), foreign exchange net open position (NOP), cash reserve ratio (CRR) and liquidity ratio (Ogunniyi & Akam, 2020). In order to achieve the inflation-targeting policy thrust, the Central Bank of Nigeria (CBN) often tinkers with these policy tools. A major variable targeted through this exercise is the lending rate which is manipulated to curtail the inflationary pressure which excessive lending poses. The literature has documented studies that have investigated the nexus between exchange rate and interest rate in Nigeria with little emphasis placed on the impact of exchange rate, particularly on the lending rate. However, exchange rate plays crucial role in influencing the lending rate through various transmission mechanisms. One of such mechanisms is through capital inflows. A weak domestic exchange rate for instance, makes domestic investment assets to be cheap in relation to that of other countries and this has the tendency to stimulate the penetration of investments into the home country. Such penetration of capital has the tendency to improve the liquidity position of the recipient country, raising money supply and thus lowering the lending rate. Given such scenario, policy aimed at influencing the lending rate will be more portent if the factors that shape its movement such as exchange rate are factored in the implementation. However, whether this hypothesized relationship between exchange rate and the lending rate exists significantly in Nigeria is a phenomenon that requires empirical validation. To give fillip to the need for this study, information in Fig.1 reveals that the link between exchange rate and the lending rate does not follow a regular pattern. Evidence shows that in some periods when exchange rate depreciates, the lending rate rises such as periods prior to 1999. However, in some periods when exchange rate appreciates, the lending rate rises such as in periods after 1999.

Fig. 1: Trend in Exchange Rate and the Lending Rate



Source: World Development Indicators

Flowing from the aforementioned, this study seeks to investigate the impact of exchange rate movement on the lending rate in Nigeria. The current exchange rate depreciation in Nigeria occasioned by the policy on exchange rate liberalization and the likely impact it could have on the lending rate has made the current study a compelling endeavor. To achieve the study's objective, the auto regressive distributed lag (ARDL) bounds method which links both the short-run and the long-run impact is utilized.

Empirical Literature

Due to the dynamic link between interest rate and exchange rate, some studies have examined the impact of interest rate on exchange rate while some have examined the impact of exchange rate on interest rate. For the studies that focus on the impact of exchange rate on interest rate, there is a diversity of findings. In a study involving 10 OECD countries, Ozcelebi (2018) shows that volatility in exchange rate results into a change in interest rate. In their study, Avdjiev *et al.* (2019) observe a decrease in cross-border lending arising from domestic currency depreciation for firms that depend on external funds. In another study, Keshtgar *et al.* (2020) reveal that exchange rate plays a role in raising the ratio of bank lending. In a related vein, Manthos *et al.* (2022) find that an increase in exchange rate volatility resulted into an increase in loan spreads for loans extended in a currency that differs from that of the lender. In further support of the foregoing results, Becker *et al.* (2024) reveal that the appreciation of the US Dollars leads to an improvement in net lending flows. However, in the long-run, the study reveals a strong and positive response. A study in the Philippines by Bagsic *et al.* (2025) find that bank lending expanded in period of currency depreciation; especially foreign and big banks whose lending is denominated in US Dollars.

However, studies that focus on the impact of interest rate on exchange rate have used several forms of interest rate such as the monetary policy rate, the Treasury bills rate, the lending rate and others. In a panel of seven major central banks, finding by Ferrari *et al.* (2017) indicates that an unanticipated increase in policy rate leads to instant currency appreciation. In a related vein, Kerssenfischer (2019) reveals that exchange rate rises on account of a contractionary monetary policy shock. This result finds corroboration in a study by Kugler (2020) which indicates that unexpected increase in short-term rate encouraged an appreciation of the Swiss

franc. However, Grisse (2020) finds that a contractionary monetary policy causes an appreciation of the Swiss franc. In Nigeria, Ogunniyi and Akam (2020) reveal that a decrease in interest rate results into domestic currency appreciation before the global financial crisis. In Ghana, Akoto (2020) finds that interest rate exhibited a strong and negative relationship with exchange rate over the study period. In another study in Nigeria, Babalola (2021) indicates that in the short-run, only Treasury bill rate impacts significantly on exchange rate. However; in the long-run the impact of other variables such as the lending rate is significant. In a study involving some sub-Saharan African countries (Nigeria, Ghana, Gambia, Sierra Leone and Liberia), Sylvia *et al.* (2022) indicate that interest rate is among the factors that encourages exchange rate depreciation. In a study involving Ghana, Armah *et al.* (2023) indicate a slow but positive response of exchange rate to shock in interest rate differential in the short-run. Umoru *et al.* (2023) shows that interest rate has a significant and positive impact on the volatility in exchange rate in Côte D'Ivoire, while in the short-run the impact is significant and negative in Cameroon. As a further proof, Fink *et al.* (2024) indicate that the announcement of monetary policy influenced the Swiss franc through its impact on medium- to longer-term expectations.

Theoretical Framework

In literature, the relationship between exchange rate and interest rate has found some theoretical backing. This study is guided by the overshooting theory by Dornbusch (1976) which lays emphasis on the link between exchange rate and interest rate. The central argument of the theory is that nominal exchange rate appreciates instantaneously when interest rate increases and then will depreciate in accord with uncovered interest parity (UIP). The instantaneous reaction of financial markets to the rise in interest rate which is dictated by the UIP condition is responsible for the initial appreciation. The overshooting model is stated as follows:

$$R = R^* + (E^e - E)/E \qquad (1)$$

Where;

R and R^* represent the home country's nominal interest rate and that of foreign country, respectively, E represents spot barter price of foreign currency in relation to home currency and E^e represent the future expectation of exchange rate. If the expected rate of depreciation, that is $(E^e - E)/E$ is introduced, such will lead to the comparability of interest rate in the same country. The assumption of uncovered interest parity (UIP) implies that investors will move capital from a country where interest rate is low to a country where interest rate is high. This development will cause the recipient country's exchange rate to appreciate. Equation (1) may be restated as:

$$R - R^* = E^e E - 1 \qquad (2)$$

Equation (2) can be interpreted to mean that if there is a short-run loose monetary policy in the home country which is associated with a fall in R and an increase in E^e, the rise in E which is greater than E^e ensures that equation (2) maintains a balance assuming there is a fixed R^*. Consequently, in both

the short-run and the long-run, when prices rise, real money supply also rises and this increase *R*but reduces *E* in order to maintain equilibrium in equation (2)

Methodology

In this paper, annual dataset that spanned the period from 1981-2022 was used to evaluate the link between exchange rate and lending rate in Nigeria. The variables considered are the lending rate which is the dependent variable and exchange rate which is the independent variable. Other explanatory variables are inflation rate, broad money supply (a proxy for money supply) and gross domestic product (GDP). Data for all the variables were obtained from the World Development Indicators. The lending rate and inflation rate are measured in percentage. Also, interest rate spread is measured in percentage and it is calculated as lending rate minus deposit rate. GDP is measured in constant 2015 US Dollars. Also, while exchange rate is measured in local currency unit per US Dollars, M2 is measured in current local currency unit. To enhance results interpretation and for normalization, we logged both M2 and GDP.

The study conducted some pre-diagnostic tests meant to examine the behaviour of the variables included in the model. These include the descriptive statistics, correlation matrix and unit root tests. Both the augmented Dickey-Fuller and Philip-Perron rests were adopted for the unit root test. The autoregressive distributed lag (ARDL) bounds was used to test for the cointegration among the variables. Post-diagnostic tests were equally conducted to identify if the series suffer from heteroskedasticity and serial correlation and whether the model is well specified and stable.

Model Specification

The baseline model that guided the study is specified as follows:

$$LR_t = (EXCHR_t, INFLR_t, INTRS_t, LM2_t, LGDP) \quad (1)$$

Equation 3 is expressed in the ARDL form as follows:

$$\Delta LR_t = \eta_0 + \sum_{j=1}^{k} \eta_1 \Delta LR_{t-1} + \sum_{j=1}^{k} \eta_2 \Delta EXCHR_{t-1} + \sum_{j=1}^{k} \eta_3 \Delta INFLR_{t-1} + \sum_{j=1}^{k} \eta_3 \Delta INTRS_{t-1} + \sum_{j=1}^{k} \eta_4 \Delta LM2_{t-1}$$

$$\sum_{j=1}^{k} \eta_5 \Delta LGDP_{t-1} + \lambda_1 LR_{t-1} + \lambda_2 EXCHR_{t-1} + \lambda_3 INTRS_{t-1} + \lambda_4 LM2_{t-1} + \lambda_5 LGDP_{t-1} + \mu_t \quad (2)$$

Where;

LR = lending rate, = $EXCHR$ = exchange rate, $INFLR$= inflation rate, $INTRS$= interest rate spread, $LM2$ = log of broad money supply (a proxy for money supply), $LGDP$ = log of gross domestic product and μ_t is a stochastic term. The coefficients of the short-run parameters are: $\eta_1, \eta_2 .... \eta_5$ while the coefficients of the long-run parameters are: $\lambda_1, \lambda_2 .... \lambda_5$

For the test of the existence of long-run relationship among the variables, the study is guided by the following null hypothesis: $H_0 : \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5$ (presence of cointegration). Alternatively, the hypothesis indicating the absence of cointegration is stated as follows: $H_1 : \lambda_1 \neq \lambda_2 \neq_3 \neq \lambda_4 \neq= \lambda_5$. If cointegration is established, the following error correction model (ECM) is specified:

$$\Delta LR_t = \eta_0 + \sum_{j=1}^{k} \eta_1 \Delta LR_{t-1} + \sum_{j=1}^{k} \eta_2 \Delta EXCHR_{t-1} + \sum_{j=1}^{k} \eta_3 \Delta INFLR_{t-1} + \sum_{j=1}^{k} \eta_4 \Delta LM2_{t-1} + \sum_{j=1}^{k} \eta_5 \Delta LGDP_{t-1} + \varphi ECM_{t-1} + \mu_t \quad (3)$$

Where;
ECM= error correction model (ECM) and φ is the coefficient of the ECM

Results and Discussions

Findings in Table 1 reveal that the variable with the highest mean value is exchange rate (113.64), but interest rate spread has the lowest mean value (6.48). It is also found that the gap between the mean and the median of all the variables is low, indicating an existence of symmetry. Equally, evident suggests that exchange rate has the highest range; implying that it exhibited high volatility within the period of study. On the other hand, GDP is found to have low range; showing that it has less volatile. Apart from interest rate spread and M2 which exhibited negative skewness (skewed to the right), others are negatively skewed (skewed to the left). Results also indicate that all the variables are heavily-tailed since their kurtosi is positive.

Table 1: Descriptive Statistics

	LR	EXCHR	INFLR	INTRS	LM2	LGDP
Mean	17.44	115.64	16.23	6.48	11.81	11.39
Median	16.92	114.89	10.75	6.95	12.15	11.35
Maximum	31.65	425.97	75.40	11.06	13.71	11.74
Minimum	9.43	0.00	0.68	0.31	0.00	11.05
Std. Dev.	4.66	119.1	14.16	2.65	2.19	0.23
Skewness	0.45	1.02	2.22	-0.74	-3.75	0.14
Kurtosis	3.79	3.22	8.90	3.04	21.04	1.43
Jarque-Bera	2.53	7.44	95.71	3.92	668.5	4.43
Probability	0.28	0.02	0.00	0.14	0.00	0.10
Sum	732.7	4856.9	682.00	272.34	496.06	478.4
Sum Sq. Dev.	890.8	582528.1	8223.9	288.3	197.7	2.33
Observations	42	42	42	42	42	42

In Table 2, results of the correlation matrix indicate that the correlation between the lending rate and exchange rate is relatively low and negative, just as its correlation with GDP. However, the correlation between the lending rate and inflation rate, interest rate spread and M2 is

relatively low and positive. It is found that the correlation between one explanatory variable and the other is low which indicates a case of low multicolinearity. This implies that the individual impact of each explanatory variable on the dependent variable could easily be isolated.

Table 2: Correlation Matrix

	LR	EXCHR	INFLR	INTRS	LM2	LGDP
LR	1.	-0.17	0.43	0.49	0.09	-0.13
EXCHR	-0.17	1	-0.32	0.41	0.58	0.83
INFLR	0.43	-0.32	1	0.04	-0.13	-0.37
INTRS	0.49	0.41	0.04	1	0.35	0.52
LM2	0.09	0.58	-0.13	0.35	1	0.30
LGDP	-0.13	0.82	-0.37	0.52	0.30	1

The results of unit root in Table 3 reveal that only inflation rate achieved stationarity (absence of unit root) at level. However, other variables became stationary after first differencing. In a nutshell, while inflation rate is integrated of order zero, ie *I(0),* other variables are integrated of order one, *i.e. I (1).* This shows that the series have an admixture of order of integration, justifying the use of an ARDL.

Table 3: Unit Roots Test

Variable	ADF		PP		Order of Integration
	Level	First Diff.	Level	First Diff.	
LR	-2.45	-5.46	-2.47	-6.96	*I(1)*
EXCHR	-1.94	-2.03	-1.95	-2.03	*I(1)*
INFLR	-3.32	-7.78	-3.32	-10.86	I*(0)*
INTRS	-2.36	-6.74	-2.36	-9.55	*I(1)*
LM2	-1.45	-2.22	-1.45	-2.23	*I(1)*
LGDP	-0.57	-5.43	0.21	-5.41	*I(1)*

The ARDL result in Table 4 indicates that the coefficient of the error term is negative and significant, indicating the existence of long-run relationship. Apart from been evidence of long-run relationship among the variables, the result also indicates that about 57% of the errors generated in each period is automatically corrected by the system in the subsequent period. The results of the individual coefficients indicate that in the short-run, exchange rate impacted positively on the lending rate but the result is not significant. However, in the long-run exchange rate impacted negatively and significantly on the lending rate. The long-run result indicates that if exchange rate depreciates by one Dollar, the lending rate declined by 0.04 percent. This result finds an empirical corroboration in the studies done in the past (Avdjiev *et al.,* 2019; Bagsic *et al.,* 2025). The implication of the result is that when the country's currency depreciates, such results into a fall in the lending rate. One channel through which this could be possible is domestic investment assets. A depreciating currency makes domestic asset prices to be cheap relative to foreign assets. Given this scenario, the

demand for domestic investment will be high and such has the tendency to improve the liquidity position in the economy, especially the lending institutions. Such improved liquidity no doubt will encourage a decline in the lending rate. We contend that the reason why the impact is significant only in the long-run is because of the time it takes on the part of the lending institutions to adjust their lending rate in the face of improved liquidity build-up. Frequent depreciation of the Nigerian currency over the years thus suggests the tendency for the lending institutions to adjust their lending rate downward and this could be more so in recent times due to the current policy on exchange rate liberalization which has affected the value of the naira.

In another vein, it is found that inflation rate exerted a significant positive influence on the lending rate in the short-run after one period lag. The result indicates that if inflation rises by one percent, lending rate rises by 0.09 percent after one period lag. The plausible reason for this result could be the effect of the contractionary monetary policy stance of the CBN, especially in times of high inflation. The major monetary policy objective of the CBN is inflation-targeting. To achieve this objective, the Bank often intervenes during period of high inflation through some measures such as raising the monetary policy rate (MPR), the cash reserve requirement or other means.

In particular, raising the MPR has the tendency to drag other rates up. One implication of this result is that when inflation is high, it will be impossible to officially lower the domestic interest rate. The reason the result is significant after one period lag could be due to the time between monetary policy intervention and the time when the policy begins to have impact on the lending behaviour of the financial institutions. From another perspective, findings indicate that interest rate spread impacted positively and significantly on the lending rate in both the short-run and the long-run. This result is not surprising, considering that lending institutions make much profit when the interest rate spread is high. Therefore, the tendency to increase their profit margin through raising the interest rate spread implies that the lending rate has to be high. In Nigeria, high lending rate in the face of low saving rate (high interest rate spread) has always been an issue of concern among bank depositors. The phenomenon of high interest rate spread has been noted to be among the characteristics of a less-developed financial system (Owusu-Antwi *et al.*, 2017).

It is found that while money supply impacted the lending rate positively and significantly after one period lag in the long-run, but in the long run its impact is negative and significant. We are of the view that the monetary policy intervention meant to reduce the inflationary impact of increased money supply could be responsible for the short-run positive impact. As noted earlier, such contractionary policy which is often designed to work in the short-run often raises the lending rate through the official increase in the MPR or other monetary policy measures such as increase in the reserve requirement. However, the long-run result is in line with apriori expectation as it is expected that due to the inverse relationship between money supply and interest rate, increase in money supply entails a fall in interest rate. Finally, finding indicates that GDP impacted the lending rate positively and significantly in the short-run.

Among the plausible reasons for the result is the inflationary pressure which improved GDP portends. In period of rising GDP, there is often a flurry of economic activities which have the tendency to be inflationary. An intervention to curtail such inflationary tendency often leads to an increase in the lending rate.

Table 4: ARDL Results

Short-run Results				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCHR)	0.02	0.02	0.59	0.55
D(INFLR)	0.02	0.03	0.67	0.50
D(INFLR(-1))	0.09	0.03	2.63	0.02
D(INTRS)	0.64	0.25	2.52	0.02
D(LM2)	-0.66	0.89	-0.74	0.46
D(LM2(-1))	20.16	7.79	2.58	0.01
D(LGDP)	75.54	29.63	2.54	0.02
CointEq(-1)	-0.57	0.12	-4.61	0.00
Long-run Results				
EXCHR	-0.04	0.02	-1.76	0.09
INFLR	-0.013	0.08	-0.16	0.87
INTRS	1.12	0.40	2.80	0.00
LM2	-18.46	7.63	-2.41	0.02
LGDP	0.85	19.11	0.04	0.96
C	182.78	225.82	0.80	0.42

The results of post-diagnostic tests in Table 5 which are evaluated at the 5% level of significance indicate that the error term does not suffer from the problem of heteroskedasticity (error terms have constant variance). The result also indicates that the model does not have an issue with serial correlation since at the 5% level; we cannot reject the null hypothesis of an absence of serial correlation. Finding also reveals that the model is well-specified since the p-value of the Ramsey RESET test is higher than the 5% level of significance. The result of normality test indicates that the p-value of the Jarque-Bera test is greater than 5%, suggesting that the errors are normally distributed. Figures 3 and 4 show that the plot of the CUSUM and CUSUMS Square statistic fall inside the critical bands of the 5% confidence interval, indicating that the parameters of the model are stable overtime.

Table 5: Results of Post Diagnostics

Test	P-value
Heteroskedasticity Test: Breusch -Pagan-Godfrey	0.28
Breusch-Godfrey Serial Correlation LM Test	0.14
Ramsey RESET Test for model specification	0.26
Jarque-Bera Test for normality	0.21

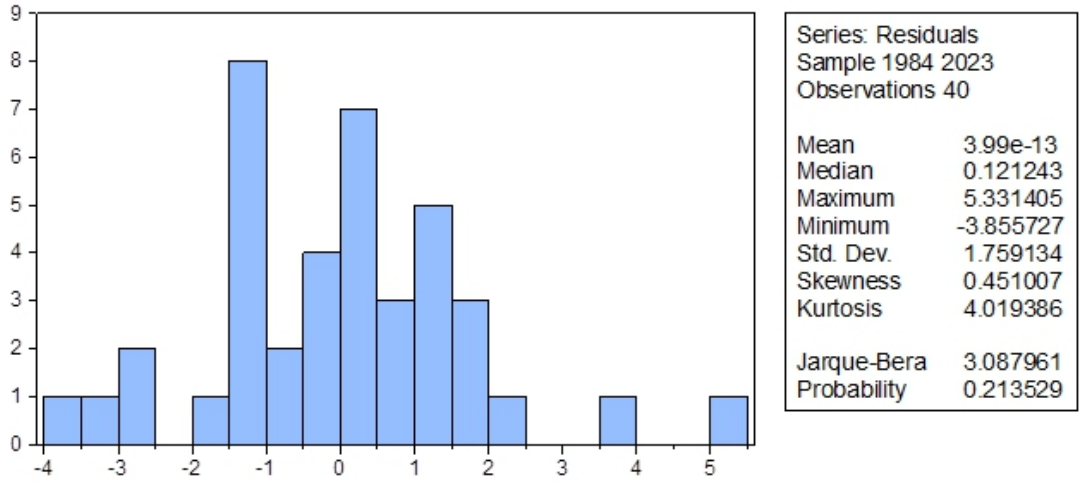


Fig. 2: Result of Stability Test

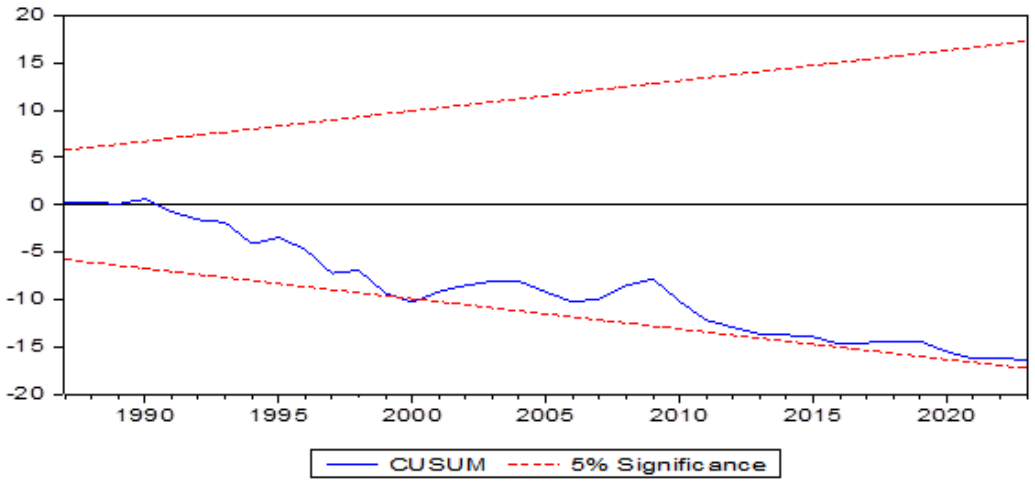


Fig. 3: Plot of CUSUM of Recursive Residuals

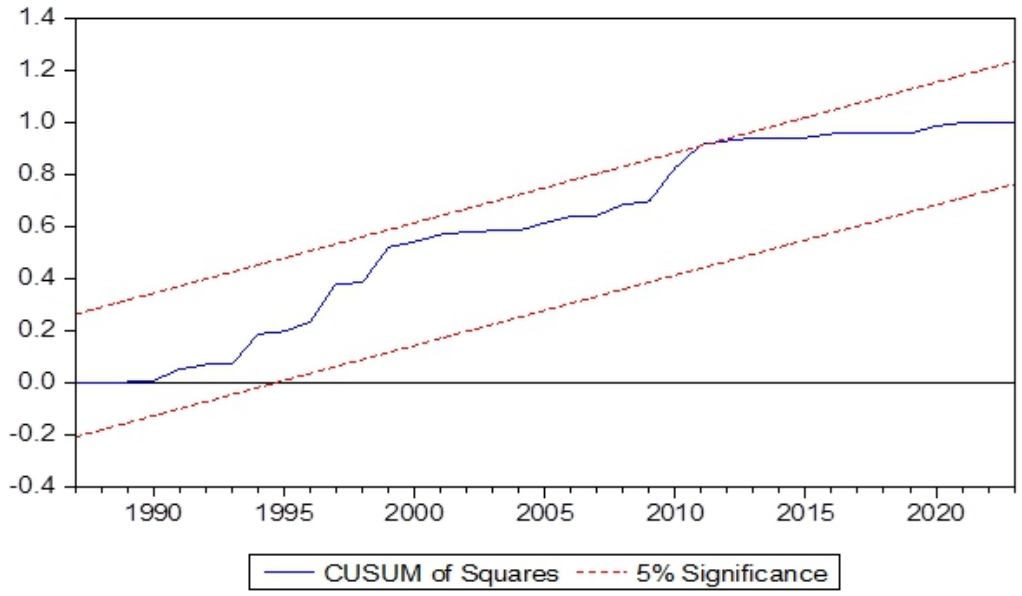


Fig. 4: Plot of CUSUM of Squares Recursive Residuals

Conclusion

In this study, emphasis is placed on investigating the impact of exchange rate movement on the lending rate in Nigeria under the framework of the ARDL. While some studies have examined the impact of interest rate on exchange rate in Nigeria, there is scanty literature on the impact of the lending rate and it is on the basis of such gap that this present study contributes to extant literature. The study finds that exchange rate impacts the lending rate negatively and significantly in the long-run. It is also found that inflation exerted a positive and significant impact on the lending rate in the short-run after one period lag. More so, findings reveal that while the impact of interest rate spread is positive and significant in both the short-run and the long-run, the impact of money supply is positive and significant in the short-run after one period lag but negative and significant in the long-run. These results have implications for monetary policy implementation in Nigeria. One of the implications is the impact of the current policy on floating the domestic currency on the value of the naira. Due to this policy, the naira has witnessed huge depreciation in recent times. Flowing from the finding of the present paper, such depreciating value of the naira has the tendency to attract foreign investment into the economy. This development could result into a decline in the lending rate which though is good for investment, but could affect the attainment of the price stability objective of the monetary authorities. By encouraging increased capital inflows, domestic currency depreciation could result into an increase in the liquidity position of the lending institutions; incentivizing them to extend more credit facilities. Such development could be inflationary, especially if the credits extended do not support growth.

It is against this backdrop that the authors suggest that several measures should be carried out to improve business prospects in the economy so that the long-run downward pressure of

exchange rate depreciation on the lending rate can be utilized to grow the economy. This is necessary because economic productivity propelled by low lending rate is less inflationary unlike when such is channeled to unproductive ventures. However, the fact is that notwithstanding the current naira depreciation, the lending rate in Nigeria is still relatively high which could be attributed to so many factors which this study did not take into consideration. Non-inclusion of these factors in the study represent one of the study's limitations which future studies should take into cognizance.

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