Do FDI Inflows Encourage Domestic Currency Appreciation in Nigeria? Revisiting the Aliber's Theory

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Abstract

Using annual series that span the period from1981-2022 and employing the ARDL framework, this study examines if inflows from FDI encourage the appreciation of domestic currency in Nigeria. Findings indicate that:1) FDI inflows impacted negatively and significantly on exchange rate both in the long-run and in the short-run; 2)   the short-run result indicates that one period lag of interest rate impacted positively on exchange rate, while the impact is negative in the long-run; 3) net barter terms of trade impacted exchange rate positively. The significant impact of FDI inflows on exchange rate revealed in the study provides an alternative view of the link between the two variables different from the postulation of Aliber's hypothesis. Consequently, policymakers in developing countries should strive to attract FDI but should as well broaden their economic base so that the currency appreciation impact will not hurt the economy.

Keywords: exchange rate, FDI inflows, ARDL, economic growth

JEL Codes: F31, F43.

1. Introduction

Over the past few decades, FDI has been widely identified as the principal engine of economic growth for both developed and developing countries. Mainly in developing countries where   capital deficiency and low technology persist, FDI could assist in transferring financial resources as well as leads to technological and managerial know-how. FDI inflows have been noted to assist in bridging the gap in domestic revenue generation in developing countries; helping them to raise sufficient fund to cater for their expenditure needs (Adegbite & Ayadi, 2010)[1]. The quest to attract FDI into the Nigerian economy has been the agenda of every successive regime so much so that most times the leaders travel out of the country to woo foreign investors. Around early 2000, due to the liberalization policy put in place, some multinationals such as the telecommunication giants invested in the Nigerian economy. Their presence and contribution placed Nigeria's economy high in terms of GDP as could be observed when the economy was rebased in 2014. In recent times however, FDI inflows into the country have been low due to certain constraints. In fact, some well-known Multinational Companies that used to operate in the country have either scaled down their operations while some have relocated to other neighbouring countries due to these constraints

Much as FDI inflows are important to the economy, their role in influencing domestic exchange rate in Nigeria should be evaluated, especially considering the sensitive nature of exchange rate. The importance of exchange rate is the reason why there have been frequent changes in the policies meant to stabilize its volatility. In Nigeria, the responsibility to manage the exchange rate is saddled with the Central Bank of Nigeria (CBN). As a measure to stimulate the formulation of monetary policy, the CBN often minimizes exchange rate fluctuations. Over the years, exchange rate policy in Nigeria has passed through several changes. During the post-independence period, the British pound maintained a fixed parity with the local currency and in the seventies the oil sector experienced a boom and there was the era of exchange rate liberalization (Akpan & Atan, 2012)[2]. In September 1986, due to the implementation of the Structural Adjustment Programme (SAP), the country introduced the Second-tier Foreign Exchange Market (SFEM). However, the autonomous foreign exchange market (AFEM) was implemented in 1988 to encourage non-oil foreign exchange earnings (Akanji, 2006)[3]. In 1992, foreign exchange deregulation was introduced and that gave rise to the floating of the naira. In 1999, the Inter-bank Foreign

Exchange Market (IFEM) was introduced which was designed to replace the AFEM (Akanji, 2006)[3]. There was a further liberalization of the local currency in 2002 and in 2006; the Wholesale Dutch Auction System (WDAS) was implemented to enhance foreign exchange convergence (Akanji, 2006)[3]. The CBN began the sale of foreign exchange to Bureau De Change (BDCs) operators by classifying them into classes A and B in 2009. In 2013, there was a reintroduction of the retail Dutch Auction System (rDAS) to curtail the menace of money laundering and in 2016; the local currency experienced another round of floating after closing the rDAS in February 2015. As a way to boost access to foreign exchange so as to stimulate eligible transactions, the CBN implemented the investors and Exporters (I & E) window in 2017 (Otiwu, 2018)[4]. However, Okoukoni and Oyekan (2023)[5] contended that in 2023, an announcement was made by the CBN that market forces would henceforth determine the exchange rate.

The fact that these policies are constantly overhauled is because exchange rate is sensitive to the economy and therefore needs to be stabilized. FDI inflows -exchange rate nexus has received theoretical as well as empirical attention over the years. Theoretically, Aliber (1970)[6] observed that exchange rate differentials play an important role in attracting FDI into an economy. Accordingly, FDI inflows are attracted to a country with weak exchange rate since foreign investors could borrow cheaply in such country. However, some scholars such as Fernandez-Arias and Montiel (1995) as cited in Mannathoko (2020)[7] have noted the role of capital inflows in encouraging the appreciation of real exchange rate which could hamper policy objectives such as price stability, exchange rate stability and export promotion. Also, Ali and Nazar (2017)[8] and Kiliçarslan (2018)[9] have noted that FDI inflows could result in the appreciation of the local currency. These claims thus require that the Aliber's theory should be interrogated empirically for appropriate policy implementation.

To tentatively evaluate FDI inflows -exchange rate nexus, *Fig.* 1 shows the movement in the two variables. It can be observed that an upward movement in the real exchange rate entails a downward movement in FDI inflows while the reverse is the case. In 1990 and up till 1998, exchange rate assumed a rising trend as opposed to the movement in FDI inflows. However, from 1999, exchange rate began to experience a downward movement. It therefore implies that within this period, the downward movement in FDI inflows was accompanied by a depreciation of the domestic currency (naira), while an improvement in FDI inflows was accompanied by domestic currency appreciation. In 1999, information on the Figure indicates that FDI inflows experienced an upward trend but exchange rate trended low. However, FDI inflows exhibited a downward movement after 2011, but a slightly upward movement in exchange rate soon after FDI inflows began to decline presents a peculiar situation. This also confirms that a fall in FDI inflows has the tendency to result into exchange rate depreciation. It is therefore concluded from Fig. 1 that FDI inflows into an economy could encourage the appreciation of the local currency but this requires further empirical validation.
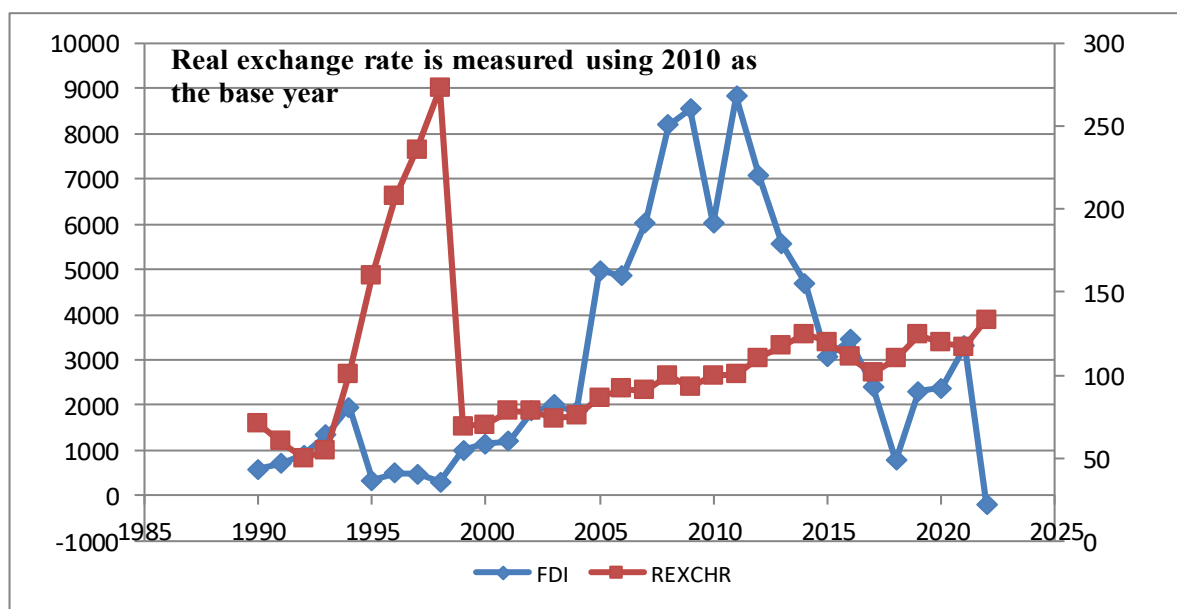

Figure 1. FDI and real exchange rate movement in Nigeria

Source: World Development Indicators (2022)

This study presents an argument different from the notion of established theory that tends to contend that it is exchange rate that influences FDI inflows without a possible feedback. Such view has been the main reason while past literatures have focused mainly on the impact of exchange rate on FDI inflows. If FDI inflows result in domestic currency appreciation as suggested by some scholars, such development could have an adverse effect on a country's terms of trade as it will make export to be costly while making import to be cheap. Such development is not a good omen for a country like Nigeria that has been struggling to diversify its economy away from the dominant oil sector. Apart from its impact on terms of trade, increase in FDI inflows can as well impact adversely on the other objectives of the monetary authorities such as the objective of price stability. This can occur through increased money supply which can raise the liquidity position of the lending institutions and hence induces an expansion in credit extension. On grounds of the aforesaid, the focus of this study is to investigate if FDI inflows actually cause the appreciation of domestic currency in Nigeria as suggested by some scholars.

Consequently, this study contributes to the literature in terms of theory and the findings will be relevant for policy making in Nigeria and other developing countries. The ARDL technique was employed to capture the short-run as well as the long-run impact of FDI inflows on exchange rate.

2. Literature Review

2.1 Theoretical Review

This work is guided by the theoretical exposition of Aliber (1970)[6] which was one of the earliest theories that connects FDI to a country's currency. Aliber's theory focuses on the exchange rate differential between the investing country and the host country. Based on the results obtained from a research which facilitated the testing of the hypothesis, Aliber confirmed that countries whose domestic currencies are weak have the tendency for increased FDI inflows in comparison to economies whose currencies are strong and stable. The theory is specifically centered on developed countries including the United Kingdom, Canada and the USA. The author argues that whenever there is the existence of risk arising from exchange rate fluctuation; firms in countries whose currency is strong are better positioned to channel their investment to economies with weak currency. The summary of the theory is that FDI reflects the fact that the firms wishing to invest in a host country capitalizes similar stream of income of expected earnings which the firms in the host country equally intends to capitalize on at a rate higher than the host-country's firm. The expectation of a change in exchange rate leads to a fall in the capitalization rates on equities and on debt issues, implying that both interest and profit are higher in an economy with weak currency. In a situation of perfect market conditions, there would be an absent of incentive for FDI, because the exchange rate risk would offset the lower capitalization rate applied to the income stream of the firm in weak-currency country. It thus implies that the currency's strength of a foreign firm enables it to have higher bargain in the host country. The theory assumes that there is an existence of perfect market condition and that an economy with a weak currency can attract more FDI. Also, Multinational National Countries (MNCs) from countries whose currency is strong tend to obtain credit facilities at cheaper interest rate than firms operating in the local economy (host country firms). Therefore, the foreign investing firms have more borrowing advantage for their overseas affiliates and subsidiaries compared to local firms.

The main weakness of the theory is that despite its relevance in the explanation of FDI inflows in strong economies, it's relevance in weak economies that grapple with poorly developed capital markets and regulated foreign exchange market is doubtful. Also, investments made by developing countries' MNCs in the strong economies are scarcely explained by the theory. Despite these limitations, the relevance of the theory in explaining the strength of a domestic currency in the determination of FDI inflows makes it worthwhile for the study.

2.2 Review of Empirical Literature

FDI inflows and exchange rate nexus have been empirically investigated both at country-specific and cross-country basis with diverse findings. In Turkey, Kilicarslan (2018)[9] found that FDI inflows exerted a negative impact on exchange rate. However, this was contrasted by the work of Mokuolu (2018)[10] which reveals that exchange rate has positive impacted on FDI inflows in Nigeria. The outcome is further supported in another study in Nigeria by Aribatise, Adeyemi and Adeseke (2019)[11] which revealed a unidirectional causality running from exchange rate to FDI. Furthermore, finding in a study in Pakistan by Siddiqui and Siddiqui (2019)[12] provided a different outcome as it showed the existence of a bi-directional causal link between FDI and exchange rate. Mostafa (2020)[13] observed that the depreciation of exchange rate encouraged more FDI flows in Bangladesh within the study period. This finding is corroborated by the outcome of a study in Nigeria by Adebayo et al. (2020)[14] which revealed the significant role of exchange rate in attracting FDI into the country. However, in a cross-country study involving Bangladesh, India, Pakistan, Nepal and Sri Lanka, Jannat (2020)[15] revealed that volatility in exchange rate exerted a downward pressure on FDI inflows in these countries. Corroborating this finding, another

cross-country study involving selected countries in the Economic Community of West African States (ECOWAS) by Akinlo and Onatunji (2021)[16] indicated that the volatile nature of exchange rate significantly retarded the inflows of FDI in Nigeria, Cote d'lvore, Togo and Sierra Leone. This outcome finds further support in a study in Zhejiang province of China by Tan et al. (2021)[17] which indicated that steady domestic currency appreciation adversely affected FDI inflows. However, Zhao et al. (2022)[18] found that in China; two-way causal relationship existed between real exchange rate and FDI; supporting the outcome of an earlier study by Siddiqui and Siddiqui (2019))[12].

In South Africa, Qabhobho et al. (2022))[19] revealed the existence of a uni-directional Granger causality running from FDI to exchange rate, supporting the earlier finding by Kilicarslan (2018)[9]. However, exchange rate was found to significantly retard FDI inflows in Nigeria in a study by Nwagu (2023)[20] which did not support the finding by Adebayo *et al.* (2020)[14]. This result finds support in a work done in emerging markets by Sultana et al. (2024)[21] which revealed that exchange rate mounted a short-run negative impact on FDI inflows. However, in the long-run the impact was positive which finds support in a study in Nigeria by Adewale et al. (2024)[22]. In Canada, Lajevardi and Chowdhury (2024)[23] found that exchange rate and its volatility impacted significantly on FDI inflows in both the short-run and in the long-run. However, in Pakistan, Ullah and Nobanee (2025)[24] revealed that FDI inflows encouraged the strengthening of the domestic currency. By introducing institutional quality, Masengesho et al. (2025)[25] observed that when institutional quality interacts with exchange rate, it produced a negative and weak relationship with FDI inflows in the East African countries.

3. Methodology and Data

The study employed annual dataset spanning the period from 1981-2022. The variables considered, their measurement and data sources are displayed in Table 1. Some pre-diagnostic tests such as stationarity, descriptive statistics and correlation matrix were conducted to identify the behaviour of the variables. The test for cointegration among the series was conducted using the autoregressive distributed lag (ARDL) bounds. Employing the ARDL in this study is justified on grounds that it is appropriate whether the series are integrated of order zero $I(0)$, integrated of order one $I(1)$ or are of mixed order of integration. Also, the ARDL approach is superior to other techniques because it is appropriate in small sample. More so, the technique integrates both short and long-run impact of one variable on another variable even when some of regressors of the model are endogenous. Post-diagnostic tests such as heteroskedasticity, serial correlation, model specification and stability tests were also conducted.

Table 1. Variables, Measurement and Sources

Variables	Definition	Measurements	Sources
OILR	Oil revenue	Billions of Naira	CBN Bulletin (2022)
FDII	Foreign direct investment inflows	Net inflows in current USA Dollars	WDI (2022)
RINTR	Real interest rate	Real interest rate in Percentage	WDI (2022)
REXCHR	Real effective exchange rate	Exchange rate of naira to Dollar using 2010 as the base year	WDI (2022)
CPI	Consumer price index	CPI using 2010 as the base year	WDI (2022)
GRGDP	Growth rate of GDP	Annual percentage	WDI (2022)
NBTT	Net barter terms of trade	NBTT using 2015 as the base year	WDI (2022)

3.1 Analytical Framework

The analytical framework that guided this study is the behavioural equilibrium real exchange rate (BEER) which is associated with the work of Clark and MacDonald (2000)[26]. In literature, the equilibrium in real exchange rate and its misalignment is analyzed under two major approaches (Sanusi, 2015)[27]. The first is the macroeconomic balance approach that owes its root to the work of Williamson (1994)[28]. Under this, the equilibrium real exchange rate which is referred to as fundamental equilibrium real exchange rate (FEER) is calculated as that real equilibrium obtained when an economy operates at full capacity and sustainable current account position. The second approach is known as behavioural equilibrium real exchange rate (BEER) associated with the work of Clark and MacDonald (2000)[26]. Under the BEER approach, equilibrium real exchange rate is expressed as a function of some fundamentals which include: capital inflows, terms of trade, exports and technological change.

As noted earlier, the model that links the real exchange rate to its determinants is specified in this study following the BEER theoretical model of Clark and MacDonald (2000)[26]. This approach, as observed by Sanusi (2015)[27] is relatively simple since it avoids some of the difficulties and arbitrariness in the choices involved in the alternative FEER approach. More so, Elbadawi (1994)[29] noted that it allows a direct investigation of the effects of certain policies and variables on exchange rate. The BEER framework entails specifying a reduced-form equation which explains the behaviour of the real exchange rate over a sample period and it is specified as follows:

$$e_t = \lambda_1^! \Re_{1t} + \lambda_2^! \Re_{2t} + \pi_1^! T_t + \varepsilon_t \tag{1}$$

where

e_t = real effective exchange rate

$\Re_1$ and $\Re_2$ are respectively vectors of economic factor that impact on the real exchange rate.

T_t = vector of factors that exhibit transitory effect on real exchange rate such as domestic interest rate.

λ_1, λ_2 and π = reduced-form coefficients

ε_t = random error term.

3.2 Model Specification

The empirical model that guided this work is modified from the work of Elbadawi and Soto (1994)[29]. In the specification, capital inflows is expected to produce an inverse relationship with exchange rate which should indicate that it leads to the appreciation of the host country's exchange rate. The following baseline model is specified to guide the empirical specification:

$$Loge_t = \delta_0 + \lambda_1 LFDII_t + V_t \tag{2}$$

where

e_t = Exchange rate at time t, $LFDII_t$ = log of foreign direct investment inflows at time t, V_t = vector of other variables that influence exchange rate at time t.

Equation 2 is specified in econometrics form as follows:

$$Loge_t = \chi_0 + \lambda_1 LFDII_t + V_t + \varepsilon_t \tag{3}$$

Where

ε_t = error term

The ARDL bounds representation of equation 3 is specified as follows:

$$\Delta LREXCHR_t = \delta_0 + \sum_{j=1}^{k} \xi_1 \Delta LREXCHR_{t-1} + \sum_{j=1}^{k} \xi_2 \Delta LFDII_{t-1} + \sum_{j=1}^{k} \xi_3 \Delta RINTR_{t-1} + \sum_{j=1}^{k} \xi_4 \Delta LNBTT_{t-1} +$$

$$\sum_{j=1}^{k} \xi_5 \Delta CPI_{t-1} + \sum_{j=1}^{k} \xi_6 \Delta GRGDP_{t-1} + \sum_{j=1}^{k} \xi_7 \Delta LOILR_{t-1} + \psi_1 LREXCHR_{t-1} + \psi_2 LFDII_{t-1}$$

$$+ \psi_3 RINTR_{t-1} + \psi_4 LNBBT_{t-1} + \psi_5 CPI_{t-1} + \psi_6 GRGDP_{t-1} + \psi_7 LOILR_{t-1} + \mu_t \tag{4}$$

Where $LREXCHR$ = log of real exchange rate, $LFDII$ = log of foreign direct investment inflows, $RINTR$ = real interest rate, $LNBTT$ = log of net barter terms of trade, CPI = consumer price index, $GRGDP$ = growth rate of GDP, $LOILR$ = log of oil revenue and μ = error term

In equation 4, the coefficients of the short-run parameters are: ξ_1, ξ_2, ξ_3, ξ_4, ξ_5, ξ_6 and ξ_7 while the parameters of the long-run coefficients are: ψ_1, ψ_2, ψ_3, ψ_4, ψ_5, ψ_6 and ψ_7.

The existence of a long-run relationship is determined following null hypotheses: $H_0 : \psi_1 = \psi_2 = \psi_3 = \psi_4 = \psi_5 = \psi_6 = \psi_7 = 0$ (indicating the presence of cointegration).

The corresponding alternative hypothesis is stated as follows:

$H_1 : \psi_1 \neq \psi_2 \neq \psi_3 \neq \psi_4 \neq \psi_5 \neq \psi_6 \neq \psi_7 \neq 0$ (indicating an absence of cointegration).

The existence of cointegration entails the specification of the following error correction model (ECM):

$$LREXCHR_t = \delta_0 + \sum_{j=1}^{k} \xi_1 \Delta LREXCHR_{t-1} + \sum_{j=1}^{k} \xi_2 \Delta LFDII_{t-1} + \sum_{j=1}^{k} \xi_3 \Delta RINTR_{t-1} + \sum_{j=1}^{k} \xi_4 \Delta LNBTT_{t-1} +$$

$$\sum_{j=1}^{k} \xi_5 \Delta CPI_{t-1} + \sum_{j=1}^{k} \xi_6 \Delta GRGDP_{t-1} + \sum_{j=1}^{k} \xi_7 \Delta LOILR_{t-1} + \sigma ECM_{t-1} + \mu_t$$

(5)

where

ECM_{t-1} = error correction model

σ = coefficient of ECM

4. Empirical Analysis

The empirical analysis is guided by the series of steps involved in time series procedures, beginning with descriptive statistics, correlation matrix, stationarity test, test for cointegration, ARDL estimation of empirical results and post-diagnostic tests.

4.1 Descriptive Statistics

The results of the descriptive statistics in Table 2 reveal that while consumer price index has the highest mean value (82.72), real interest rate has the lowest mean value (0.46). It is equally found that for each of the variables; both their mean and the median are very close, signifying their symmetric nature. The range for consumer price index is high, indicating that it exhibited more volatility within the study period. Exchange rate and consumer price index are positively skewed, while the rest of the variables are skewed negatively. Since the kurtosis of all the variables is positive, it suggests that they are heavy-tailed.

Table 2. Descriptive statistics

	LEXCHR	LFDII	CPI	GRGDP	RINTR	LNBBT	LOILR
Mean	2.08	8.94	82.72	4.15	0.46	1.87	2.59
Median	2.004	9.20	37.45	4.57	3.66	1.93	2.97
Maximum	2.72	9.94	421.07	6.98	18.18	2.19	3.94
Minimum	1.69	0.00	0.48	-3.06	-65.85	0.00	0.00
Std. Dev.	0.25	1.49	105.56	1.96	14.08	0.35	1.19
Skewness	1.02	-5.24	1.57	-1.33	-2.75	-3.47	-0.63
Kurtosis	3.21	32.12	4.79	5.72	13.23	18.98	2.10
Jarque-Bera	7.40	1676.73	23.00	25.50	236.32	531.7	4.22
Probability	0.02	0.00	0.00	0.00	0.00	0.00	0.12
Sum	87.36	375.72	3474.36	174.68	19.51	78.62	109.01
Sum of Sq.	2.68	91.56	456898.7	158.03	8133.17	5.23	58.86
Obs.	42	42	42	42	42	42	42

4.2 Correlation Matrix

The essence of conducting the correlation matrix test is to identify the degree of correlation among the variables. Information in Table 3 indicates that while exchange rate has weak negative correlation with FDI inflows, its correlation with consumer price index is low and positive. It is also revealed that exchange rate has weak and negative correlation with the growth rate of GDP, just as it correlates weakly and negatively with real interest rate. It is also found that while exchange rate has positive and weak correlation with net barter terms of trade, its correlation with oil revenue is weak and negative. Generally, it is revealed that the correlation between exchange rate and all the variables is weak and with respect to the correlation among the independent variables, evidence shows that the correlation is weak. The weak correlation among the independent variables indicates an absence of a case of multicolinearity among them and which suggests that it is easy to separate the impact of each individual independent variable on the dependent variable.

Table 3. Correlation matrix

	LEXCHR	LFDI	CPI	GDPGR	INTR	LNBBT	LOILR
LEXCHR	1	-0.19	-0.09	-0.18	-0.19	0.08	-0.44
LFDI	-0.19	1	-0.33	0.05	0.09	0.88	0.53
CPI	-0.09	-0.33	1	0.09	0.25	-0.19	0.13
GRGDP	-0.18	0.05	0.09	1	0.29	0.11	0.27
RINTR	-0.19	0.09	0.25	0.29	1	0.05	0.37
LNBBT	0.08	0.88	-0.19	0.11	0.05	1	0.44
LOILR	-0.44	0.53	0.13	0.27	0.37	0.44	1

4.3 Stationarity Tests

In Table 4, the results of the unit root test at level reveal that while the consumer price index, growth rate of GDP and real interest rate are stationary at level; other variables did not achieve stationarity. Thus, consumer price index, growth rate of GDP and real interest rate are integrate of order zero, that is they are *I(0)*. Results in Table 5 indicate that after taking the first difference, the series that did not achieve stationarity at level became stationary.   That is to say that they all become integrated of order one *I(1)* after first differencing.

Table 4. Results of unit root tests at level

Variables	ADF t-stat.	PP t-stat.	ADF Critical value at 5%	PP Critical value at 5%	Order of integration
LFDII	-1.55	-1.54	-2.935	-2.93	
: CPI	-3.55	-3.87	-2.93*	-2.94*	*I(0)*
REXCHR	-2.15	-2.04	-2.93	-2.93	
GRGDP	-4.80	-4.82	-2.93*	-2.93*	*I(0)*
RINTR	-7.57	-7.34	-2.93*	-2.93*	*I(0)*
LNBTT	-2.00	-1.87	-2.93	-2.93	
LOILR	-1.66	-1.67	-2.93	-2.93	

Table 5. Results of unit root tests at first difference

Variables	ADF t-stat.	PP t-stat.	ADF Critical value at 5%	PP Critical value at 5%	Order of integration
ΔLFDII	-7.14	-7.14	-2.93*	-2.93*	*I(1)*
: ΔCPI	-20.33	-10.78	-2.93*	-2.93*	
ΔREXCHR	-4.39	-4.29	-2.93*	-2.93*	
ΔGDPGR	-6.94	-16.16	-2.93*	-2.93*	
ΔRINTR	-10.22	-25.21	-2.93*	-2.93*	
ΔLNBTT	-6.43	-6.43	-2.93	-2.93*	*I(1)*
ΔLOILR	-6.11	-6.18	-2.93*	-2.93*	*I(1)*

4.4 Cointegration Test

Since the unit root results indicate that the series have mixed order of integration, the cointegration test was conducted using the ARDL bounds. Results in Table 6 show that the computed F-statistic is 4.59, while the upper bounds is 3.61 at the 5% level and which is lower than the computed F-statistic. This suggests that the series have long-run relationship.

Table 6. ARDL Bounds Cointegration

Test Statistic	Value	K
F-statistic	4.59	6
		Critical Value Bounds
Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

4.5 ARDL Bounds Estimation

The estimated results in Table7 show that in the short-run, FDI inflows impacted negatively and significantly on real exchange rate at the 5% level of significance. Finding reveals that if FDI inflows rose by one percent, exchange rate declined by 0.14. This result indicates that FDI inflows led to domestic currency appreciation within the study period. This is in line with apriori expectation because FDI inflows encourage high demand for domestic currency of the host country and such has the tendency to propel an appreciation of the value. In another vein, it is found that real interest rate exerted a positive and significant impact on exchange rate after one period lag. If real interest rate rose by one percent, real exchange rate rose by 0.003. The short-run result also reveals that at the 5% level of significance, net barter terms of trade impacted positively and significantly on real exchange rate. A rise in the net barter terms of trade by one unit resulted in an increase in the real exchange rate by 0.41. However, consumer price index, growth rate of GDP and oil revenue had negative impact on real exchange rate but the results are not significant. The coefficient of the error correction model is found to be negative and significant; satisfying the condition for cointegration. The implication of the ECM result is that about 29% of errors generated in each period is automatically corrected by the system in the subsequent period.

The long-run results indicate that FDI inflows exerted a negative and significant impact on real exchange rate at the 5% level. If FDI inflows increased by one percent, real exchange rate declined by 0.49. Real interest rate was also found to impact negatively and significantly on real exchange rate at the 5% level of significance. One percent rise in real interest rate resulted in a fall in real exchange rate by 0.03. The long-run result also indicates that net barter terms of trade impacted positively and significantly on real exchange rate. One unit increase in net barter terms of trade led to an increase in real exchange rate by 1.42. While consumer price index and the growth rate of GDP had negative but none significant impact on real exchange rate, the impact of oil revenue was found to be positive but none significant.

Table 7. ARDL bounds estimation

Dependent Variable: LREXCHR Selected Model: ARDL(1, 0, 2, 0, 0, 0, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Short-run Results				
D(LFDII)	-0.14	0.05	-2.76	0.009
D(RINTR)	-0.001	0.002	-0.82	0.41
D(RINTR(-1))	0.003	0.002	2.36	0.02
D(LNBTT)	0.41	0.16	2.57	0.01
D(CPI)	-0.0004	0.0004	-1.16	0.25
D(GRGDP)	-0.01	0.01	-1.49	0.14
D(LOILR)	-0.03	0.03	-0.90	0.37
ECM(-1)	-0.29	0.09	-2.97	0.005
Long-run Results				
LFDII	-0.49	0.22	-2.16	0.03
RINTR	-0.03	0.015	-1.99	0.05
LNBTT	1.42	0.60	2.35	0.02
CPI	-0.001	0.002	-1.06	0.29
GRGDP	-0.06	0.04	-1.38	0.17
LOILR	0.31	0.21	1.47	0.15
C	3.45	0.92	3.74	0.0008

4.6 Post-Diagnostics

The results of post-diagnostic tests in Table 8 indicate that at the 5% level, the series do not suffer from the problem of heteroskedasticity, serial correlation and the model is well specified. This is based on their individual p-values which are higher than 5%. At the 5% level also, evidence in Fig. 2 reveals that the errors are normally distributed. In Figures 3 and 4, the plots of cumulative sum (CUSUM) and the cumulative sum of squares (CUMSUM of Squares) show that the coefficients are stable since the plots fall inside the critical bands of the 5% confidence interval.

Table 8. Post-diagnostic results

Test	P-value	Null Hypothesis	Conclusion
Heteroskedasticity Test: ARCH	0.80	No Heteroskedasticity	Accept
Serial Correlation: Breusch-Godfrey LM Test	0.09	No Serial Correlation	Accept
Model Specification: Ramsey RESET Test	0.97	Model is well specified	Accept
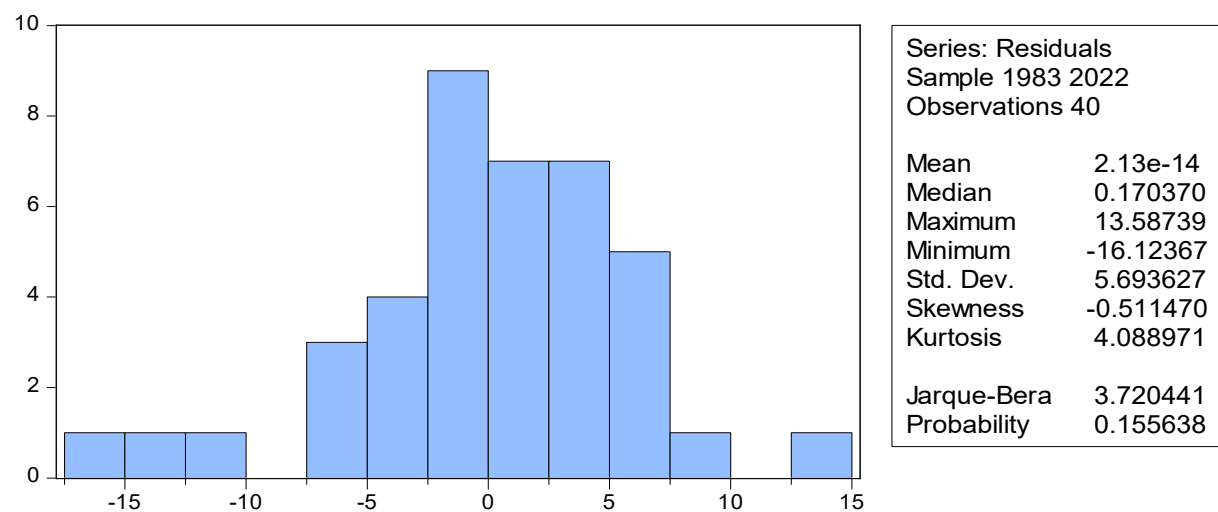
Figure 2. Normality result
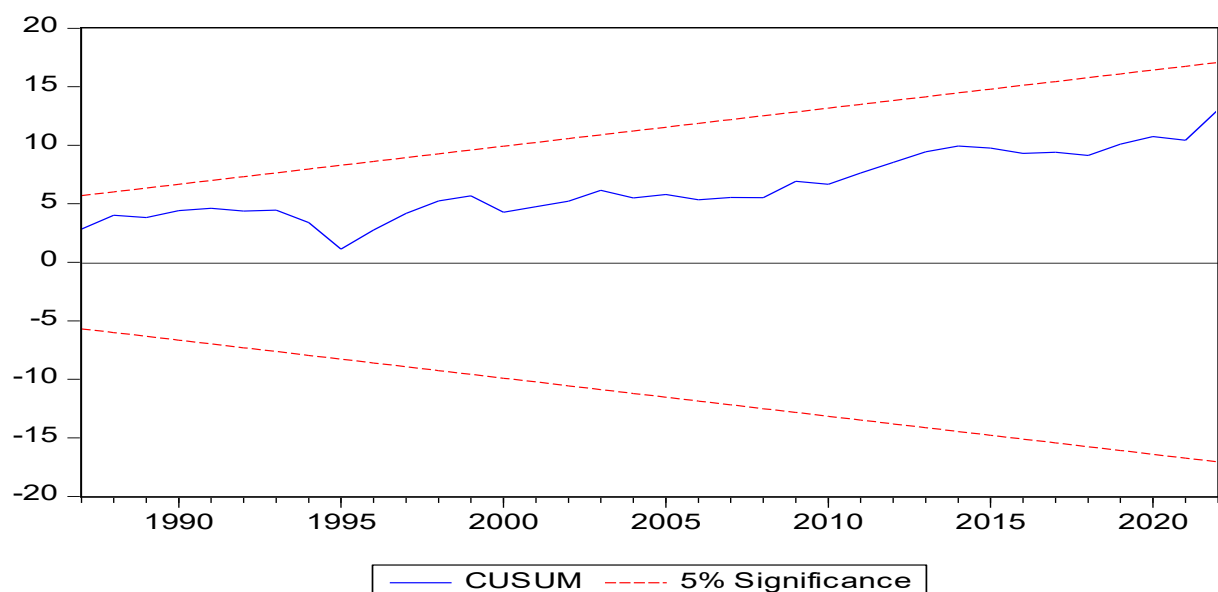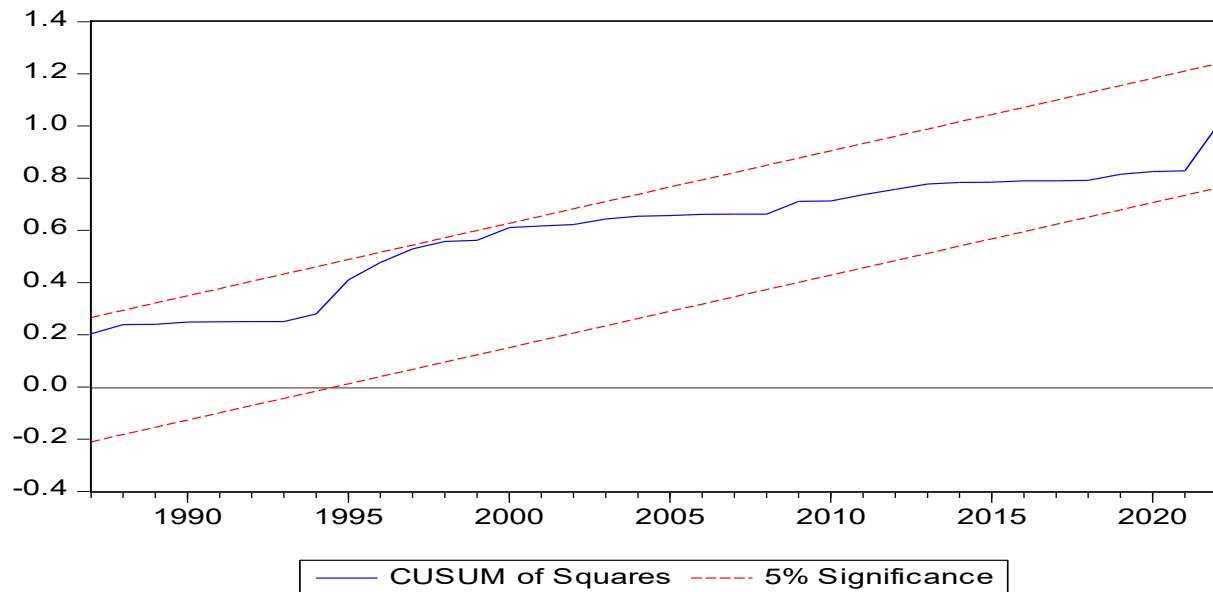

Figure 3. CUMSUM test for stability

Figure 4. CUMSUM of square test for stability

5. Conclusion

5.1 Research Findings

In any economy which experiences exchange rate fluctuations, examining the factors that influence exchange rate volatility becomes an interesting topic. The role of exchange rate in influencing FDI inflows has been emphasized in literature. The theoretical postulation of Aliber (1970)[6] noted that FDI is attracted more in countries with weak domestic currency. Following this, extant literature is replete with studies that focus on the role of exchange rate in attracting FDI inflows. However, this study rather considered the impact of FDI inflows on exchange rate as a way of providing an empirical support to the opinion held by some scholars that FDI inflows could encourage domestic currency appreciation. Findings of the study provide the following conclusions:

(1) Regardless of the time horizon, FDI inflows mounted a significant negative impact on real exchange rate in Nigeria; justifying the popular view that FDI inflows encourage domestic currency appreciation.

(2) A significant and positive impact of real interest rate on real exchange rate occurred in the short-run after one period lag, but in the long-run the impact is negative. This indicates that while rising interest rate leads to domestic currency depreciation in the short-run, it encourages domestic currency appreciation in the long-run.

(3) Terms of trade encourages exchange rate depreciation which could be due to the foreign exchange rate interventions of the CBN which do not allow exchange rate to behave as expected.

5.2 Comparison with Existing Studies

Compared with extant literature, findings of the study align with the outcomes of the few studies that focus on the impact of FDI on exchange rate and also provide some improvements. The result conforms to the findings by Kiliçarslan (2018)[9] and Qabhobho et al. (2022))[19] concerning the role of FDI inflows in influencing exchange rate. It also finds an empirical support in a study in Pakistan by Ullah and Nobanee (2025)[24]. However, the study differs from the empirical works reviewed in Nigeria which mainly focused on the impact of exchange rate on FDI inflows. This present study has provided evidence of the existence of a reverse causality running from FDI inflows to exchange rate. As such, it has contributed to theory by improving on the Aliber's theory which postulates that exchange rate differential influences FDI inflows into a country. In particular, the outcome of the study is more relevant to developing countries that often face exchange rate instability.

5.3 Unresolved Issues in the Study

Despite the findings of the study, there are some limitations and problems that are yet resolved. First, the study used FDI inflows specifically to proxy capital inflows. As such other sources of capital inflows such as remittances, foreign portfolio investment (FPI) and others which play much role in influencing domestic exchange rate are ignored. Second, the study did not consider the interaction of institutional quality variables with FDI inflows.

Because of weak institutional frameworks in most developing countries such as Nigeria, FDI inflows could be hampered and as such their actual impact on exchange rate without such consideration could be distorted. Third, annual data which is used in the study do not capture the dynamism, especially with regard to exchange rate. Volatility in exchange rate is better taken care of using monthly or even quarterly data.

5.4 Policy Suggestions

Exchange rate stabilization has always been among the major policy thrusts in Nigeria and other sub-Saharan African countries that export mainly primary products which do not compete favourably in the international market. From the period of fixed exchange rate policy to the era of managed float and exchange rate liberalization policy, the agenda has always been to achieve a realistic value of the local currency in these countries. Currently, exchange rate in Nigeria has experienced much depreciation as a result of the recent policy on exchange liberalization. Despite the liberalization policy, the role of some factors such as FDI inflows, interest rate and terms of trade in shaping the movement in exchange rate remains crucial. It is on the basis of this that we make the following suggestions.

(1) For a country to improve its resources, increase employment and enhance technological transfer, FDI is paramount. However, the problem is, if FDI inflows are allowed to penetrate in large volume unregulated, the currency appreciation impact they entail may harm a country's terms of trade position as exports are hampered. The question faced by most developing countries and Nigeria in particular is whether to implement policies that will attract FDI inflows at the detriment of terms of trade improvement or to intensively regulate FDI and thus retard its penetration into the economy. It is the suggestion of the authors that increased FDI inflows should be encouraged as a way to strengthen the value of the local currency as well as augment the shortfall in domestic resources. This is more so, considering that Nigeria and indeed most developing countries are import-dependent such that they need the penetration of FDI to defend the value of the domestic currency. However, in order not to allow the domestic currency appreciation to hurt the economy, it is necessary to channel resources in the development of other relevant sectors of the economy so that the economy will be self-sustaining. If the economy becomes self-sustaining, the local currency will find its realistic value even in the face of massive FDI inflows.

(2) Interest rate in Nigeria is often considered high such that it impedes investments, export potentials and then the depreciation of the domestic currency. High interest rate is among the major factors that contribute to high cost of running businesses in Nigeria. With this increased business cost, prices of export products are high at the international market; causing them to be less attractive and resulting in domestic currency depreciation. On the other hand, high interest rate has the tendency to encourage the penetration of capital inflows (especially foreign portfolio investment) which could lead to domestic currency appreciation. The dual role of interest rate on the economy therefore gives room for serious policy concern. There has always been much pressure from the private sector investors for interest rate to be reduced in Nigeria. However, the fact that inflation rate is high in the country which is also a common issue in most sub-Saharan African countries makes the decision to officially reduce interest rate impossible. It is on this basis that the authors suggest that both fiscal and monetary policy measures should be employed to address the inflationary pressure. Efforts should be geared mainly towards increase in productivity using both fiscal and monetary policy measures in order to tame inflation and address the issue of high interest rate which will rub off on domestic exchange rate.

(3) In another vein, net barter terms of trade was found to have positive and significant impact on real exchange rate in both the short-run and the long-run. The implication is that it encourages exchange rate depreciation. This is contrary to expectation as it is expected that improvement in terms of trade should lead to domestic currency appreciation as such situation entails improved export revenue. One plausible reason for the positive impact of terms of trade on exchange rate could be that the foreign exchange intervention of the CBN does not allow exchange rate to behave as expected. Prior to the current exchange rate liberalization in Nigeria, the CBN maintained dual exchange rate regime (official and parallel). It is therefore suggested that much as the current exchange rate liberalization policy stance is expected to achieve a realistic value of the domestic currency, the cost of such policy on domestic productivity should be evaluated.

5.5 Future Research Prospects

Future research efforts can be extended in the following directions: First, a decomposition of the various sources of capital inflows so as to identify their individual impact on exchange rate. Second, examine the interaction effect of institutional quality variables and exchange rate on FDI inflows.

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