

Interest Rate And Foreign Direct Investment In Sub-Sahara African Countries: The Comparison Between Asymmetric And Symmetric Effects (Ardl And Nardl Approach)

Isiaka, Najeem Ayodeji^{1*}, Osifalujo, Babatunde Bunmi², Taiwo, Oluwaseun Kayode²

¹Federal Polytechnic Ilaro

Ilaro, Ogun State, Nigeria

²Moshood Abiola Polytechnic

Abeokuta, Ogun State, Nigeria

*Email: najeem.isiaka@federalpolytechnicilaro.edu.ng

ABSTRACT

The differences in the estimation techniques considered by the researchers in the previous study have continued to generate considerable arguments to ascertain the relationship between interest rate and foreign direct investment. This current study investigated the relationship between interest rate and foreign direct investment in selected Sub-Sahara African countries between 1990 and 2019. The data on foreign direct investment, interest rate, and exchange rate were gathered from World Bank Development Indicators and asymmetric or Nonlinear ARDL was considered for the analysis. It was revealed that though interest rate and real exchange rate have a significant effect on foreign direct investment in the symmetric model in the long – run but there were found insignificant in the short –run. Also, the interest rate and exchange rate have negative relationship with foreign direct investment in the short-run but interest rate was found positive with foreign direct investment in the long-run and exchange rate was negative. . It was revealed that in the short-run a positive changes in interest rate will attract foreign direct investment but in the long-run it would change and reduces foreign direct investment. However, a decline of interest rate tends to attract foreign direct investment in the short-run but will not attract foreign investment in the long-run. The ECM revealed that the error in the short-run will be adjusted in the long-run by 94.5% and 88%. The study recommends that lending rate should be increased by monetary authorities within short-period to attract foreign investors but exchange rate must be appreciating.

Keywords: Interest Rate, Real Effective Exchange Rate, Foreign Direct Investment and NARDL

DOI: <https://doi.org/10.55983/ijeset.v1i3.193>



INTRODUCTION

Inward foreign direct investment is a major feature of economic boost for developing countries especially Sub-Sahara African (SSA) countries. However, the dwindling and volatile nature of foreign direct investment in recent times has spurred academic debate among economist and finance scholars and more emphatically the attracting factors is a major concern for policy makers (Ditta& Hassan, 2017). Although globally there is a huge increase in the inflows and outflows of foreign direct investment but African region is still struggling to attract more despite the abundance of natural resources, and other variables such as level of technology and human development factors. Meanwhile, the region has benefited from the global rise in FDI inflows. In 2008, the inflow of foreign direct investment into African countries increased from \$2billion in 1990 to the tune \$72billion and contribute significantly to economic growth of the region (Ezeoha&Cattaneo, 2012). Yet, there exists among the Sub-Sahara African countries a huge disparity in the pattern of inflows of foreign direct investment, which is a paltry figure of global share of FDI. For instance, the inflow of FDI into developing economies in East and South –East Asia experienced an increase in the recent years. However, the African countries witnessed subsequent declined in FDI for by 16percent between 2019 and 2020, this amounted from \$47billion in 2019 to \$40billion in 2020. Specifically, it has been reported by UNCTAD, (2021) that not less than 12percent was witnessed in Sub-Sahara African countries in 2020 while FDI is growing in some few countries.

This decline has been attributed to political and economic factors. Danjuma(2021),aligned political unrest, insurgencies, terrorism and corruption as the major political factors hindering the extent of foreign direct investment in Sub-Sahara African countries. While, Pettinger (2019) attributed wage rates, lack of infrastructure, low labour skills and productivity, poor transportation links, and constant economic recession without any potential recovery. However, despite aforementioned challenges and quite number of empirical studies have established the impact of those factors on foreign direct investment; it is noted in the empirical evidence that less attention has been devoted to the role of interest rate on the factors attracting foreign direct investment into Sub-Sahara African countries. It is important to note that one of the structural adjustments programmes adopted in Sub-Sahara African countries is the reformed of financial sector which comprises deregulation of interest rate and reduction in credit ceiling. Also, the objective of this reform was to synchronize the local interest rate with that of foreign rate. Regrettably, the decision has not yielded desired result as openness to international market continues to affect the local banking environment negatively. More than the rate of international level, Sub-Sahara African countries have maintained high interest rate trends (Tarus & Manyala, 2018).

Despite the high interest rate maintained in the region, it is not equivalent to the desire foreign direct investment inflows. In theory, the higher rate is expected to attract more foreign direct investment. This is because foreign investors tend to place their resources in a country where investment promises higher rate of returns. Regrettably, this assumption is more contentious in empirical evidence than theoretical understanding. For instance, some strands of empirical literature argued that interest rate has a positive influence on foreign direct investment, meaning than an increase in interest rate will further enhance the inflows of foreign direct investment (Ditta and Hassan,2017, Fornah &Yuehua,2017). However, the research conducted

by Benson, Eya, and Yunusa, 2019 in Nigeria drawn a negative conclusion. Their study argued that exchange rate and interest rate have a negative relationship with foreign direct investment in Nigeria. In 2017, Linus studied Kenya economy and the situation of foreign direct investment. The study suggested that over the years, interest rate does not have a significant impact on foreign direct investment in Kenya. Faroh and Shen (2015), stated emphatically that high interest rate does not attract foreign direct investment in Sierra Leone. This mix results and controversy continues in the literature across countries.

However, various researchers have tried to solve this controversy but estimation techniques remain a hindering factor leading to the different results obtained in the previous studies. Meanwhile, to solve the problem of estimating the true influence of interest rate on foreign direct investment is the adoption of alternative estimation techniques. It is assumed in this study that the responsiveness of foreign direct investment to interest rate is asymmetric, that is a rise or a decline in interest rate poses a different effect on foreign direct investment. This assumption will ascertain the true effect of interest rate on foreign direct investment in Sub-Saharan African countries. This study bridge the gap and contribute to the existing empirical literature because to the best of our knowledge most of previous studies have ignored the decrease and increase effect of interest rate on foreign direct investment. To bridge this gap methodologically, although the previous study assumed linear relationship between interest rate and FDI, however, his current study assumed non-linear relationship to capture the asymmetric relationship and influence between the key variables. In addition, NARDL was considered to estimate the effect of interest rate on FDI both in short-run and long-run.

Review of Concept on Interest Rate, Exchange rate and Foreign Direct Investment

Foreign direct investment is reasonably important in emerging economies but there are limiting factors such as climate and lack of infrastructure but the few attracted in developing nations are resources seeking and exploring cheap labour. Benson, Eya, and Yunusa, (2019) opined that stable environment, political stability and low production cost are FDI-Driven factors in Nigeria. The financial and real economies are intertwined; the interest rate plays a function and has an influence on the economy. Investment decisions are directly affected by the interest rate on a loan, for example. Investment money is less likely to be loaned out when interest rates are higher. There will be more loanable cash available for investments as a result of a high savings rate. As a result, the interest rate's direction depends on the amount of money invested in a country's economy (Ojinma & Emerenini, 2015). Foreign direct investment into a developing country, which is experiencing emerging and transition markets, is severely hampered by interest rate and currency rate volatility. Interest rates rise, and the actual exchange rate rises as a result of this increase. To put it another way, foreign direct investments are financial transactions that attempt to establish long-term relationships with foreign companies' management and politics and have substantial influence over them. Greenfield investments (sometimes referred to as "mortar and brick investments") and mergers and acquisitions are examples of such investments, which can either be new investments or purchases of existing shares (Ogunkalu, 2016). Foreign Direct Investment (FDI) inflows have a direct correlation with the exchange rate and interest rate fluctuations, which, in turn, boosts economic growth (Benson, Eya & Yunusa, 2019). The purpose of this study is to examine interest rate and foreign direct

investment in Sub-Saharan African countries. For example, a small firm can acquire a loan from a bank to buy new assets for its business, and the interest rate is the amount the borrower pays for borrowing money from a lender. In exchange for delaying the use of money, the lender receives a payment from the borrower (Ayano, 2014). A capitalist society cannot function without interest rates. The annual percentage rate of interest is the most common unit of measurement. In monetary policy, interest rate goals are a significant consideration when dealing with factors such as investment, inflation, and unemployment. For the sake of this discussion, we define interest as a financial benefit that the fund user (the borrower) gives to the fund owner (the lender). It is frequently represented as an annual percentage. Another way to think of interest is as a way of rewarding or compensating an entrepreneur for taking on a degree of risk. A sensible entrepreneur expects a larger benefit or return on investment for taking on more risk (Okoye, Nwakoby & Modebe, 2015).

However, the rise in interest rate was assumed to cause an increase in exchange rate which further influence the inflow of foreign direct investment especially in developing countries. How exchange rate influenced foreign direct investment is a major point of discussion in this study. The foreign currency exchange rate is a measure of how much one currency is worth in relation to another currency. Exchanging rates may be described as "the price of one unit of currency quoted in another." (Ibenta, 2012) In terms of another country's currency, it can be expressed mathematically, qualitatively, or quantitatively. Exchange rates are defined by Danladi and Uba (2016) as a comparison between the prices of the currencies of two countries, or as the number of units of one currency that are needed to purchase a number of the other's units of currency. The floating exchange rate could be linked with the extinct period of Bretton Woods's system in 1970 and led to the concepts of fluctuation in the literature. It has been established that the untamed and unfavorable fluctuations in real exchange rate is the factor limiting the competitiveness of SSA countries to attract sufficient FDI into their countries. In 1980, the situation of unfavourable and untamed fluctuation in exchange rate was rampant in SSA especially the conditions of structural adjustments programmes. Empirically, Ogun, Egwaikhide & Ogunleye, 2012; and Madura and Fox, 2011, opined that the foreign firms will strategically invest in a country with a weaker currency in order to earn better exchange rate value.

As one of the macroeconomic variables, exchange rate is the reason foreign investors will want to invest in host country. Empirically, exchange rate was found to be positively influence foreign direct investment. The argument in the concept is that host currency should be weaker in order to attract the foreign investors. This will increase capital mobility and inflows to the host country and enhance economic growth. Meanwhile, weaker currency means that cost of production for the home companies will be higher compare to the stronger currency. What is missing in the literature is the true effect of exchange rate that is increase and decrease in exchange rate and how it affects the inflows of foreign direct investment. Empirically, there is a need to established and predict if government policy on foreign exchange rate either devaluation or otherwise will positively influence foreign direct investment. The importance of interest rate is to attract foreign investors and after the successfully attraction, the direct investment is expected to increase productivity and enhance economic growth. Surprisingly, this situation is far from what has been experiencing in Africa countries. Despite being residence

to a number of FDIs, the economy of African countries yet to improve as expected and currency has not greatly improved. It is argued in this study that an increase in interest rate should attract foreign investors while the decrease should be expected to drive away the investors. In addition, the currency appreciation (increase) should be a positive influence contrary to the assumption that decrease or weaker currency will attract more foreign investors. A strong currency means that the investors will have confidence in the macroeconomic environment management of a given or host country and attract more investors rather than weaker currency that may further leads to inflation in the long-run.

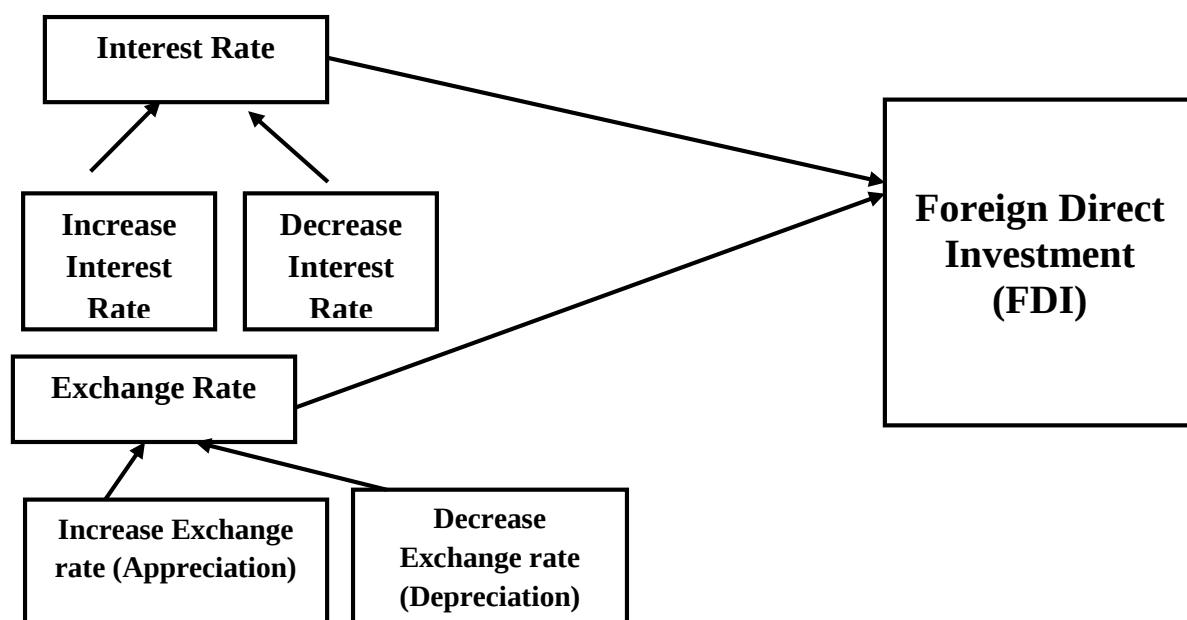


Figure 1. Conceptual Frameworks

The Loanable Fund's Theory

British economist Dennis Robertson and Swedish economist Bertil Ohlin developed the loanable fund hypothesis in the 1930s, which is often used to explain changes in the interest rate market today. According to the theory, supply and demand for loadable funds determines the market interest rate. This theory may be used to explain the movement of the general interest rate in a given nation. The demand for loanable funds is extensively used in financial markets to refer to the borrowing activities of borrowers, including consumers, enterprises, and the government. In addition, it may be used to explain why interest rates change on specific debt instruments of a particular nation. Housing costs necessitate the usage of loanable cash by the family. In addition, they provide installment loans for the purchase of automobiles and other

home goods. It is expected that theoretically, foreign direct investment will responds differently to the changes of interest rate in the market.

Empirical Review

The result of the study conducted by Tarus and Manyala (2018) on the determinants of bank interest rate spread in Sub-Saharan African countries was significant. The study considered Sub-Sahara African countries ranging between 2003 and 2012 for the analysis. Specifically, the study confirmed that inflation rate is an important factor influencing interest rate while other institutional quality factors were found to be less significant. In the study by Kyereboah-Coleman and Agyire-Tettey (2016) on the effectiveness of volatility in real exchange rate volatility on foreign direct investment (FDI) in Ghana provided different findings. ARCH and GARCH was considered as estimated techniques and finds out that exchange rate negatively influence the inflow of foreign direct investment. The weakness of the study is the limited number of years compare to the recent researches that captured recent shocks in the system. So, the study is a confirmation that structural adjustment programmes ideas do not influence FDI. Also, Ogun, Egwaikhide and Ogunleye (2012), argued that some variables such as real exchange rate, inflation rate and interest rate received little attention in the empirical studies and examined the following variables in their study. The study revealed that foreign direct investment responds impressively to movement in exchange rate, interest rate and inflation rate.

METHOD

This study assumed that favourable monetary policy environment is an indicator for the level of foreign direct investment in any given country. However, the attraction of foreign direct investment inflows in Sub-Sahara African countries depends largely on two major factors such as interest rate and exchange rate. As the literature has been previously stated, foreign direct investment is a foster process in achieving economic growth and development. The study relied on expo facto research design because data are gathered from reliable and secondary source which is not easily manipulated by the researchers. The data were gathered from World Bank Development Indicators 2020. The study covers between 1990 and 2019 in panel series for the eleven countries selected from Sub-Sahara African countries.

Model Specification

Therefore, it becomes important to empirically test any factors linked to its attraction to the host countries in Africa. These argument guide our empirical framework that linked FDI to interest rate and exchange rate as stated below.

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \mu \quad \dots\dots\dots (1)$$

Where Y_t is FDI proxied with foreign direct investment percentage of gross domestic product, X_t is sub-divided into two interest rate and exchange rate, μ is the error term.

Therefore,

$$FDI_{it} = \beta_0 + \beta_1 LINTR_{it} + \beta_3 REER_{it} + \mu \quad \dots\dots\dots (2)$$

Model Assumption :

1. Interest rate is expected to be positive because it will attract investors from abroad. Which means an increase in interest rate will increase foreign direct investment.
2. Since interest rate is expected to be positive, the study assumed that the value of the currency should be increased because investors will demand for the country currency

The symmetry assumptions have been empirically proven in the literature but what is unknown is the asymmetric or the nonlinear assumption. For instance, the existing studies are yet to ascertain the following

1. The direction of the effect and relationship if monetary policy decided to reduce or increase interest rate, will it still cause foreign direct investment to increase or otherwise .
2. What will be the effect if the model analyse the appreciation and depreciation of exchange rate within the period under review in the same model as control variable.

In order to contribute to the methodology argument and analyse the nonlinear assumption, the nonlinear autoregressive distributive lag(NARDL) by Shin and Greenwood-Nimmo(2014) was employed. In the recent studies, the procedure of NARDL has been tested if an increase and decrease in explanatory variables will pose different effect on dependent variables (Katrakilidis&Trachanas, 2016; Bahmani-Oskooee&Ghodsi, 2017, ALI,Shan,Wang, and Amin, 2018). Based on the existing studies, this current study specified and estimated a nonlinear model to capture the increase and decrease of interest rate and exchange rate on foreign direct investment as asymmetric effects. Meanwhile in order to formulate the nonlinear, the linear equation (2) was converted into asymmetric bychanging LINTR and REER by its positive and negative parameters.

$$FDI_{it} = \beta_0 + \beta_1 LINTR_{it}^+ + \beta_2 LINTR_{it}^- + \beta_3 REER_{it}^+ + \beta_4 REER_{it}^- + \mu \dots\dots\dots (3)$$

The above model explained how lending interest rate and real exchange rate is decomposed into increasing and decreasing sum such that LINT =LINT_POS ,LINTR_NEG, and REER=REER_POS,REER_NEG .

The following is the model for standard NARDL to measure short-run and long-run NARDL.
 $\Delta FDI_{it} = \beta_0 + \beta_1 \Delta FDI_{it-1} + \beta_2 \Delta LINTR_{it}^+ + \beta_3 \Delta LINTR_{it}^- + \beta_4 \Delta REER_{it}^+ + \beta_5 \Delta REER_{it}^- + \varepsilon_{it} \dots$
 (4)

$$\Delta FDI_{it} = \sum_{j=0}^p \beta_j \Delta FDI_{it-j} + \sum_{j=0}^p \beta_j \Delta LINTR_{it-j}^+ + \sum_{j=0}^p \beta_j \Delta LINTR_{it-j}^- + \sum_{j=0}^p \beta_j \Delta REER_{it-j}^+ + \sum_{j=0}^p \beta_j \Delta REER_{it-j}^- + \partial ECM_{t-1} + \varepsilon_t \dots\dots\dots (5)$$

The equation (5) measure the short-run asymmetric relationship between interest rate and foreign direct investment in Sub-Sahara African countries.

RESULTS AND DISCUSSION

The table below shows that different results of unit root statistics for estimation techniques decision. It was revealed that all the variables were not stationary at level but were found significant and stationary at first difference based on ADF test

Table 1. Unit Root

UNIT ROOT TEST RESULTS TABLE (ADF)				
Null Hypothesis: the variable has a unit root				
	At Level			
		FDIGDP	LINTR	REER
With Constant	t-Statistic	0.0753	0.0951	NA
	Prob.	0.0338	0.3401	0.4200
		**	n0	n0
With Constant & Trend	t-Statistic	0.0602	0.1942	NA
	Prob.	0.0961	0.7081	0.8124
		*	n0	n0
	At First Difference			
		d(FDIGDP)	d(LINTR)	d(REER)
With Constant	t-Statistic	0.0000	0.0001	NA
	Prob.	0.0000	0.0133	0.0017
		***	**	***
With Constant & Trend	t-Statistic	0.0000	0.0001	NA
	Prob.	0.0002	0.0375	0.0075
		***	**	***

Table 2. Descriptive Statistics

Variables	FDIGDP	LINTR	REER
Mean	1.905756	20.75554	108.5576
Median	1.099403	17.58500	103.3498
Maximum	12.71601	65.41750	272.9240
Minimum	-1.304135	12.34167	49.73626
Std. Dev.	2.638818	10.07604	34.91608
Skewness	2.212921	2.652631	2.320404
Kurtosis	8.178658	10.00839	11.10753
Jarque-Bera	137.2861	228.5705	258.1713
Probability	0.000000	0.000000	0.000000
Observations	71	71	71

The table 2 above shows the statistical understanding of the parameters such as foreign direct investment, interest rate, and real exchange rate in selected Sub-Sahara African countries within the period of 30 years between 1990 and 2019. It was observed that only real exchange rate exhibited a significant deviation from 1, while interest rate and foreign direct investment ratio of GDP are less volatile for the period under review. The variables in the model are observed to be positively skewed and the normality test measured with Jarque – Bera indicates all variables are not normally distributed .

Table 3. Correlation Matrix

variables	FDIGDP	LINTR	REER
FDIGDP	1.000000	0.570123	-0.173459
LINTR	0.570123	1.000000	-0.190280
REER	-0.173459	-0.190280	1.000000

The correlation matrix was performed to investigate the presence of multicollinearity among the employed variables. It was revealed that interest rate was fairly and positively correlated with foreign direct investment while is negatively correlated with exchange rate 19%. Also, exchange rate is negatively correlated with foreign direct investment and interest rate 17% and 19% respectively.

Table 4. Pedroni co integration test results
For the purpose of result comparison.

CRITERION	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	0.5152	0.3032	-0.2245	0.5888
Panel rho-Statistic	-2.0185	0.0218	-2.1455	0.016
Panel PP-Statistic	-5.0645	0	-2.9593	0.0015
Panel ADF-Statistic	-1.4086	0.0795	-1.8567	0.0317
	Statistic	Prob.		
Group rho-Statistic	-1.2631	0.1033		
Group PP-Statistic	-3.8408	0.0001		
Group ADF-Statistic	-1.5779	0.0573		

The table above measures the cointegration and existence of long-run relationship in the model. The pedroni analysis indicated that there is a long-run relationship because Panel rho, Panel PP, and Panel ADF are significance.

For the purpose of comparison, the standard ARDL bound test and NADL was estimated for better understanding of the model.

Table 5. Symmetric and Asymmetric ARDL Models Comparison (LONG-RUN)

Variables	Asymmetric ARDL		Symmetric ARDL	
	Coefficient	Prob.	Coefficient	Prob.
LINT	-	-	0.103865	0.0000
REER			-0.012408	0.0157
LINT+(Positive)	-0.112827	0.0007		
LINT-(Negative)	0.040165	0.0054		
REER+(Positive)	0.004032	0.4977		
REER-(Negative)	-0.012039	0.0251		
Constant	0.292078	0.292078	1.598996	0.1705

The result in table 5 clearly reported the comparison between Asymmetry effects and symmetric ARDL. The symmetric ARDL shows interest rate and real exchange rate are significant but with different degree and signs. Meaning that in the long –run interest rate has a positive relationship and poses a significant effect on foreign direct investment. This result is in consonance with the assumption that a unit increase in interest rate will increase the foreign direct investment by 10.4%. Also, real exchange rate indicated a significant impact on foreign direct investment but with a negative signs. This means a unit increase in real exchange rate will reduce foreign investment by `12percent rate of change.

The long-run asymmetric effects show that coefficient associated with positive changes is negative and significant. This means that when there is a unit increases in positive interest rate will lead to decline in foreign direct investment in sub-Sahara African countries by 11.2% in the long-run. This is new information regarding the direction of interest rate and its effect on the attraction of foreign direct investment in the long-run. Also, the coefficient linked with decrease in interest rate shows a positive signs and significant, which implies that a unit decrease in interest rate will result to 4% decrease in foreign direct investment in the long-run.

In addition, the appreciation and depreciation in exchange rate shows different significant level and signs. For instance, the coefficient attached with positive real exchange rate (appreciation) is positive and insignificant, which means that positive unit increase real exchange rates will increases foreign direct investment in Sub-Sahara African countries by 0.4%. Also, the coefficient attached with negative changes (depreciation) is negative and significant, which means that a percent decrease in real exchange rate or depreciation will increase foreign direct investment by 1.2%. Specifically, this result provides an increase in interest rate make foreign direct investment deceases while a decrease in interest rate further reduces foreign direct investment. This could be inferred as the true relationship that existed between interest rate and foreign direct investment when other variables are held constant.

For the purpose of result comparison, the standard ARDL bound test and NADL was estimated for better understanding of the model.

Table 6. Symmetric and Asymmetric ARDL Models Comparison (SHORT-RUN)

Variables	Asymmetric ARDL		Symmetric ARDL	
	Coefficient	Prob.	Coefficient	Prob.
D(LINTR)		-	-0.080772	0.6447
D(REER)			-0.000579	0.9510
LINT+(Positive)	0.173962	0.4588		
LINT-(Negative)	-0.196070	0.4255		
REER+(Positive)	0.000134	0.9893		
REER-(Negative)	0.047552	0.1425		
ECMt-1	-0.945728	0.0020	-0.879125	0.0006

In the table 6 above, the short-run asymmetric and symmetric ARDL was presented for comparison.

It is observed that in the short-run, interest rate and exchange rate are insignificant to influence foreign direct investment. Specifically, a unit increase in interest rate will reduce foreign direct investment in the short-run by 8% while a unit increase in real exchange rate will reduce foreign direct investment by 0.06percent in the short-run. Meanwhile the asymmetric effect shows different information. For instance, the coefficient attached to positive changes in interest rate is positive, which means a unit increase in positive interest rate will increase the foreign direct investment in the short-run but it was insignificant. Also, the coefficient linked with negative interest rate is negative; this means that a decline in interest rate will increase foreign direct investment by 19.6percent and was insignificant in the short-run.

The sign attached to coefficient of positive or appreciation in exchange rate is positive but insignificant. This means that for every 1percent increase in positive exchange rate, it will increase foreign direct investment by 0.0134 percent in Sub-Sahara African countries in the short-run. Also, the coefficient associated with negative changes in exchange rate or depreciation is positive. This means that a unit decreases in real exchange rate will decrease foreign direct investment by 5% in the short-run.

Meanwhile, the error in the model was corrected by Error Correction Term (ECM). The ECM is negative and significant in both asymmetric and symmetric effect of ARDL model. This implies that disequilibrium in both asymmetric and symmetric model in the short-run will be corrected at 94.5% and 88% speed of adjustment in the long-run between interest rate and foreign direct investment in the selected Sub-Sahara African countries.

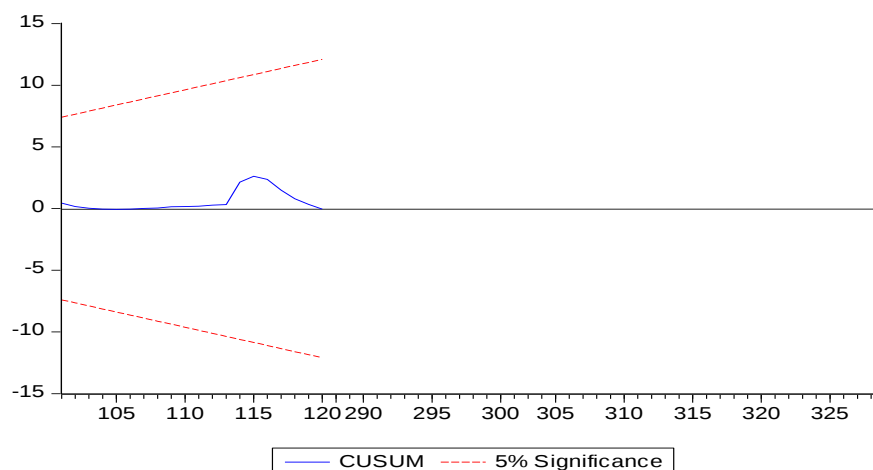


Figure 1. :Model Stability (Cusum)

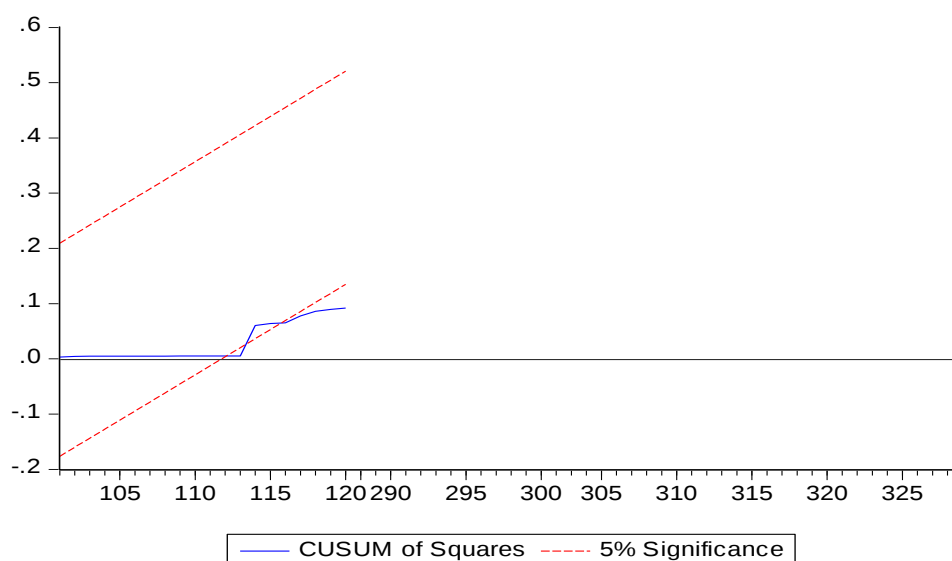


Figure 2. Model Stability(Recursive Cusum Test)

In the Fig .1 and Fig.2 above, the stability of asymmetric was examined through CUSUM recursive and CUSUM of squares of recursive. It was indicated that the model was stable using the CUSUM of recursive as the basis for the decision because the value does not fall outside the critical bands of 5% level of significance. However, there is a slight fall out of the critical bands if the decision if stable model relied on CUSUM of squares.

CONCLUSION

This contemporary study on the relationship between interest rate and foreign direct investment investigated the dynamism between the core economic variables. The study bridged the existing gap by investigating 11 selected Sub-Sahara African countries using panel annual data between 1990 and 2019 from World Bank Development Indicators. In the study, long-run, short-run and ECM were analyzed to ascertain the effect of linear relationship in the model while Nonlinear ARDL was considered to measure the asymmetric effect and relationship between interest rate and foreign direct investment with the period under review. It was revealed that though interest rate and real exchange rate have a significant effect on foreign direct investment in the symmetric model in the long –run but there were found insignificant in the short –run. Also, the interest rate and exchange rate have negative relationship with foreign direct investment in the short-run but interest rate was found positive with foreign direct investment in the long-run and exchange rate was negative. In addition, there was a discovery that there is a presence of asymmetric effect between the interest rate and foreign direct investment in Sub-Sahara African countries.

It was revealed that in the short-run a positive changes in interest rate will attract foreign direct investment but in the long-run it would change and reduces foreign direct investment. This means that assumption of the symmetric model only exist in the short-run but vanish in the long-run. However, a decline of interest rate tends to attract foreign direct investment in the short-run but will not attract foreign investment in the long-run. Generally, it was concluded that both the increase and decrease in interest rate reduces foreign direct investment in the long-run and poses a significant influences on foreign direct investment which is noted that the assumption that the relationship between interest rate and foreign direct investment is linear may not be absolutely true due to the estimation techniques and state emphatically that its misleading to concluded that increase in interest rate attracts foreign direct investment in Sub-Sahara African countries. Therefore the study recommended that in order to attract foreign direct investment in Sub-Sahara African countries, the monetary authorities and policy maker should ensure that exchange rate are properly monitor because it tends to attract foreign direct investment in the long –run than interest rate in the long-run. Also, lending rate should be increased within short-period to attract foreign investors and find proper policy tools to retain the attracted investors and ensure that exchange rate is appreciating.

REFERENCE

- Ali,U, Shan,W., Wang,J. Amin,A.(2017). Outward foreign direct investment and economic growth in china: evidence from asymmetric ardl approach. *Journal of Business Economics and Management*.9(5) 9 706–721
- Ayano, D. A. (2014). Interest rate regime and macroeconomic stability in Nigeria.*Global Journal Commerce and Management Perspectives*, 3(5), 245-258.
- Bahmani-Oskooee, M., & Ghodsi, S. H. (2017). Asymmetric causality and asymmetric cointegration between Income and house prices in the United States of America. *International Real Estate Review*, 20(2), 127-165.

- Benson, E., Eya, C. I. & Yunusa, A. (2019). Effect of exchange and interest rates on foreign direct investment in Nigeria. *International Journal of Contemporary Research and Review*, 10(7), 72-85.
- Danladi, J. D. & Uba, U. P. (2016) Does the volatility of exchange rate affect the economic performance of countries in the West African monetary zone? A case of Nigeria and Ghana, *British Journal of Economics, Management and Trade*, 11(3), 1-10.
- Danjuma, I. (2021). Insurgency, political risk, and foreign direct investment inflows in Nigeria: A Sectorial Analysis. *CBN Journal of Applied Statistics*. 12 (2), 27-57
- Ditta, A. & Hassan, A. (2017). Nexus of economic misery, interest rate, exchange rate and foreign direct investment in Pakistan. *Bulletin of Business and Economics*, 6(1), 35-44.
- Faroh, A. & Shen, H. (2015). Impact of interest rates on foreign direct investment: case study Sierra Leone economy. *International Journal of Business Management and Economic Research (IJBMER)*, 6(1), 124-132
- Fornah, S. & Yuehua, Z. (2017). Empirical Analysis on the Influence of Interest Rates on Foreign Direct Investment in Sierra Leone. *International Journal of Research in Business Studies and Management*. 4, (12), 28-35
- Ibenta, S. N. O. (2012). *International Trade and Finance*, Enugu, Ezu Books Limited.
- Kyereboah-Coleman, A. & Agyire-Tettey, K. (2016). Effect of exchange-rate volatility on foreign direct investment in Sub-Saharan Africa. The case of Ghana. *The Journal of Risk Finance*, 9(1), 52-70.
- Katrakilidis, C., & Trachanas, E. (2016). Vertical price transmission in the US beef sector: Evidence from the nonlinear ARDL model. *Economic Modelling*, 52, 499-506. <https://doi.org/10.1016/j.econmod.2015.09.03>
- Linus, K. (2017). Effect of interest rate on foreign direct investment inflows in Kenya. A research presented in partial fulfillment for the degree of master of business administration in the university of Nairobi.
- Ogun, O., Egwaikhide, F. O. & Ogunleye, E. K. (2012). Real exchange rate and foreign direct investment in Sub-Saharan Africa. Some empirical results. *Economía Mexicana Nueva Época*, 21(1), 175-202.
- Ogunkalu, J. (2016). Foreign direct investment in Nigeria: magnitude direction and prospects. *African Economic Research Consortium*, 2(9), 9-16
- Ojinma, D. & Emerenini, F. M. (2015). Impact of interest rate on investment in Nigeria. *Journal of Developing Countries*, 5(3), 103-109.
- Okoye, L. U., Nwakoby, C. I. N. & Modebe, N. J. (2015). Interest rate reform and real sector performance: Evidence from Nigeria. *African Banking and Finance Review*, 2(1), 97-114
- Pettinger, T. (2019) Factors that affect foreign direct investment (FDI), <https://www.economicshelp.org/blog/15736/economics/factors-that-affect-foreign-direct-investment-fdi/>
- Shin, Y. Yu, B. & Greenwood-Nimmo, M. (2014), Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In *Festschrift in Honor of Peter Schmidt*; Sickles, R.C., Horrace, W.C., Eds.; Springer: Berlin, Germany, 281-314.

- Tarus, D. K., & Manyala, P. O. (2018). What determines bank interest rate spread? Evidence from Sub-Saharan Africa. *African Journal of Economic and Management Studies*, 9(3), 335-348.
- UNCTAD (2021). United Nations Conference on Trade and Development. <https://unctad.org/press-material/investment-flows-africa-significantly-cut-pandemic-says-un-report>