



Threshold Effects of Exchange Rate on Foreign Direct Investment (FDI) in Nigeria

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Abstract

The study investigated the threshold effects of exchange rate on foreign direct investment (FDI) in Nigeria during the period 1981-2021. The study employed Threshold Regression Model adopted from the work of Hansen (1999). The variables employed were Foreign Direct Investment (FDI), Exchange Rate, Trade Openness, Interest Rate and Human Capital. The result of the threshold analysis revealed a threshold value, which was set at N115, which served as a pivotal point for discerning how changes in the exchange rate influenced FDI. This means that the relationship between exchange rate and FDI is not uniform across all exchange rate levels. It is influenced by whether the exchange rate is below or equal to N115 Naira. It underscores that exchange rate fluctuations may not have a uniform impact on FDI but can vary based on the specific exchange rate level. This implies that investors would consider not only the direction but also the magnitude of exchange rate changes concerning the threshold when making investment decisions. The study recommended that government should understand the dynamics of FDI in Nigeria, emphasizing the significance of taking into account diverse factors, including exchange rates and human capital, in shaping investment decisions and policy formulation.

Keywords: Exchange rate, Foreign Direct Investment, Threshold, Inflation Rate,
JEL Classification: F31, F21, C22, E31,

Contribution to/Originality Knowledge

1.0 Introduction

Foreign Direct Investment (FDI) serves as an essential driver of economic growth, involving long-term interests and a level of influence or control by foreign entities over a host country's operations (Alfaro et al., 2020). In 2019, international capital flows exceeded \$1.5 trillion, with over \$635 billion directed toward businesses in developing countries, Africa accounted for a notable share of the international capital flows and Nigeria received a significant portion of international capital flows (World Bank, 2020). Scholarly endeavours have sought to comprehensively explain the rivalry between developing and emerging economies as they strive to attract foreign capital. The primary argument behind this economic choice is based on the fundamental assumption that FDI not only brings much-needed financial resources to developing countries like Nigeria but also stimulates job creation, enhances productivity, sharpens managerial skills, and introduces advanced technology. It is expected that each of these factors will expedite economic development (Ogu, 2020).



Although Nigeria is a market with high demand for goods and services and has historically drawn FDI (Kenny, 2019), the inflows have experienced fluctuations. After reaching a peak of \$8.56 billion in 2009, FDI inflow toward Nigeria declined to \$3.45 billion, \$2.41 billion, and \$0.78 billion in 2016, 2017, and 2018, respectively. The year 2018 marked the lowest point, with inflows totalling \$0.78 billion. However, there has been a gradual increase in FDI inflows, reaching \$2.31 billion, \$2.39 billion, and \$3.31 billion in 2019, 2020, and 2021, respectively. Despite the significant influx of international investment in Africa, Nigeria encounters hurdles in attracting FDI (Kenny, 2019). Factors such as exchange rate stability, corruption levels, and socio-political dynamics shape the flow of foreign capital into the country (Sadia & Zahoor, 2023). These challenges underscore the need for thorough examination of exchange rate dynamics and their impact on FDI to formulate effective policies and strategies for sustainable economic development.

Exchange rates as a major factor of FDI represent a country's currency value in terms of another. It is shaped by diverse factors such as supply and demand dynamics, interest rates, inflation, and economic indicators (Rashid & Lin, 2018). Fluctuations in exchange rates on the other hand exert substantial influence on international trade and investment. Notably, exchange rate instability can discourage FDI, breeding uncertainty and caution among foreign investors (Saidu *et al.*, 2018).

Within this interplay, the concept of threshold effects emerges, proposing critical levels where the relationship between exchange rates and FDI undergoes qualitative shifts. In Nigeria's dynamic economic landscape, comprehending these thresholds is indispensable for policymakers, investors, and researchers (Ibhagudi, 2020). These thresholds provide insights into whether the impact of exchange rate changes on FDI follows a linear trajectory or if specific levels amplify or diminish these effects.

Nigeria, with its diverse sectors attracting foreign investment, grapples with economic performance influenced by external factors like oil prices and global economic conditions. Fluctuations in exchange rates add a layer of complexity, making the study of threshold effects essential for understanding how these changes reverberate through FDI.

This study aims at investigating the sustainable threshold level of exchange rate for FDI in Nigeria from 1981 to 2022. By analysing this period, the study seeks to uncover critical thresholds where the relationship between exchange rates and FDI undergoes qualitative shifts, providing valuable insights for policymakers, investors, and researchers navigating Nigeria's dynamic economic landscape.

There have been issues with exchange rate fluctuation which has negatively affected FDI inflow into the countries. The stability of exchange rates poses several challenges for Foreign Direct Investment (FDI) (Asamoah & Alagidede, 2022). When the currency of the host country depreciates against the currency of the investor's home country, the value of the investment and its returns in the home currency decreases. This uncertainty makes it difficult for investors to accurately forecast and assess the profitability of their investments, potentially discouraging FDI inflows. Despite implementing different exchange rate regimes since independence, which

include fixed exchange rates, flexible exchange rates, and unified exchange rate policy. Each regime has had its unique characteristics and has influenced both FDI and currency stability. However, Nigeria has faced challenges and experienced unstable exchange rate as a result of these policy regimes, necessitating a closer examination of the fluctuation and their implication for policy recommendations (Alade & Adeleke, 2021).

While existing studies have explored the effects of foreign exchange volatility on FDI in Nigeria, including investigations into the broader macroeconomic implications of exchange rate movements, not much studies had employed threshold analysis to ascertain the sustainable level of the exchange rate for FDI in Nigeria. Conducting this research would contribute to a better understanding of the relationship between exchange rates and FDI inflows in Nigeria and provide policymakers and investors with crucial insights for formulating effective policies and investment strategies. By incorporating threshold analysis into the study, the researcher can explore potential nonlinearities, discontinuities, or regime shifts in the relationship between exchange rate and FDI. The rest of the paper is organised having the Review of literature where similar works are reviewed according to the variables of the topic. Then the gap of study follows, which highlights the uniqueness of the study from the reviewed studies. Next is the Methodology where the steps taken for easy analysis are taken for the study to arrive at the correct outcome. The data presentation and analysis will follow, here the data obtained for the study are stated and will further be analysed. Finally, there will be result and discussion that lays out the findings with detailed explanation to guide the understanding of the study outcome and finally, conclusion.

2.0 Literature Review

2.1 Theoretical Underpinning

2.1.1 Capital Mobility Theory:

The theory, proposed by Maurice Obstfeld and Kenneth Rogoff in their book "Foundations of International Macroeconomics" in 1996, argues that capital flows, including foreign direct investment (FDI), are influenced by changes in relative returns between countries. Exchange rate movements have the potential to impact the appeal of investing in Nigeria in comparison to other countries. This is because they can affect the relative returns on investment. In this context, threshold effects may suggest important levels of exchange rate movements that can cause a significant shift in FDI behavior. This study is closely connected to the theory as it provides insights into the impact of exchange rate movements on FDI inflows, which are influenced by capital mobility. Threshold effects can indicate crucial points where the appeal of investing in Nigeria compared to other countries changes significantly.

2.2 Review of Empirical Literature

According to Kenny, (2019), FDI enables host economies to utilize local resources, adopt modern tools and techniques, access advanced skills, address current account deficits, and promote human capital development. Governments monitor FDI flows due to their potential impact on economic growth (Rashid & Lin, 2018). However, changes in technology and

internet usage have influenced foreign investment patterns. FDI is sought after to leverage foreign capital and drive economic development, especially in developing economies (Cambazoğlu & Güneş, 2016). The determinants of FDI include exchange rates, the stability of both economic and political conditions, coupled with the demand for a country's goods and services, among various interconnected factors (Kenny, 2019).

Nigeria's exchange rate policy has evolved from a fixed parity system to embrace a flexible exchange rate regime, where market forces dictate rates through the interplay of supply and demand. The dynamics of imports and exports play a pivotal role in shaping the demand for and supply of foreign currency, consequently influencing exchange rate movements, whether appreciating or depreciating (Obi et al., 2016). This shift emphasizes the country's commitment to allowing market mechanisms to play a significant role in determining exchange rates, reflecting the broader trend of many economies transitioning towards more flexible and market-oriented exchange rate systems.

In accordance with Dabwor et al. (2019), the adoption of a freely fluctuating exchange rate obviates the necessity to settle balance of payments deficits using gold. In a system with a flexible exchange rate, the balance of payments adjusts organically, diminishing the requirement for external interventions. This flexibility affords a country the autonomy to pursue its internal monetary policies more effectively. Additionally, a freely fluctuating exchange rate alleviates the central bank from the burden of safeguarding gold reserves, thereby eliminating the need for deflationary policies aimed at preserving those reserves. This shift reflects a pragmatic approach, allowing nations to navigate economic challenges with greater adaptability and reducing reliance on rigid policies tied to gold reserves.

Scholars had investigated the effect exchange rate on foreign direct investment using several techniques. Tho and Ngoc (2016), in their study, threshold effect in the relationship between foreign direct investment and economic growth in ASEAN countries, examined the relationship between foreign direct investment and economic growth using Threshold Auto Regressive (TAR) model. Using a panel data of eight ASEAN countries in the period from 2002 – 2014, their findings indicate that the relationship between FDI and economic growth is non-linear. Furthermore, the results show that FDI can influence growth in different ways, depending on the level of FDI inflows.

Ibhagudi (2020) undertook a study through Sub-Saharan Africa (SSA) to unravel the intricate correlation between FDI and economic growth. Employing the beacon of threshold analysis, the study cast its gaze on six variables: inflation, initial income, population growth, trade openness, financial market development, and human capital. Anchored in a comprehensive panel dataset spanning 45 SSA countries from 1985 to 2018, the analysis bore forth revelations. The direct influence of FDI on growth stood veiled in ambiguity and inconsistency. However, the tapestry transformed under the light of threshold analysis, illuminating a path. FDI's positive influence unveiled itself in SSA countries that had surged past specific thresholds of inflation, population growth, and financial market development. A symphony of thresholds painted the canvas, ushering nuanced dynamics into the growth narrative of Sub-Saharan Africa.

Shifting the focus to the intricate relationship between FDI and China's exchange rate, Ford et al. (2017) delved into the non-linear terrain spanning 1970 to 2015. Employing varied threshold variables, they aimed to uncover the elusive link between FDI and growth, finding no substantiation for a positive correlation, even under the umbrella of good governance. Van, (2021), in a parallel vein, investigated the impact of FDI on economic growth within Central and South-eastern Europe, from 1995 to 2013. Through the lens of threshold analysis, his insights illuminated a transformative narrative. As foreign investment levels escalated, the nature of FDI metamorphosed. Initial attraction to market size and cost efficiency evolved into a new phase, where institutional development, business environment, and overall prosperity of the host country emerged as magnets for a distinct class of investors. These intertwined studies uncover a symphony of complexities that underlie the interplay between exchange rates, FDI, and economic dynamics.

Further enriching the narrative, Mahmudul et al. (2020) navigate nonlinear relationships, probing the intricate dance between infrastructural development and FDI inflows in Nigeria. Funnelled by Hansen's (2000) threshold regression model, their study spans 1972 to 2015. Within this chronicle, nonlinear dynamics unfold—the relationship between infrastructural development and FDI thrives in both regimes, but it blooms more radiantly after surmounting a threshold level. In parallel, Raymond et al. (2020) engage in an exploration of the nonlinear rapport between FDI and economic growth in Nigeria. Anchoring their endeavour from 1980 to 2018, their journey embraces the nonlinear autoregressive distributed lag (NARDL) approach.

2.3 Gaps of the Literatures

The literature surrounding the relationship between exchange rates and Foreign Direct Investment (FDI) presents several significant gaps and areas for further exploration. Firstly, while scholars like Kenny (2019) highlight the importance of FDI in utilizing local resources and promoting economic growth, there remains a lack of consensus on the specific determinants of FDI inflows. Factors such as exchange rate stability, corruption levels, and socio-political dynamics are acknowledged as influential, but their precise impact and interplay with FDI require deeper investigation (Sadia & Zahoor, 2023).

Secondly, the shift towards flexible exchange rate regimes in countries like Nigeria raises questions about the implications for FDI and economic development. While the adoption of flexible exchange rates is touted as beneficial for market efficiency and policy autonomy (Obi et al., 2016), further research is needed to understand how these changes impact FDI flows and economic outcomes. Additionally, existing studies on the relationship between exchange rates and FDI often employ different methodologies and analytical techniques, leading to inconsistencies and varying conclusions (Tho & Ngoc, 2016).

While some studies, such as those by Ford et al. (2017) and Van (2021), explore the intricate dynamics between exchange rates, FDI, and economic growth, there is still a need for research that examines the specific mechanisms through which exchange rate movements affect FDI inflows and their subsequent impact on economic development. Additionally, studies like

Mahmudul et al. (2020) and Raymond et al. (2020) highlight the importance of infrastructural development in attracting FDI, suggesting that further investigation into the interaction between infrastructure investment, exchange rates, and FDI is warranted. Overall, while existing literature provides valuable insights into the relationship between exchange rates and FDI, there are several gaps that need to be addressed to develop a more nuanced understanding of this complex relationship and its implications for economic development.

Furthermore, while some studies explore threshold effects and nonlinear dynamics in the relationship between FDI and economic growth, there is a need for research that specifically examines the sustainable threshold level of exchange rates for FDI in Nigeria (Ibhagudi, 2020). Therefore, this study aims to fill this gap by investigating the sustainable threshold level of exchange rates for FDI in Nigeria, providing valuable insights for policymakers, investors, and researchers navigating the country's dynamic economic landscape.

3.0 Methodology

The Threshold Regression Model is employed to analyse the impact of variables on a dependent variable, with the recognition that the relationship may change at certain threshold levels. In the context of exchange rates and Foreign Direct Investment (FDI), this model seeks to identify specific threshold levels of exchange rates where the effect on FDI changes significantly. The Threshold Regression Model determines is a critical point or range of exchange rates beyond which the impact on FDI intensifies or diminishes.

Following the work of Hansen (1999), it is believed that FDI is influenced by a number of factors including the source of capital, human capital, policy regime, exchange rate, trade openness of the economy, etc. For this study, Threshold effects of exchange rate on foreign direct investment was examined from 1981 – 2021. The threshold regression equation adapted from Hansen (1999) is given below:

$$FDI_t = \beta_0 + \beta_1 EXRT_t + \beta_2 TRDO_t + \beta_3 INFR_t + \beta_4 GDP_t + u + \varepsilon_t \quad (1)$$

Where FDI_t represents FDI inflows into the economy at time t ; $EXRT_t$ is measured by the real exchange rate at time t ; control variables $TRDO_t$ measures trade openness, $INFR_t$ measures inflation rate, GDP_t measures the gross domestic growth, u_i represents effects and is assumed to be unchanged over the time, and ε_t is the observation error at time t .

For this study, control variables were not employed, hence equation (1) is modified into equation (2) below.

$$FDI_t = \beta_0 + \beta_1 EXRT_t + u + \varepsilon_t \quad (2)$$

Although the regression model depicts the association between exchange rate and FDI, It does not indicate a change in the nature of this relationship as the level of $EXRT$ increases. Hansen's (1999) methodology enables testing with the equation divided into regimes based on the value of threshold variables. The presence of at least one threshold value indicates a nonlinear

relationship between the exchange rate and FDI. Building upon Hansen's (1999) work, the formulation of the non-linear regression can be expressed as follows:

$$FDI_t = \beta_0 + \beta_1 EXRT_t + u + \varepsilon_t \text{ when } EXRT \leq \gamma_1 \quad (3)$$

$$FDI_t = \beta_0 + \beta_1 EXRT_t + u + \varepsilon_t \text{ when } EXRT > \gamma_1 \quad (4)$$

Where γ_1, γ_2 are the threshold parameters that split the sample into sub-samples depending on the condition term; the various regimes are characterized by distinct regression slopes. The threshold variable, EXRT, determines the switch between the two regression equations. Therefore, if EXRT is less than or equal to the threshold value (γ), equation (3) will be employed to estimate the relationship between EXRT and FDI. However, if EXRT is greater than the threshold value, equation (4) will be employed.

4.0 Results and Discussion

Table 1: Threshold Analysis Results

Variable	Coefficient
	115 <= EXRT – 23 obs
EXRT	0.010178
C	0.576176
	115 <= EXRT – 18 obs
EXRT	-0.015579
C	8.045523

The threshold analysis conducted in the study introduces a crucial element of nonlinearity into the examination of the relationship between Foreign Direct Investment (FDI) and the Exchange Rate (EXRT). Table 1 represents the result of the threshold analysis. The result revealed a threshold value, which is set at ₦115, which serves as a pivotal point for discerning how changes in the exchange rate influence FDI. The threshold value of ₦115 signifies a critical juncture in the relationship between FDI and the exchange rate. This threshold separates the data into two distinct regimes, each characterized by a different effect of the exchange rate on FDI.

In the regime where the exchange rate is below ₦115, the analysis reveals a positive effect on FDI. This is evident in the positive coefficient of EXRT (0.010178). When the exchange rate is below ₦115, an increase in the exchange rate is associated with a positive impact on FDI. In this context, a more competitive exchange rate, which favours foreign investors, tends to attract higher FDI inflows.

Conversely, in the regime where the exchange rate is greater than or equal to ₦115, the analysis points to a negative effect on FDI. This is evident in the negative coefficient of EXRT (-0.015579). When the exchange rate exceeds or equals ₦115, a rise in exchange rate is linked to a negative influence on FDI. This suggests that, beyond the threshold, a stronger or less

favourable exchange rate may deter foreign investment. The threshold analysis emphasizes the presence of a nonlinear relationship between FDI and the exchange rate in Nigeria. It highlights the importance of considering not only the direction of change in the exchange rate but also its magnitude concerning the threshold value (₦115).

The threshold analysis conducted in this study revealed, a threshold value of ₦115. This means that the relationship between exchange rates and FDI is not uniform across all exchange rate levels; instead, it is influenced by whether the exchange rate is below or equal to ₦115 Naira. It underscores that exchange rate fluctuations may not have a uniform impact on FDI but can vary based on the specific exchange rate level. This implies that investors would consider not only the direction but also the magnitude of exchange rate changes concerning the threshold when making investment decisions. This finding is similar to the result of studies of Tho and Ngoc (2016) and Ibhagudi, (2020) who employed threshold analysis to investigate the effect of exchange rate on FDI, they found correlation among exchange rate, FDI, and economic dynamics. Understanding this nonlinearity is crucial for creating effective policies and strategies to attract and retain foreign investment, as it acknowledges that the effect of exchange rate variations on FDI may differ based on the specific exchange rate levels, necessitating a nuanced approach to economic management.

5.0 Conclusion

Threshold regression analysis revealed non-linear relationship between exchange rates and FDI in Nigeria. The identification of a threshold value at N115 for the exchange rate has significant implications. Below this threshold, an increase in the exchange rate appears to positively impact FDI, as indicated by the positive coefficient of EXRT. However, beyond this threshold, a higher exchange rate is associated with a reduction in FDI, as evident from the negative coefficient.

5.1 Recommendations

In pursuit of the overarching objectives of this study, which centre on identifying a sustainable threshold level for exchange rates conducive to Foreign Direct Investment (FDI) in Nigeria spanning the period from 1981 to 2021, the study's findings prompt the following recommendations:

- i. The Central Bank of Nigeria (CBN) and policymakers are urged to prioritize the maintenance of a stable exchange rate. Implementing monetary policy adjustments should give precedence to ensuring exchange rate stability, creating an environment favourable for foreign investors.
- ii. To mitigate exchange rate fluctuations and discourage preferential allocation of foreign currencies, it is advisable for the government to streamline the exchange rate system. This measure can effectively curb artificial scarcity and activities in the black market, fostering a more predictable environment for foreign investors.

- iii. The government should bolster its foreign reserves through a strategic combination of monetary and fiscal policies. Such an approach will contribute significantly to stabilizing the exchange rate and instilling confidence among foreign investors.
- iv. Nigeria is encouraged to reduce the prevalence of dollarization in its economy, particularly for investment projects that can be assessed and conducted in the local currency. This initiative aims to alleviate pressure on foreign earnings and play a role in enhancing overall exchange rate stability.

5.2 Contributions to Knowledge

This study makes several significant contributions to the existing body of knowledge.

- i. Firstly, it adds to the understanding of the relationship between exchange rates and Foreign Direct Investment (FDI) by uncovering the presence of a threshold value (N115) that influences this relationship. This identification of a specific threshold level provides valuable insights into the non-linear nature of the exchange rate-FDI nexus, enhancing our understanding of how exchange rate fluctuations impact FDI inflows.
- ii. Secondly, by highlighting that the effect of exchange rate changes on FDI may vary based on specific exchange rate levels, the study highlights the importance of considering threshold effects in economic analysis and policymaking. This understanding can inform policymakers and investors in Nigeria and similar economies about the complexities involved in managing exchange rate policies to attract and retain foreign investment.
- iii. Finally, the study contributes methodologically by employing threshold analysis to explore the exchange rate-FDI relationship, demonstrating the applicability and relevance of this approach in studying economic phenomena.

Overall, the findings of this study advance our knowledge of the dynamics between exchange rates and FDI and provide valuable insights for policymakers, researchers, and investors.

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