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Monetary Policy and Foreign Direct Investment in Nigeria

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Abstract
This study analysed the nexus between monetary policy and Foreign Direct Investment (FDI) in Nigeria (1981-2022). The study uses both ARDL and Non-linear ARDL econometric techniques. The analysis reveals that monetary policy has long-run and short-run relationships with FDI in Nigeria even though the instruments do not influence FDI similarly. Real Exchange Rate (REXR) has a negative symmetric impact on FDI in both short and long terms. There is however no asymmetric relationship between REXR and FDI. A stable and market-reflective exchange rate will have a stronger effect on FDI than a currency appreciation in Nigeria. The short-term impact is found to be significant. Monetary contraction in terms of Monetary Policy Rate (MPR) has both short and long-term negative impacts on FDI and an asymmetric effect on FDI with the negative shock having a stronger impact. Money Supply (M_2) is attractive to FDI in the short term but not significantly impactful on FDI in the long term. The study recommends the implementation of a moderate and stable monetary policy rate and exchange rate systems that balance the need to create an investment-friendly climate to make Nigeria a destination for foreign investors.

Keywords: Foreign Direct Investment, Monetary Policy
JEL Classification Codes: E52, F210

1. Introduction

Foreign Direct Investment (FDI) is regarded as an indispensable tool in economic development in both developed and emerging economies and middle-income countries like Nigeria. Not only does it help with the provision of capital, it also performs a substantial function in the advancement of economies by enhancing the employment and production processes, technology transfer and the fostering of international trade (Karahan & Musa, 2022). Foreign capital inflow into any economy is necessary to close the domestic savings and foreign exchange gaps (Chenery & Strout,1966). As widely acclaimed in economic literature, the stability of a country's monetary policy has a significant influence on FDI flows. A stable and predictable

monetary environment can attract more foreign investment as it reduces risks for investors. A volatile monetary environment can discourage foreign investment, as it makes it difficult for investors to assess the potential risks and returns of investing in Nigeria.

Over the years, Nigeria has experienced challenges with monetary policy variables including exchange rate and interest rate, which has impacted its attractiveness for FDI. The government through the Central Bank of Nigeria (CBN) has implemented various policies and reforms to improve the investment climate, attract more FDI and enhance monetary stability (Ashamu, 2020).

The trend of monetary policy and FDI for Nigeria is characterized by periods of expansion and contraction. In recent years, the CBN has pursued a generally expansionary monetary policy stance. This has been reflected in a lowering of the Monetary Policy Rate (MPR) from 14% in 2016 to 11.5% in 2021. The MPR was however raised to 16.5% in 2022. The CBN has also implemented some measures to boost liquidity in the banking system, such as reducing the Cash Reserve Ratio (CRR) from 22.5% in 2016 to 14% in 2022 (CBN, 2022). In 2023, CBN decided to unify the exchange rate regimes into a single floating exchange rate regime after adopting a multiple exchange rate regime in 2014. The expectation was that it would promote transparency and price realism in the Foreign Exchange (FOREX) market, among others (Ozili, 2024).

FDI inflows to Nigeria have also been volatile in the past decade. Inflows reached US$6.8 billion in 2014 but fell to US$4.3 billion in 2015 and US$3.2 billion in 2016. Could the multiple exchange rate introduced in 2014 have been responsible? FDI inflows have since recovered somewhat, reaching US$4.8 billion in 2021 but declined to -US$1.8 billion in 2022 (CBN, 2022). According to the National Bureau of Statistics [NBS], (2024), FDI inflows rose to US$3.4 billion in 2024 from US$1.1 billion in 2023. This is the highest rise since 2020 and as noted by the Nigerian Economic Summit Group [NESG], (2024), noted that the rise reflects an improvement in foreign investor confidence following the government's recent monetary reforms. This study interrogates these reports.

Despite the recent jump, FDI in Nigeria has remained below the desired level that could significantly stimulate any meaningful economic development especially when compared to its peak in 2014. Among many factors impeding. Foreign direct investment in Nigeria are unstable macroeconomic environment, poor infrastructure and deteriorating security problems. As a result, the benefits of FDI have eluded Nigeria. Unemployment and endemic poverty which could have been overturned have therefore consistently remained monsters in the economy.

There is a conflicting amount of empirical work on monetary policy and FDI nexus in Nigeria. From the literature reviewed so far, whereas there is consensus on the impact of exchange rate as a monetary policy variable on FDI, this is however not the case with the impact of other monetary variables like money supply and monetary policy rate. For example, while Tajudeen and Adesina (2024) and Nguyen (2023) found money supply to be inversely related to FDI, Okeke and Adeyeye (2022), and Tiberto and Mendonca (2022) found money supply to be positively related to FDI. While Chete, Olanrele, and Angahar (2024), and Emmanuel, Ike, and Alhasan (2019) found monetary policy rate to adversely impact FDI, Ndugbu, Duruechi, and Ojiegbe (2017) found it to have a positive effect on FDI. This lack of consensus creates a gap and a need to, apart from confirming the long-term impact between monetary policy and FDI, also check for possible asymmetric effects involving positive and negative shocks of monetary policy on FDI in Nigeria. Most studies reviewed so far only concentrate on the symmetric relationship between monetary policy and FDI.

Against this background, this study seeks to first, examine the short-term and long-term impact of monetary policy on FDI in Nigeria and secondly to measure and check for the asymmetric impact of monetary policy on FDI in Nigeria. This study is organized into five segments viz: introduction, literature review, methodology, results and discussion and lastly, conclusion and policy recommendations.

2. Literature Review

2.1 Conceptual Literature

2.1.1 Monetary Policy

Monetary policy is the mix of instruments and strategies used to manipulate the supply of money, and thereby affect macroeconomic activity. It is the actions of the central bank in influencing the cost of money and credit as well as the availability of the same to enhance the achievement of a country's economic objectives. Ajayi (2007), defined it as putting together measures developed to control credit supply, value, and cost in an economy in alignment with economic expectations. To this end, it is pursued to broadly achieve equilibrium in price, employment, GDP, exchange rate, interest rates and trade balance. The various channels for achieving monetary policies include the interest rate channel as propounded by Keynes (1936).

Interest rates have the potential to affect both consumption and investment decisions. Another Channel is the exchange rate channel which relates to the external sector of the economy. Variations in exchange rates can change the demand pattern for imports by making domestic goods cheaper. In this way, the trade balance is achieved. Other channels include equity price

channels, which relate directly to FDI, and credit channels such as bank lending. Monetary policy instruments include monetary policy rate, exchange rate, bank rates, cash reserve requirement and Open Market Operations (OMO) among others.

2.1.2 Foreign Direct Investment

World Bank (2024) conceptualized FDI as equity investments held to have at least 10% control in terms of voting rights in a company operating in a country other than the country of the investor. It is equal to equity capital, reinvested earnings, and long and short-term capital as contained in international financial statements. This is differentiated from portfolio investment which is limited to investment in financial assets such as bonds, and stocks without any interest in management or control of the investment. Portfolio investments are only intended for passive returns such as interest and dividends. FDI is rather a long-term investment with the intent to have at least 10% control or ownership. Foreign Direct Investment is considered crucial to a nation's economic growth for some reasons. It brings in improved technology which is a stimulant for productivity. It is also a key source of employment opportunities and a catalyst for human capital development (Jhingan, 2011)

2.2. Theoretical Literature

2.2.1 Keynesian Liquidity Theory of Investment

The Keynesian theory of investment explains the role of monetary policy in investment decisions. The theory is rooted in Keynes' famous work. The first key element of the theory is the Marginal Efficiency of Capital (MEC). According to Keynes (1936), excess of MEC over interest rate encourages investment. Investment, therefore, is a function of the expected profitability of capital goods and the cost of borrowing which is the interest rate. The second key element is the interest rate**.** Higher interest rates discourage investment because the high cost of capital reduces profitability. Conversely, lower interest rates encourage firms to borrow and invest in capital. The argument in this theory is that high liquidity lowers interest rates and makes FDI attractive due to differentials in interest rates.

Bernanke and Gertler (1995) provided empirical evidence of how sensitive investment is to interest rates using United States (US) monthly data from January 1965 to December 1993. The empirical analysis revealed that business investment declined sharply following monetary tightening within the first eight months after an unexpected monetary disturbance. The monetary shock generated a negative response from business investments and this is

consistent with Keynes's postulation on the impact of interest rates on investment decisions.

Even though Keynes did not advocate monetary policy, the relevance of the theory stems from the emphasis on the role of interest rates in influencing the profitability of investment. It is criticized for downplaying monetary policy since Keynes believed that interest rate is determined by market mechanisms and never foresaw the potency of monetary policy in determining interest rates. Keynes was also critiqued for concentrating on only the role of interest rates in investment decisions.

2.2.2 Currency Area Hypothesis

This theory relates FDI inflows to the exchange rate. Aliber (1970, 1971) came up with the hypothesis that FDI is best explained based on the relative strength of the various currencies. If a country's currency is stronger in comparison to other currencies, the firms from that country will be drawn to external investments in other countries and it will be less likely for foreign friends to invest in the domestic country. The argument is based on capital market relationships, exchange rate risks, and the market's preference for holding assets in selected currencies. Country, in testing the validity of this theory, Boatwright and Renton (1975) carried out a study on the inward and outward FDI of the U.K. and found that the depreciation of the pound sterling indirectly raised the value of the FDI in the U.K. but it also raised the U.K.'s FDI overseas instead of a negative effect on it.

Alexander and Murphy (1975) also tested the hypothesis and concluded that the devaluation of a country's currency discourages FDI outflows and encourages inflows. Agarwal (1980) criticized the theory because it does not account for cross-investment between nations with the same currency strength, for FDI in countries with the same currency strength, and for the concentration of FDI in certain types of industries.

2.3 Empirical Review

Chete *et al.* (2024) studied the influence of macroeconomic tools on FDI inflow from 1981 to 2022. The Autoregressive Distributed Lag (ARDL) model was used and the result shows that while nominal exchange rate and inflation have positive impacts in the short-term and long-run, monetary policy rate has a significantly inverse relationship with FDI. That means the exchange rate depreciation results in an increase in FDI entry. Monetary policy was also found to have a short-run negative impact on FDI though not significant, the paper recommended that the Government should lower the monetary policy rate.

Okeke and Adeyeye (2024) measured the impact of monetary policy and fiscal policy on the climate of investment in Nigeria between 1990 -2021. Using ARDL, the study found that money supply has an insignificant negative impact on FDI in the short run but the two-stage least squares revealed a significantly positive effect of money supply on FDI. Interest rates at different lagged periods have both positive and negative impacts and are significant while an increase in inflation rate has a positive relationship with FDI. The study recommends that future researchers introduce more variables that are suitable to the current financial conditions in Nigeria such as exchange rate. This work therefore fills that gap.

Tajudeen and Adesina (2024) investigated the effect of monetary policy on foreign direct investment inflow in Nigeria between 1980 and 2021. Using ARDL with the stock of money supply as a monetary policy variable, it found that monetary policy has a long-run positive impact but a negative impact in the short term. Specifically, the rise in the stock of money supply causes a decline in FDI inflows in the short period but increased FDI inflows in the long run. The recommendation was that monetary authorities should increase the stock of money supply in the economy. The study ignored the role of exchange rate and monetary policy rate in attracting FDI into the economy which are captured in this study. The study is also limited as it does not reflect developments between 2022 and 2023.

Similarly, Nguyen (2023) evaluated the impact of monetary policy on FDI in south-east Asian countries from 1997 to 2020. The study utilized OLS, fixed effects model, and random effect model. The results show that loose monetary policy has a negative influence on FDI while monetary tightening is positively linked to FDI. Specifically, the study found that an increase in Broad Money (M_3) decreases FDI inflows. The key recommendation of the study is that authorities should be flexible in the implementation of monetary policy. The finding of this study is counterintuitive and may require further study. Theoretically, lower interest rates lessen the cost of capital and increase potential profitability.

Karahan and Musa (2022) used both ARDL and VAR to investigate the effects of monetary policy on FDI inflows post-COVID-19 in emerging economies. The study revealed that embarking on monetary tightening after COVID-19 inhibits FDI into developing countries. However, both loosed monetary policies before and after COVID-19 lowered interest rates and attracted FDI to emerging economies. The study recommends compensatory expansionary FDI-attracting policies to compensate for the repulsive effects of monetary tightening embarked upon after COVID-19.

Tiberto and Mendonca (2022) investigated how effective sustainable Monetary Policy and fiscal policy are in drawing FDI from the period 1990 to

2019. Using GMM in their analysis, the study found that macroeconomic imbalance can impact the flow of foreign investment. Specifically, the study reveals that a rise in monetary supply and nominal official exchange rate, that is, depreciation) favour FDI inflows but a rise in the interest rate and uncertainty diminishes FDI entry. The study recommends that the expectation channel should be enhanced to improve the influence of monetary policy.

Okonkwo, Osakwe, and Nwadibe (2021) analysed the impact of the exchange rate on FDI in Nigeria (1981-2018). The ECM and Granger causality analysis reveals that the exchange rate positively impacts FDI and the impact is significant. The implication is that currency depreciation is attractive to FDI. The paper recommends that the authorities should ensure a smooth flow of foreign exchange in the economy with the view to ensure a stable exchange rate However, extending the analysis beyond 2018 is now imperative following new developments in the Nigerian monetary policy rates and exchange rate volatility.

Emmanuel *et al.* (2019) studied how FDI is influenced by exchange and interest rates in Nigeria using data from 2006-2018. Using the Johansen cointegration test, the study found significantly positive relationship between Exchange rate and foreign direct investment in the long period but an inverse relationship between interest rate and foreign direct investment. The impact of interest rate is however not significant. The study recommends the maintenance of a stable exchange rate. While the result of the exchange rate impact appears to be validated by current trends, this is not the case with interest rates.

In a similar finding, Ndugbu *et al.* (2017) examined the impact of macroeconomic policy variables on FDI in Nigeria using the impulse response function variance decomposition within the Vector Autoregression (VAR) environment. The paper found a direct relationship between macroeconomic policy and FDI. The study found exchange rate and interest to be having a positive impact on FDI and that the impact is significant. The study recommends more concerted efforts by monetary authorities. The recent jump in FDI in Nigeria in 2023 in the face of the implementation of the market-determined exchange rate in Nigeria validates this study. However, updating the analysis and extending the period to capture current realities is imperative.

3. Methodology

The methodology used in this research is the *ex-post facto*. It uses historical data in the study, which are annual secondary data covering 1980 - 2023 obtained from the World Bank development indicators, and the Central Bank of Nigeria.

3.1 Model Specification

The impact of monetary policy on FDI has a good theoretical justification within the context of the liquidity theory of Investment advanced by Keynes and the currency area hypothesis. The liquidity theory of investment is centred on the nexus between investment and interest rates, while the Currency Area Hypothesis is centred around the nexus between Investment and exchange rate. In liquidity theory, investment is inversely related to interest rate (Keynes, 1936) and for currency area hypothesis, investment is a positive function of exchange rate and this relationship is captured in this equation

$I = I_0 - \alpha R + \beta X$ ……...……..1

Where; I_0 is the autonomous level of investment, $-\alpha$ is the change in investment as a result of change in the rate of interest and R is interest rate β is the coefficient of exchange rate and is the change in investment as a result of a change in exchange rate While X is exchange rate. Modifying the equation by incorporating our variables and generating a precise theoretical form:

$FDI = f(M_2, MPR, REXR, GDPR)$ ……2

Where; FDI = foreign direct investment

M_2 = Broad money supply,

MPR = Monetary policy rate,

$REXR$ = Real exchange rate,

$GDPR$= gross domestic Product annual growth rate in % and

The choice of M_2, MPR and REXR is born out of the fact that they are key monetary policy instruments used by monetary authorities to regulate the economy. GDPR is used as control variables to avoid bias in model estimation since they are also key in determining FDI inflow.

Consequently, the econometric form of the model can be written in the form:

$FDI_t = \alpha + \beta_1 M_{2t} + \beta_2 MPR_t + \beta_3 REXR_t + \beta_4 GDPR_t + \mu_t$ ……3

3.2 Method of Data Analysis

3.2.1 Descriptive Statistics

This involves the calculation of measures to determine the observations are distributed around their mean values so we can ascertain the normality of their distribution for both FDI and monetary policy variables. This provides a basic understanding of the data's central tendency, dispersion, and potential outliers.

3.2.2 Augmented Dickey-Fuller (ADF) Unit Root Test

This test measures the stationarity or otherwise of the time series data. The test statistic (ADF statistic) is compared to critical values. If the ADF

statistic is less than the tabulated critical value at a chosen significance level (e.g., 5%), we reject the null hypothesis and conclude the variable is stationary. The ADF is given as:

$\Delta Y_t = \alpha + \beta Y_{t-1} + \sum \delta i \Delta Y_{t-i} + \varepsilon t$ ……..4

3.2.3 Autoregressive Distributed Lag (ARDL) Model

This study uses the ARDL model which is a suitable estimation technique due to its ability to handle non-stationary data and analyse cointegration between variables with mixed orders of I(1) and I(0). The ARDL model is written as:

$$\Delta FDI_t = \alpha + \beta_{11} lnFDI_{t-i} + \beta_{21} lnM2_{t-i} + \beta_{31} MPR_{t-i} + \beta_{41} EXR_{t-i} + \beta_{51} GDPR_{t-i} + \sum_{i=1}^{p} \beta_{1i} FDI_{t-i} + \sum_{i=1}^{q} \beta_{2i} lnM2_{t-i} + \sum_{i=1}^{q} \beta_{3i} MPR_{t-i} + \sum_{i=1}^{q} \beta_{4i} EXR_{t-i} + \sum_{i=1}^{q} \beta_{5i} GDPR_{t-i} + \mu_{it}) \ldots\ldots\ldots\ldots 5$$

Where:

ΔFDI_t = variation FDI at time t (usually a first difference of the actual value).

α: Intercept term.

β_{1i} = coefficient of the lagged dependent variable (FDI) at different lag periods (i).

$\beta_{2i}, \beta_{3i}, \beta_{4i}, \beta_{5i},$ = coefficients of the independent variables for different lag periods (i).

μ_t: Error term at time t.

If the null hypothesis of no cointegration is rejected following the bounds test after estimation, an error correction form of the model is estimated. The Error correction form which is a combination of the short run form and the long run parameter is specified thus:

$$\Delta FDI_t = \alpha + \sum_{i=1}^{p} \beta_{1i} \Delta FDI_{t-i} + \sum_{i=1}^{q} \beta_{2i} \Delta lnM2_{t-i} + \sum_{i=1}^{q} \beta_{3i} \Delta MPR_{t-i} + \sum_{i=1}^{q} \beta_{4i} \Delta EXR_{t-i} + \sum_{i=1}^{q} \beta_{5i} \Delta GDPR_{t-i} - \lambda_1 ECT_{t-1} + \mu_t) \ldots\ldots\ldots\ldots 6$$

Where:

$-\lambda_1 ECT_{t-1}$ is error correction term and $-\lambda_1$ represents the speed of adjustment towards equilibrium in the long term.

3.2.4 Non-Linear ARDL

This is an extension of the model in equation 6 which is used for the second objective of this study to test for the asymmetric effect of some of the independent variables on the response variable when there is a shock. It tests the bidirectional effect of a change in independent variables at certain magnitudes or thresholds whether positive or negative change. We proceed by decomposing the independent variables of interest in equation 6 into positive (+) and negative (-) shocks.

$$\Delta FDI_t = \alpha + \beta_{11} FDI_{t-i} + \beta_{21} lnM^{+}_{2t-i} + \beta_{21} lnM^{-}_{2t-i} + \beta_{31} MPR^{+}_{t-i} + \beta_{31} MPR^{-}_{t-i} + \beta_{41} REXR^{+}_{t-i} + \beta_{41} REXR^{-}_{t-i} + \beta_{51} GDPR^{+}_{t-i} + \beta_{51} GDPR^{-}_{t-i} + \sum_{i=1}^{p} \beta_{1i} FDI_{t-i} + \sum_{i=1}^{q} \beta_{2i} lnM^{+}_{2t-i} + \sum_{i=1}^{q} \beta_{2i} lnM^{-}_{2t-i} + \sum_{i=1}^{q} \beta_{3i} MPR^{+}_{t-i} + \sum_{i=1}^{q} \beta_{3i} MPR^{-}_{t-i} + \sum_{i=1}^{q} \beta_{4i} REXR^{+}_{t-i} + \sum_{i=1}^{q} \beta_{4i} REXR^{-}_{t-i} + \sum_{i=1}^{q} \beta_{5i} GDPR^{+}_{t-i} + \sum_{i=1}^{q} \beta_{5i} GDPR^{-}_{t-i} \mu_{it}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 7$$

At either of the positive or negative magnitudes, the response variable can change in either the same direction or opposite directions.

3.4 Post-estimation Tests

These tests assess if the estimated model satisfies the underlying assumptions of linear regression analysis. Addressing potential violations ensures the reliability of your results. The tests include serial correlation (autocorrelation), heteroscedasticity, normality of residuals and stability of the model.

4. Results and Discussion

4.1 Descriptive Analysis

Table 1 shows the descriptive analysis of the raw data used in the analysis which involves measures of central tendencies, dispersion and variations from mean for each of the variables involved in this study.

Table 1: Descriptive Statistics

	FDI	M_2	MPR	REXR	GDPR
Mean	24.53140	11019.83	13.21512	146.3150	3.042141
Median	18.73000	1555.800	13.50000	101.4468	3.251681
Maximum	88.41000	63512.00	26.00000	536.9175	15.32916
Minimum	-1.870000	15.24000	6.000000	49.77690	-13.12788
Std. Dev.	25.11094	16299.20	3.995005	113.1165	5.255826
Skewness	1.197475	1.563768	0.604708	2.010324	-0.839215
Kurtosis	3.328334	4.622059	4.137800	6.355868	4.845801
Jarque-Bera	10.46977	22.23916	4.940120	49.14088	11.15153
Probability	0.005327	0.000015	0.084580	0.000000	0.003789
Observations	43	43	43	43	

Source: Computed by the Author.

From Table 1 the highest standard deviation of 16299.20 is recorded by M_2 followed by FDI with 25.11 and the lowest standard deviation of 3.99 is recorded by MPR. The large standard deviation implies the non-normality of the series owing to the volatility inherent in economic time series. Application of log transformation and NARDL which handles the non-

normality are used. The skewness statistic reveals that FDI, REXR and M_2 are positively skewed and that means there are few positive extreme values in the distribution implying non-normality. MPR and GDPR mirror normal distribution based on skewness. The kurtosis values indicate that FDI mirrors a normal distribution with a kurtosis of 3.3.M_2, and $_{REXR}$ have high peaks and are leptokurtic with values greater than 3 meaning they have higher positive values than their respective means. MPR and GDPR also mirror a non-normal distribution based on kurtosis despite normality in skewness. The Jarque Berra statistics reveal that the null hypothesis of normal distribution can only be accepted in the case of MPR with a probability value of 0.08 meaning the series has a normal distribution, which agrees with the skewness statistics. M_2 and REXR are all non-normal distributions based on probability value. The non-normal distribution implies that it may affect the stationarity of the data which can result in spurious results and inaccurate confidence intervals. To avoid these, log transformation of data is carried out before analysis and the NARDL technique which is appropriate for these data variability is applied.

4.2 Normalization of Data

Before proceeding with data estimation, it is important to smoothen out some series that are large using Log transformation and standardization. FDI, MPR, GDPR and REXR are in their raw form and retained their asymmetry for the purpose of the nature of the analysis. However, FDI was scaled down to its standard form as $FDI * 10^{-n}$. M_2 is returned to its natural log.

4.3 Unit Root Test

Table 2: Augmented Dickey Fuller Unit Root Test

Variable	ADF	5% Critical Value	Probability	Integrating Order
FDI	-8.338385	-2.935001	0.0000	I(1)
REXR	-4.473311	-3.600987	0.0009	I(1)
LnM2	-3.525513	-2.935001	0.0121	I(I)
MPR	-3.596616	-2.933158	0.0233	I(0)
GDPR	-3.244201	-2.935001	0.0244	I(0)

Source: Computed by the Author.

The unit root test outcomes indicate that certain variables exhibit stationarity at their original levels, denoted as I (0), while others do not. Given this mix the ARDL bound test and the NARDL are employed. ARDL bound

test allows for the examination of cointegration among variables, indicating whether there exists a stable long-run relationship among them despite their differing levels of stationarity. By conducting this test, one can ascertain the presence and nature of the long-term connections among the variables under consideration.

4.4 Optimal Lag Length Selection

Table 3: Optimal Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-681.3910	NA	82114579	35.25082	35.50675	35.34265
1	-477.6107	334.4087	15413.92	26.64670	28.43823*	7.28949*
2	-431.4291	61.57549*	10469.15*	26.12457*	29.45169	27.31831
3	-405.5272	26.56598	25777.85	26.64242	31.50514	28.38712
4	-364.3213	29.58377	47802.55	26.37545	32.77376	28.67111

Source: Computed by the Author.

Table 3 shows the different lag order criteria for the optimum lags to include in the equation based on the Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn (HQ (information criterion). The optimal lag selected for the ARDL equation is 2 based on the suggestion of (AIC) criterion.

4.5 ARDL Bounds Test

The bounds test is carried out to determine the existence of a long-run relationship between the dependent variable and the independent variables using the bounds test developed by Pesaran, Shin, and Smith (2001).

Table 3: Bounds Test

F Statistic	K	Level of Significance.	I(0)	I(1)
8.202595		10%	2.75	3.79
	5	5%	3.12	4.25
		2.5%	3.49	4.67
		1%	3.93	5.23

Source: Computed by the Author.

From Table 4, the F statistic of the ARDL bounds test is 8.20. The lower bounds' critical value of the Pesaran table at a 10% level of significance is 2.75 while the critical value of the lower bounds is 3.79 at a 2.5% significance level, the critical value of the lower bound is 3.49 and of the higher bound is 4.67 at 1% significance level the critical value of the lower bound of the Pesaran table is 3.93. and that of the upper bound is 5.23. The

decision rule is that if the F statistic is below the critical value of the lower bound of the Pesaran table at a determined significance level, the null hypothesis of no long-run cointegration is accepted but if the critical value is higher than the critical value of the upper bound, the null hypothesis is rejected and the conclusion is drawn on the presence of long run cointegration among the variables.

From the result obtained K number of variables falls on the row with a 5% level of significance and that means the decision will be based on a 5% level of significance. The F statistic is higher than the lower bound I (0) critical value, 3.12 and the critical value of the upper bounds I (1), 4.25 at a 5% level of significance. We therefore conclude that there is a long-run association between FDI and the regressors, REXR, MPR, lnM_2, and GDPR. We can then proceed to estimate the short-term model and the long-term model.

4.6 Short-run and Long-run Estimation

To achieve the first objective of this study, the short-term and long-run ARDL regression is carried out to measure the impact of monetary policy on FDI in Nigeria in both the short term and long term. Table 4 shows the short-run estimation results.

Table 4: Short-run and Long- run results.

Variable	Coef	S E	t-Statistic	Prob.
		Short run estimates		
FDI(-1)*	-0.241051	0.117623	-2.049352	0.0506
D(LNM_2)	12.36326	12.21772	1.011912	0.3209
D(LNM_2(-1))	54.66623	13.91380	3.928922	0.0006
D(MPR)	-2.073813	0.533541	-3.886882	0.0006
D(MPR(-1))	1.948068	0.502396	3.877554	0.0006
D(REXR)	-0.034181	0.024696	-1.384071	0.1781
D(REXR(-1))	0.073788	0.026627	2.771146	0.0102
D(GDPR)	-1.164141	0.380306	-3.061064	0.0051
D(GDPR(-1))	12.36326	12.21772	1.011912	0.3209
CointEq(-1)*	-0.695887	0.106481	-6.535314	0.0000
R-squared		0.654962		
		Long-run estimates		
LNM2	1.212299	1.343374	0.902428	0.3751
MPR	-6.815755	1.054407	-6.464067	0.0000
REXR	-0.078577	0.057379	-1.369423	0.1826
GDPR	2.298442	0.888634	2.586489	0.0156

Source: Computed by the Author.

From the short-run estimation result in table 4. A unit increase in LnM_2 leads to an increase in FDI by 54.6 units in the short run. The coefficient of LnM_2 is significant based on the p-value of 0.0006. In the long-term, a unit

increase increases FDI by 1.21 units but it is insignificant based on a p-value of 0.375. A unit rise in MPR decreases FDI by 2.07 units in the short run and 6.81 units in the long run. The estimates are statistically significant based on p-values of 0.0006 and 0.0000 respectively. A unit increase in REXR reduces FDI in the short run by 0.073 units and in the long run by 0.078. The short-run coefficient is significant based on p-values of 0.01 but the long-term coefficient is insignificant based on the p-value of 0.18.

A unit increase in GDPR reduces FDI in the short run by 1.164 and is significant based on its p-value of 0.0051 but the unit rise increases FDI in the long run by 2.298 and is significant based on p-value of 0.0156. The short-run error correction term denoted by cointeq (-1), is -0.695887 and it is statistically significant at 0.000. It means that any disturbance in the relationship re-converges back by a speed of 69%. The Adjusted R for the model is 0.55, signifying that 55% of the change in (FDI) is caused by explanatory variables. That means the model has a relatively good fit.

4.7 Non-linear ARDL Estimation

This is estimated to achieve objective two (2) which is to determine the asymmetric effect of the independent variables on FDI. This is estimated by decomposing each of the independent variables into positive and negative magnitudes to determine the bidirectional impact of a change in the variables on FDI when there is a shock which could be either an increase or decrease in the independent variable. The results are presented in Table 5.

Table 5: Non-linear ARDL Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	Short-run estimates			
D(LNM2_POS)	10.72994	10.21423	1.050490	0.3113
D(LNM2_POS(-1))	41.82691	10.04591	4.163577	0.0010
D(LNM2_NEG)	307.1248	643.5439	0.477240	0.6406
D(LNM2_NEG(-1))	-141.4624	733.9555	-0.192740	0.8499
D(MPR_POS)	-0.802412	0.539905	-1.486211	0.1594
D(MPR_POS(-1))	1.125185	0.703125	1.600263	0.1319
D(MPR_NEG)	-4.108733	0.688541	-5.967302	0.0000
D(MPR_NEG(-1))	1.869569	0.487800	3.832651	0.0018
D(REXR_POS)	-0.438100	0.056838	-7.707916	0.0000
D(REXR_POS(-1))	0.039275	0.056368	0.696761	0.4974
D(REXR_NEG)	0.019369	0.022596	0.857200	0.4058
D(REXR_NEG(-1))	0.065950	0.024720	2.667830	0.0184
D(GDPR_POS)	-0.135901	0.497114	-0.273380	0.7886
D(GDPR_POS(-1))	-2.761806	0.575094	-4.802353	0.0003
D(GDPR_NEG)	-1.907934	0.616424	-3.095164	0.0079
D(GDPR_NEG(-1))	-0.145899	0.475245	-0.306998	0.7634

Long run estimates				
LNM2_POS	8.456190	8.588356	0.984611	0.3428
LNM2_NEG	3374.091	934.5448	3.610411	0.0032
MPR_POS	-2.888358	1.274363	-2.266511	0.0411
MPR_NEG	-5.440717	1.411788	-3.853778	0.0020
REXR_POS	-0.200516	0.058125	-3.449755	0.0043
REXR_NEG	-0.028042	0.041529	-0.675243	0.5114
LNM2_POS	8.456190	8.588356	0.984611	0.3428
LNM2_NEG	3374.091	934.5448	3.610411	0.0032
GDPR_POS	-0.342613	1.160967	-0.295110	0.7726
GDPR_NEG	0.823395	1.220339	0.674726	0.5117

Source: Computed by the Author.

From the Non-linear ARDL result in Table 5, (LnM_2^+) means that a unit increase in LnM_2 which can also be interpreted as a positive shock, increases FDI by 10.72 units and LnM_2^- means that a unit decrease in LnM_2 which is a negative shock also increases FDI by 307.12 units. However, based on p-values of 0.31 and 0.64 respectively both positive and negative shock from LnM_2 have no significant asymmetric effect on FDI. In the long run, the coefficient of LnM_2^+ means that a unit rise in LnM_2 will increase FDI by 8,456 and that of LnM_2^- means a unit decrease will also increase FDI by 3374.41 units. LnM_2^+ is insignificant at the p-value of 0.34 but LnM_2^- is significant with a p-value of 0.0032. The short-run coefficient of MPR^+ implies that a unit increase in MPR will reduce FDI by 0.802 units with a p-value of 0.16 which means the coefficient is insignificant and the coefficient of MPR^- means a unit decrease, that is, a negative shock will increase FDI by 4.108 with a p-value of 0.0000 in the short-term, meaning it is statistically significant.

In the long run, the coefficient of MPR^+ implies that a unit increase in MPR will reduce FDI by 2.88 units and the coefficient of MPR^- means a negative shock will increase FDI by 5.44. They are significant with p-values of 0.0020 and 0.0043 respectively. $REXR^+$ means that a unit increase in REXR i.e. a positive shock will significantly reduce FDI by 0.02005 based on a p-value of 0.0043 while that of $REXR^-$ implies a unit decrease will increase FDI by 0.028 but not significantly based on the p-value of 0.51. That means there is no sufficient evidence of the asymmetric impact of a negative shock in the long run. In the short run, $REXR^+$ means a unit increase in REXR i.e. a positive shock will significantly reduce FDI by 0.438 with a p-value of 0.0000 but that of $REXR^-$ shows that a unit decrease will increase FDI by 0.019 but insignificantly based on the p-value of 0.497.

The short-run coefficient of $GDPR^+$ indicates that a unit increase in GDPR will insignificantly reduce FDI by 0,13 based on the p-value of 0.788 and the coefficient of $GDPR^-$ will reduce FDI by 1.90 which is significant based on the p-value of 0.0079. In the long run, the coefficient of $GDPR^+$

shows that a unit increase in GDPR will reduce FDI by 0.342 and that of $GDPR^{-}$ shows that a unit decrease in GDPR in the long run will also reduce FDI. The coefficients are however not statistically significant with p-values of 0.77 and 0.511 respectively meaning GDPR has no asymmetric impact on FDI.

4.8 Post-estimation Tests

Table 7: Diagnostic Tests Result

Source: Computed by the Author.

Test	Statistic Value	Prob. Value
Serial correlation LM test (Breusch-Godfrey)	1.501175	0.2431
Heteroskedasticity test (Breusch-Pagan-Godfrey)	0.624655	0.8125
Histogram-normality test	J B(0.396609)	0.820120

From Table 7 the null hypotheses of the absence of serial correlation, heteroskedasticity and abnormality in the model is accepted since the probability values of the statistics are higher than 5%. This implies that our estimates are reliable. Similarly, the value of Jarque-Bera statistic is more than 5% hence meaning our model is reliable. The stability diagnostic tests are as shown in figures 1. and 2.

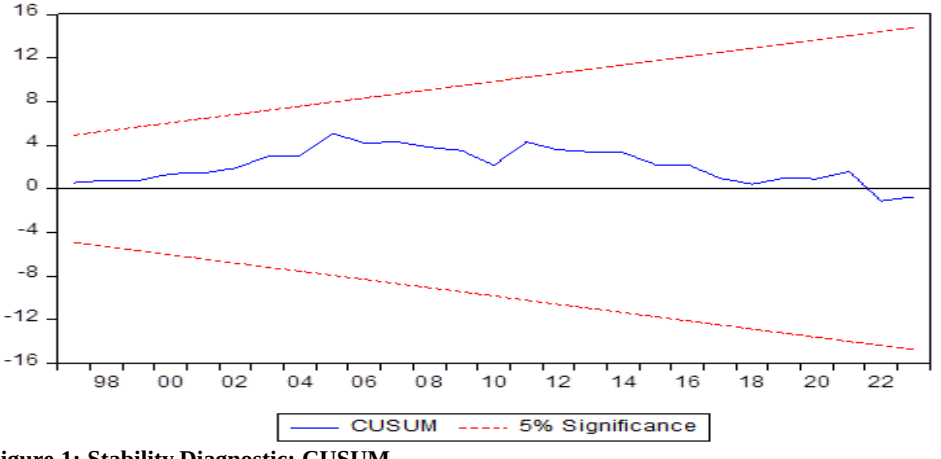

Figure 1: Stability Diagnostic: CUSUM

From the Stability diagnostic test depicted in Figure 1, the CUSUM line falls in between the upper control limit and the lower control limit. This indicates that there is no significant drift in the mean or trend of our model and that means the model is stable and there are no structural breaks.

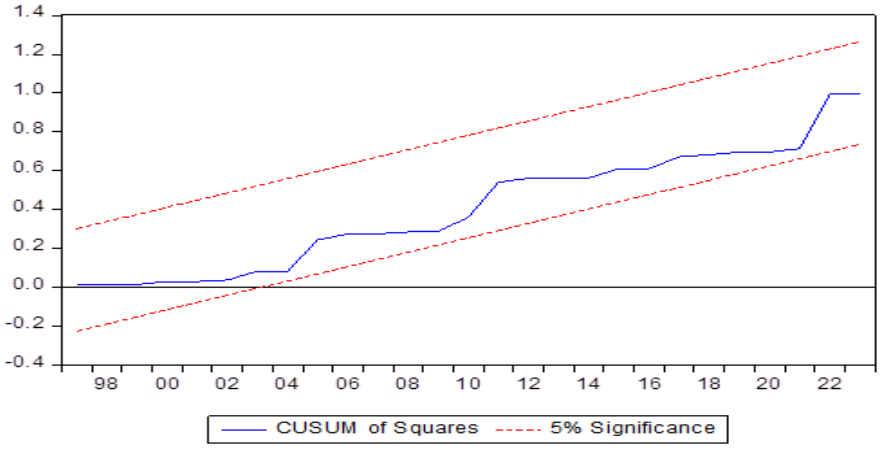

Figure 2: Stability Diagnostic: CUSUM of Squares.
Source: Computed by the Author.

From the CUSUM of squares test depicted in Figure 2, the CUSUM of squares line falls in between the critical boundaries. This indicates that the variance of the residual of the model is stable over time and thus, there are no structural breaks.

4. 9 Discussion of Findings

From the linear ARDL model estimated the bounds test in Table 3 confirmed the existence of a long-run relationship between monetary variables in the model and FDI. This is consistent with the findings of Tajudeen and Adesina (2024) and Emmanuel *et al.* (2019). The short-run and long-run regression estimates obtained reveal that Money supply has a significantly positive impact on FDI in the short run. This agrees with the findings of Okeke and Adeyeye (2022), and Tiberto and Mendonca (2022) but disagrees with the findings of Tajudeen and Adesina (2024), and Nguyen (2023) which found money supply to be inversely related to FDI. An increase in money supply (M_2) increases liquidity, lowers borrowing costs and stimulates economic activities, creating a more attractive environment for foreign investors. An increase in money supply can also induce aggregate demand, thereby raising overall economic activities which can attract Foreign Investment. On the other hand, excess liquidity in the economy can cause inflation, thereby creating macroeconomic instability that can scare foreign investors.

This study also found monetary policy rate has a significant short-run and long-run negative impact on FDI based on the estimates in Table 4. This corroborates the findings of Chete *et al*. (2024), Emmanuel *et al*. (2019); Tiberto and Mendonca (2022); and Karahan and Musa (2022) found monetary policy rate to adversely impact FDI. The study contradicts the findings of Ndugbu *et al.* (2017). The central bank monetary policy rate is the baseline rate which determines the lending rate in the economy which is the cost of borrowing. Monetary tightening worsens investment climate. This explains why many multinational companies that operated in Nigeria for 50 years divested their equities from Nigeria in 2023 before the new administration.

The study found that real exchange rate (REXR) has a negative effect on FDI in both the short and long-run although the effect in the long-run is not significant. A high real exchange rate means high currency appreciation and could be a sign of an overvalued currency which could be a deterrent to foreign investors. The finding corroborates Okeke and Adeyeye (2022); Chete *et al*. (2024); Tiberto and Mendonca (2022); and Okonkwo *et al.* (2021) which found an increase in exchange rate i.e. devaluation to be having a positive impact on FDI rather than appreciation. The finding on the exchange rate does not disagree with any other finding in the literature on Nigeria reviewed so far. This agrees with the theoretical postulations of the Currency Area Hypothesis which says devaluation of host currency endears foreign investors. The jump in FDI inflows in the second quarter of 2024 in Nigeria is not unconnected to the exchange rate unification and pursuance of the market-determined exchange rate in Nigeria. Growth rate (GDPR) was found to have a significantly negative effect on FDI in the short run but a significantly positive effect in the long run. The short-run negative effect could signal a disconnect between GDP growth and FDI as a result of other constraints which makes GDP growth less of a factor in driving FDI flow in the short-run.

The Non-linear ARDL estimates in Table 7 reveal that the monetary policy rate has a significant asymmetric long-run effect. The impact of the decrease in MPR (negative shock) is stronger than the impact of a positive shock based on the relative magnitudes of the change in FDI caused by both the positive and negative shocks which are 5.44 and 2.88 units respectively. Monetary policy shocks can cause asymmetric behaviour by economic entities. This result means that while an increase in MPR will reduce FDI by only 2.88 units, a decrease in MPR will increase FDI flow but more than twice, that is, 5.44 units and this is significant. That means if CBN relaxes the monetary tightening gradually, more FDI will come into the country. There is no asymmetric relationship between money supply and FDI in Nigeria from the result since both positive and negative shocks will increase FDI in the long run.

The non-linear ARDL result also shows that there is no asymmetric relationship between real exchange rate and FDI in Nigeria because even though the FDI reacts directly to Positive and negative shocks, the impact of the negative shock is insignificant and thus cannot support any claim. It is therefore. Since only the impact of the positive shock is significantly impactful on FDI, authorities should continue to pursue a realistic market-reflective exchange rate to attract FDI into the country. The fact that some of the variables in this study were found not to significantly explain the variation in FDI is not surprising considering other variables not included in this study that may be influencing FDI decisions such as political risks and social environment.

5. Conclusion and Recommendations

Nigeria is in dire need of FDI with its attendant productivity growth potential. The potential of monetary policy as an instrument in attracting FDI is not in question but it is no straight-jacket approach. It will require a multipronged approach and strategic coordination of the monetary policy variables. This study provides a deep insight into the need to put round pegs in round holes to attract the FDI needed to jump-start the economy in the path of prosperity. The monetary policy framework has been an essential tool in shaping the investment climate. To this end, a stable and predictable policy framework can encourage foreign investors to commit their resources to Nigeria, while uncertainty and instability can deter them. It follows that There must be a deliberate but careful approach to the use of monetary policy instruments in shaping the economic environment to attract the needed foreign investment.

In line with the conclusion of the discoveries of the analysis, the study endorses policies that can make the economy attractive to foreign investors, and the following recommendations are made. The study recommends that the monetary policy authority (CBN) should establish a clear and consistent monetary policy framework that promotes stability and predictability, which can help attract FDI. This could include the use of open market operations to regulate liquidity in the economy to achieve both stability and adequate liquidity that is investment friendly thereby creating a favourable investment climate. Secondly, the implementation of a monetary policy rate system that balances the need to stabilise the economy with the need to stimulate FDI inflow is necessary. A moderate and stable monetary policy rate can encourage FDI by making Nigeria a more attractive destination for investors. This study also recommends a managed floating exchange rate regime that permits some sort of elasticity while preserving a stable exchange rate. This can help attract

FDI by reducing uncertainty and increasing the attractiveness of Nigerian assets.

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