

# FOREIGN INVESTMENTS AND MARKET CAPITALIZATION IN NIGERIA: A VECM ANALYSIS

## ABSTRACT

A healthy capital market promotes the overall economic wellbeing of a country. However, Nigeria's capital market has witnessed both internal and external pressures leading to high rate of volatility. This study examines the **impact** of foreign investments on market capitalization in Nigeria's capital market for the period 1981 to 2022. The study is anchored on the theoretical framework of capital movement across regions and seeks to explain why **investors invest in foreign countries** and the impacts of such investments on the host country's capital market. We adopted a vector error correction model (VECM) as our analytical tool. The control variables: **exchange rate, infrastructure, interest rate, and the target variables: foreign direct investment (FDI) and foreign portfolio investment (FPI) were regressed on market capitalization.** Results indicate that FDI and FPI had positive and significant **impact** on market capitalization in Nigeria's capital market and that FDI and market capitalization are the major contributors to the variations in market capitalization in Nigeria's capital market. We conclude that FDI and FPI play important roles in Nigeria's capital market performance and recommend incentives such as tax reduction and fee waivers which are capable of encouraging foreign enterprises listing. These will make Nigeria's capital market globally attractive to foreign investors and hence ensure a continuous and impactful inflow.

*Keywords: market capitalization, foreign investments, exchange rate, real interest rate*

## 1. INTRODUCTION

The capital market is a network of specialized financial institutions, a collection of infrastructure, processes, and mechanisms that facilitate connections between providers and consumers of long-term capital (Abayomi&Yakubu, 2022; Omimakinde&Otite, 2022). It provides a strong link between Nigeria's **financial** and real sectors and **supports real sector** expansion by providing access to long-term financing (Ayeni&Fanibuyan, 2022), providing job opportunities, reducing poverty and accelerating economic growth (Oyerinde, 2019).

Through its activities, a healthy capital market accelerates the overall economic wellbeing of the country (Umar, 2022). Such activities can be viewed through the lenses of the major capital market performance indicators such as number of listed companies, number of listed securities, market capitalization, and the all-share price index. The aggregate value of stock size is represented by market capitalization which is the number of authorized, issued and purchased stocks by investors of a publicly listed company, multiplied by the market share price. It determines the size of enterprises and corporations (Araoye, 2021).

A major challenge faced by most developing economies is inadequate domestic investment that could ensure the achievement of desired economic growth. To compensate for the insufficient savings, many developing countries resort to foreign financial inflows such as foreign direct investment, portfolio investment, concessional loans and grants. Economic integration, partnership and multi-lateral investment treaties are enhanced via the inflow and outflow of capital across national borders with the aim of bridging financial disequilibrium and savings investment gaps among countries (Ayeni&Fanibuyan, 2022).

The performance of the Nigeria's capital market over the last decade broadly reflects the performance of the Nigerian economy. Nigeria dipped into economic recession in 2016- the first in 25 years; and since then economic recovery has been on a slow pace. Nigeria is one of the preferred emerging markets and the Nigerian Stock Exchange (NSE) is a primary market for monitoring Nigeria's equity market.

It has made conscious efforts towards initiating policies that can attract foreign investors the recent ones being the Nigerian Capital Market Master Plan, a 10-year master plan to drive the vision and growth of the Nigerian capital market which was later revised and updated in 2023; this was launched by the Security and Exchange Commission in 2015. In 2020, the Company and Allied Matters Act (CAMA) which provided the necessary legal backing for the development of the derivatives market in Nigeria was signed into law. Furthermore, there was the introduction of the float system as the process of unification of exchange rates as announced by the Central Bank of Nigeria (CBN) in the second quarter of 2023. This significant development indicates a shift in the country's exchange rate policy, where naira's value against dollar is to be determined by market forces of demand and supply rather than being solely controlled by CBN.

Despite these policies, Nigerian's capital market has not performed up to expectations. Between 2015 and 2022, growth in Nigeria's equity market capitalization has been on a downward trend and when compared with other benchmark economies, the overall size of the equity market (measured by market capitalization) is small relative to the size of the Nigerian economy (NGX 2023). Macroeconomic instability continues to fuel investor and issuer apathy in the equities market. The market witnessed a few significant listings in the ICT and industrial sectors, however, the total number of listed entities on the Nigeria Exchange Group Plc (NGX) reduced from 190 in 2015 to 156 in 2020. Foreign participation in the capital market has been on decline since 2015. From 54% in 2015 to 51% in 2018, it went down further to 34% in 2020, and then to 17% in 2022. Although Nigeria's market capitalization to GDP ratio rose from 9.8% in 2020 to 16.7% in 2022, this is not significant when compared with other benchmark economies such as Kenya, India, Malaysia, South Africa and Brazil whose market capitalization to GDP ratio stood at 23.8%, 75.6%, 111.7%, 294.8% and 43.6% respectively as at 2022 (World Bank, 2022). More-so, foreign participation in Nigeria's capital market has been on the decline since 2015. From 54% in 2015 to 47% in 2017, it went down to 34% in 2020 and dropped further to 17% in 2022 (Nigeria Exchange PLC, 2022).

The focus on attracting foreign investment with respect to the economic situation in developing countries such as Nigeria has brought a lot of debate on how important foreign investment is in improving notable macroeconomic variables. Earlier scholars focused on just a component of foreign investment for instance Nzenwata (2017), Nwonodi (2018) and Oyerinde (2019) but findings from these studies cannot account for differential impacts of FDI and FPI on market capitalization. Azebi (2020) and Ilugbemi (2020) focused on the impacts of both foreign direct investment and foreign portfolio investment but the use of ARLD model and OLS method respectively does not provide forecast evidences and therefore will not enhance better understanding of the dynamics of Nigeria's capital market. Foreign investments in terms of FDI and FPI are distinct in characteristics and do not lend themselves to homogenous policy interventions. Thus, the need to enhance policy interventions in Nigeria's capital market by providing responses to questions including the impacts of foreign direct investments and foreign portfolio investment on market capitalization in Nigeria as well as the extent to which foreign direct investment and foreign portfolio investment contribute to variations in market capitalization of Nigeria's capital market for the period 1986 to 2022.

The study is thus organized as follows: Having introduced the study, Section two provides the theoretical and empirical foundations for the study, Section three contains the research method for this paper, Section four presents the results and discusses the findings, and Section five concludes the paper.

## Basic Theories

The capital market and the flow theory of capital movement provide the basic theories for this study.

### a. The Capital Market Theory

The capital market theory as propounded by Aliber (1970) explains why some countries end up moving their capital to foreign countries on the basis of the strength of currency and was put forward on the basis of the differences in the strength of the currencies in host and source country. The theory postulates that weaker currencies compared with stronger investing country currencies had a higher capacity to attract FDI in order to take advantage of differences in the market capitalization rate. This implies that the differences in the purchasing power of currencies make countries with a stronger currency to see it gainful to invest in foreign countries with weaker purchasing power currencies. The theory has gained wide acceptance among scholars after being tested empirically with Aliber (1970) providing results which are consistent in the United States, the United Kingdom and Canada. According to Nayak and Choudhury (2014), countries with a weaker currency are in the best position to attract more FDI. Makoni (2015) notes that foreign firms with a stronger currency benefit from host countries' low interest rate on borrowing. This creates a win-win transactional relationship between these two parties. This theory is robust enough to explain FDI inflows from first world into third world.

A major criticism of this theory is its inability to provide investment conditions between two advanced countries with currencies of equal strength. More so, it cannot justify how in some cases, foreign capital flows from developing countries with weaker currencies into developed countries (Nayak & Choudhury, 2014).

## b. The Flow Theory of Capital Movement

The flow theory of capital movement was propounded in the 1950s by Meade who argued that the achievement of balance of payments equilibrium is possible if exchange rates float. The flow theory of capital movement focuses on exploring the relationship between capital flows and the level of interest rate. According to the theory, interest rate is the decisive factor in international capital flows, and the differences in interest rate causes capital flows. The increase of foreign interest rate relative to domestic interest rates improves outflows of domestic capital. Another major assumption is that the behaviour of an economy depends crucially on its exchange rate system - whether floating or fixed exchange rate system. International capital flows therefore has high sensitivity to interest rates under floating rather than fixed exchange rate system. The model further assumes that, in both domestic and foreign country, there are: equality in tax rates, such that investors' risk levels is zero; political stability; perfect institutional factors for attracting foreign investments; complete integration of international capital markets; as well as perfect mobility of capital across countries.

Duo Li (2018) attests to the success of this theory in matching empirical facts as it affects the US macroeconomic policies of the 1980s. Its criticism is rooted in its assumption of perfect capital mobility, zero investment risks, and perfect institutional factors. Despite these criticisms, the flow theory is highly relevant in explaining capital flows. The recent introduction of the floating exchange rate in Nigeria in 2023 as a policy to attract foreign investment is a confirmation of the relevance of this theory.

## Empirical Literature

The discussion on the performance of the capital market as linked with foreign investment is a very diverse and multi-faceted one. As a result, it has been approached from different angles. For instance, while engaging the OLS and ARDL for Nigeria and Zimbabwe respectively, Adaramola and Obisesan (2015); Okoro, et al. (2023) and Tsaurai (2018) found the market capitalization impact of FDI to be positive and significant just as Sameh (2017) and Adumekwe (2023); Eniekemezie (2013); Nzenwata (2017); Oyerinde (2019) using the OLS frame studied the Jordan and Nigerian economies respectively and found the market capitalization impact of FPI to be positive and significant. Njane (2017) studied the Kenyan capital market within the OLS frame and found a positive but no significant impact of FDI on market capitalization. Using the ordinary least square method, Nwonodi (2018) found the market capitalization impact of FPI for the Nigerian economy to be of significant but diverse impacts depending on the measure of FPI.

In addition, there have been few studies on foreign investment and capital market which simultaneously considered the effect of foreign direct investment and foreign portfolio investment on capital market. For instance, Chauhan (2013) found positive impacts of foreign investments for the Indian economy although FDI was more significant than FPI. This contradicts Azebi (2020) which studied Nigeria's capital market using the Johansen technique and found that although foreign investments positively explained market capitalization, only FPI was statistically significant. The market capitalization impacts of FDI and FPI were found to be positive but not significant for Ilugbemi (2020) study of the Nigerian economy using the ARDL method.

## Justification for the Study

Fewer attempts have gone into investigating the impacts of FDI and FPI on the performance of Nigeria's capital market. Existing empirical evidences may not capture current realities in Nigeria's capital market. More so, studies on the contributions of FDI and FPI to the variations in the Nigeria's capital market are scarce. This study therefore contributes to existing literature because the period of study 1980-2022, captures the recent period in the country marked by a significant increase in the level of insecurity and instability. The study utilizes a system equation to account for each predictor's unique impact on the dependent variables. This study will therefore, broaden knowledge transfer and serve as inputs for monetary and financial policy making and applications geared towards operating a healthy capital market in Nigeria which will further transcend to higher living standards and well-being for all through job creations and liquidity for investment purposes. These goals are in line with sustainable development goals (SDGs) 2030 and African Agenda 2063.

## 2. RESEARCH METHOD

### 2.1 Theoretical Framework and Empirical Model

The flow theory of capital movement provides the theoretical link between foreign capital flows and capital market growth in Nigeria where total stocks in a capital market is presented as:

$$KA = Z(r, r^*) + k \quad 1$$

Where KA is stock of capital, Z is level of capital mobility,  $r$  is domestic interest rate,  $r^*$  is foreign interest rate and  $k$  is capital investment independent of interest rate. Differentiating Equation 1 yields:

$$dKA = \frac{dz}{dr} dr + \frac{dz}{dr^*} dr^* \text{ such that } \frac{dz}{dr} > 0 \text{ and } \frac{dz}{dr^*} < 0 \quad 2$$

A rise in the domestic interest rate increases capital inflow and a fall in foreign interest rate relative to domestic interest rate decreases capital outflow. Equation 2 can thus be:

$$dKA = zrdr - zr^* dr^* + dk \quad 3$$

$$KA = zrdr - zr^* dr^* + dk \quad 4$$

Thus:

$$KA = f(z, r, r^*, k)$$

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Where  $dKA$  is change in capital stock,  $z$  is the change in capital mobility,  $r$  is change in domestic interest rate,  $r^*$  is foreign interest rate and  $k$  is change in capital flow or investment independent of interest rate.  $KA$  is the total capital stock, or the size of the capital market which can be presented as market capitalization  $MCAP$ .

The flow theory holds that an economy is explained by its exchange rate system and that foreign capital flows are more sensitive to interest rates under floating exchange rate system. Exchange rate reflects the activities in the industrial sector and capital market. Nigeria is heavily reliant on imported factor inputs thus the exchange rate determines its expansion paths. An unstable exchange rate inhibits business planning and consequently negatively affects market capitalization. Infrastructure provides the super structure for economic activities therefore, it is fundamental for market capitalization (Nwokoye & Otu, 2018). Consequently, explanations for changes in capital flows which are independent of interest rate  $INTR$ , can be expanded to incorporate exchange rate  $EXCH$  and infrastructure  $INFR$ . Capital mobility refers to movements of capital across nations in form of foreign investments and is expanded to incorporate foreign direct investment  $FDI$  and foreign portfolio investment  $FPI$ . Therefore, we modify Equation 5 to Equations 6 and 7 to fit our study:

$$MCAP = f(FDI, FPI, INFR, INTR, EXCH) \quad 6$$

$$MCAP = \beta_0 + \beta_1 FDI + \beta_2 FPI + \beta_3 INFR + \beta_4 INTR + \beta_5 EXCH + \mu_1 \quad 7$$

Where  $\mu$  is disturbance term/error term;  $\beta_0$  is constant term;  $\beta_1 \beta_2 \beta_3 \beta_4$  are parameters to be estimated.

## 2.2 Estimation Procedures and Sources of Data

The vector error correction model (VECM) provides a better choice of analytical technique because it identifies the presence of long-run equilibrium relationships amongst non-stationary variables. The VECM is a restricted form of the VAR model which provides a framework for the impulse-response function used to dynamically evaluate the impact of shocks in one variable on others (Juanda & Junaidi, 2012); and the variance decomposition which evaluates how changes in a variable are indicated by changes in error variances that are affected by other variables (Firdaus, 2011). By calculating the percentage of the future  $k$ -stage error prediction of a variable due to innovation in other variables, it provides evidence of how big the difference between the error variance before and after the shock comes from itself or from other variables (Novrianti, 2012).

A VAR stability test is necessary to determine the roots of characteristic polynomial. If all the roots of characteristic polynomial in the unit circle is less than one, then the VAR model is stable. The implication is a valid impulse response function and a valid variance decomposition function. A stationary condition is also important to ensure that the mean, variance and auto variance remain the same all through the data. Our a priori expectations are positive impacts of all the explanatory variables on market capitalization except interest rate and exchange rate whose impacts are expected to be negative and indeterminate respectively.

All data used for this study were got from the Central Bank of Nigeria (CBN) Statistical Bulletin (2023) except those of infrastructure and interest rate which came from the World Bank Indicators (2023). All pre-estimation, estimation, and post-estimation tests were conducted using E-Views 10 and Excel 2019.

## 3. RESULTS AND DISCUSSION

### 3.1 Presentation of Pre-estimation Tests

The results presentation starts with the descriptive statistics on Table 4 which helps one understand time series data and its properties. The unit-root tests provide evidences of stationarity and precedes the cointegration test.

#### a. Descriptive Statistics

With mean scores of 10.7, 1.6, 31.8, 30.8, 133.1 and 2.6 for market capitalization, foreign direct investment, foreign portfolio investment, infrastructure, exchange rate and interest rate respectively, we observe that the minimum and maximum values of six variables deviated markedly from their mean values. Standard deviation values of 6.9, 1.2, 21.4, 12.8, 123.9 and 9.8 are less than mean values for the respective variables indicating that the variables follow normal distribution.

Table 1 shows that only  $FDI$  and exchange rate are positively skewed implying higher values than their sample mean values.  $MCAP$  and infrastructure both are normally skewed while  $FPI$  and  $RINT$  are negatively skewed implying lower values than their sample mean values.  $INFR$  showed a platykurtic kurtosis values, indicating that its distributions is flatter than a normal distribution and have relatively fewer extreme values compared with the sample mean.

Furthermore, given the hypothesis of the Jarque-Bera test, the descriptive statistics indicates that foreign direct investment, foreign portfolio investment, and exchange rate are normally distributed while infrastructure does not follow normal distribution. However, as stated by central limit theorem, empirical researches are not deterred by non-normality of empirical data (Gujarati & Porter, 2009).

**Table 1:** Summary of Descriptive Statistics of the variables

	MCAP	FDI	FPI	INFR	EXCH	RINTR
Mean	10.70199	1.627833	31.76211	30.83453	133.0916	2.566311
Median	9.905001	1.450318	-1.29011	28.3709	125.8081	4.576829
Maximum	30.50899	5.790847	61.09599	54.94827	486.9572	18.18
Minimum	0.161021	0.183822	-0.0007	14.16873	1.754523	-31.4526
Std. Dev.	6.859014	1.226339	21.37845	12.75004	123.8515	9.820271
Skewness	0.828558	1.738967	-1.0987	0.276369	1.075332	-1.22848
Kurtosis	3.538788	6.049815	11.98343	1.874316	3.617067	5.354756
Jarque-Bera	4.681008	32.98765	131.8597	2.424555	7.717777	17.8548
Probability	0.096279	0	0	0.297519	0.021091	0.000133
Sum	395.9737	60.22981	0.00018	1140.878	4924.388	94.95349
Sum Sq. Dev.	1693.658	54.14068	0.000061	5852.285	552211.1	3471.758
Observations	37	37	37	37	37	37

**b. Stationarity Test**

Information on the unit root test are presented on Table 2. At first difference, the ADF test value of market capitalization, foreign direct investment, foreign portfolio investment, infrastructure, exchange rate as well as interest rate are greater than their critical values at 5% respectively. Therefore, we reject  $H_0$  of non-stationarity for market capitalization, foreign direct investment, foreign portfolio investment, infrastructure, exchange rate as well as interest rate and then conclude that they are stationary at first difference.

**Table 2: Stationarity Test**

Variables	ADF- $t_{cal}^*$ (-3.44) @ 5%	KPSS $t_{cal}^*$ (0.14) @ 5%	I(d)
MCAP	-6.32	0.139	I(1)
LogFDI	-5.80	0.113	I(1)
LogFPI	-6.30	0.122	I(1)
LogINFR	-6.32	0.124	I(1)
LogEXCR	-6.34	0.135	I(1)
LogRINTR	-6.29	0.133	I(1)

**Note:** I(0) denotes integrated of order zero, which is stationary at the level of the series, and I(1) denotes integrated of order one, which is stationary after the first differencing of the series.

### c. Test for Co-integration

Given that the series are integrated of order one that is 1(1), Johansen co-integration approach is found worthy in ascertaining if a long run relationship exists among the variables of the model. In line with the Johansen test of co-integration, the residuals of the supposed co-integrating variables are stationary at level.

**Table 3 Unrestricted Cointegration Rank Test (Trace and Max- Elgen) Results**

Hypothesized No. of CE(s)	Eigenvalue	Trace statistics		Max-Elgen statistics		Probability values	
		Stat. value	Critical value	Stat. value	Critical value	Trace	Max- Elgen
None *	0.901697	175.343	95.75366	81.1896	40.07757	0	0
At most 1 *	0.69242	94.15342	69.81889	41.26571	33.87687	0.0002	0.0055
At most 2 *	0.520512	52.88772	47.85613	25.72631	27.58434	0.0156	0.0848
At most 3	0.464628	27.16141	29.79707	21.86779	21.13162	0.0977	0.0394
At most 4	0.120915	5.293615	15.49471	4.510593	14.2646	0.7769	0.8019
At most 5	0.022124	0.783022	3.841466	0.783022	3.841466	0.3762	0.3762

Note: \* denotes presence of cointegration and implies there are three cointegrating vectors using trace statistic but two cointegrating vectors using Max Eigen values.

### 3.2 Estimation Results

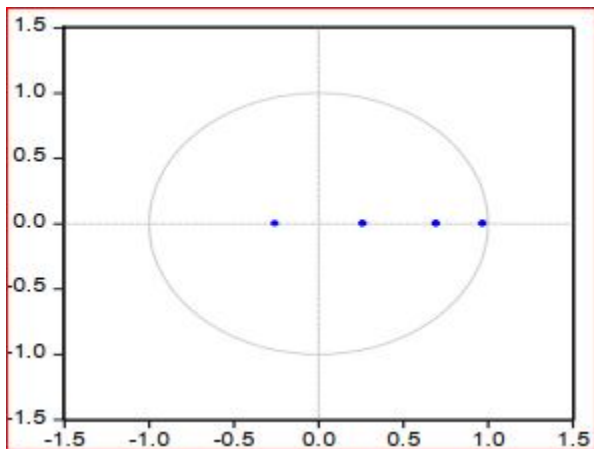
Given results for the trace statistics, we conclude that a long run relationship exists among all variables and that they can be combined in a linear form. Hence, we investigate the impact of FDI and FPI on market capitalization of Nigeria's capital market in the short and long run using VECM. Table 4 indicates a lag optimum of 2 by all the selection criteria except the Akaike information criterion.

**Table 4: Lag selection for VECM Analysis**

Lag	LR	FPE	AIC	SC	HQ
0	-	0.0003	38.46113	38.56032	38.48449
1	95.84936	1.61e+12	33.78006	34.07762	33.85016
2	16.20309*	9.05e+11*	33.19058	33.68650*	33.30740*
3	2.939937	1.10e+12	33.35822	34.05252	33.52177
4	1.415685	1.50e+12	33.61295	34.50563	33.82324
5	5.355699	1.46e+12	33.48971	34.58075	33.74673

**Note:** \* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.

Furthermore, roots of characteristic polynomial stability condition tests and Figure 1 show that the VECM model satisfies stability conditions since all the roots lie inside the unit circle.



**Figure 1.** Stability graph for VECM

Table 5 provides a summary of the VECM result for our model. The impacts of foreign investments (FDI), foreign portfolio investment (FPI), infrastructure (INFR), and exchange rate (EXCH) on market capitalization (MCAP) in Nigeria's capital market were found to be positive and significant excepting infrastructure whose coefficient was not significant. Real interest rate (RINTR) had a negative but significant influence on MCAP. Furthermore, if all the endogenous variables are kept constant, MCAP would be up by 6.2 percentage points.

The DW statistic shows minimal autocorrelation; the adjusted R2 statistic of 62% gives a 38% credit to the error term while the F-statistic shows that our model is significant in providing explanations about changes in market capitalization for the period under review. All the variables such as foreign direct investment, foreign portfolio investment, and infrastructure conformed to a priori expectation except exchange rate and interest rate.

**Table 5 Vector Error Correction Estimates**

CoIntEq1	LNMCAP(-1)	LNFDI(-1)	LNFPPI(-1)	LNINFR(-1)	EXCH(-1)	RINTR(-1)	C
-0.673615	-1.084098*	9.63095*	0.0003**	0.260458	0.020826*	-0.09069**	6.23701
(3.12626)		(2.99896)	(2.80785)	(0.08307)	(3.01255)	(-4.12891)	
[-5.33523]		[9.64097]	[ 1.81324]	[ 3.13528]	[ 1.65916]	[ 0.70353]	
Adjusted Square = 0.619059	R-Statistic = 0.000371	F-Statistic = 1.977907	DW-statistic =				

The result in brackets and parenthesis are t-statistics and standard error respectively while \*, \*\* and \*\*\*asterisks represent significance at 1%, 5% and 10% levels respectively.

### 3.3 Post Estimation Tests

Using Breusch-Godfrey Serial Correlation LM Test, the F-statistic probability value of 0.6857 shows the absence of serial correlation.

**Table 6: Breusch-Godfrey Test for Serial Correlation**

F-statistic	0.384574	Prob. F(2,20)	0.6857
Obs*R-squared	1.296161	Prob. Chi-Square(2)	0.523

Using the Breusch-Pagan-Godfrey heteroskedasticity test, the probability Chi square statistic is greater than 0.05 levels of significance shows that there is homoscedasticity in the residuals (that is, error variance of each observation is constant) and so, the data is reliable for prediction.

**Table 7: Breusch-Pagan-Godfrey test for Heteroscedasticity**

F-statistic	0.330173	Prob. F(12,22)	0.9745
Obs*R-squared	5.34135	Prob. Chi-Square(12)	0.9456
Scaled explained SS	6.992005	Prob. Chi-Square(12)	0.8581

Using the variance inflation factor (VIF) test, the VIF coefficient is less than 10, therefore we concluded that the explanatory variables are not perfectly linearly correlated and there are no exact linear relationship among any of the variables

**Table 8: Variance Inflation Factor (VIF) Test for Multicollinearity**

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C(1)	0.034357	11.48761	3.113623
C(2)	0.028199	8.972992	2.679542
C(3)	0.503876	4.542087	1.592957
C(4)	0.504763	4.536677	1.622658
C(5)	3.26E-15	1.756522	1.522894
C(6)	1.50E-15	1.486607	1.450965
C(7)	0.068854	152.204	21.6339
C(8)	0.089759	208.8191	31.44673
C(9)	0.001607	93.98142	39.54254
C(10)	0.002219	107.2044	45.26291
C(11)	0.008914	1.974568	1.860882
C(12)	0.009953	2.214929	2.078738

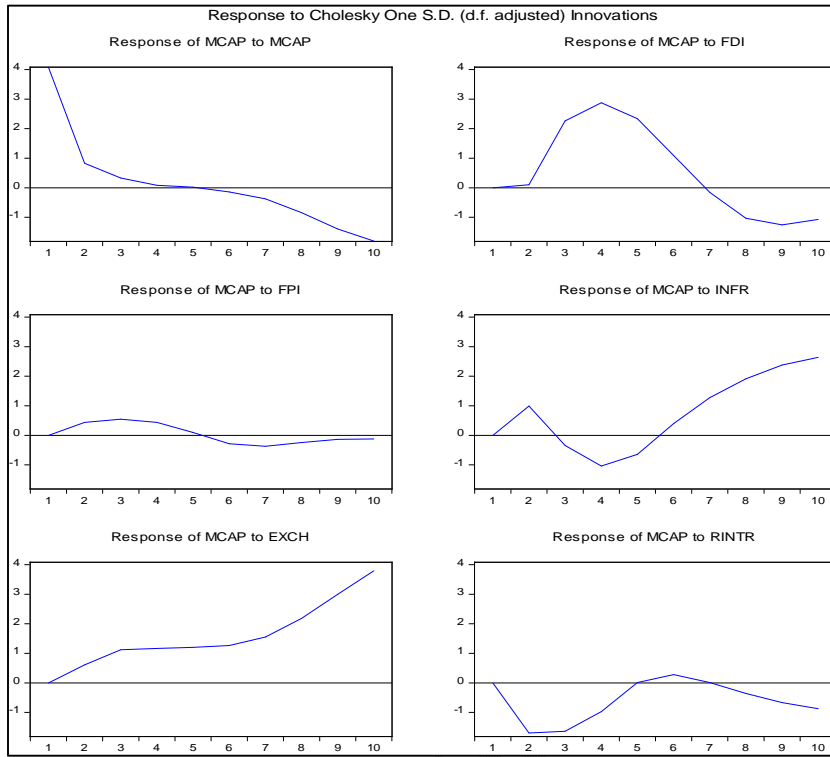
### 3.4 Impulse - Response Functions

The impulse-response function shows the effect of a standard deviation shock, which occurs in one of the variables in the system, on the current and future values of endogenous variables. Dashed lines show the confidence intervals for +/- 2 standard error; straight lines show the reaction given in time by the dependent variable against standard deviation shock occurring in the error term of the model. This is shown in Figure 2, which provides a summary of the impulse response results for the model.

The impulse response function is significant in this study, in order to show the responses of Market capitalization to the changes in the independent variables. That of FDI show that one standard deviation shock given to FDI resulted to an initially stable market capitalization at the first to second period, but sharp increases in the capital market starting from the



second period till the fourth period. This is however followed by a slight decrease in the responses to the shocks in FDI from the fifth to seventh period. A cursory look shows negative responses to changes in FDI from the seventh to tenth period. This is as a result of external factors such as changes in global economic conditions, market maturity, or domestic policy shifts that affect the long-term attractiveness of foreign investment.



**Figure 2:** Impulse Responses of Independent Variables to the Dependent Variable

Similarly, a one standard deviation shock or innovations given to foreign portfolio investment causes an increase in the capital market from the first period till the fourth period. However, from the 5th period, there was a negative declining response of MCAP to changes in FPI up till the 10th period.

Market capitalization witnessed an initial increase from the changes in infrastructure from the first period. However, from the 2nd period (year), there was a sharp decline, with the 3rd period experiencing a negative decline up till the 4th period. From the middle of the 5th year, the impulse graph showed MCAP responding positively to the SD shocks in infrastructure with the upward trend, up till the 10th period.

Evidently from the graph, MCAP responds positively to the changes in exchange rate from the first period till the 10th period (year). Additionally, Real interest rate witnessed a negative response of MCAP to its standard deviation shocks. This was however temporarily changed to positive response in year 5-7, which shows a less than 1% response of MCAP to the shock in RINTR.

### 3.5 Variance Decomposition

Variance decomposition is adopted to forecast the error variance effects for each endogenous variable on the dependent variable MCAP. The result of this is shown in Table 9, which provides a summary of the variance decomposition results for the model.

Evidence from the variance decomposition result shows that at the first period (year), MCAP accounted for all the variations in itself and dominated up to the 4th year. However, FDI took over in the 5<sup>th</sup> year and accounted mostly for the variations on MCAP over the 5th year till the 10th year period. However, Table 9 shows that MCAP own shocks constituted a predominant source of variation in MCAP forecast errors. FDI is the second predominant source of variation in MCAP forecast errors, ranging from 16 per cent to 37 per cent over the third to 6th year horizon and then between 34% to 21% over the 7th to 10th year horizon. Foreign portfolio investment and RINTR constituted the least source of variation in MCAP.

**Table 9.** Variance Decomposition

Period	S.E.	MCAP	FDI	FPI	INFR	EXCH	RINTR
1	4.073592	100	0	0	0	0	0
2	4.658667	79.61284	0.049101	0.892633	4.522101	1.710754	13.21257
3	5.592318	55.59298	16.39884	1.565405	3.519268	5.202155	17.72135
4	6.568261	40.31508	31.09743	1.577128	5.053629	6.914635	15.04209
5	7.104839	34.45657	37.42189	1.367184	5.136556	8.761729	12.85607
6	7.321053	32.48987	37.45404	1.438603	5.134271	11.2296	12.25362
7	7.611792	30.30008	34.68943	1.568706	7.553594	14.55257	11.33562
8	8.264271	26.74189	30.97732	1.420009	11.74959	19.30585	9.805339
9	9.323105	23.25193	26.14961	1.138052	15.74682	25.49763	8.215961
10	10.65215	20.68457	21.04657	0.884818	18.20032	32.22051	6.963207

### 3.6 Discussion of Findings

#### **Foreign Direct Investment and Market Capitalization**

The positive relationship between FDI and MCAP in Nigeria, particularly at lag 1, suggests that an increase in FDI initially leads to an increase in market capitalization. The positive effect suggests that the initial investment may have long-term benefits for market confidence and capital inflows, enhancing the growth potential of the stock market as businesses expand and foreign investors become more confident in the local economic environment. The impulse response analysis corroborates this, showing that FDI initially causes a stable MCAP in the first to second years, followed by a sharp increase in the capital market from the second period to the fourth period. Afterward, there is a slight decline in the response, turning negative after the seventh year. The persistence of a negative response beyond the seventh year could be attributed to external factors such as changes in global economic conditions, market maturity, or domestic policy shifts that affect the long-term attractiveness of foreign investment. This is in line with the findings of Azebi (2020) who found that FDI had a positive relationship with market capitalization.

#### **Foreign Portfolio Investment and Market Capitalization**

Evidence from the findings showed that foreign portfolio investment (FPI) exhibited a positive relationship with MCAP, indicating that FPI inflows contribute positively to the Nigeria's capital market. At lag 1, a unit increase in FPI leads to an extremely small increase in MCAP by 0.0003 units, which suggests that the immediate impact of FPI on MCAP is positively minimal. The impulse response function indicates that FPI causes an increase in MCAP from the first period to the fourth period. However, from the fifth period onwards, there is a negative response in MCAP, suggesting that foreign portfolio investors' short-term strategies may not always align with sustained market growth, leading to a decline in MCAP after initial positive effects. This is in line with the findings of Oyerinde (2019). The above finding is in agreement with the capital market theory of FDI which believes that investor having information gaps about the host country's securities prefers FDI which allows control of host country assets over FPI. This implies that investors alternate between FDI and FPI in their investment decision and will invest in less risky FDI. This finding has been supported by Ezeoha, *et al.* (2009) who conducted a study on the nature of relationship between stock market development and levels of domestic or foreign portfolio investment flows in Nigeria. Their study found a positive link between capital market and domestic private investment and a negative relationship between stock market development and foreign portfolio investment.

#### **Infrastructure and Market Capitalization**

The positive relationship between infrastructure development and MCAP, particularly at lag 1 (0.26), indicates that improvements in infrastructure have a strong initial positive effect on market capitalization. This is likely because better infrastructure facilitates economic growth, improves business operations, and attracts both foreign and domestic investments. In terms of impulse response, infrastructure shocks result in an initial increase in MCAP, followed by a sharp decline in the second period and a negative response until the fourth period. However, from the middle of the fifth year,

the response turns positive, indicating that improvements in infrastructure could lead to long-term capital market growth once the initial adjustments and disruptions are absorbed.

### **Exchange Rate and Market Capitalization**

The exchange rate exhibits a positive relationship with MCAP in the short term, as a unit increase in EXCH at lag 1 causes a 0.02 unit increase in MCAP. This indicates that a depreciation of the local currency may make Nigerian assets more attractive to foreign investors, thus boosting market capitalization. The impulse response function shows a consistent positive response of MCAP to exchange rate shocks from the first to the tenth period. This reflects the positive perception of exchange rate changes in the short term, where a weaker currency might improve export competitiveness and attract foreign capital in the equity markets. This is in line with the findings of Ilugbemi (2020).

### **Real Interest Rate and Market Capitalization**

Real interest rate is negatively related to MCAP, with a unit increase in RINTR causing a decrease in MCAP by 0.09 units. This is expected, as higher interest rates increase the cost of borrowing, which can reduce corporate profits, diminish investment in the stock market, and lower market capitalization. The impulse response shows a negative response of MCAP to shocks in real interest rates, though this effect weakens between the fifth and seventh years, where the market shows a less than 1% response. This indicates that while higher interest rates might depress market capitalization in the short term, the effect is less severe over time, possibly due to the economy adjusting to the interest rate environment.

The variance decomposition analysis provides insights into the relative importance of the independent variables in explaining the variations in MCAP over time. Initially, MCAP accounts for all variations in itself, but by the third year, FDI and RINTR become the main drivers of MCAP fluctuations, with FDI contributing about 21% and RINTR contributing a significant share. By the tenth year, EXCH also accounts for over 32% of the variation in MCAP, highlighting its growing importance over time. FPI, however, consistently accounts for a minimal portion of the variation in MCAP throughout the period.

## **4. CONCLUSION**

From the above analyses, the empirical analysis in this study showed that a balanced and stable economic environment is critical to sustaining growth in the capital market. Building a stable financial system by enhancing market transparency, improving governance, and reducing systemic risks in the financial sector should be the priority of the capital market regulators. More so, the evidence of the findings suggests that foreign direct investment and infrastructure development have more long-term benefits compared to foreign portfolio investment. Policymakers should therefore focus on creating policies that attract stable, long-term investments in sectors that contribute to sustainable growth, such as manufacturing, technology, and infrastructure. Additionally, policies aimed at improving investor protection and market transparency could help mitigate the negative effects of volatility in the short term. This would encourage more foreign and domestic investors to enter the market and would stabilize the relationship between key variables like FDI, FPI, and MCAP.

The implications of a positive shock of foreign direct investment (FDI) and foreign portfolio investment (FPI) on the capital market in Nigeria can be significant. Firstly, increased FDI and FPI inflows suggest growing investor confidence in the Nigerian economy. This confidence can stimulate further investment from both domestic and foreign investors, leading to enhanced liquidity and depth in the capital market (Ogunmuyiwa&Ekone, 2019).

Moreover, the influx of FDI and FPI can contribute to the development of the Nigerian capital market infrastructure. With more foreign capital flowing into the market, there may be increased demand for financial services, such as brokerage, advisory, and investment banking, thereby encouraging the expansion and modernization of these sectors. Additionally, increased foreign investment can lead to greater diversification of investment opportunities in the Nigerian capital market. This diversification can help reduce overall market risk and enhance stability, making the market more attractive to both domestic and foreign investors. Furthermore, the positive shock of FDI and FPI can contribute to economic growth and development in Nigeria. Foreign investment inflows can stimulate job creation, technology transfer, and infrastructure development, all of which are crucial factors for sustainable economic progress (Ogunmuyiwa&Ekone, 2019).

In summary, our findings show that FDI and FPI had positive and significant impacts on market capitalization of the Nigeria's capital market and that FDI and market capitalization are the major contributors to the variations in market capitalization of the Nigeria's capital market. This paper therefore concludes that foreign investments is beneficial to the Nigerian economy and advocates for conducive business, economic, and political environment in order to attract foreign investment.

## CONSENT (WHEREEVER APPLICABLE)

All authors declare that all literature, used for this study, were duly acknowledged.

## ETHICAL APPROVAL (WHEREEVER APPLICABLE)

Not applicable.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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