Revisiting Foreign Direct Investment and Exchange Rate Relationship with Stock Market Development in Nigeria

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Abstract

This study investigates the relationship of foreign direct investment (FDI) and exchange rate to the stock market development in Nigeria. The study used ordinary lease square, quantile regression and autoregressive distributed lag (ARDL) bounds techniques to determine long-run relationship among the variables. Annual time-series data from 1990 – 2021 was used. The results suggest that FDI and exchange rate have negative relationship with the stock market development in the short run, while the reverse is the case in the long run. The foreign direct investments in Nigeria if increased can improve the exchange rate, which in turn will have a combined effect on stock market development as there is unidirectional causal relationship from foreign direct investment to exchange rate. The policy maker should formulate policies that will improve exchange rate position through the foreign direct investment especially by the improvement of the security situation of Nigeria.

Keywords: Market Capitalization, Investment, Exchange Rate, Financial Development, Quantile Regression, Nigeria.

JEL Classifications: C32, F21, F31, G12, G23

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1. Introduction

The reduction of poverty and improvement in the quality of lives of the people have been the objectives of development policies in any economy, which is only feasible by integrating sound investment and economic growth strategies that are sustainable over time. Nevertheless, in the midst of resource constraints, Nigeria as a developing country cannot achieve these objectives alone (Osunkwo, 2020) without attraction of foreign aids and investments to the country. Hence, the need for international transfer of technology for poverty to reduce through foreign aids (Toye, 2007). On the other hand, the transfer of technology for the purpose of creating employment, enhancing export and lowering the dependency on import in order to attain total growth of the economy through foreign direct investment (De Mello, 1999) cannot be neglected. It has been asserted that to get higher economic growth, a country should concentrate on outward-oriented development strategies instead of internal-oriented development strategies that further emphasized the significance of FDI (Sethi & Sucharita, 2010). It is for this reason why developing countries tend to strengthen and develop their industrial sector so as to attain economic growth through the inflow of FDI (Bista, 2005). The Nigeria's trend line of stock market development (MCAP) and foreign direct investment (FDI) is presented in Figure 1. It revealed that stock market development surged in the 1990s, but plummeted in the early 2000s due to the global financial crisis of the early 2000s. However, it recovered immediately and continues to maintain a steady trend. As for FDI it had a massive increase in the early 1990s because of the effect of financial system reforms in Nigeria in the late 1980s. It decreased in the late 1990s, but with the Nigerian Investment Promotion Laws of the Federation of Nigeria in 2004, it maintained a steady increased up to 2010. In 2016 it decreased because of regime change and poor security situations that the country is still experiencing.
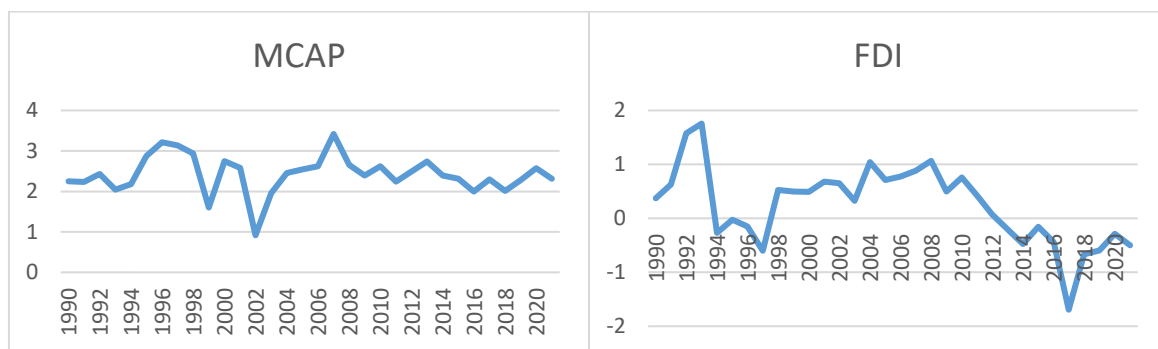

Figure 1. MCAP and FDI Trends of Nigeria

In the world economy FDI is an external capital that is very germane to any emerging economy and its growth. This is a factor that augments growth in both developed and developing economies (Te Velde, 2006). Furthermore, local investments in countries with very limited capital resources are complemented and stimulated with inflow of FDI from foreign countries (Cristina & Levieuge, 2017). The aftermath of the financial liberalization policy in Nigeria came with high inflow of FDI. For

instance, the annual average from 1984 – 1989 of FDI was US$624 million in subsequent years and up to 1994 increased to US$1, 959 million (UNCTAD, 1996). However, the proclamation of the Nigerian Investment Promotion Council (NIPC), which was established by an ACT of the Nigerian Investment Promotion Laws of the Federation of Nigeria in 2004 which aimed at encouraging, promoting and coordinating investments in the economy, gingered the inflows of FDI into Nigeria. In 2005, the FDI was US$4,978 million and increased to US$13,956 million in 2006, but later decreased to US$12,454 million in 2007. The FDI however increased astronomically in 2008 to US$20,279 million. But for the insecurity in the country, the FDI nosedived systematically in 2018 and reduced to US$775 million. With Nigeria joining as a member of Africa Continental Free Trade Area (AfCFTA) in 2019, the FDI shot up to US$4,844 million. Nevertheless, FDI inflows in Nigeria is high compared with other West African economies where the inflow of FDI was US$2, 614 million for Ghana and US$ 2, 232 million for Senegal in 2019 (UNCTAD, 2022).

With the stock market remaining as the major channel through which long term capital are mobilized to the developing countries, Su Dinh et al., (2017) asserted that for over twenty years, FDI had remain the impetus for attainment of economic growth. Therefore, the positive impact of FDI to a host economy is glaring in the development of stock market (Yartey, 2008). Furthermore, Ramady (2013) argued that stock market reflects the strength and healthiness of an economy. Considering the establishment of Nigerian Stock Exchange (NSE) in the 1960s and the various challenges faced at its inception, it is about the strongest among other African stock markets. This is because it is a good trading ground for the small, big and institutional investors. The Nigerian stock market capitalization in 1993, for instance, was around US$2 billion, which by 2020 had grown steadily to over US$57 billion.

Many studies such as Al Samman and Jamil (2018); Raza et al., (2015); Raza and Jawaid (2014); Abdul Malik and Amiad (2013) and Jeffus (2005) had examined the relationship between FDI and the development of stock market. Interestingly enough, they found strong relationship that reinforced the position of inflows of FDI to the development of stock market performances. Further arguing the significance of stock market performance to FDI is Yartey (2008) in which host countries' stock market with strong regulations and institutions and adequate requirement for listing companies on the trading floor coupled with fair trading practices with transparency tend to give pathway to attract FDIs. Considering this, an examination of FDI, exchange rate and stock market development relationship is very vital not only for the policy making, but also for its contribution to the current literature on the developing economies. Furthermore, since most of the studies have concentrated on the developed economies, there is need to emphasize on developing economies in order to identify the extent to which FDI and exchange rate has affected their stock markets' performance.

Given the examination of the impact of FDI in stimulating the generation of funds with the aid of capital market as an objective, this study aims at determining the relationship between foreign direct investment, exchange rate and the development of the stock market in Nigeria. This is vital and

worth revisiting as the previous studies showed the positive effect of macroeconomic variables such as inflation on stock market as investors struggled to be reimbursed to compensate for higher inflation. Given the current situation in Nigeria of hyperinflation and poor security that is undermining the inflow of foreign direct investment; this study is necessitated as the liquidity position of the market is under threat.

This study is therefore divided into five sections. After Introduction in Section One, the other sections of the study include Literature Review in Section Two, Section Three is the Methodology while Sections Four and Five are Results and Discussion coupled with Conclusion and Policy recommendations respectively.

2. Literature Review

Going by OECD (2009), FDI has been defined as a cross border investment in which the residents of an economy have good management control of business enterprises in other economy with ownership of such businesses not less than 10%. The activities in stock market reflect the overall economic activity without exclusion of FDI. There are two divergent view points of the relationship of FDI and stock market development. These are negative and positive perspectives. The former sticks to the assertion of Hausmann and Fernandez-Arias (2000a, b) that FDI is more proactive in weak economies that have both underdeveloped financial system and institutions. As a result of the poor debt and equity market FDI becomes the alternative source of capital for companies. In adherence to this, a study conducted by Raza and Jawaid (2014) confirmed that FDI had a significant negative effect on stock market development in 18 Asian countries. Similarly, Arikpo, and Ogar (2018) and Ho (2019) found negative relationship between FDI and stock market development in both long and short run in Malaysia.

The later viewpoint however emphasizes on the positive effect of FDI on the development of stock market. Authors like Claessens et al. (2001) asserted that foreign investors are merely attracted in economies that have sound institutions because stock market liquidity can rise when external equity finance investment projects increase. In line with this view point, Jeffus (2005) found that stock market development was gingered by FDI in the Latin American economies from 1988 to 2002. Also, Abdul Malik and Amjad (2013) and Shahbaz et al. (2013) confirmed that Pakistan stock market development was promoted by FDI. Raza et al. (2015) in a study over the period 1976 to 2011 also unearthed that stock market development was facilitated by FDI. Studies like Al Samman and Jamil (2018), Ngobe (2020) and Olokoyo et al. (2020) gleaned that FDI stimulates stock market performances.

In the same vein, the relationship between stock market development and exchange rate were found to be positive (Dube and Shoko, 2020; Ho and Odhiambo, 2018; Muktadir-a-Mukit, 2012). On the contrary however, Abdul Malik and Amjad (2013); Javed and Akhtar (2012) as well as Subair and Salihu (2010) established a negative relationship between exchange rate and the stock market

development. Importing economy like Nigeria in manufacturing inputs (tools, plants and equipment) and finished goods and services, local currency depreciation would translate to huge capital flight because of the enormous import of goods and services, and that would further decline dividend payment of companies that are importing from other countries. This therefore, neutralizes the relationship between the exchange rate and stock market development. Abdul Malik and Amjad (2013) emphasized on currency risk as host country currency depreciation stimulates inflows of FDI because of the likelihood of the wealth of the foreign investors to increase (Takagi and Shi, 2011). Furthermore, Ahmad et al., (2015) gleaned that macroeconomic variables influenced stock market returns in Nigeria and the insecurity situation of the Nigerian economy support the necessity of the study as there is high withdrawal of foreign investors. Thus, the significance of this study is the existence of the mixed effect of the relationship between FDI and stock market development in Nigeria on one hand. In another, many studies had focused more on the relationship between FDI and economic growth in Nigeria, while ignoring the relationship of FDI and exchange rate to the stock market. This paper therefore contributes to the current study by revisiting the relationship of FDI and exchange rate to stock market development in Nigeria. At the same time the causal relationship between FDI and exchange rate is not left out.

3. Data and Methodology

3.1 Data Description

Annual time series dataset is used in this study covering the period 1990 to 2021 and sourced from World Development Indicators (2022). The starting   point is chosen because of the aftermath of the financial liberalization policy in Nigeria which came with high inflow of FDI and the subsequent reforms in the financial system. Market capitalization of the Nigerian stock market as percentage of GDP is utilized as the proxy for stock market development (Ho, 2019; Raza and Jawaid, 2014). The capacity of stock market to mobilize capital and diversify depends on the size of the market capitalization (Demirguc-Kunt and Levine, 1996). The FDI represents the measures of total equity capital and other short- and long-term capital earnings reinvested as shown in the balance of payments. Net inflows of FDI that is percentage of GDP stands for FDI, which is in line with Ho (2019) and Al Samman and Jamil (2018). The real effective exchange rate that is the nominal exchange rate is utilized as used by Abdul Malik and Amjad (2013).

In examining the relationship of FDI and stock market development, interest rate as used by Ouma and Muriu (2014) and financial development as used by Ho (2019) are utilized as control variables. These variables are incorporated as they reflect the chances of stock market development and the capacity of channeling savings into investment by the financial system respectively.

3.2 Model Specification and Methodology

The various underlying factors that can influence the capital market performance at macroeconomic level include FDI as used by Abdul Malik and Amjad (2013), Ho (2019), Olokoyoet

al. (2020) on one hand and exchange rate on the other hand by Subair (2018) among others. Therefore, the current study is investigating the functional relationship that may exist between the FDI and stock market development through the integration of exchange rate and two control variables, interest rate and financial development as specified in equation 1:

$$MCAP_t = f(FDI_t, EXC_t, INT_t, FD_t) \qquad (1)$$

where:

$MCAP_t$ = Market capitalization at time t

FDI_t = Foreign direct investment at time t

EXC_t = Exchange rate at time t

INT_t = Interest rate at time t

FD_t = Financial development at time t

The investigation of this functional relationship is carried out using the linear econometric model as shown in equation 2:

$$lnMCAP_t = \beta_0 + \beta_1 FDI_t + \beta_2 EXC_t + +\beta_3 INT_t + \beta_4 FD_t + \mu_t \qquad (2)$$

Time series dataset has the tendency of having unit root problems such as random walk, trend and cycle effects. If the unit root issue is not avoided it creates the estimation of spurious regression in the series. Hence, this informs the necessity of overcoming the unit root problems in the time series. The unit root tests employed is the traditional unit root test, the Dickey and Fuller (1981) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) (1982) test to reconfirm the existence of the stationarity problem. Interestingly, this test is more suitable for shorter time series period. The influence of structural break is not recognized in the traditional unit root test. Basically, due to policy and regime changes, structural breaks are likely to influence time series dataset adversely. This is more prevalent because of the regime changes in the economy under study.

In line with a priori, Perron (1989) asserted that when the structural break exists in the series and the model to be estimated ignored it, the outcome could be inappropriate for rejecting the presence of a unit root. Thus, three models by Perron (1989) of structural breaks are considered. The break in the intercept is measured in the Model A, while Model B and C measured the breaks in the slope, and in both the intercept and slope respectively. Lee et al. (2008) contributed that the test of unit root involving the structural break, which is better than the ordinary test of stationarity, and that Model C is the most preferable. This is because it combines the intercept and the slope. The following is adopted from Lee et al. (2008):

$$MCAP_t = \hat{\mu}_0^c + \hat{\mu}_1^c DU_t(T_B) + \hat{\mu}_2^c DT_t(T_B) + \hat{c}_j^c MCAP_{2t-1} + \sum_{j=1}^{k} \hat{c}_j^c \Delta MCAP_{2t-j} + \hat{\varepsilon}_t^c \qquad (3)$$

where T_B is the correct break date; $DU_t(T_B) = 1_{(t>T_b^c)}$; and $DU_t(T_B) = (t - T_B)1_{(t>T_b^c)}$; if $t < T_B$, then $1_{(t>T_b^c)} = 0$; otherwise $1_{(t>T_B)} = 1$. The constant fraction of the sample size is the break

date (T); that is, $T_B = \lambda^c T$ with the appropriate break fraction $\lambda^c \in (0,1)$ that has the smallest integer function. The DU_t and DT_t are both intercept and trend respectively.

To ascertain a robust regression results the quantile regression is employed. Given $MCAP_t$ as the dependent variable and FDI_t as the independent variable, the quantile regression function τ^{th} can be expressed as:

$$Q_{MCAP}(\tau|\text{FDI}) = inf\{b|F_{MCAP}(FDI) \geq \tau\} = \sum_k \beta_K(\tau)FDI_K = x^1\beta(\tau) \qquad (4)$$

where, $F_{MCAP}(FDI)$ stands for the conditional distribution of MCAP while FDI stands for $\beta(\tau)$ which is the dependence relationship of the specified quantile (τ).

Lin and Benjamin (2017) estimated (τ), calculating one quantile after another by the minimization of the weighted deviation between the estimated series is used to make equation (5) as:

$$\beta(\tau) = Argmin \sum_{t=1}^{T} \left(\tau - 1_{\{yt<x_t'\beta(\tau)\}}\right) \qquad (5)$$

The various quantiles (τ) if extended by the calculated β_k^τ as the $\tau = 0.10, 0.20, 0.30...$ and 0.90, the k stands for the parameters in addition to the intercept. The different effects of the independent variables on the dependent variable can be ascertained across the quantiles as the quantile regression model is specified in equation 6:

$$QMCAP(\tau|\text{X}) = \beta_0^{(\tau)} + \beta_1^{(\tau)}FDI + \beta_2^{(\tau)}EXC + \beta_3^{(\tau)}INT + \beta_4^{(\tau)}FD + \mu_t^{(\tau)} \qquad (6)$$

At the final stage, the autoregressive distributed lag (ARDL) bounds test approach is utilized in that both the long and short run estimates are identified by the joint F-statistical test. To ascertain the long run estimates among the variables the t-ratio of the error correction term must be significant. In addition, the short run relationship among the variables is established if the F-statistical values are identically significant. The ARDL bounds test model is specified in equation (7) as:

$$\Delta MCAP_t = \vartheta_0 + \sum_{i=1}^{p} \vartheta_{11i}\Delta MCAP_{t-1} + \sum_{i=1}^{p} \vartheta_{12i}\Delta FDI_{t-1} + \sum_{i=1}^{p} \vartheta_{13i}\Delta EXC_{t-1} + \sum_{i=1}^{p} \vartheta_{14i}\Delta INT_{t-1}$$

$$+ \sum_{i=1}^{p} \vartheta_{15i}\Delta FD_{t-1} + \sum_{i=1}^{p} \vartheta_{16i}\Delta TB_{t-1} + \lambda_{11}MCAP_{t-1} + \lambda_{12}FDI_{t-1} + \lambda_{13}EXC_{t-1}$$

$$+ \lambda_{14}INT_{t-1} + \lambda_{15}FD_{t-1} + \lambda_{16}TB_{t-1}$$

$$+ \mu_{1t} \qquad (7)$$

where, Δ gives the first difference operator, the short run elasticity is the coefficient ϑ_{iz}, the long run elasticity is the coefficient λ_1, and the normal white noise is the coefficient μ_t.

In the estimation of the co-integration relationship, the expression of the null hypothesis is H_0: $\lambda_{11} = \lambda_{22} = \lambda_{33} = \lambda_{44} = \lambda_{55} = \lambda_{66} = 0$. And the alternative hypothesis is H_1: $\lambda_{11} \neq \lambda_{22} \neq \lambda_{33} \neq \lambda_{44} \neq \lambda_{55} \neq \lambda_{66} \neq 0$. The null hypothesis for short-run can be expressed as H_0: $\vartheta_{11} = \vartheta_{22} = \vartheta_{33} = \vartheta_{44} = \vartheta_{55} = \vartheta_{66} = 0$, while the alternative hypothesis is H_1: $\vartheta_{11} \neq \vartheta_{22} \neq \vartheta_{33} \neq \vartheta_{44} \neq \vartheta_{55} \neq \vartheta_{66} \neq 0$. The linear transformation of the ARDL gives the error correction term. Pesaran et al. (2001) critical value is employed for the rejection of the null hypothesis, which stands if the calculated F-statistics is higher than the upper bound of the critical value.

The benefits from FDI are on the investing countries and host countries, thus, the investigation of the causal link of exchange rate with FDI is vital for the policies formulation of FDI. The examination of the relationship between FDI inflows and stock market development of Nigerian economy steered the investigation of the causal relationship of EXC with FDI by employing Toda and Yamamoto (1995) approach in this study.

Toda and Yamamoto (1995) using the Granger (1969), formulated a technique of estimating augmented VAR model according to (k + dmax) where k is equal to the optimal time lag of the VAR model that is first and dmax is the integrated order that is maximum on the variables of the system (VAR model). The Toda and Yamamoto VAR model of causality is formulated as in equation (8):

$$EXC_t = \theta_0 + \left(\sum_{i-1}^{k} \alpha_{1t} EXC_{t-1} + \sum_{i=k+1}^{d_{max}} \alpha_{2t} EXC_{t-1} \right) + \left(\sum_{i-1}^{k} \beta_{1t} FDI_{t-1} + \sum_{i=k+1}^{d_{max}} \beta_{2t} FDI_{t-1} \right)$$
$$+ \varepsilon_{1t} \tag{8}$$

$$FDI_t = \delta_0 + \left(\sum_{i-1}^{k} \gamma_{1t} FDI_{t-1} + \sum_{i=k+1}^{d_{max}} \gamma_{2t} FDI_{t-1} \right) + \left(\sum_{i-1}^{k} \sigma_{1t} EXC_{t-1} + \sum_{i=k+1}^{d_{max}} \sigma_{2t} EXC_{t-1} \right)$$
$$+ \varepsilon_{2t} \tag{9}$$

where k is equal to the optimal time lag on the first VAR model and dmax symbolizes the maximum order of integration of the system VAR model variables.

4. Results and Discussion

4.1 Data and Descriptive Statistics

In Table 1 the descriptive statistics is presented, the Jarque-Bera (JB) statistics shows that only FD is normally distributed. This gives the need for the estimation of the quantile regression. The most volatile series is EXC because its standard deviation has a value of 49.409. This means that it is the most fluctuating variable in the study. FDI is the least with standard deviation of 1.208. The correlation coefficient of MCAP and EXC, and FDI and INT are positive and significant, implying that they have positive association. On the other hand, FDI and EXC, EXC and INT, and INT and FD

are negative and significant. This means a decrease in one variable leads to an increase in the other variable. For example, the foreign investors take advantage of a fall in exchange rate to increase investment in Nigeria.

Table 1. Descriptive statistics and correlation results

	MCAP	**FDI**	**EXC**	**INT**	**FD**
Mean	12.433	1.613	108.562	18.944	9.6E-16
Median	11.161	1.487	100.259	17.872	-0.579
Maximum	30.509	5.791	272.997	31.650	3.940
Minimum	2.497	0.184	49.745	11.483	-2.372
Std. Dev.	5.731	1.208	49.409	3.889	1.672
Skewness	1.292	1.842	1.854	1.140	0.513
Kurtosis	5.012	6.772	6.345	5.089	2.433
Jarque-Bera	14.297	37.071	33.248	12.751	1.831
Probability	0.001	0.000	0.000	0.002	0.400

Correlation Matrix

	MCAP	**FDI**	**EXC**	**INT**	**FD**
MCAP	1				
FDI	-0.039	1			
	(0.832)				
EXC	0.544*	-0.438**	1		
	(0.001)	(0.012)			
INT	-0.216	0.641*	-0.348***	1	
	(0.235)	(0.000)	(0.051)		
FD	-0.079	-0.189	-0.110	-0.531*	1
	(0.667)	(0.300)	(0.549)	(0.002)	

Notes: *, ** and *** is 1%, 5% and 10% statistically significant levels respectively. The parentheses show the p-values.

The ADF and KPSS traditional unit root test and Perron (P) unit root test with a single break test of stationary results are in Table 2. It indicated that all series are stationary at first difference I(1) except MCAP according to ADF and KPSS, and EXC according to KPSS that is stationary at first difference I(1). Thus, it informs the need of estimating the autoregressive distributed lag (ARDL) bounds test in the study.

Table 2. The unit root test results

Variables	At level			At first diff		
	ADF	KPSS	P	ADF	KPSS	P
MCAP	-4.197*	0.066	-4.740	-6.585*	0.033	-8.512*
			(2002)			(2002)
FDI	-2.378	0.379***	-4.031	-6.722*	0.100	-6.717*
			(1997)			(1997)
EXC	-2.374	0.119	-3.900	-4.753*	0.054	-9.409*
			(1998)			(1999)
INT	-1.598	0.678**	-3.561	6.382*	0.054	-6.485*
			(2002)			(2008)
FD	-.2.293	0.595**	-4.332	-4.178*	0.078	-5.296**
			(2006)			(2006)

Notes: *, ** and *** is 1%, 5% and 10% statistically significant levels respectively. The parentheses show the p-values.

The OLS and quantile regression analysis are presented in Table 3 and further exhibited by figure 1. FDI stimulates MCAP according to OLS and the quantile regression at 10%, 40% and 50% only. This indicates that there are opportunities for foreign investors to gain in Nigeria. This is in line with Olokoyo et al. (2020) that gleaned FDI stimulating stock market development in Nigeria, but contrary to the findings of Arikpo and Ogar (2018) and Ho (2019) that found FDI undermining stock market development. EXC enhances MCAP as revealed by the OLS and the quantile regression from 10% to 70%, which was equally found by Dube and Shoko (2020), Ho and Odhiambo (2018) whereas, it is the reverse in the case of Subair (2018) with the MCAP negatively enhancing exchange rate volatility.

Table 3. Ordinary regression and quantile regression results

Variables	OLS	$\tau = 0.10$	$\tau = 0.20$	$\tau = 0.30$	$\tau = 0.40$	$\tau = 0.50$	$\tau = 0.60$	$\tau = 0.70$	$\tau = 0.80$	$\tau = 0.90$
FDI	0.284**	0.950***	0.646	0.605	0 .740***	0.651***	0.5216	0.3652	0.1177	0.0631
	(0.036)	(0.074)	(0.235)	(0.176)	(0.072)	(0.093)	(0.166)	(0.313)	(0.778)	(0.901)
EXC	0.756*	0.733***	1.002*	0.9258*	0.720**	0.6740*	0.639**	0.7397***	0.4720	0.2308
	(0.005)	(0.058)	(0.004)	(0.012)	(0.016)	(0.008)	(0.038)	(0.077)	(0.278)	(0.684)
INT	-0.560	-0.184	0.044	-0.075	-0.174	-0.1980	-0.0526	-0.0363	0.02409	0.3093
	(0.318)	(0.657)	(0.917)	(0.852)	(0.647)	(0.532)	(0.873)	(0.904)	(0.948)	(0.369)
FD	-0.017	0.1595	-0.258	-0.1457	-0.1421	-0.0723	-0.1887	-0.2948	-0.04718	0.0841
	(0.756)	(0.559)	(0.347)	(0.682)	(0.546)	(0.795)	(0.548)	(0.285)	(0.903)	(0.862)
R-squared	0.36	0.2553	0.2625	0.285	0.3030	0.2892	0.2735	0.2550	0.2193	0.1647

Notes: *, ** and *** is 1%, 5% and 10% statistically significant levels respectively. The parentheses show the p-values.
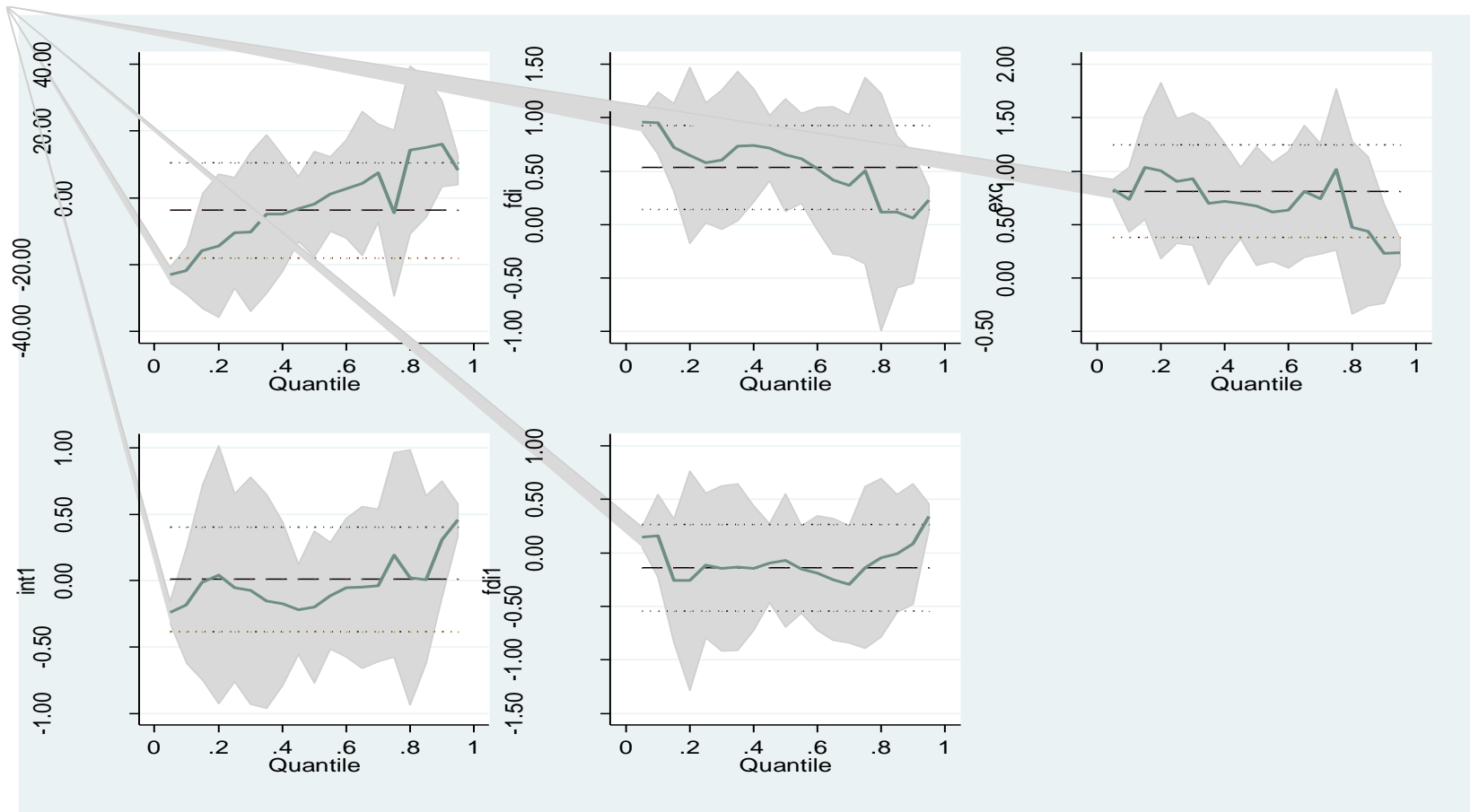
Figure 2. Quantiles Regression Coefficient Changes.

The ordinary least square (OLS) estimates with confidence interval of 95% shows the degree of influence of the variables on stock market development across the quantiles.

Table 4 gives the lag length that is optimal, which is selected in this study according to the suitable criteria shown in the Table 4. Lag 1 is the optimal. Table 5 gives the results of the ARDL bounds test. It indicated that there is co-integration in the estimated model at 1% level of significance. This means the presence of the long run relationship among the variables.

Table 4. Optimal lags order selection criteria

Optimal lag	LR	FPE	AIC	SC	HQ
0	NA	5.78e-07	-0.175	0.059	-0.100
1	92.200*	6.75e-08*	-2.350*	-0.948*	-1.901*
2	20.730	1.40e-07	-1.774	0.795	-0.952

Note: * implies the lag selected based on the criteria Akaike information criterion (AIC), Schwarz information criterion (SC), and Hannan-Quinn information criterion (HQ)

Table 5. ARDL bounds test estimates

Model estimated $lnmcap = f(lnfdi, lnexc, lnint, lnfd)$	F-statistics 7.660*	K = 4 N = 30
Significance level	I(0)	I(1)
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

Notes: Statistically significant 1% (*) levels.

In Table 6, the short run analysis indicated that FDI and EXC have negative relationship with MCAP with the coefficient of -0.063 and -0.572 respectively at 1% level of significance. This implies that there are less inflows of FDI into Nigerian economy and the devaluation of the EXC is affecting the MCAP, which further has negative effect on the stock market liquidity as it undermined MCAP. These findings are contrary to Ngobe (2020), Olokoyo et al., (2020), Dube and Shoko (2020) and Ho and Odhiambo (2018) that found FDI and EXC stimulating MCAP. Osunkwo (2020) suggested that Nigeria cannot do without the attraction of foreign investment, thus, necessary measures must be considered. Interestingly, the INT had a positive relationship with MCAP with the coefficient of 0.725 at 1% level of significant. The continuous increase of INT in Nigeria over the period is facilitating the stock market liquidity by implication. The error correction term came out with the required coefficient that is negative, that is -0.665, which is significant at 1% level. The long run equilibrium can be ascertained at the speed of 67% per annum, if there is short run disequilibrium. There is presence of normality issue as presented in the diagnostic test, while there is no serial correlation, and heteroscedastic issues. In addition, the model estimated revealed that it is really stable, which is shown in the cumulative sum of recursive squares (CUSUM) and the cumulative sum of square of recursive residuals (CUSUMQ) in Figure 3.
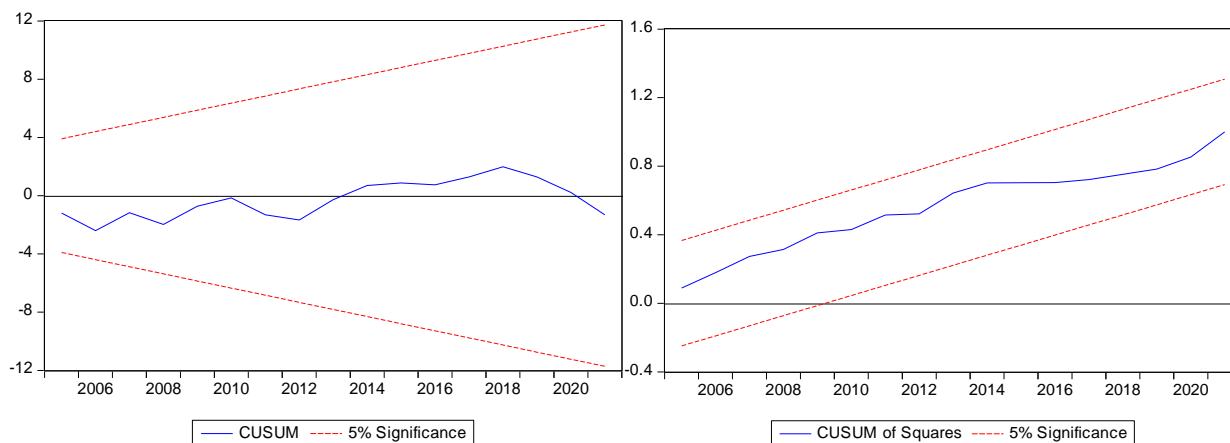
Figure 3. Cumulative Sum of Square (CUSUM) and Cumulative Sum of Recursive Square (CUSMQ).

Table 6. Short run: dependent variable ΔMCAP

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ΔMCAP (-1)	0.597*	0.128	4.672	0.000
ΔFDI	0.119*	0.014	8.693	0.000
ΔFDI (-1)	-0.063*	0.020	-3.188	0.005
ΔEXC	1.073*	0.144	7.476	0.000
ΔEXC (-1)	-0.572**	0.240	-2.379	0.029
ΔINT	-1.472*	0.154	-9.576	0.000
ΔINT (-1)	0.725*	0.274	2.642	0.017
ΔFD	0.016*	0.007	2.154	0.046
ΔFD (-1)	-0.011	0.007	-1.561	0.137
ΔTB	-0.017	0.041	-0.416	0.682
ΔTB (-1)	-0.071	0.046	-1.557	0.138
C	0.431	0.351	1.227	0.237
ε_{t-1}	-0.655*	0.132	-4.950	0.000

Diagnostic tests

		Prob			Prob
Normality	11.656	0.003	Heteroscedasticity	0.579	0.784
Serial correlation	1.213	0.318	CUSUM and CUSUMSQ		Stable

Notes: *, ** and *** is 1%, 5% and 10% statistically significant levels respectively.

The long run results in Table 7 revealed that both FDI and EXC have positive relationship with MCAP, which is contrary with Subair and Salihu (2010), Javed and Akhtar (2012), Abdul Malik and Amjad (2013), Arikpo, and Ogar (2018) and Ho (2019) that established a negative relationship between foreign direct investment and exchange rate on the stock market development. This is an indication that in the long run the negative relationship of the FDI and EXC will change to positive, which will facilitate MCAP, promoting the liquidity of the stock market and reducing the shocks in the market returns as suggested by Ahmad et al., (2015).

Table 7. Long run: dependent variable MCAP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.307**	0.125	2.461	0.021
EXC	0.688*	0.239	2.876	0.008
INT	-0.935	0.571	-1.638	0.114
FD	0.023	0.057	0.398	0.694
TB	-0.380*	0.215	-1.769	0.089
C	2.194	2.406	0.912	0.370

Notes: *, ** and *** is 1%, 5% and 10% statistically significant levels respectively

The Granger causal relationship in Table 8 reveals there is unidirectional causality from FDI to EXC only. This means that FDI could facilitate the appreciation of EXC in Nigeria. This could bring currency risk as emphasized by Abdul Malik and Amjad (2013) that if exchange rate appreciates it may later depreciate to cause capital flight. However, the causal relationship from FDI to EXC indicates that improvement exchange rate in Nigeria will in turn stimulate stock market development, and the macroeconomic variables shocks on the stock market returns will be reduced

Table 8. Toda-Yamamoto Granger causality results

Variables	FDI	EXC
FDI	-	0.564 (0.754)
EXC	7.083** (0.029)	

Notes: Statistically significant 5% (**) levels. The p-values are stated in the parentheses.

5. Conclusion and Policy Recommendations

This study considered the relationship of foreign direct investment, exchange rate, interest rate and financial development to stock market development in Nigeria. The results revealed that foreign direct investment and exchange rate do not facilitate stock market development in the short run, but in the long run, the reverse is the case. This means the effects of macroeconomic variables shock on stock market returns that support the current study and the combined negative relationship of foreign direct investment and exchange rate would only be in the short run but in the long run it promotes stock market performance, thus, improving the stock market liquidity. The present level of insecurity should be improved so that foreign investors would be attracted in order to increase the foreign exchange earnings to Nigeria such that the performances of the stock market activities would be stimulated. More so, as unidirectional causal relationship is emanating from foreign direct investment to exchange rate, policy makers should concentrate on ensuring enabling environment that will attract foreign investors. This is a welcome development to the economy since it needs more foreign resources to grow most especially now that the Africa Continental Free Trade Area (AfCFTA) agreement is exposing Nigeria to gain massive revenues in trade. Nigeria stands the chance to benefit considering the enormous human and capital resources available, which can be augmented with the foreign resources that can be channeled into valuable finished goods and services to trade within and outside the African continent. Thus, the policy makers can leverage on this through encouraging foreign investors into the stock market as they do in the other sectors of the economy. In particular foreign direct investment would enhance the liquidity in Nigeria's stock market.

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