# Empirical Analysis of Exchange Rate Volatility and Nigeria Stock Market Performance

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**Abstract:** Since 1993 Nigeria exchange rate started running beyond digit level as against United-state dollar amidst pursuance of growth of macroeconomic indicators. While available data show that growth in key macroeconomic indicators specifically exchange rate and inflation rate has impacted negatively on the growth of Nigerian stock market through GARCH process and ECM estimation techniques, interest rate was found to have impacted positively. This paper examined betweenexchange rate volatility and stock market performance using Generalised Autoregressive Conditional Heteroskedascity (1.1) (GARCH) model in establishing the relationship. A Vector Error Correction Model of stock market performance was estimated to examine the impact of exchange rate volatility. It was found from the available data spanning 1986 to 2013 that long run volatility in exchange rate has strong negative impact on the change in the performance of the Nigerian stock exchange market having proved the uni-directional relationship through pairwise granger causality test. The study recommends supporting fiscal policy and diversification to avoid subsequent external shocks because the main problem of Nigeria in the international market is its heavy dependence on oil and that manufacturing firms should produce quality goods that attract international patronage in order to have monetary and exchange rate control and remote causes should also be addressed like providing enabling business environment friendly atmosphere for domestic and foreign investors.

Keywords: Exchange rate, Market Capitalisation, Inflation rate and Interest rate

#### 1. Introduction

The existence of a stock exchange in a capital market helps to broaden the share ownership base of firms; and evenly distribute the nation's wealth by making it possible for people in different locations to own shares in a firm in another location by purchasing the shares, bond/stock through the simple mechanism of the capital market. The stock market plays a pivotal role in the growth of the industry and commerce of the country that eventually affects the economy of the country to a great extent through channeling idle funds from surplus to deficit units in the economy. As the economy of a nation develops, more resources are needed to meet the rapid expansion. The stock market serves as a channel through which savings are mobilized and efficiently allocated to achieve economic growth (Alile, 1984). The stock market tends to mirror the level of confidence in the economy in general and the financial system in particular. It reflects the strength of the productive sector and expectations about the stability of the financial system. The importance of the stock market in any economy can be seen in its vital role of mobilizing individual resources and channeling same to investors. These enable firms to acquire the much needed capital quickly, and by so doing helps in facilitating capital allocation, investment, and growth. It also assists in reducing investment risks due to the ease with which equities are traded, and play crucial role in helping to determine the level of economic activities in most economies (Yartey and Adjasi, (2007).

According to Umar and Soliu (2009) there is scarcely any country that lives in absolute autarky in this globalised world. The economies of all the countries of the world are linked directly or indirectly through asset and/or goods markets. This linkage is made possible through trade and foreign exchange. The price of foreign currencies in terms of a local currency (i.e. foreign exchange) is therefore important to the understanding of the growth trajectory of all countries of the world.Like other economic variables which include interest rate, inflation rate, unemployment rate, money supply, exchange rate is a strong economic indicator for assessing the overall performance of any economy. It is one of the macro-economic variables that reflect the strength or weakness of an economy (Sanusi, 2002). According to Olukole (1992) a persistently strong currency is a reflection of a strong economy while conversely, a persistently weak currency is a reflection of a weak and vulnerable economy however an appreciation of the local currency, for example, makes exporting goods unattractive and leads to a decrease in foreign demand and hence revenue for the firm and its value would fall. In Nigeria the story is not different, the stock market collapsed by 70% in 2008-2009. Naira trended slightly downward during the period averaging around N125 per US\$ from 2006-2008, but depreciated from №150.3 in 2010 to average of №153.90, №156.81 and №156.8 per US\$ in 2011, 2012 and 2013 respectively (World Fact Book, 2015). Since no economic activity operates in a vacuum, markets react promptly and uncharacteristically to rumuors of war, changes in regulatory environment; political and economic climate, among others. Developing countries like Nigeria have macro-economic instability as their greatest problem. Hence, resolute efforts must be exerted in determining the appropriate policy mix to achieve stability. However, one of the problems facing our country Nigeria is the effect of exchange rate instability on the economy

The subject of exchange rate fluctuation has become a topical issue in Nigeria because it is the goal of every economy to have a stable rate of exchange with its trading partners. Exchange rate management varies from time to

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time according to market dynamism, where supply and demand is unstable. There is floating exchange rate which is market determined, according to basket of currencies: The Central Bank allows exchange rate of naira to other currencies to be determined by market forces. This makes the currencies of other countries to be part in determining the value of the naira. However, the mechanism with which the conversion takes place is hinged on rate of industrial productivity where our finished goods need to be exchanged with other countries. Nigeria as a developing nation produces less and imports more of the output used in industry, this affects the rate of industrialization and the exchange rate. From 1986-2013, Nigeria has passed through series of exchange rate control, because productive base of the economy is weak, so the rate of exchange of naira to other currencies is weak, and this has direct proportionality between the exchange rate of naira and solidity of the productive base of the economy. Incidentally, exchange rate has been changing against the value of the naira consistently since 1990; this has adverse effect on manufacturing capacity utilization, exchange rate, export, Gross Domestic Products and rate of industrialization (Onyeizugbe and Umeagugesi, 2014). The goal of exchange rate stability in Nigeria was not reached in spite of the fact that the country embarked on devaluation to promote export and stabilize the rate of exchange. The failure to realize this goal subjected the Nigerian manufacturing sector to the challenge of a constantly fluctuating exchange rate. This was not necessitated by the devaluation of the naira but the weak and narrow productive base of the sector and the rising import bills also strengthening it.

The traditional models of the open economy have established the existence of a relationship between the stock market performance and the exchange rate behavior. The models show that changes in exchange rates affect the competitiveness of firms as variations in exchange rate affect the value of the earnings as well as the cost of its funds because many companies borrow in foreign currencies to finance their operations and hence its stock price (Dornbusch and Fischer, 1980).

Although the existing literature investigates the relationship between exchange rates and stock prices based on a twovariable framework, a number of studies have shown that such a system can be misleading due to the omission of inflation rate and interest rate as important variables. According to Adebiyi, Adenuga, Abeng, and Omanukwue (2014) exchange rate has positive significant impact on capital market performance and kolawole and olalekan (2014) which concluded that exchange rate volatility has very serious implication on Nigerian capital market. The study of Abram (1980), Cushman (1983, 1988), Coes (1981), Akhtar and Hilton (1984), Thursby and Thursby (1987), Kenen and Rodrik (1986), Kumar and Dhawan (1991), De Graiuwe (1988), and Caballero and Corbo (1989) found statistically significant evidence that exchange rate uncertainty does impede trade. Contrarily, the devaluation optimists believe that it will improve trade balance and thereby stimulate general economic activity of the developing countries (Balassa, 1964).

However, the controversy associated with the topical issue hasdrawn the need for an inquiry into the impact of

exchange rate on Nigeria stock market performance. It is therefore against this background that this research work seeks to examine the impact of exchange rate on stock market performance in Nigeria from 1981 to 2013. The study therefore intends to pursue the following objectives:

- 1. examine the causal relationship between exchange rate and Nigeria stock exchange
- 2. investigates the effects of exchange rate volatility on the Nigeria stock market performance

## 2. Conceptual Framework

Exchange rate is the price of a nation's currency in terms of another currency. An exchange rate thus has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly. In a direct quotation, the price of a unit of foreign currency is expressed in terms of the domestic currency. In indirect quotation, the price of a unit of domestic currency is expressed in terms of the foreign currency. An exchange rate that does not have the domestic currency as one of the two currency components is known as a cross currency, or cross state. There are three types of exchange rate viz: nominal exchange rate, real exchange rate and real effective exchange rate while Olisadebe (1991) identified two additional exchange rates namely nominal effective exchange rate and equilibrium exchange rate.Exchange rate can be floating or fixed. While floating exchange rates-in which currency rates are determined by market forces-are norm for most major nations, some nations prefer to fix or peg their domestic currencies to a widely accepted currency like the US dollar.

Market Capitalization (Market Value): Market capitalization (also known as market value) is the share price times the number of shares outstanding. The product of the total number of issued and fully paid shares of a company and its current price on a recognised exchange. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies do not include investment companies, mutual funds, or other collective investment vehicles.

#### 2.1 Theoretical Review

Classical economic theory hypothesises that stock prices and exchange rates can interact. The first approach is encompassed in 'flow oriented' models (Dornbusch and Fisher 1980), which postulate that exchange rate movements cause stock price movements. In the language of Granger-Sim causality, this is termed as 'uni-directional' causality running from exchange rates to stock prices, or exchange rates 'Granger-cause' stock prices. This model is built on the macro view that as stock prices represent the discounted present value of a firm's expected future cash flows, then any phenomenon that effects a firm's cash flow will be reflected in that firm's stock price if the market is efficient.

The second is stock-oriented economic theory" captured in the portfolio balance model which postulates a negative relationship between stock prices and exchange rates (Branson et. al 1977). The crux of the theory is that a rise in domestic stock prices would attract capital flows, which increase the demand for domestic currency and cause exchange rate to appreciate. In contrast to "flow oriented" models, "stock-oriented" or 'portfolio balance theory postulate that movements in stock prices Granger-cause movements in the exchange rate via capital account transactions. The degree to which stock oriented models explain currency movements is a function of stock market liquidity. In the flow oriented model or portfolio balance theory–it postulate that currency movements influence a firm's earnings and hence causes change in stock prices stock oriented models suggest that movements in stock prices Granger-cause movements in the exchange rate via capital account transactions.

#### 2.2 Empirical Review

Subair and Salihu (2013) examined exchange rate volatility and the stock market evidenced from Nigerian through the Error Correction model, this study investigated the effects of exchange rate volatility on the Nigeria stock markets. The study found that the exchange rate volatility generated via GARCH process exerts a stronger negative impact on the Nigeria stock markets. However the rate of inflation and interest rate did not have long run relationship with stock market capitalization since the major participant in the market is government. The study recommended that a coordinated monetary and fiscal policy should be put in place to check mate the fluctuation of exchange rate in order to deepen the depth of the Stock Market.

Olugbenga (2012) examined the long-run and short-run effects of exchange rate on stock market development in Nigeria over 1985–2009 using the Johansen co-integration tests. A bi-variate model was specified and empirical results show a significant positive stock market performance to exchange rate in the short-run and a significant negative stock market performance to exchange rate in the long-run. The Granger causality test shows strong evidence that the causation runs from exchange rate to stock market performance; implying that variations in the Nigerian stock market is explained by exchange rate volatility.

Mlambo, Maredza and Sibanda (2013) assessed the effects of currency volatility on the Johannesburg Stock Exchange. An evaluation of literature onexchange rate volatility and stock markets was conducted resulting into specification of an empirical model. The Generalised Autoregressive Conditional Heteroskedascity (1.1) (GARCH) model was used in establishing the relationship betweenexchange rate volatility and stock market performance. The study employed monthly South African data for the period 2000-2010. The data frequency selected ensured an adequate number of observations. A very weak relationship between currencyvolatility and the stock market was confirmed. The research finding is supported by previous studies. Prime overdraft rate andtotal mining production were found to have a negative impact on Market capitalisation. Surprisingly, US interest rates were found to have a positive impact on Market capitalisation. The study recommended that, since the South African stock market isnot really exposed to the negative effects of currency volatility, government can use exchange rate as a policy tool to attractforeign portfolio investment. The weak relationship between currency volatility and the stock market suggests that the JSE canbe marketed as a safe market for foreign investors. However, investors, bankers and portfolio managers still need to be vigilantin regard to the spillovers from the foreign exchange rate into the stock market. Although there is a weak relationship betweenrand volatility and the stock market in South Africa, this does not necessarily mean that investors and portfolio managers neednot monitor the developments between these two variables.

Zubair (2013) uses Johansen's co-integration to test for the possibility of co-integration and Granger-causality to estimate the causal relationship between stock market index and monetary indicators (exchange rate and M2) before and during the global financial crisis for Nigeria, using monthly data for the period 2001–2011. Results suggest absence of long-run relationship before and during the crisis. The Granger-causality tests show a uni-directional causality running from M2 to ASI before the crisis while during the period of the crisis there is absence of causality between the variables. This suggests that ASI show responsiveness to M2. Thus, absence of the direct linkage between ASI and Exchange rate shows that the market is inefficient and perhaps not derived or guided by the fundamentals.

Acikalinet. al. (2008) using co-integration test and vector error correction model submit that exchange rate provides a direct long run equilibrium relationship with stock market index. Findings from the study reveal two ways of causalities between the two variables; implying that prediction of ISE is possible using the past information on the moves of exchange rate. The study of Ali et. al. (2010) on Pakistan Stock Exchange reveals that exchange rate has no co-integration with stock exchange price index. The authors went further to establish that there is no granger causality between exchange rate and stock market performance.

Usman and Adejare (2014) empirically investigated the impact of interest rate and exchange rate on capital market performance in Nigeria. Secondary data were obtained from central bank of Nigeria statistical bulletin and Security exchange commission (SEC) covering the period of 1978 to 2012. Multiple regressions and Unit roots were employed to analyze data on variables such as interest rate, exchange rate, and market capitalization with the adjusted R2 which significant at 0.9256 (92.6%), it signifies that interest rate and exchange rate accounted for 92.6% of the variation in the influence of the market capitalization in Nigerian capital market. It is therefore concluded that exchange rate has positive impact on capital market but there is a negative relationship between interest rate and capital market performance. The result suggests that Government should ensure appropriate determination of interest rate level that will break the double-edge effect of interest rate on savers and local investors in order to encourage investment and transactions in Nigerian Capital Market. Only the interest rate policy that can attract savings mobilization and encourage domestic investment will help the economy. Kasmanet al. (2011) investigates the effects of interest and

Kasman*et al.* (2011) investigates the effects of interest and exchange rate changes on Turkish bank's stock returns and finds significant negative impact. Their results further

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indicate that interest and exchange–rate volatility are the major determinants of conditional bank stock return volatility. Giraitis, *et al.* (2009) examines ARCH models, their stationarity, long memory properties and the limit behaviour of partial sums of their processes and their modifications like: linear ARCH, and bilinear models. In line with other theoretical studies, Ling and McAleer(2002) derive the necessary and sufficient conditions for the existence of higher order moments for GARCH and asymmetric *power* GARCH models.

Yaya and Shittu (2010) examined the impact of inflation and exchange rate on conditional stock market volatility. Sentana's QGARCH model was generalized to include the asymmetries in inflation and exchange rate that were not allowed in linear GARCH (p, q) model of Bollerslev (1986). Nonlinear specifications of QGARCH model then show the significant relationship of inflation and exchange rate to conditional stock market volatility.

#### 3. Research Methodology

This research work is fundamentally analytical as it embraces the use of secondary data in examining the effect of exchange rate volatility on the Nigeria stock exchange market. Of course, the analytical tools consist of the econometrical tests (i.e unit root test ARCH and GARCH models, and vector error correction test). The data for the study was obtained mainly from secondary sources, particularly from Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS), Security and Exchange Commission bulletin and some publications such as the CBN statistical Bulletin and the internet and other related literature.

The study adopted stationarity test using the Augmented Dickey Fuller Test (ADF). This test is aimed at ascertaining the stationarity properties of the time series in order to avoid spurious regression or random walk in the regression estimates and ensure reliability of estimates and therefore the application of appropriate test statistic for long run relationship/effect. The ADF formula is thus specified as:

$$\Delta P_{it} = \beta_1 + \beta_{2t} + \sigma P_{it-1} + \alpha \sum_{t=1}^{m} \sum \Delta P_{it-1} + \varepsilon_{it} - \cdots - (1)$$

Thus, Granger causality test was employed to determine the causal relationship between the variables under study. There are four possible outcomes regarding causal relationships: unidirectional causality, bidirectional causality and finally, lack of any causal relationship between variables. It is thus stated as:

 $y_t = a_0 + a_1 y_{t-1} + \dots + a_l y_{t-l} + b_1 x_{t-1} + \dots + b_l x_{t-l} + e_t - \dots - (2)$   $x_t = a_0 + a_1 x_{t-1} + \dots + a_l x_{t-l} + b_1 y_{t-1} + \dots + b_l y_{t-l} + u_t - \dots - (3)$ for all possible pairs of series in the group.

The ARCH model has become a popular method because its variance specification can capture commonly observed features of the time series of financial variables; in particular, it is useful for modeling volatility and especially changes in volatility over time (Hill et al 2008) cited in Arabi (2012). Most economic and financial time series and especially conditional stock market volatility has always been studied using the ARCH and GARCH models

introduced by Engle (1982) and Bollerslev (1986) respectively. Assuming linearity, the first and second conditional moments of return series (given its past behaviour) can be jointly estimated by GARCH (p, q) in order to characterize the dependence of future observations on past values.

Therefore, the jointly estimated GARCH (1, 1) model introduced by Bollerslev (1986) is given by;

$$Y_{t} = X_{t}^{1} \theta + \varepsilon_{t} - \dots - (4)$$
  

$$\alpha_{t} = \delta_{t}Z_{t}, Z_{t}: N(0, 1) - \dots - (5)$$
  

$$\delta_{t}^{2} = u_{t} + \alpha\varepsilon_{t-1}^{2} + \beta\delta_{t-1}^{2} - \dots - (6)$$

Where, the mean equation given in (4) is written as a function of exogenous variables with an error term, u>0,  $\alpha>0$ ,  $\beta\geq0$ , u is a constant term,  $\varepsilon_{t-1}^2$  is news about volatility from the previous period measured as the lag of the squared residual from the mean equation (the ARCH) and  $\delta_{t-1}^2$  is the last periods forecast variance (the GARCH term).

GARCH (p, q) is the Generalised ARCH by Bollerslev (1986) models used widely especially in financial time series analysis:

Following Saryar (2007) and Yaya and Shittu (2010), the impact of asymmetric effect of shocks on volatility will be estimated using Santena's QGARCH (1, 1) model,

 $\begin{aligned} \alpha_t &= \mu + \varepsilon_t, \ \varepsilon_t = \delta_t Z_t, \ Z_t: \ N(0, 1) - - - - - (9) \\ \delta_t^2 &= u + \alpha \varepsilon_{t-1}^2 + \beta \delta_{t-1}^2 + \gamma \varepsilon_{t-1} - - - - (10) \end{aligned}$ Where the term  $\gamma \varepsilon_{t-1}$  makes it possible for positive and

negative shocks to have different effects on conditional volatility, once the appropriate model is determined.

Thus the estimation of the impact of exchange rate, inflation rate and interest rate on stock market can be investigated by specifying the model below;

 $MCAP_{t} = \mu + \lambda_{1}(exchange rate)_{t} + \lambda_{2}(inflation rate)_{t} + \lambda_{3}(interest rate)_{t} + \varepsilon_{t}$ 

 $\varepsilon_t = \delta_t Z_t, Z_t: N(0, 1) - \dots - \dots - (11)$ 

 $\delta_t^2 = \mathfrak{u} + \alpha \varepsilon_{t-1}^2 + \beta \delta_{t-1}^2 + \theta(\operatorname{exchange rate})_{t-1} + \Phi(\operatorname{inflation rate})_{t-1} + \Psi(\operatorname{interest rate})_{t-1} - (12)$ 

The above model estimates the impact of the previous period exchange rate, inflation rate and interest rate in order to capture time variation in the mean and variance equations.

The ECM incorporates both the short run and the long run effects. When equilibrium holds  $[Y_{t-1} - \beta_0 - \beta_1 X_{t-1}] = 0$  but in the short run when equilibrium exists, this term is non-zero and measures the distance by which the system is away from equilibrium during time t. Thus,  $1 - \alpha_1$  provides an estimate of the speed of the adjustment of the variable Y<sub>t</sub>.

#### 4. Result of Unit Root Tests

The test results of the Augmented Dickey-Fuller statistic for all the time series variables used in the estimation are presented in the Table 1. From the unit root test results of the variables, all the variables (MCAP, EXR, INFL and INTR) were integrated (i.e. not unit root) at order one i.e. I(1) only stock market capitalization and inflation rate were

Volume 4 Issue 4, April 2015 www.ijsr.net stationary at a level at 5% critical value when estimated with constant and trend.

#### 4.1 Causality test Result

From the result of pairwise granger causality from Table 2 revealed that there is uni-directional relationship between exchange rate and stock market capitalization in Nigeria running from exchange rate to stock market capitalization in Nigeria.it thus shows that exchange rate granger cause Nigeria stock exchange at 5% critical level. This finding is in line with the flow oriented economic theory which earlier specified 'flow oriented' models which postulate that exchange rate movements cause stock price movements termed as 'uni-directional' causality running from exchange rates to stock prices.

#### 4.2 GARCH Estimation Output

The appropriate model for stock market volatility considering the effect of exchange rate, inflation rate and interest rate is given as,

(0.0566) (0.0000) (0.0000) (0.0000) (0.0000) (0.0000)

 $R^2$ =0.451625, Akaike info criterion=29.05528, Schwarz criterion=29.37272, Hannan-Quinn criterion=29.16208

#### $\overline{R}^2$ =0.394896, Durbin Watson=1.585967

From the results of the exchange rate and interest rate on the mean equation are negative and positive respectively and all were significant at 55 critical levels while the effect of inflation is negative but not significant. The estimated sampled variance  $({}^{\rm U}/_{1-\alpha})$  indicates that the impact of shocks on the conditional variance will last for a long time thus high persistent volatility on market capitalization. This result is in line with that of Johansen co-integration estimates which reported a negative influence of exchange rate and inflation rate but positive effect of interest rate which may not be unconnected with the government participation irrespective of the interest rate. Therefore, 1% increase in exchange rate causes increase in the conditional volatility of stocks in Nigeria by 45.16%.

#### 4.3 Johansen Hypothesized Co-integration Result.

The Johansen hypothesized co-integration was carried out to determine the number of stationary long-run relationships among the variables included in the study. It offers two tests, the trace test and the Eigen value test, with a view to identify the number of co-integrating relationships. The results are shown in the Table 3 and 4. From Table 3 it revealed that there is co-integration among the variables. This is because the trace statistic of 52.04075 is greater than the critical value of 47.85613 at 5% level of significance. We reject the null hypothesis of none \* of the hypothesized number of co-integrating equations. Accordingly, Trace statistic test indicates 1 co-integrating equations at 5 percent level of

significance. For the remaining number of hypothesized cointegrating Equations (at most 1, 2 and 3), we do not reject the null hypothesized as their trace statistics values are less than the critical values at 5 percent level of significance.

From the Table 4, it revealed that, there is 1 co-integration among the variables. This is because; the Max-Eigen statistics of 33.71754 is greater than the critical value of 27.58434 of none hypothesized number of co-integration at 5% level of significance. We therefore reject the null hypothesis of none hypothesized number of co-integrating equation meaning that atleast there is 1 co-integrating equation reported in the Max-Eigen test. Accordingly, the Max-Eigen test indicates 1 co-integrating equation at 5 percent level of significance. Thus, the numbers of hypothesized co-integrating equations (at most 1, 2 and 3) were not rejected since their Max-Eigen statistics values are less than the critical values at 5 percent level of significance. This implies that there is a long-run relationship between exchange rate and stock market capitalization in Nigeria.

## 4.4 The Impact of Exchange rate on Stock market capitalization in Nigeria

In order to determine the nature of the long run relationship by using the normalized Johansen co-integrating equation this is based on the lowest log likelihood.

It is stated as: MCAP= -128.1594 - 15.35335EXR - 79.83072INFL +176.9785INTR

(2.31162) (11.6943) (38.1814)

Note: Standard Errors in parenthesis.

The coefficient of exchange rate is correctly signed (negative). The coefficient of the exchange rate is statistically significant at 5% critical level. It implies that, 1% increase in EXR will lead to 15.35335 decreases in stock market capitalization (MCAP). Thus, there is strong negative and significant relationship between exchange rate and market capitalization. This is at variance with the findings of Usman and Adejare (2014) who reported that exchange rate has positive significant impact on capital market performance, kolawole and olalekan (2014) who concluded that exchange rate volatility has very serious implication on Nigerian capital market, Acikalinet. al. (2008) who submitted that exchange rate provides a direct long run equilibrium relationship with stock market index but conforms to Subair and Salihu (2013) who found that the exchange rate volatility generated via GARCH process exerts a stronger negative impact on the Nigeria stock markets and Kasmanet al. (2011) that investigated the effects of interest and exchange rate changes on Turkish bank's stock returns and found significant negative impact. Thus the result indicates that long run volatility in exchange rate had strong impact on the change in growth rate of stock market capitalization.

More so, the coefficient of INFL is correctly signed (negative). However, the coefficient of the Inflation rate is statistically significant at 5% critical level. Thus, it implies that, 1% increase in INFL will lead to 79.83072 decreases in stock market capitalization (MCAP). This finding obeys the theoretical underpinnings of the relationship.

Nonetheless, the coefficient of interest rate is positive and not correctly signed. This means that coefficient of interest rate has a positive relationship with stock market capitalization (MCAP). Thus, 1% increase in interest rate will lead to 176.9785 increases in stock market capitalization in Nigeria. This is at variance with the findings of Usman and Adejare (2014) who reported that interest rate has negative significant impact on capital market performance as supported by Akingunola and Adekunle (2012) which concluded that that as the rate of interest increases, the performance of the capital market reduces.

#### 4.5 Empirical Results of the Dynamic Model (ECM)

There is long-run equilibrium relationship among the variables in the regression model; however, it is the short-run that transmit to the long-run. Thus, error correction mechanism is therefore used to correct or eliminate the discrepancy that occurs in the short-run. The coefficient of error-correction variable gives the percentage of the discrepancy between the variables that can be eliminated in the next time period. The coefficients of the explanatory variables in the error correction model measure the short-run relationship. Thus, the first order specification of the model VAR is selected with a constant and a time trend. The results are summarized in Table 5

The short run estimates in Table 5 shows that, MCAP in the current period (t) is influenced by 188.7280 holding all other variables constant. The coefficient of  $AGOUT_{t-1}$  (i.e in the previous year) is correctly signed, being positive. The coefficient of exchange rate in the previous year not is statistically significant at 5% level in the short run. This finding conforms to Mlambo, Maredza and Sibanda (2013) who assessed the effects of currency volatility on the Johannesburg Stock Exchange and found a very weak relationship between currencyvolatility and the stock market. However, the coefficient of MCAP<sub>t-1</sub> and INFL<sub>t-1</sub> negates the apriori expectation while only MCAP<sub>t-1</sub> that is statistically significant at 5% level. Furthermore, the coefficient of error correction term is not significant but with the expected sign and low magnitude (-0.107070). Its magnitude indicates that if there is any deviation the long run equilibrium is adjusted slowly where about 10.7% of the disequilibrium maybe removed each period (i.e each year). This shows that, the speed of adjustment to where the exchange rate will equilibrate the stock market capitalization in Nigeria even when there is initial disequilibrium is at the rate of 10.7%

It is obvious from the coefficient of multiple determinations  $(R^2)$  that the model has a good fit as the independent variables were found to jointly explain 75.05% of the movement in the dependent variable with the  $R^2$ -adjusted  $(R^2)$  of 64.82%. The fitness of the model is continued by the F-statistic which is significant at 7.7 which explains the overall significance of all the variables incorporated in the model.

#### 5. Conclusion

This study concludes that long run volatility in exchange rate had strong negative impact on the change in the performance of the Nigerian stock exchange market.

## 6. Recommendations

Nigeria needs a supporting fiscal policy because the present economic woes bedeviling the country cannot be attributed wholly to the current crash in the oil prices but to the lack of monetary and fiscal policy coordination in recent times. Diversification should also be embarked upon to avoid subsequent external shocks because the main problem of Nigeria in the international market is its heavy dependence on oil.

Manufacturing firms should produce quality goods that attract international patronage in order to have monetary and exchange rate control. This is because the floating nature of Nigerian exchange rate today has obeyed the impossible trinity which allows monetary autonomy and capital market integration giving up exchange rate stability and to should encourage the development of local industrial subsector in order to boost GDP and avoid subsequent crash of naira against United-state dollar. Remote causes should also be addressed like Government providing enabling business environment friendly atmosphere for domestic and foreign investors' like constant power supply, good network and others. This is because, Nigeria is ranked 122th, 151th, 185<sup>th</sup>, 185<sup>th</sup>, 13<sup>th</sup>, 68<sup>th</sup>, 170<sup>th</sup>, 158<sup>th</sup>, 136<sup>th</sup> and 107<sup>th</sup> for starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency respectively (Doing Business, 2014)

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Table 1. Result of Olite Root Test for Order of Integration of the Variables (ADI)						
Variables	ADF with Constant and Trend			ADF with Constant		
	At level	<b>First Difference</b>	Order of	At level	<b>First Difference</b>	Order of
			Integration			Integration
MCAP	-2.642379	-6.830911	I(1)	-3.702835	-6.850721	I(0)
Prob*	0.0953	0.0000		0.0367	0.0000	
EXR	0.114082	-4.847398	I(1)	-2.057546	4.854183	I(1)
Prob*	0.9619	0.0005		0.5488	0.0025	
INFL	-2.857822	-5.946060	I(1)	-3.959028	-5.849850	I(0)
Prob*	0.0617	0.0000		0.0212	0.0002	
INTR	-2.907240	-5.607344	I(1)	-2.669370	-6.381772	I(1)
Prob*	0.0572	0.0001		0.2555	0.0001	

Table 1: Result of Unit Root Test for Order of Integration of the Variables (ADF)

Source: Computed from the Unit Root Test (ADF) at 5% critical level.

Note: These critical values are computed from Mackinnon (1996). If  $Z(t) \ge ADF$  (t-statistic), it implies that unit root exist. If  $Z(t)^* \le ADF$  (t-statistic), it implies that unit root does not exist.

Table 2						
Pairwise Granger Causality Tests						
Date: 02/23/15 Time: 22:06						
Sample: 1981 2013						
Lags: 2						
Null Hypothesis:	Obs	F-Statistic	Prob.			
INFL does not Granger Cause EXR	31	0.91616	0.4126			
EXR does not Granger Cause INFL 2.16896						
INTR does not Granger Cause EXR 31 0.66376						
EXR does not Granger Cause INTR 0.07198						
MCAP does not Granger Cause EXR 31 0.44103						
EXR does not Granger Cause MCAP 5.94198						
INTR does not Granger Cause INFL	31	2.60370	0.0932			
INFL does not Granger Cause INTR 2.84293						
MCAP does not Granger Cause INFL 31 0.76097						
INFL does not Granger Cause MCAP 0.39768						
MCAP does not Granger Cause INTR 31 0.48004						
INTR does not Granger Cause MCAP 0.21680 0.8065						

Source: E-views Output, 2015

#### Table 3: Result of Unrestricted Co-integration Rate Test (Trace)

Null hypothesis	n-r	Hypothesized No of	Eigen value	Trace statistic	0.05 critical	Prob**
		CEs			value	
r = 0	3	None *	0.674996	52.04075	47.85613	0.0192
r ≤ 1	2	At most 1	0.335240	18.32321	29.79707	0.5423
$r \le 2$	1	At most 2	0.183196	6.073320	15.49471	0.6869
$r \le 3$	0	At most 3	8.79E-05	0.002636	3.841466	0.9566

Trace test indicates 1 co-integrating equation(s) at the 0.05 level \*denotes rejection of the hypothesis at the 0.05 level. \*\*Mackinnon-Haug-Michelis (1999) p-values

Table 4: Result of Unrestricted Co-integration Rank Test (Maximum Eigen	value)	
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Null hypothesis	n-r	Hypothesized No of	Eigen value	Max-Eigen	0.05 critical	Prob**
		CEs		statistic	value	
r = 0	3	None *	0.674996	33.71754	27.58434	0.0072
$r \le 1$	2	At most 1	0.335240	12.24989	21.13162	0.5232
$r \le 2$	1	At most 2	0.183196	6.070684	14.26460	0.6042
r ≤ 3	0	At most 3	8.79E-05	0.002636	3.841466	0.9566

Max-Eigen value test indicates 1 co-integrating equation(s) at the 0.05 level \*denotes rejection of the hypothesis at the 0.05 level.

\*\*Mackinnon-Haug-Michelis (1999) p-values.

Also, the Eigen value test rejects the null hypothesis if the Eigen value test statistics exceeds the respective critical values.

Table 5: V	Vector Error-	Correction Estimates	
• 11	C (C · ·		

Variable	Coefficient	Standard errors [t-statistic]
AGOUT <sub>t-1</sub>	0.597658	(0.29052)[2.05721]
AGRMIM <sub>t-1</sub>	-467.082	(874.526)[-0.5341]
GFCF <sub>t-1</sub>	-0.24793	(0.37804)[-0.65583]
VLG <sub>t-1</sub>	-6.558502	(5.82936)[-1.12508]
GSAG <sub>t-1</sub>	-1.09993	(4.70739)[-0.23366]
ECM	-0.04175	(0.04085)[-1.02205]

(235.832)[1.18662]

279.843

 $R^{2=} \underbrace{0.932834}_{R^{2} = 0.871264 \text{ F- statistic} = 15.15096}$ Akaike information criterion = 96.24032 Schwarz criterion = 99.43088 Figure 1

