Macroeconomic Determinants of Stock Market Performance in Nigeria, 1986-2016

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Abstract

The paper is part of larger research agenda with the purpose of exploring some of the determinants of stock market in Nigeria for the period 1986-2016. The variables employed included market capitalization, per capita income, interest rate, exchange rate, inflation and the economy level of openness. The econometric methodology is error correction model and the paper finds that interest rate, inflation rate and past level of market capitalization were the major determining factors for trading activities at the Nigerian Stock Exchange. The paper also finds a negative relationship between stock market performance and inflation, interest rate as well as per capita income. Among other things, the paper recommends that the monetary authority should ensure moderate interest rate that encourages investment even as the current double digit inflation in the economy should be checked.

Keywords: Nigerian Stock Exchange, Stock Market, Co-integration and Error Correction Model

1. Introduction

A unique benefit of the stock market to corporate entities in any economy is the provision of long-term, non-debt financial capital. Through the issuance of equity securities, investors are able to acquire perpetual capital for development and at the same time enable companies to avoid over-reliance on debt financing, thus improving corporate debt-to-equity ratio. According to Saibu, Alenoghena, Olaniyi and Tewogbade (2016), the stock market is an economic institution which promotes efficiency in capital formation and allocation as well as ensures financing of new projects thereby expanding and modernizing industrial and commercial concerns. The determination of the overall growth of an economy depends on how efficiently the stock market performs its allocative functions of capital. As the stock market mobilizes savings, it also allocates a larger proportion of it to companies with relatively high prospects as indicated by its rate of returns and level of risk. The importance of this function is that capital resources are channeled by the mechanism of the forces of demand and supply to those firms with relatively high and increasing productivity thus enhancing economic expansion and growth (Andabai & Tonye, 2015).

In the last few decades, stock market indices have witnessed significant crashes in both developed and emerging markets. The most commonly publicized instance was the 1987 Wall Street crash in the United States where the Dow Jones industrial average fell by 22.6%, the largest one-day decline in recorded stock market history. According to Nwokoma (2004) cited in Uwalomwa, Olowe and Agu (2012), this significant crash was not confined to the United States only, but spread to other developed systems. As at October 1987, stock markets in Australia had fallen to 41.8%, Canada 22.5%, Hong Kong 45.8% and the United Kingdom 26.4%. These collapses nevertheless, generated a lot of research in developed economies on the extent to which stock market indices really reflect economic fundamentals. In developing economies like Nigeria, pricing of securities particularly equities in the secondary market has been the subject of debate. Criticism has come not only from senior executives of quoted companies who at times perceived their shares as undervalued but also from investors, experts in security pricing, stockbrokers in other developed exchanges, and other observers of Nigeria capital market.

In 2005, Nigeria's stock market performance reveals that market capitalization as a ratio of GDP was at 19.5% while value of stock as a ratio of GDP stood at 2.1%. As a result of steady improvement in the economy, market capitalization as ratio of GDP in 2007 reached all-time high of 56.0% while value of stock recorded 8.9%. Arising from global financial crises which began in 2008, the performance of market indicators assumed a negative trend. Thus, both market capitalization and value of stock as ratio of GDP declined to 39.7% and 6.9% respectively in 2008. They reached all-time low of 16.1% for market capitalization and 1.0% for value of stock as ratio of GDP respectively in 2011. In 2016, market capitalization as ratio of GDP oscillated to 17.2% and value of stock also recorded marginal increase as it stood at 1.3%. These performances, not withstanding, has not encourage the growth of investment in Nigeria in recent time thereby negating one of the core values of any capital market around the world. Likewise, average stock price of the banking sector which stood at ₦52 in 2007 declined to ₦37 in 2016 prompting analyst to conclude that the Nigerian capital is inherently unstable.

Notably, the country stock market is characterized by complexities arising from trends in globalization and increased variety of new instruments being traded. They include equity options, derivatives of various forms, index futures etc. This is further exacerbated by global financial crisis of 2008 and the current recession which began since 2014, all of which has made the Nigerian capital market illiquid resulting in downward trend of market indicators. Consequently, stocks of some companies are becoming less attractive to long-term investors and very risky to invest on. There is the risk associated with insecurity occasioned by the deadly Islamic Boko Haram and Fulani Jihadists otherwise known as Fulani herdsmen in Nigeria. Also, there is epileptic power supply which forces most firms to generate their domestic sources of power thereby making the cost of doing business in Nigeria very high leading to low returns on investment. As a result, most foreign investors are now patronizing other emerging markets despite the fact that Nigeria is the most preferred destination for investors in Africa. In the view of Osisanwo and Atanda (2012), the NSE capitalization dropped from its peak of ₦13 trillion in 2008 when the financial turmoil started spreading to emerging markets to the turn of ₦4.9 trillion which is equivalent to ₦8.1 trillion or 62% at the end of 2009. In 2016, stock market capitalization stood at ₦12 trillion from ₦61.8 trillion it recorded in 2013. It is in the light of these problems that this study was undertaken to find solutions.

The objective of the paper therefore is to identify key macroeconomic determinants for the Nigerian stock market. Consequently, the sequence of the paper is clear. Section two establishes brief theoretical and empirical literature. Section three depicts the methodology of the study. Section four gives the empirical results and discussion of findings while the last section does not only conclude the study but also proffer policy recommendations.

2. Review of Related Literature

The capital market consists of primary and the secondary markets. The primary market provides the avenue through which governments and corporate bodies raise fresh funds through the issuance of securities. Fresh funds can be raised through public offers, rights issues and private placements. The secondary market which can be organized or unorganized provides investors the opportunity to buy or sell securities that were earlier issued in the primary market (Uwalomwa et al, 2012). The distinguishing factor between the two segments is that in the primary market, the funds raised from investors go to the issuing entity, while in the secondary market; the proceeds from the transactions go to investors. The ease of securities' conversion into cash is an important determinant of the efficiency of the secondary market and indeed the capital market in general. Essentially, the development of the capital market through the promotion of private capital investment is anchored on the Nigerian Stock Exchange (NSE). Since the introduction of Structural adjustment programme (SAP) in 1986 there has been a significant growth in the country's stock market. This was as a result of deregulation of the financial sector and the privatization exercises, which exposed investors and companies to the relevance of the stock market. Equity financing became one of the cheapest and flexible sources of finance from the capital market and remain a critical element in the sustainable development of the economy.

According to Nneji (2013), a capital market is constituted when a network of financial institutions interact to mobilize and allocate long term funds to productive investment. The long term capitals are exchanged for financial assets issued by borrowers or traded by holders of previously issued assets. The capital market therefore serves an important function of bringing together deficit and surplus units of an economy. Without this function the capital market is rendered useless as the opportunity for investment and production of goods and services for development is eliminated.

From the empirical space, a number of studies seeking to establish the determinants of stock market exist in the literature. Nwokoma (2002) scrutinizes the long-run relationship between stock market and some macroeconomic indicators. His findings show that only industrial production and level of interest rates (a proxy for 3-month commercial bank deposit rate) have a long-run relationship with stock market returns. Also, he finds that the Nigeria market responds more to its past prices than changes in the macroeconomic variables in the short run. Osunibi (2002) examines the effect of stock market on economic growth in Nigeria using the data for the period 1980 to 2000. The study employed ordinary least squares regression (OLS) method and finds a positive relationship between growth and all the stock market development variables used. Ibrahim and Aziz (2003) explore the relationship between stock prices and industrial production, money supply, consumer price index and exchange rate in Malaysia. The study finds positive long-run relationships between stock prices and industrial production as well as CPI contrary to its negative response to money supply and exchange rate. Kyereboah, Anthony and Kwame (2008) examine how macroeconomic indicators affect the performance of Ghana stock market using quarterly time series data covering the period 1991 to 2005. They find that lending rates from deposit money banks have an adverse effect on stock market performance which serve as major hindrance to business growth in Ghana. Also, inflation rate was found to have a negative effect on stock market performance.

In Maku and Atanda (2009), their study focuses on the long- and short-run macroeconomic shocks effect on the Nigerian capital market between 1984 and 2007. Employing error correction model (ECM), the study finds

that the NSE all share index is more responsive to changes in exchange rate, inflation rate, money supply and real output. Samuel and Oka (2010) appraise the implications of the efficient-market hypothesis and the levels of market efficiency. They utilized primary data obtained from questionnaire on Likert scale and descriptive statistics. The study finds that information contributed to the efficiency of the Nigerian capital market to a great extent. Osisanwo and Atanda (2012) analyze the determinants of stock market returns in Nigeria using the OLS method on data covering 1984 - 2010. They find that interest rate, previous stock return levels, money supply and exchange rate were the main determinants of stock returns in Nigeria. Daferighe and Charlie (2012) investigate the impact of inflation on stock market performance in Nigeria using time series data from 1991 to 2010.The stock market variables were market capitalization (MCAGDP), total value traded ratio (TVMS), percentage change in all-share index (%ΔASI) and turnover ratio (TOR). Using a simple linear regression, the study finds that all stock market variables were negatively related to inflation in convergence to a priori expectation except for TOR which showed a positive relationship. Uwalomwa et al, (2012) scrutinize the determinants of share prices in Nigeria for the period, 2006 - 2010. The paper employs regression technique to model share price as a function of financial performance, dividend payout and financial leverage. The paper observes a significant positive relationship between firms' financial performance and market value of share prices in listed firms at the NSE.

Nneji (2013) scrutinizes the efficiency of the Nigerian capital market for the period 1986 to 2009. The study employs co-integration and vector error correction model and results revealed that a significant relationship exists between capital market performance and economic development. He argues that there is still room for improvement in the capital market mainly because of high level of inefficiency within the period of study. Owolabi and Adegbite (2013) examine the effect of inflation on capital market performance in Nigeria covering the period, 1970 to 2010. The study uses multiple regressions technique to explore the contemporaneous dynamics between inflation rate, market capitalization, all-share index, market volume and market turnover as well as gross domestic product. The study finds that inflation accounts for 18.2% variation in capital market performance. Also, it finds evidence of negative relationship between inflation and capital market performance. In Kenya, Barasa (2014) assesses the determinants of stock market performance in Nairobi Securities Exchange (NSE) for the period, 2000 and 2013. The study uses variables such as inflation rate, money supply and real GDP per capita and finds a positive relationship between the stock market performance and the macro-economic variables in Kenya. Likewise, the study finds that the relationship between inflation and stock market performance is inverse and statistically insignificant. The study by Omorokunwa and Ikponmwosa (2014) accounts for the variation in stock price volatility occasioned by changes in inflation, exchange rate, GDP and interest rate covering the period, 1980 - 2011. Using generalized autoregressive conditional heteroskedasticity (GARCH) model, the study finds evidence of stock prices volatile with weak effect from interest and exchange rates and strong effect from inflation rate making the variable as the main determinant of stock price volatility in Nigeria.

Andabai and Tonye (2015) assess the relationship between stock market performance and manufacturing sector growth in Nigeria using time series data, 1987-2013. Employing OLS methodology, the study finds a positive significant relationship between stock market performance and manufacturing sector as well as between new issues and manufacturing sector in Nigeria. The study recommends that market forces should be allowed to operate without any hindrance because interference in security pricing is inimical to the performance of the stock market and the manufacturing sector growth in Nigeria. Ahmad, Abdullah, Sulong and Abdullahi (2015) investigate the relationship between stock market returns and macroeconomic variables namely: broad money supply, nominal effective exchange rate, treasury bills rate, foreign direct investment, per capita income as well as gross domestic saving spanning 1984 to 2013. The study finds evidence of a long-run equilibrium relationship between stock market returns and the macroeconomic variables. The study also finds the existence of both unidirectional and bidirectional causality between some of the macro-variables and stock market returns in Nigeria. The study utilizes the autoregressive distributive lag (ARDL) model and granger causality to explore the contemporaneous dynamics. Saibu et al, (2016) assess the determinants of stock trading volume using the demand for money approach for the period, 1985 – 2014. Employing the ARDL model on variables such as stock volume, broad money, interest rate, foreign direct investment, exchange rate, income and global financial crisis, the study finds a long run equilibrium relationship between stock volume and the macroeconomic variables. The study further finds that stock volume is significantly and positively responsive to changes in money supply contrarily to its negative response to interest and exchange rates. The study also finds that the error correction model exhibits a speed of 41.3% towards equilibrium. The study recommends that policy makers should take into account the influence of money supply, interest rate and exchange rate when planning the target volume level of trading on the floor of the Nigerian Stock Exchange.

3. The Method
The literature reviewed above shows that none of the studies included per capita income and degree of openness

which normally should boost the level of investment in an economy. All the variables utilized in the study are in logarithmic form except PCY and DPN which was not for obvious reason. Therefore, following the works of Maku and Atanda (2009) and Osisanwo and Atanda (2012), the study employs error correction model using the method of least squares. Specifically, let:

$$MCAP = f(PCY, INT, EXCR, INF, DPN) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

In log stochastic form, equation (1) becomes:

$$InMCAP_t = \beta_0 + \beta_1 PCY_t + \beta_2 InINT_t + \beta_3 EXCR_t + \beta_4 INF_t + \beta_5 DPN_t + \mu_t \dots\dots\dots\dots,,,,,,\dots(2)$$

Where: MCAP = level of market capitalization, PCY = level of per capita income (GDP/population), INT = interest rate, EXCR = exchange rate, INF = inflation rate, DPN = degree of openness (export + import/GDP), β_0 = constant term and $\beta_1 - \beta_5$ = parameters to be estimated, μ = white noise error term.

Consequently, the error correction model is estimated thus:

$$\Delta InMCAP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1t} \Delta InMCAP_{t-1} + \sum_{i=1}^{n} \alpha_{2t} \Delta PCY_{t-1} + \sum_{i=1}^{n} \alpha_{3t} \Delta InINT_{t-1} + \sum_{i=1}^{n} \alpha_{4t} \Delta InEXCR_{t-1} +$$

$$\sum_{i=1}^{n} \alpha_{5t} \Delta InINF_{t-1} + \sum_{i=1}^{n} \alpha_{6t} \Delta DPN_{t-1} + \lambda_7 ECM_{t-1} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

Analytical technique

The findings that many macroeconomic time series contained unit root has spurred the development of the theory of non-stationary time series analysis. Engle and Granger (1987) argue that a linear combination of two or more non-stationary series may be stationary. If such exists, the non-stationary (with a unit root), time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long-run equilibrium relationship between the variables. A vector error correction (VEC) model is a restricted vector auto-regression (VAR) that has co-integration restrictions built into the specification, so that it is designed for use with non-stationary series that are known to be co-integrated. The VEC specification restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationships while allowing a wide range of short-run dynamics. The co-integration term is known as the error correction term (ECM) since the deviation from long run equilibrium is corrected gradually through a series of partial short-run adjustments. Assume a two variable system with one co-integrating equation and no lagged difference terms, the co-integrating equation is,

$$y_{1,t} = \beta_1 y_{2,t} + \varepsilon_t$$

$$y_{2,t} = \beta_2 y_{1,t} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

and the VEC is

$$\Delta y_{1,t} = \gamma_1 (y_{2,t-1} - \beta_1 y_{1,t-1}) + \nu_{1,t}$$

$$\Delta y_{2,t} = \gamma_2 (y_{2,t-1} - \beta_1 y_{1,t-1}) + \nu_{2,t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

In (5), the only right-hand side variable is the ECM term. In the long run equilibrium, this term is zero. However, if y_1 and y_2 have deviated from long run equilibrium in the last period, the error correction term is nonzero and each variable adjusts to partially restore the equilibrium relationship. The coefficients Y_1 and Y_2 measure the speed of adjustment.

Another VEC specification assumes that there are linear trends in the series and a constant in the co-integrating equations, so that it has the form:

$$\Delta y_{1,t} = \delta_1 + \gamma_1 (y_{2,t-1} - \mu - \beta_1 y_{1,t-1}) + \nu_{1,t}$$

$$\Delta y_{2,t} = \delta_2 + \gamma_2 (y_{2,t-1} - \mu - \beta_1 y_{1,t-1}) + \nu_{2,t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

Lastly, if there is a separate linear trend outside the parentheses in each VEC equation, this indicates an implicit quadratic trend in the series.

4. Presentation and Analysis of Results

Table 1 contains the results of unit root test which shows that inflation and openness were stationary at level while other variables were stationary after first differencing. The level of stationarity was either at 1 or 5% confidence level. The results also show that apart from interest rate tested with only intercept, other variables have intercept and trend included in test equation.

Table 1: Result of Stationarity

Variable	Order	ADF	Mckinnon	Included
LMCAP	I(I)	-3.630749	5% = -3.5670	Trend & Intercep
PCY	I(I)	-6.040731	1% = -4.2949	"
LINT	I(I)	-5.202655	5% = -3.6661	Intercept
LEXCR	I(I)	-3.944377	5% = -3.5670	Trend & intercept
LINF	I(0)	-3.870068	5% = -3.5614	Trend & intercept
DPN	I(0)	-3.875264	5% = -3.5614	Trend & intercept

Source: Authors' computation using Eview 9.0

The major aim of the test in table 2 is to find out whether a linear combination of variables that are integrated of the same order is stationary. If co-integration exists, then there is a long run relationship between the variables.

Table 2: Granger Co-integration test of Residual

Variable	ADF	1% Critical Value
ECM	-4.573156	-4.3082

After running the OLS estimation, the residual of the equation was tested for unit root with trend and intercept and was discovered to be stationary at 1% level. This is due to the fact that the absolute value of the observed variable is greater than the absolute critical value. This means that the null hypothesis which states that the residual of the co-integrating regression equation is non stationary is rejected at the 1% levels of significance. By this, it is evident that there is long run relationship between the variables in the stock market equation. This is similar to the findings of Ahmad et al, (2015) in Nigeria.

Table 3 is the short run result which shows that the explanatory variables and previous year lags of MCAP explain about 41% of current MCAP. The F-stat reveals that the model is statistically significant while the DW statistics shows absence of serial correlation. The result further indicates that previous two years lag of per capita income (PCY), interest rate and previous two years lag of inflation rate had deleterious effect on market capitalization. On the other hand, openness and previous levels of market capitalization exert positive impact on current market capitalization. However, only interest rate, inflation and two years past level of market capitalization was statistically significant.

Table 3: Parsimonious error correction model
Method: Least Squares
Dependent Variable: DLMCAP

Variable	Coefficient	Std error	t-statistics	Prob
Constant	0.025252	0.177640	0.142150	0.8883
DLMCAP(-1)	0.227793	0.244330	0.932315	0.3618
DLMCAP(-2)	0.472347	0.219530	2.151626	0.0432
DPCY(-2)	-0.240137	3.027329	-0.079323	0.9375
DINT	-1.748902	0.677312	-2.582123	0.0174
DLINF(-2)	-0.465907	0.222150	-2.097265	0.0483
DDPN	0.693058	2.446085	0.283334	0.7797
ECM(-1)	-0.565777	0.210547	-2.687178	0.0138
R^2 = 0.41, F-stat = 2.1, DW = 1.7				

The ECM is statistically significant and carries the expected negative sign. Its coefficient which is the speed of adjustment is relatively high showing that whenever the system is out of equilibrium, it is returned with a speed of about 57%. Kyereboah, et al. (2008) in Ghana, Maku and Atanda (2009), Nneji (2013), Andabai and Tonye (2015) as well as Saibu et al, (2016) all in Nigeria have also reached similar findings.

5. Conclusion and Policy Remarks

The objective of the paper is on identifying some of the determinants of stock market in Nigeria for the period1986-2016. The stock market in Nigeria revolves round the NSE and so the dependent variable is market capitalization while the independent variables include per capita income, interest rate, exchange rate, inflation and the economy level of openness. The study employs error correction model and finds that interest rate, inflation and past level of market capitalization were the major determining factors for trading activities at the Nigerian Stock Exchange. However, the negative impact of inflation, interest rate and per capita income as revealed by the study is worrisome.

The financial meltdown of 2008 which started in the United States and spill over to other countries including Nigeria has negatively affected transactions at NSE. Thus, the negative impact of interest rate on the NSE is in sympathy with the global economy crises which is further complicated by the recession being experience in Nigeria since 2014 yet to fully recover. High cost of production occasioned by high inflation in an

economy with low demand is also a factor affecting the NSE. Low demand is not unconnected with low income as revealed by the per capita income. Also, impact of external influence on Nigerian economic performance is very minimal as it is insignificant. Many foreign investors in Nigeria have relocated to other countries due mainly to harsh business environment and insecurity among which include armed robbery, kidnapping, and the deadly Boko Haram terrorists and Fulani herdsmen. For example, there are no good roads and power supply is so epileptic.

The major conclusion drawn therefore is that the Nigeria capital market poor performance is due to failure of the government and institution to put in place necessary mechanisms that make for good business climate. It is therefore recommended that the monetary authority should ensure moderate interest rate that encourages investment. Also, the current double digit inflation in the economy should be checked. Finally, effort should be intensified by the government at all levels to create employment and boost the per capita income of the citizens so as boost demand and generate increase investment.

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