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Perceived Macroeconomic Factors and Stock Market Capitalization: Experience from the Nigerian Economy Perspective

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Abstract

The interference of perceived macroeconomic variables on stock market performance despite the continuous management of monetary and fiscal policies has raised eyes brow and motivated for this study. The purpose of this study is to examine the magnitude of relationships of the perceived macroeconomic factors and stock market performance during its interface. Therefore this study evaluated the prevailing interrelationships between Nigerian Stock Market Performance and the Perceived Macroeconomic factors of Exchange rate, External reserves, Gross Domestic Product, Inflation rate and Interest rate. The data information is sourced from Central Bank of Nigeria statistical bulletin between 1985 and 2014. The Augmented Dickey Fuller, Johansen Co-integration, and the Error Correction Models were employed. The results of the ADF revealed that all variables were stationery at first level differences. The results in Johansen Co-integration indicate a significant long run relationship between three studied variables that relate with the Nigeria Stock Market performance. Further, ECM results reported that GDP remains significant variable that respond to stock market performance positively, while inflation responded negatively, while interest rate and external reserves are shown to responding and adjusting to trends in Stock Market Capitalization. And market capitalization and exchange rate are operating independent of each other. The study concluded that GDP and inflation rate constitute the significant policy variables of interest to manage and promote the desired performance of Nigerian stock market. The study recommend for increase of output of goods and services, and adequate management of inflation rate.

Keywords: Macroeconomic variables, Stock market capitalization, Augmented dickey fuller, Johansen co-integration, Error correction model, Nigeria.
JEL Classification: Macroeconomic Variables are the perceived factors which include exchange rate, external reserves, gross domestic product, inflation and interest rate. Stock Market Capitalization is activity performance of the stock market. Augmented Dickey Fuller is a tool used to test the data stationary. Johansen Co-integration is tool adopted to forecast the long run relationship of variables. Error Correction Model is a model employed to test the short run relationships and speed of adjustment. Nigeria is the country of study.

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Ethical: This study follows all ethical practices during writing.

Contents

Contribution of this paper to the literature
This study contributes to existing literature by examining the magnitude of relationships of the perceived macroeconomic factors and stock market performance during its interface.

1. Introduction

Ability of the Stock Market to accelerate economic activities in emerging market remains important. The stock market no doubt plays a major role of financial intermediation in both developed and developing countries. Financial intermediation is a function that links the suppliers of funds to those users of funds. The Stock Market provides opportunities for long term investment. It thus, offers the investors alternative investment avenues to put their surplus funds. Most studies argue that Stock Market performance is influenced by some macroeconomic variables such as, interest rate, GDP, and inflation among others. Ologunde, Elumilade, and Asaolu (2006) argue that some macroeconomic determinants could have a negative effect on investors' decision to invest in the stock market. Maku and Atanda (2010) opine that monetary authorities should set macroeconomic target every budgetary year. The Central Bank of Nigeria over these years has adopted series of policies to stabilize macro economy which affects Nigerian stock market performance. This is to aid in achieving output growth, price stability, exchange rate, foreign reserves, employment etc.

Following series of reforms and policies on macroeconomic variables over these years, it is expected that significant could prevail among the set of macroeconomic variables. McQueen and Roley (1993) as well as Järvinen (2000) stated that during depression, a higher unexpected economic growth might indicate the end of recession, which influences stock market positively. Alternatively, higher than expected economic growth might bring about fears of overheating the economy, which might prompt monetary authorities to raise interest rates and thus constitute bad news in the stock market. Their results were supportive of asymmetric relationships between stock market and macroeconomic factors. The relationship between stock market performance and macroeconomic determinants is well illustrated by Miller and Modigliani (1961). Also, Ross (1976) hypothesizes the relationship between stock prices and certain macroeconomic determinants since the fundamental value of stocks equals the expected present value of the firm's future dividends. Thus stock price (return) performance is expected to be a product of feature macroeconomic determinants. In this literature; gross domestic product, inflation, and interest rates are considered as key macroeconomic determinants that influence performance of an emerging economy like Nigeria. This however, calls for motivation to investigate the interrelationships between real sector and the financial sectors together these macroeconomic variables. The emphasis is to establish extent of support or interference among variables employed.

Sensitiveness to macroeconomic variables including GDP, inflation, and interest rate contribute a valuable subject in finance and economics. Despite the increase of output of goods and services and constant management of macroeconomics variables the stock market performance seems unstable. The issue of stock trading performance in emerging market like Nigeria has been a concern to investors. There are serious concerns about the sudden turn of events in both positive and negative direction with respect to the Nigerian Stock Market. The instability of the Nigeria Stock Market tends to be so sharp and it has become difficult for Nigerian Stock market to stabilize.

Though several studies have variedly identified this related problem, that poor management of macroeconomic variables and low level of output of goods and services can mere the financial sector activities. The study of Osamwonyi and Evbayiro-Osagie (2012) evaluations indicated interrelationship between macroeconomic variables along with GDP through the employment of the Vector Error Correction Model. Substantially, Onwumere, Ibe, Okafor, and Uche (2012) uphold the demand following hypothesis from economic growth to the financial sector through stock market capitalization. This shows that real sector can only be relied on the activities of the financial sector. Largely their study neglected to examine the extent to which these macroeconomic aggregates support or promote economy in the process of output growth. Impressively, Igoni, Onwumere, and Ogiri (2020) discovered no significant impact on the Nigerian economy performance tracing from digital environments as an indicator of macroeconomic factor.

In light of the above, there is an urgent need not only to examine empirical the extent to which these variables support or reinforce each other in light of recent data within Nigerian environment. The above key issues constitute the core problem and motivation for this study. This study is therefore aimed to examine the interrelationships prevailing between real sector and the financial sector in nexus of, exchange rate, external reserves, gross domestic product, interest rate inflation rate, stock market performance using recent Nigeria data.

The findings of this study will contribute significantly and shall be of use for scholars in resolving the prevailing controversy between the real sector and the financial sector together with the macroeconomic variables. And therefore, Scholars will see the findings arising from this study as a reasonable addition to the existing body of knowledge. More so, results arising from this study will be used by the general public for awareness and understanding of the functional relationship between economic growth and stock market performance. Also, public policy managers including Central Bank of Nigeria, Securities and Exchange Commission in Nigeria will find this useful in the formulation, management and/or reviews of Monetary and Capital Market policies. Finally, Industry Practitioners such as Bankers, investors, market/financial players and makers will find this study significant as it will expose the risk from the macroeconomic variables. The study period is between 1985 and 2014 of the Central Bank of Nigeria data of various issues. The obvious limitation arises from the fact that Stock Exchange Fact books, publication started in 1985, which makes it difficult to obtain data on stock market capitalization before this period while data on other study variables are available. In that circumstance therefore, the results of this study would have improved a bit if the data covered earlier periods.

2. Literature Review

Economic theory postulates that GDP, inflation, and interest rates as well as other macroeconomic indicators constitute valuable determinants or predictors of stock market performance. However, several schools of thoughts have offered theoretical explanations for stock market performance. Prominent among the theories is Arbitrage

pricing theory. The Arbitrage Pricing Theory approach tries to explain the performance of stock market by positing that behavior of the stock market is influenced by some macroeconomic variables. The theory takes into account systematic factors common across all class of assets. The idea behind this theory is that stock market performances are generated by a number of common factors, for which different securities have different sensitivities in the market. The theory asserts that stock market performance is influenced by several independent factors. The central thesis of APT is that more than one systematic factor affects long-term average performance in the stock market. However, the problem with this is that the theory in itself provides no indication of what these factors are, so they need to be empirically determined. By implication, the theory itself does not tell the investor what these factors are.

Arbitrage pricing theory directly relates value of the security to fundamental macroeconomic factors driving it and by extension, measures the performance of market. Existing literature suggests that a wide range of macroeconomic factors may be relevant. However in emerging stock markets, there is argument that not all of these macroeconomic factors are either relevant or appropriate, Bilson, Brailsford, and Hooper (2000). The main empirical strength of the APT is that it permits the researcher to select whatever macroeconomic factors that provides theoretical explanation for particular sample at hand, Greenewold and Fraser (1997). Sharpe (1984) argues that good investment managers identify important factors in the economy and market place and assess the extent to which different securities will respond to changes in those factors. There is no reason to assume or believe that a good factor for one period will be a better one for the next period. So do risk and prices which are associated with various factors as well as also the sensitivities of securities to those factors.

Extensive research has shown that more than four factors are relevant; Cho, Elton, and Gruber (1984) contend that the number of stocks in the market or portfolios determines number of factors which are important (Dhrymes, Friend, & Gultekin, 1984). The behavioral school of finance holds that market might fail to reflect, economic fundamentals under three conditions. When all three apply, the theory predicts that pricing biases in financial markets can be both significant and persistent. The first condition is irrational behavior. It holds that investors behave irrationally when they don't correctly process all available information while forming their expectations of company's future performance. Second is systematic patterns behavior, which holds that even if individual investors decide to buy or sell without observing economic fundamentals, the impact on share prices would be limited.

Various scholars have evaluated the existing determinants of stock prices. The relationship between macroeconomic variables and stock market performance has necessitated divergent opinions among scholars Macroeconomic variables are relied upon to explain the price of stock. In a claimed by Erdogan and Ozlale (2005) that stock market performance influences economic growth in Turkey.

Gan, Lee, Yong, and Zhang (2006) evaluate the relationship between New Zealand stock market performance and seven macroeconomic variables between 1990 and 2003. Johansen Multivariate Co-integration and Granger-causality test were employed. The results demonstrated significant long term relationship between macroeconomic variables and on New Zealand's stock market performance. However, the Granger causality test results show that the stock market does not promote the macroeconomic variables. Padhan (2007) investigates the relationship between economic growth and stock market performance in India between 1991 and 2005. Johansen Multivariate Co-integration and Granger Causality test were applied. The results indicate significant long run and causality relationships between the variables of study. Ahmed (2008) after employment of Granger causality test as well as Johansen's Co-integration to study relationship between some macroeconomic variables and stock market in India, the results confirm prevalence of significant long run relationship between GDP and stock market performance. Rahman, Sidek, and Tafri (2009) results indicated significant relationships between industrial production and stock market performance, while insignificant relationships prevail in interest rate of Malaysian. Ali, Rehman, Yilmaz, Khan, and Afzal (2010) explored the causal relationship between macroeconomic pointers and stock market prices in Pakistan. Data was extracted from Bureau of Statistics covering the period 1990 and 2008. The macroeconomic indicators were. The tests show no significant interrelationships were found between inflation, GDP and stock market performance. Ozlen and Ergun (2012) set out to evaluate the impacts of selected macroeconomic variables on stock market performance. Employed macroeconomic variables included inflation, exchange rate, interest rate, and unemployment rate in stock market of 45 organizations. ARDL (Auto Regressive Distribution Lag Bound) technique was employed on data over the period 2005 to 2012. The results indicate that interest rates and exchange rates significantly influence market performance. Abdulrasheed (2013) evaluated the nature of causal relationship between stock market performance and external trade in Nigeria using monthly data over the period 2001 to 2011; however no significant relationships were detected.

Again, Naik (2013) employed five macroeconomic variables; industrial production, inflation, money supply and interest rate to examine stock market performance in India. Johansen's Co-integration and Error Correction Models were employed. The results provide compelling evidenced of statically significant long run relationship between GDP and market capitalization was statistically significant effect. Aweda, Olusegun, and Taofik (2014) utilized Error Correction Model (ECM) and Johansen's Co-integration to evaluate the nature of long run relationship between macroeconomic variables and stock market performance in the USA. Index of industrial production, interest rate, trade rates, consumer price index, unemployment rate and money supply were employed as macroeconomic aggregates. Index of industrial production and interest rate were observed to have significant influence over stock market performance. Teker and Alp (2014) studied the relationship between interest rate and stock market performance in four emerging markets of Turkey, Brazil, China and Hungary. The Augmented Dickey-Fuller (ADF) and Phillips-Person (PP) Unit Root tests were utilized to evaluate stationary of data variables. The results indicate that Hungary markets demonstrated significant relationship between stock market and interest rate, while Chinese markets indicate a lower support. Further, the results provide evidence to show that every other stock market performance Granger cause treasury bill rates. Onneetse and Khaufelo (2014) analyze the nature of long run relationship between macroeconomic variables in Botswana Stock Market Performance. The study employs Error Correction Model and Johansen's Co-integration to examine quarterly information from period 1998 to 2012. The study utilized GDP, long-term loan costs, money supply, external reserves, inflation and exchange rate. The results demonstrate that the selected macroeconomic variables

significantly influence stock market performance in Botswana. Pooja (2014) examined the relationship between macroeconomic variables and Indian Stock Market. Granger Causality test was employed to determine the nature of causal relationship among the variables of study based on monthly data over the period 2011 to 2012. The macroeconomic indicators include index of industrial production, money supply, interest rate, remote institutional speculation, exchange rate, unrefined petroleum cost and Gold cost. The results indicate that index of industrial production significantly promotes Indian stock market performance. In the same (Vanita & Seth, 2014) evaluated the relationship between stock market performance and selected macroeconomic variables in India. Monthly information from 1997 to 2011 was secured for the macroeconomic variables. They include exchange rate, index for industrial production (IIP), interest rate, money supply and oil price. The study employed ADF and PP unit root tests, Regression, ARCH model, Granger Causality and Johansen Co-integration tests to evaluate the data. Inflation and exchange rates were found as significant variables on the performance of the stock market.

Amarasinhe and Amarasinhe (2015) explored the dynamic relationship between interest rate and stock market performance in Sri Lanka. Time series data for the period 2007 to 2013 was utilized in the study. Additionally, All Share Price Index (ASPI) in Colombo Stock Exchange was employed as indicator of market performance. The Augmented Dickey Fuller test was utilized to determined stationary of the data while the Granger Causality test was employed to ascertain the extent to which the study variables support or promote themselves. The results indicate a unidirectional Causality with causality flowing from interest rates to stock market performance.

Mutuku and Ng'eny (2015) results discovered positive relationships between stock market and GDP, exchange rate, and treasury bills. The results provide significant evidence to assert the prevalence of significant relationships between the variables of study. Mahmoud, Elgazzar, and Hanafy (2016) findings show a significant relationship in Egypt between stock market performance and interest rate, while for Tunisia stock market performance has no significant relationship with the consumer price index.

Kofie and Ansah (2018) examine a study of the effect of inflation and exchange rate on stock market returns in Ghana between January 2000 and December 2013 on a co-integration and Error Correction model tests. The results indicate the existence of significant long-run relationships between the Ghana stock market, exchange rate, and inflation rate.

Further Lee and Brahmasrene (2018) evaluated the dynamical relationship between macroeconomic variables and stock prices in Korea from1986 to October 2016 with interest on the exchange rate, money supply, industrial production, and inflation. The Johansen co-integration and vector error correction model (VECM) initiated results indicated a long-run relationship between macroeconomic variables and stock prices of Korea, while interest rate was not significantly related to stock market prices. However, external shocks did not constitute factors that affect the market in the study.

More so, Megaravalli and Sampagnaro (2018) studied macroeconomic indicators and its impact on markets in Asian; that includes India, China, and Japan from January 2008 to November 2016 being monthly information. The co-integration and Granger causality tests for analysis results show positive long-run relationships effects on stock market performance.

Also, Mubarik and Javid (2018) inspected the impact of macroeconomic volatility on stock market price changes in Pakistan with employment of industrial production, inter-bank rate, interest rate, money supply, exchange rate and stock market price from July 1998 to June 2014. The results of auto-regression show significant volatility among employed macroeconomic variables except interest rate.

Meanwhile, Tsaurai (2018) questioned the determinants of emerging market in Argentina, Brazil, Colombia, Mexico, Peru, Czech Republic, Greece, Poland, Portugal, Russia, Turkey, China, Hong Kong, Indonesia, India, Malaysia, Philippines, Republic of Korea, Thailand, Singapore and South Africa. The study adopts FDI, economic growth, infrastructural development, savings, inflations, trade openness, exchange rate, banking sector development and stock market liquidity. The results reveal relationships among adopted variables.

And Aldukhail (2019) measured the effect of macroeconomic variables on Saudi stock market between 1997 and 2017 with employment of GDP, interest rate, and inflation rate as macroeconomic variables on Saudi stock market price, shares value and traded shares. The analysis was carried out using ARDL model and the results show no significant impact in the short run but statistically influence during long run.

Again, Aryasta and Artini (2019) account for the effects of macroeconomic indicators and global stock index on composite stock market price in Indonesia with application of gross domestic product, exchange rate, inflation, interest rate, Dow Jones index, BSE Sensex index and Shanghai index on composite stock index from the period January 2010 to December 2018. The multiple linear regression analysis technique application results indicated GDP, exchange rate, Shanghai index significantly and positive affect stock market price. Whereas inflation and interest rate were negatively affect stock prices in Indonesia.

Thrust, Bassar (2019) analyses the effect of Sharia stock trading activity factors and macroeconomic variables performance in Indonesia capital market. The study uses the Capital Asset Pricing Model CAPM) and the Arbitrage Pricing Theory (APT). Variables employs includes interest rate, inflation rate, exchange rate, market capitalization and trade volume between January 2014 and December 2018, and the results reveal existence of relationships between interest rate, exchange rate and stock market.

However the above literature needs caution as majority of these studies have indicated just a little departure and mixture which this study tends solve that will contribute to existing body of knowledge. However, this interpretation from interrelationships between the real sector and the financial sector can be explained by stock market performance and GDP growth as well as selected macroeconomic variables.

3. Methodology

The design for this study is on country-specific. Based on this, the *ex-post facto* research design is found useful for the study. As claimed by Onwumere. (2009) that *ex-post facto* research design is fit for a work that quasi-experimental. Originally, it is an attempt to expose the relationship between real sector and financial sector through macroeconomic and stock market capitalization in Nigeria. This novelty adds in its design architecture, the econometric/analytical design to compliment the *ex-post facto* design.

The data sets for empirical estimation in this study have two major properties. Firstly, the data is secondary. Secondly, they are time series. Time series are data sets that follow regular time-frequency. In this work, annualized data are used in the case of both the dependent and explanatory variables. In terms of sources, we extract our data from the Central Bank of Nigeria fact books of various issues. As measurement necessities demand, some of the series may be transformed to add their goodness for the aim of study. This study covers the Nigeria environment with particular focus on selected macroeconomic variables: - exchange rate, external reserve, inflation, interest rate, gross domestic product and stock market capitalization as indicators of real sectors and financial sectors. It can arguably be said that the sets of data are in annualized form from 1985 to 2014.

The theoretical leaning of this study is the Arbitrage Pricing Theory (APT) as espoused by Ross (1976). The theory takes into account systematic factors common across all class of assets. The idea behind this theory is that stock market performances are generated by several common factors, for which different securities have different sensitivities in the market. The central idea of APT is that more than one systematic factor affects long-term average performance in the stock market. The theory in itself provides relevant macroeconomic variables that include; exchange rate, external reserves, gross domestic product, inflation, and interest rate so they need to be empirically determined.

Expressing the APT functionally appears thus:

$$SMPI = f(environmental\ factors) \quad (1)$$

Equation 1 above explained according to APT that macroeconomic variables influence the stock market performance.

Taking SMP to be stock market performance indicators and environmental factors to be macroeconomic indicators such as interest rate, inflation rate, money supply and economic growth rate and stock market indicators to be all share index and market capitalization, we empirically estimate two functional relationships as follows:

$$MCAP = f(EXCH, EXTR, GDP, INFLR, INTR,) \quad (2)$$

Equation 2 explains that Exchange rate, External reserves, Gross Domestic Product, Inflation, and interest rates are perceived macroeconomic factors that may influence stock market performance.

From the theoretical standpoint, this study is designed to prove the reality or otherwise of the APT using variables from Nigeria.

Generally, the regression form, following Neter, Wasseraman, and Kutner (1989) Equation 1 and 2 can be rewritten in econometric form, thus:

$$MCAP_t = \gamma_0 + \gamma_1 EXCH_t + \gamma_2 EXTR_t + \gamma_3 GDP_t + \gamma_4 INFLR_t + \gamma_5 INTR_t + \varepsilon_t \quad (3)$$

Where all the variables are as stated above and γ_0 = the constant (the value of the dependent variable when all the repressors are at zero); γ_1- γ_5 are coefficient of the independent variables and ε_t is the noise or error term.

The model's variable of this study is stock market capitalization as a broad dependent variable that is being symbiotically disclosed in macroeconomic variables and real sector of exchange rate, external reserves, GDP, inflation, and interest rates as independent variables. They serve as the explanatory variables for financial sector; stock market capitalization.

The estimation process for this study follows the Error Correction Model Estimations, Test of Hypothesis and Diagnostic/Reliability Tests including correlation matrix analysis. These sets of tests are designed to validate the goodness of the data sets for Unit Root stationary of the variables. The traditional Augmented (Dickey & Fuller, 1976) test is adopted to show the unit root properties of the series following equation specified.

$$\Delta y_t = \beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 + \delta y_{t-1} + \alpha_i \sum_{t=1}^{m} \Delta y_{t-1} + \varepsilon_t \quad (4)$$

This equation indicates that all variables employed are subject unit root test to avoid spurious data during analysis. Where the test is for: $H_o = \delta = 0\ and\ H_1 = \delta < 0$.

Lag selection will be based on the Bayesian Criterion generated automatically by the estimation software following the form of Equation 5:

$$BIC = \ell n(n)K - 2\ell n(\hat{\mathcal{L}}) \quad (5)$$

Where:

n represents either the sample size, the number of observations, or the number of data points in x.

k represents free parameters to be estimated.

$\hat{\mathcal{L}}$ represents the maximized value of the likelihood function for the estimated model *M given as* $\hat{\mathcal{L}} = \mathcal{P}(\frac{x}{\theta}, \mathcal{M})$

3.1. Long Run and Co-integration Test (Bound Test)

In this study we shall also carry out the long run test and Error Correction representation following the Ordinary Least Square OLS framework. The procedure as prescribed by Pesaran, Shin, and Smith (2001) sets two critical values namely lower and the upper bound, and the decision guide is contained in Table 1 below:

Table-1. Decision rules for the bound tests process.

State	Inference	Remark
F stat is more than upper bound	Reject the null hypothesis	A co-integrating relationship exists
F stat less than the lower and upper bound	Refuse to reject null hypothesis	No co-integrating relationship exists
F stat at the chosen level of significance falls within the lower and upper bound	Inconclusive Finding	Results is indecisive

3.2. Error Correction Representation

After establishing a possible short-term run relationship through the error correction model will be used to test the speed of adjustment of monetary policy to the shocks emanating from the digital currency. This will follow the form specified below:

For the Model MCAP as the dependent variable:

$$\Delta \text{MCAP}_t = \pi_p + \sum_{i=1}^{k} \delta_{ip} \Delta \text{MCAP}_{t-i} + \sum_{i=1}^{k1} \tau_{ip} \Delta EXCHR_{t-i} + \sum_{i=1}^{k2} \theta_{ip} \Delta EXTR_{t-i} + \sum_{i=1}^{k3} \theta_{ip} \Delta GDP_{t-i} + \sum_{i=1}^{k4} \theta_{ip} \Delta INFLR_{t-i} + \sum_{i=1}^{k5} \theta_{ip} \Delta INTR_{t-i} + \varpi_{1p} MCAP_{t-1} + \varpi_{2p} EXCH_{t-1} + \varpi_{3p} EXTR_{t-1} + \varpi_{4p} GDP_{t-1} + \varpi_{5p} INFL_{t-1} + \varpi_{6p} INTR_{t-1} + \xi_{1t} \quad (6)$$

Equation 6 above denotes how variables will be responding to speed of adjustment.

All the variables are discussed above with combined modeling of the short-run coefficients in the error correction framework.

3.3. Priori Expectorations

The priori expectations are derived from underlying theoretical relationships been the dependence and each of the employed explanatory variables. These are presented as follows;

Exchange Rate: An appreciation in the exchange rate of the Naira would translate to a stronger value of the Naira and consequently, on the economy thereby, directly boosting stock market performance. Accordingly, the sensitivity of stock market performance to improvements in exchange rate is expected to be greater than zero, i.e. $\gamma_1 > 0$.

External Reserves: Increases in external reserves indicate higher economic performance which transmits directly to stock market performance. Hence, a sensitivity of greater than zero for stock market performance with respect to external reserves i.e. $\gamma_2 > 0$.

Gross Domestic Product: Fundamentally, a rise in gross domestic product would imply enhanced business opportunities which directly raise stock market. Investments and performance, thereby, yielding a sensitivity greater than zero with respect to GDP, i.e. $\gamma_3 > 0$.

Inflation Rate: Inflation would reduce the real value of money by inducing higher prices. In this respect economic units would save less and consume an increased proportion of their earned income. This invariably reduces investment thereby, stock market performance. In that sense, a sensitivity of less than zero is expected. i.e. $\gamma_4 < 0$.

Interest Rate: An Increase in interest rate implies higher cost of funds. This will invariably increase investors expected returns from investments since it implies a higher capitalization rate. Higher interest rate would invariably induce economic units to save more which would be mobilized for investment thereby, inducing higher activities in the stock market. Accordingly, i.e. γ_5 is expected to be more than zero, $\gamma_5 > 0$.

All the variables are discussed above with a combined modeling of the short run and long run coefficients in the error correction framework. Therefore the summary of priori expectations from the models tests of the hypotheses are given as follows:

$$MCAP_t = \gamma_0 + \gamma_1 EXCH_t + \gamma_2 EXTR_t + \gamma_3 GDPGR_t + \gamma_4 INFLR_t + \gamma_5 INTR_t + \varepsilon_t \quad (7)$$

The equation above explains the expected position of a variable in the results if it happens to increase.

Therefore the priori expectation with regards to this will be thus:$\gamma_1 > 0, \gamma_2 > 0, \gamma_3 > 0, \gamma_5 > 0$, while $\gamma_5 < 0$

To ensure that estimates are valid, efficient and unbiased inferences in this study, the diagnostic test contained in Table 2 below shall be adopted.

Table-2. Summary of adopted diagnostic tests.

S/No	Test name	Test function	Decision rule
1.	Coefficient of Correlation (R^2)	To measure the goodness of fit of the model	The higher the R^2 the better the fit
2.	F-Statistics	To Test the significance of the overall regression	The p-value of F-stat less than 0.05 suggests that the model is good enough for analyses/inferences.
3.	Durbin Watson Statistics	To measure the first-order autocorrelation	DW approximately 2 shows evidence against the first-order autocorrelation.

Inferences in this study shall be made based on the outcome of the estimation approaches as well as conclusions drawn based on the tested hypotheses. The choice level of significance for all tests shall be the 0.05 or 5% level. All estimations shall be done using version 9 of the E-views estimation software.

4. Presentation of Results and Discussion of Findings

4.1. Presentation of Data

The base data for this study is presented in the Table 3.

4.2. ADF Unit Root Test Results

The results of the Unit root test are presented in Table 4.

4.3. ADF Data Analysis

In the above, the results of Augmented Dickey-Fuller (ADF) test statistics indicate that all variables became stationary at first difference. ADF-Test Statistic -5.090450, -5.606112, -4.850510, -6.5645842, -6.009562**,** and -7.809319 are greater than the respective critical level values of -2.671853, -3.711457, -3.788030, -3.788030, -3.699871,-3.689194. Besides, the respective probability values of 0.0003, 0.0001, 0.0010, 0.0000, 0.0000 and 0.0000

are all less than 0.05 significance level, therefore the study refuses to accept the alternate hypothesis that there are unit roots. So the data are free from spurious and can be used for analysis.

Table-3. Data of market capitalization (MCAPr), exchange rate (EXCHR), external reserves (EXTRr), gross domestic Product (GDPr), inflation rate (INFLR) and interest rate (INTR) for the period 1985 to 2014.

YEAR	MCAPr	EXCHR	EXTRr	GDPr	INFLR	INTR
1985	0.17	0.89	0.25	11.33	1.0	8.50
1986	0.03	2.02	0.56	1.89	13.7	8.50
1987	0.17	4.02	0.22	-0.69	9.7	11.75
1988	0.18	4.54	-0.39	7.58	61.2	11.75
1989	0.22	7.39	0.75	7.15	44.7	17.50
1990	9.21	8.04	0.62	11.36	3.6	17.50
1991	0.29	9.91	0.21	0.01	23.0	15.00
1992	0.26	17.30	-0.02	2.63	48.8	21.00
1993	0.34	22.05	-0.35	1.56	61.3	26.90
1994	0.28	21.89	0.05	0.78	76.8	12.50
1995	0.63	21.89	0.20	2.15	51.6	12.50
1996	0.37	21.89	0.77	4.13	14.3	12.25
1997	-0.01	21.89	-0.01	2.89	10.2	12.00
1998	-0.07	21.89	-0.11	2.82	11.9	12.95
1999	0.12	92.69	0.68	1.19	0.2	17.00
2000	0.36	102.11	0.34	4.89	14.5	12.00
2001	0.29	111.94	0.34	4.72	16.5	12.95
2002	0.13	120.97	-0.17	4.63	12.2	18.88
2003	0.44	129.36	0.05	9.57	23.8	15.02
2004	0.36	133.50	0.57	6.58	10.0	14.21
2005	0.27	132.15	0.57	6.51	11.6	7.00
2006	0.43	128.65	0.33	6.03	8.5	8.80
2007	0.61	125.83	0.34	6.45	6.6	6.91
2008	-0.38	118.57	0.15	5.98	15.1	7.03
2009	-0.36	148.88	0.11	6.96	13.9	3.72
2010	0.29	150.30	-0.12	7.98	11.8	5.60
2011	0.03	153.86	0.07	7.43	10.3	11.16
2012	0.31	157.50	0.21	6.58	12.0	11.70
2013	0.22	157.31	0.17	6.89	8.0	10.75
2014	0.22	158.55	-0.10	6.89	8.0	10.70

Table-4. ADF unit root test.

Differenced variable	ADF-test Statistic	Test of critical level			Order of integration	Probability value
		1%	5%	10%		
D(EXCHR)	-5.090450	-3.689194	-2.671853	-2.625121	1(1)	0.0003
D(EXTRR)	-5.606112	-3.711457	-2.981038	-2.629906	1(1)	0.0001
D(INFLR)	-4.850510	-3.788030	-3.012363	-2.646119	1(1)	0.0010
D(INTR)	-6.5645842	-3.788030	-3.012363	-2.616119	1(1)	0.0000
D(MCAPR)	-6.009562	-3.699871	-2.976263	-2.627420	1(1)	0.0000
D(GDPR)	-7.809319	-3.689194	-2.971853	-2.625121	1(1)	0.0000

The results of the Correlation analysis is presented in Table 5.

Table-5. Correlation matrix analysis output of exchange rate (EXCHR), external reserves (EXTRr), inflation rate (INFLR), interest rate (INTR), market capitalization (MCAPr) and gross domestic product (GDPr) for Nigeria over the period of 1985 to 2014.

Variables	EXCHR	EXTRR	INFLR	INTR	MCAPR	GDPR
EXCHR	1	-0.053469478	-0.446845807	-0.390833145	-0.209405237	0.38683087
EXTRr	-0.053469478	1	-0.377272145	-0.12755703	0.270097992	0.069067095
INFLR	-0.446845807	-0.377272145	1	0.422967866	-0.129224579	-0.322933789
INTR	-0.390833145	-0.12755703	0.422967866	1	0.228015639	-0.295249342
MCAPr	-0.209405237	0.270097992	-0.129224579	0.228015639	1	0.369127507
GDPr	0.38683087	0.069067095	-0.322933789	-0.295249342	0.369127507	1

4.4. Correlation Matrix Data Analysis

The results of correlation analysis as presented in Table 5 above shows that the highest correlation coefficient (measure of association) between the variables is 0.4468. Therefore the results of correlation matrix in Table 5 indicate the absence of any significant multicollinearity issues.

4.5. Co-integration Test Results

The results of Johansen's Co-integration are shown in Table 6:

Table-6. Results of co-integration test (Johansen co-integration).

Hypothesized		Trace	0.05	Probability
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.978604	198.1517	95.75366	0.0000
At most 1 *	0.743022	94.34908	69.81889	0.0002
At most 2 *	0.668601	57.66242	47.85613	0.0046
At most 3	0.541808	27.84275	29.79707	0.0827
At most 4	0.197646	6.770138	15.49471	0.6045
At most 5	0.030079	0.824586	3.841466	0.3638
Trace test indicates 3 co-integrating e.q(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
** denotes Prob. level				

The co-integration results presented in Table 6 above indicate that there are three co-integrating equations. Therefore, there is a significant relationship between the study variables. This is for fact the trace statistics of 198.1515, 94.34908 and 57.66242 are less than the corresponding critical values of 95.75366, 69.81889, and 47.85613 at 5% significance level, respectively. Besides there exist probability values of 0.0000, 0.0002 and 0.0046 less than 0.05 significance level.

4.6. Error Correction Test Results

The results of the Error Correction estimates are shown in Table 7:

Table-7. Output of error correction model.

Error Correction Model.
Dependent Variable: D(MCAPR).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.173742	0.311942	-0.556969	0.5834
D(EXCHR)	0.009153	0.021795	0.419945	0.6788
D(EXTRR)	-0.840929	0.824750	-1.019617	0.3195
D(GDPR)	0.525927	0.102378	5.137102	0.0000
D(INFLR)	-0.078452	0.018600	-4.217784	0.0004
D(INTR)	-0.003958	0.068653	-0.057654	0.9546
ECM(-1)	-0.007913	0.207020	-0.038224	0.9699
R-squared	0.711477	Mean dependent var		0.006786
Adjusted R-squared	0.629042	S.D. dependent var		2.454062
S.E. of regression	1.494679	Akaike info criterion		3.854018
Sum squared resid	46.91536	Schwarz criterion		4.187069
Log likelihood	-46.95625	Hannan-Quinn criter.		3.955835
F-statistic	8.630759	Durbin-Watson stat		1.921856
Prob(F-statistic)	0.000084			

This section presents the Error Correction Model (ECM). In the above table, the result of -0.556969 values in respect to t-Statistic is less than 2, and show sufficient evidence against the alternate hypothesis and is negative. The measurement of the goodness of fit in the model from the above results in the table, show a coefficient of correlation R^2 value of $(0.7114)^2$ 0.7114 * 100 translating to 71.14% is strong and fit, as it is above 50%. It indicates that the model is good enough and has the power to predict the variables used. The 28.86% variation may be can explain by independent variables or other exogenous factors not captured in 1985 and 2014 during the short run respectively. In all the long run increase effect of shocks will be neutralized by the passage of time, since there are trace test that indicates 3 co-integrating equations at the 0.05 levels significance. It could be as a reason for balancing the variables in the equations and other variables not captured that were denote as an error term. The adjusted R^2 $(0.6290)^2$ 0.6290 * 100 translating to 62.90%. This implies the addition of more explanatory variables R^2 is expected to reduce. While the result of S.E regression 1.494679 indicates the summary measurement base on the estimated variable of the residuals. The value of the log likelihood 46.95625 displayed the difference between restricted and unrestricted version 10 of the E-views soft wear. To test the significance of the overall regression, the study used the results of the Probability F-statistic value of 0.000084 is less 0.05 in the table which suggest that the explanatory variables are significant enough to explain the outcome significance of the study. The SD dependent variable value of 2.454062 shows deviation from the average 0.006786. This suggested that 1% increase in stock market capitalization will bring about 0.65% of the explanatory variables. The Akaike, Schwarz and Hannan-Quinn criterion values of 3.854018, 4.187069, and 3.955835 respectively are relatively low as it is been use to choose the competing models. Besides the lower the value is better. The Durbin-Watson stat results of 1.921856 revealed no evidence of the first-order autocorrelation as the value is approximately 2 and within the range. The coefficient results reveal that the market capitalization -0.173742 exerts negatively with EXCHR, (0.009153) EXTER, (-0.840929) GDPR, (0.525927) INFLR, (-0.078452) and INTR (-0.003958) although there is no significance in EXCHR, EXTER, and INTR, while significance existed in GDPR and INFLR. On the other hand GDPR and INFLR responded positively and significantly to stock market capitalization performance. Further, EXCHR responded positively and not significant to stock market capitalization, while EXTER and INTR responded negatively and insignificant to stock market capitalization.

4.7. Tests of Hypotheses

Having performed the analysis, we proceeded to test the hypotheses of the priori formulated in section 3. To facilitate hypotheses testing, the hypotheses are re-stated in both their null and alternate forms below:

4.8. Test of Hypothesis One

The null and alternate versions of hypothesis three are stated as follows: (Co-integration)

H_{o1}: *There is no significant long run relationship between Stock Market Capitalization and the set of exchange rate, external reserves, gross domestic product, inflation rate and interest rate in Nigeria.*

H_{A1}: *There is a significant long run relationship between Stock Market Capitalization and the set of exchange rate, external reserves, gross domestic product, inflation rate and interest rate in Nigeria.*

Table 6 above shows that the prevailing co-integrating equations are significance at 0.05 levels. Since this prevails, we reject the null hypothesis of no significant long run relationship and accept alternate hypothesis that there exists a significant long run relationship among the set of study variables.

4.9. Test of Hypothesis Two

The null and alternate versions of hypothesis two are stated as follows: (ECM)

H_{o2}: *There is no significant long run relationship between Stock Market Capitalization and each of exchange rate, external reserves, gross domestic product, inflation rate and interest rate in Nigeria.*

H_{A2}: *There is a significant long run relationship between Stock Market Capitalization and each of exchange rate, external reserves, gross domestic product, inflation rate and interest rate in Nigeria.*

From Table 7, going by the probability values there is a significant long run relationship between stock market capitalization and each of GDP and inflation rate, while there is no significant between stock market capitalization and each of exchange rate, external reserves and interest rate.

Consequently, the null hypothesis is rejected in respect of GDP and inflation rate and the alternate hypothesis accepted in respect of exchange rate, external reserves, and interest rate with the hypothesis correspondingly rejected.

5. Discussion of Findings

This study empirically, examined the interrelationship prevailing between stock market capitalization as a measure of performance and perceived macroeconomic factors namely Exchange (EXCHR), External Reserves (EXTRr), Inflation (INFR), Interest rates (INTR) and Gross domestic product (GDPr). The results indicate a significant long run relationship between 3 variables that relate with the performance of Nigeria Stock Market. Further, ECM results reported that GDP remains significant variable that respond to stock market performance positively, while inflation responded negatively in a significant manner to stock market performance. More so, interest rate, external reserves and inflation are shown to responding and adjusting to trends in Stock Market Capitalization while market capitalization and exchange rate are operating independent of each other. Implications of the results in interest rate, external reserves and inflation could be that the monetary authorities are mismatching monetary policies management. These results reveal that Nigerian output of goods and service grows the financial sector but in the short and in the long runs.

6. Conclusion

This study empirically, examines the interrelationships between macroeconomic determinants of external reserves, GDP, exchange, inflation, interest rates and stock market capitalization in Nigeria. It is proceeds determine the extent to which these key macroeconomic variables promote and /or support the growth of Nigeria stock market. While the short run regression analysis indicate a significant relationship between stock market performance and gross domestic product, the long run analysis indicate that the study variables are co-integrated and significantly related in the long run. In the short run however, the ECM results indicate that only GDP and inflation rate have significant relationship with the stock market capitalization while all the variables explain only 71.14% of the variations in market capitalization in the long run. The difference being about 28.86% are explained from factors not captured in the study. Hence, it is attributed to error terms in Equation 3 above.

From above, it is concluded that gross domestic product and inflation rate constitute the significant policy variables of interest to promote and manage the desired performance of Nigeria stock market. At the same time, interest rate is depicted as purely promoted by stock market performance and constitutes a derived effect. Thrust, stock market performance in Nigeria appears to be independent of exchange rate and external reserves performance and as such, cannot be influence by each other. A glaring contribution of this study to knowledge remains the empirical evidence on the extent to which stock market performance/operations promote interest rate movements which is not traced in other studies. Recognition of stock market performance in the management of interest rate policies therefore, remains vital and compelling.

7. Recommendation (S)

In this light, the following recommendations are made:

i.) Inflation rate management should be employed as a measure for improved Stock Market Performance in Nigeria.

ii.) Monetary policy authorities should adopt stock market movements as one of the variables in managing Nigeria interest rate.

iii.) To increase output of goods and services to encouraged and invigorate the financial system in Nigeria.

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