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Macroeconomic indicators and capital market performance: Are the links sustainable?

Felicia O. Olokoyo^{1*}, Oyakhilome W. Ibhagui² and Abiola A. Babajide¹

Abstract: This paper examines the long-run impact of macroeconomic indicators such as interest rate, foreign capital flows, exchange rate, GDP growth, inflation and trade on stock market performance (market capitalization) in Nigeria. Using data drawn from the World Development Indicators (WDI, 2018) and the Central Bank of Nigeria (CBN) Statistical Bulletin 2018, the study employed the VECM analysis. The results found suggest that 1) macroeconomic variables and stock market performance are cointegrated and thus linked in the long run; 2) interest rate, inflation and trade bear a negative relationship with stock market performance; and 3) exchange rate, GDP growth rate and foreign capital flows are positively related to stock market performance. Our results show that when there is a deviation from the long-run relation between stock market performance and macroeconomic fundamentals, it is primarily the stock market, interest rate and foreign capital flows that adjust to ensure that the long-run link is restored, whereas exchange rate, GDP growth, inflation and trade are weakly exogenous. We estimate that any disequilibrium emanating from interest rate is more than fully corrected in one year, in the oscillating convergence sense, while 29% and 5% of the disequilibrium from stock

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PUBLIC INTEREST STATEMENT

The capital market plays key roles in the development process of any nation. This market promotes growth and development, which comes via the role it, plays in mobilizing resources as well as attracting both foreign and domestic investments. To put it simply, the capital market is expected to boost economic growth by growing the liquidity of financial assets thereby providing investors with opportunities to diversify risk. A well-developed capital market puts a nation on a sustainable path to growth and development through savings accumulation, the optimal use of investment resources and by attracting portfolio investments. For an economy like Nigeria, the process of achieving growth and development requires the availability of long-term capital. No other financial institution is well equipped to provide long-term capital like the capital market. It therefore becomes imperative to study the impact of macroeconomic variables on the performance of the capital market in Nigeria.

market and foreign capital flows are corrected in one year. A policy recommendation that emerges from the study is the need to strengthen policies aimed at improving the country's macroeconomic environment. Specifically, this will involve policies aimed at lowering interest rate, increasing foreign capital flows and improving the country's terms of trade.

Subjects: Economics; Finance; Corporate Finance; Investment & Securities

Keywords: macroeconomic variables; capital market performance; long-run relationship

Subjects: C22; C32

1. Introduction

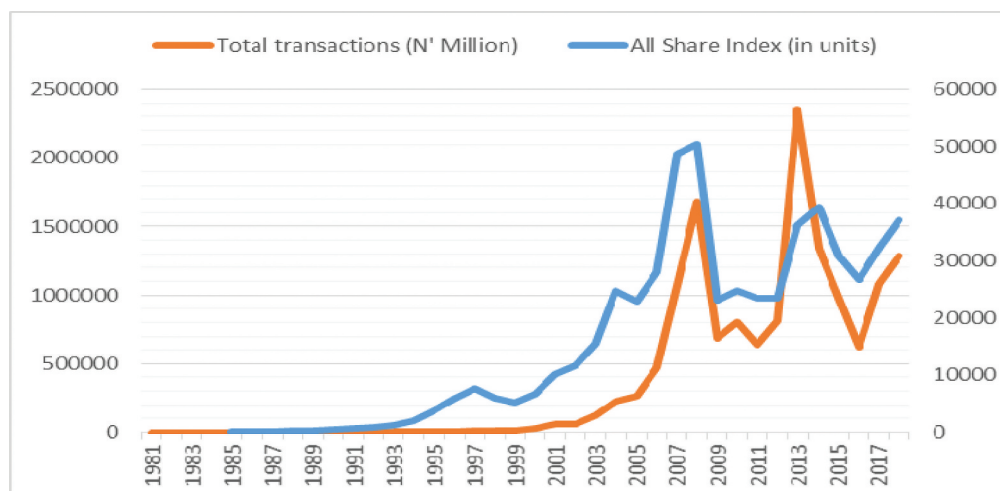
Capital markets play an important role in the development process of any nation. This is because they help promote growth and development, which comes via their role in mobilizing resources as well as attracting both foreign and domestic investments into the country. A well-developed capital market puts a nation on the sustainable path of growth and development through savings accumulation, the optimal use of investment resources and by attracting portfolio investments. For a developing economy like Nigeria, the process of achieving growth and development requires the availability of long-term capital. No other financial institution is well equipped to perform this role like the capital market. The level of development of the capital market and the macroeconomic factors affecting its performance is therefore an important issue for policymakers and market practitioners alike.

It is also however a good research topic among scholars in the academic community. The extant literature has established that the rate at which a nation records economic progress is dependent on how well its stock market can mobilize savings for investment. Sohail and Hussain (2009) for instance, put forward the assertion that a well-developed capital market promotes economic growth in that it helps to mobilize savings that are devoted to investment projects. In industrialized economies, the financial markets are well developed; we cannot however say the same about developing countries. In specific terms, the developing nations are yet to fully explore the potentials and financing possibilities offered by the capital market, which partly explains why they are still underdeveloped. According to Daferighe and Charlie (2012), stock market performance can be measured using market capitalization, stock market liquidity, all share index (ASI) and turnover ratio. Market capitalization, stock market liquidity, ASI and turnover ratio capture stock market size, the ease at which investors can buy and sell securities, the performance of the stock market and the index for comparing the level of transaction cost and market liquidity rating, respectively. However, it is often thought that for these measures to record positive improvements, the overall macroeconomics must be stable and favorable.

Capital markets in developing and emerging markets are usually characterized as shallow and unstable, leading to extreme sensitivity of stock returns to developments in the economy. These features underscore the role macroeconomic variables play in the performance of capital markets. It is therefore evident that the performance of the stock market is contingent on the overall macroeconomic environment. It is often noted in the literature that stock prices and capital market performance hinge on the state of macroeconomic variables—inflation rate, GDP growth, exchange rate, interest rate and money supply. Aldin et al. (2012) note that investors believe macroeconomic conditions influence capital market performance. Given that the capital market accounts for a larger chunk of a nation's wealth—and considering the role macroeconomic variables play in its performance—it becomes empirically expedient to investigate what macroeconomic variables affect capital market performance, especially in a developing country like Nigeria where this link is yet to be fully understood.

Figure 1. Nigeria's stock market —total transactions (left axis) and all-share index (right axis).

Source: CBN.



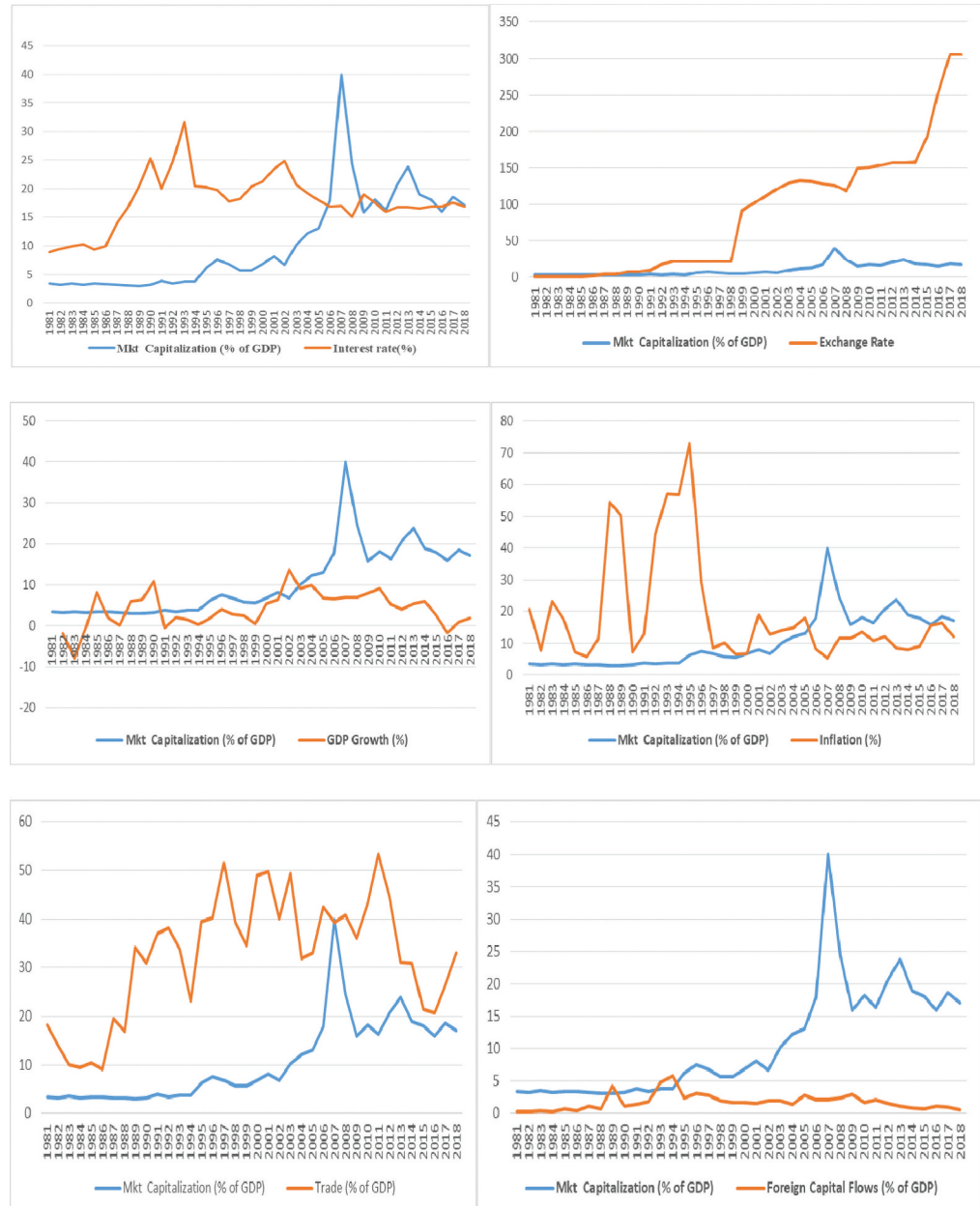
According to Fama (1970), market efficiency comprises strong, semi-strong and weak forms. The strong form postulates that present stock returns reflect all available information and unanticipated return is not linked with any public or insider information. The semi-strong form postulates that market returns are not linked with any information that is available publicly. The last one is the weak form which stipulates that the market has no recollection of past returns and consequently, such knowledge cannot influence future returns. As regards the impact of macroeconomic variables, the efficient market hypothesis advocates that competition among the profit-seeking investors would ensure that information on macroeconomic variables that is already known is fully reflected in current stock prices (Chong & Koh, 2003). Another important theoretical contribution is the Arbitrage Pricing Theory (APT) proposed by Ross (1976). The concept basically seeks to quantify whether the risk premium attached to the factors that determine the return on assets is priced into stock market returns. Chen et al. (1986) also demonstrate that economic factors determine how firms can generate cash flow and also discount rates.

Another key feature of the stock market is price movement captured by the random walk hypothesis. A stock market crash however occurs when stock prices reach an all time high and then suddenly crashes within a very short period of time. Consequently, the stock market index declines sharply, and investors suffer severe losses. Such extreme variations in stock prices indicate market risk and uncertainty. These situations are often triggered off by the behavior of investors as opposed to market fundamentals (Bailey, 2005). These situations would suggest that the market is inefficient, and it usually results in price distortions, meltdown or even eventual collapse. Aside from the usual behavioral and fundamental factors, macroeconomic factors are the next in line as it pertains to capital market performance and this represents the focus of this study.

There is a preponderance of empirical evidence on the relationship between macroeconomic variables and capital market performance. However, majority of the studies have been concentrated on developed economies (see Aylward & Glen, 2000; Binswanger, 2000; Foresti, 2007; Otoo, 1999; Stock & Watson, 2003; Taamouti, 2015; Thornton, 1993) while the possible impact of macroeconomic variables on capital market performance in developing and emerging markets remains either unclear or relatively underexplored. According to Hosseini et al. (2011), the response of the capital market to macroeconomic variables such as GDP growth rate, interest rate, inflation, exchange rate, trade and foreign capital flows remains a largely unexplored area. Except for a few studies (see Akani, 2013; Asekome & Agbonkhese, 2015; Okpara, 2010; Worlu & Omodero, 2017), very little studies have been carried out on Nigeria. Even in the few instances where such studies have been done, the results are often mixed and conflicting. Therefore, our study is motivated by the apparent gap in knowledge that exists in this area. To this end, this study seeks to uncover the long-run impact of selected macroeconomic variables on Nigeria's stock market performance.

Figure 2. Market capitalization versus each macroeconomic indicator.

Source: World Development Indicators and Central Bank of Nigeria statistical bulletin.



Following this introductory section, the rest of the paper is organized as follows. In section 2, we present a brief history of the Nigerian stock market in the literature review. Section 3 presents the empirical methodology. The empirical results are presented in section 4 while section 5 concludes the paper with policy recommendations and suggestions for future studies.

2. Brief history on the performance of the Nigerian stock market and review of the empirical literature

2.1. Brief history on the performance of the Nigerian stock market

In Nigeria, the history of the capital market can be traced back to 1961. This was the year the Nigerian Stock Exchange (NSE) began operations starting with initial nineteen securities. This rose to 264 securities in 1998 and by 2014, it had risen to over 300 securities. A key reform measure

that has significantly improved the fortunes of the Nigerian capital market was the introduction of the Structural Adjustment Programme (SAP) in 1986. Prior to this time, only very few investors were interested in the Nigerian capital market. In addition, the market was also largely under-utilized. The adoption of the policy however led to significant improvements in its performance. The high interest rate environment that characterized money markets during the reform era compelled enterprises to seek equity capital from the capital market. This in turn created a huge opportunity for private investors to participate in the capital market.

Improvement in the performance of key indicators of the market such as number of listed companies, market capitalization and all-share index can be linked majorly to the following reforms: the creation of the second-tier securities market (SSM) in 1985, the deregulation of interest rates in 1987 and the privatization exercise that swept across government-owned enterprises in 1991. Number of companies listed on the market grew to 195 in 1999 from 100 in 1988. Also, the number of total securities traded rose from 244 in 1987 to hit 268 in 1999. The improved performance of the indicators of the stock market also extended to market capitalization, which soared to 294.1 billion or, 8.7% of GDP in 1999 from just 8.3 billion or 7.6% of GDP in 1987.

In 2008, the global financial crisis struck the Nigerian stock market. In March that year, market capitalization stood at 12.6 trillion naira but by December 2008, it had fallen to 6.96 trillion naira. It further crashed to 4.48 trillion naira in the month of March 2009. However, the fortunes of the Nigerian stock market improved in subsequent years with market capitalization hitting 13.6 trillion in 2014. This trend was sustained up until January 2018. Beginning from February 2018, the Nigerian capital market has been experiencing a drastic decline in key performance indices. Many observers have also adjudged the Nigerian stock markets as one of the worst-performing stock markets in Africa. Another important reform policy we would like to point out is the banking recapitalization policy introduced by the CBN on 4 July 2004. This policy saw the increment of the minimum capital requirement of banks from 2 billion to 25 billion naira (CBN, 2005–2018). This policy improved quoted securities on the Nigerian stock exchange and consequently, equity exchanged as a proportion of aggregate market capitalization rose to 17.0 in 2013 (Olowe, 2009).

2.2. Review of empirical literature

The empirical literature is replete with studies on the impact of macroeconomic variables on capital market performance. However, majority of these studies focused on developed countries while developing countries have only attracted a few studies. Fama (1981) carried out one of the earliest studies and results reported that stock prices and macroeconomic factors are related. This empirical study spurred the interest of researchers and consequently, researchers started embarking on studies in this area. Another defining feature of the last three decades is the increasing trend of globalization. Thus, it dawned on researchers that global and macroeconomic factors have gained center stage and most empirical works in this area were situated within this perspective.

Junttila et al. (1997) document a negative relationship between the stock market in Finland and unexpected inflation. Maysami and Koh (2000) also provide evidence on the nexus between macroeconomic variables and the Singaporean stock index in addition to the relationship among Japan, U.S. and Singapore stock indices. Result based on the Vector Error Correction Model reveals that the country's stock markets are cointegrated with money supply, price levels, exchange rates and interest rates. The study also finds that the stock markets of the US and Japan are cointegrated with Singapore's stock markets.

Flannery and Protopapadakis (2002) examined the impact of macroeconomic variables on the US stock market empirically. This study considers the impact of six macroeconomic variables, namely, producer price index, balance of trade, employment, housing, M1 and consumer price index. Results reveal that these variables significantly influence stock returns. In a related study by M. H. Ibrahim and Aziz (2003), based on the Malaysian economy, the links among stock prices and money supply, industrial production, exchange rate and consumer price index were investigated.

The study finds that CPI and industrial production are positively linked with stock prices. A related empirical study by Serkan (2008) also explores the role macroeconomic variables play in explaining Turkish stock returns. For the empirical analysis, the study employs a factor model for the period, July 1997 to June 2005. The study finds that oil prices, money supply and industrial production do not significantly affect Turkish stock returns. It is also reported that portfolio returns are affected by world market return, interest rate and exchange rate.

A study by Abd Majid et al. (2001) based on the Malaysian economy also reports that stock returns are not influenced by inflationary trends while the empirical studies by Gjerde and Sættem (1999), Paul and Mallik (2003), Puah and Jayaraman (2007), and Reilly et al. (2007) conclude that a fall in interest rates increases stock prices. The empirical study by Pilinkus and Boguslauskas (2009) explores the link between macroeconomic factors and the Lithuanian stock market. In their analysis based on impulse response function, it is reported that exchange rate and unemployment negatively influence stock market returns while money supply and GDP growth have a positive impact. A similar study by Snieska et al. (2008) based on correlation and regression analyses also reports a moderately strong connection between the stock market and each macroeconomic indicator considered. Kralik (2012) in their study on the Romanian economy finds that stock market development is influenced by gold price, global interest rates, crude oil price, global interest rates, global stock market indices and exchange rates.

In recent times, developing countries have been receiving growing attention as it relates to the subject matter. The study by Goh and Wang (2013) rests on the widely held view that the stock market of a nation can impact that of another nation in a globalized world. The study finds that US macroeconomic factors began influencing the Chinese stock market after China joined the World Trade Organization (WTO) in 2001. The empirical study by Adam and Tweneboah (2008) based on the impact of macroeconomic indicators on stock prices in Ghana reports that a long-run relationship exists between stock prices and macroeconomic indicators in Ghana. Using the VECM analysis, they find that inflation and interest rate significantly influence stock market performance while exchange rate, FDI and oil prices have weak impacts on price changes. A related study on Ghana by Coleman and Tettey (2008) also finds that inflation rates and lending rate significantly influence the performance of the stock market. This result supports those reported in the study by Azeez and Yonezawa (2006). Al-Mutairi and Al-Omar (2007) report contrary results in that inflation negatively impact Kuwait's Stock Market. Arango et al. (2002) also report an inverse relationship between the rate of interest and the Bogota Stock Market.

M. Ibrahim and Musah (2014) explore the link among macroeconomic indicators and stock returns in Ghana. They find a long-run relationship between stock market returns and macroeconomic indicators, where money supply and inflation have a positive impact on stock prices while industrial production, exchange rate and interest rate have a negative effect. Muhanamani and Sivagnanasithi (2014) investigated the impact of macroeconomic indicators on the Indian stock market and the study shows that industrial productivity, wholesale price index and money supply are positively linked with stock market returns in India. Subburayan and Srinivasan (2014) also examine the impact of macroeconomic variables on the Indian stock market. Result reveals no causal relationship between inflation, interest rate and the Indian stock market. Mutuku and Ng'eny (2014) also find a positive relationship between nominal GDP and stock price. This is also similar to the empirical results reported by Al-Shami and Ibrahim (2013). Sikalao-Lekobane and Lekobane (2014) find that macroeconomic variables and US share price index are positively related. On the contrary, Barakat et al. (2016) find no evidence supporting a causal relationship between Egypt's market index and selected macroeconomic variables. Recent studies such as that by Badullahewage (2018), Radha and Gopinathan (2019), Al-Kandari and Abul (2019), and Bahloul et al. (2017) have documented mixed results.

In Nigeria, a few studies have investigated the subject matter. However, the existing empirical evidence has produced largely mixed and conflicting results. Nwokoma (2002) reports that

interest rate and production level have a long-run relationship with Nigeria's stock market. In a related study, Ologunde et al. (2007) find that interest rate impacts market capitalization positively while the impact of government development index on the stock market is negative. Maku and Attanda (2009), using error correction analysis, reports that consumer price index, exchange rate and money supply influence the performance of the Nigerian stock market. Worlu and Omodero (2017) also report equivalent results. In a study by Asekome and Agbonkhese (2015), they show that only money supply and GDP have a significant impact on the all share index. The study by Onakoya (2013) and Okoli (2014) conclude that macroeconomic indicators are significant predictors of stock price movements and volatility. However, Okoro (2017) finds contrary results that macroeconomic indicators do not explain movements in stock prices. Nkechukwu et al. (2013) report that GDP does not influence Nigeria's stock market positively; they argue that the impact on stock prices is negative while money supply has a positive effect. One theme is common to most of these studies—they ignore the dynamics of the speed of adjustment and deviations from the long-run cointegrating relationship even in instances where long-run relationships are established.

Furthermore, from the empirical studies in the literature presented above on Nigeria's stock market, the pertinent question on how macroeconomic variables drive stock market performance in Nigeria has not been answered conclusively. Studies on Nigeria have yielded largely mixed and conflicting results. This study therefore revisits this subject with the hope that our approach will offer insight and enrich the literature. To this end, our study seeks to uncover what macroeconomic variables affect stock market performance in Nigeria. For our empirical analysis, we adopt the Johansen cointegration approach and VECM framework. This approach will help establish the long-run links among the variables, an analysis of the adjustment mechanisms, as well as establish the influence of the selected macroeconomic variables on capital market performance in Nigeria.

3. Methods & materials

3.1. Research model & hypotheses

This paper uses time series econometric techniques to investigate the impact of macroeconomic indicators on stock market performance in Nigeria. It has been established from previous studies reviewed (see Sikalao-Lekobane and Lekobane (2014), Okoli (2014), and Muhanamani and Sivagnanasithi (2014)) that the performance of the capital market is influenced by some underlying factors at the macro level. Thus, in this study, we investigate the functional relationship that exists between stock market performance proxied by market capitalization (MCAP) and macroeconomic variables that have been identified through the literature and theories such as interest rate (INT), exchange rate (EXR), gross domestic product growth rate (GDPG), inflation (INF), foreign capital flows (FKF) and trade (TRD).

We employ the vector error correction model (VECM) to investigate the relationship between capital market performance and selected macroeconomic variables. An alternative approach is the two-step error correction model by Engle and Granger (1987). This study adopts the VECM approach because the cointegrating vectors it yields are more efficient. This superiority compared to other approaches arises from the fact that the VECM approach allows for testing for long-run relationships in systems of equations through a single step. Also, the approach does not require the strict condition that a variable or variables should be normalized.

Moreover, we have adopted the VECM instead of the GARCH model adopted by some studies in the literature because we are not concerned with estimating the volatility of stock market indices and macroeconomic variables which the GARCH model is most appropriate for.

As a first step, we specify a hypothesized relationship where stock market performance depends on the selected macroeconomic variables. This is specified as:

$$MCAP_t = f(INT_t, EXR_t, GDPG_t, INFL_t, FKF_t, TRD_t) + \varepsilon_t \quad (3.1)$$

In equation 3.2, we re-specify equation 3.1 as

$$MCAP_t = \alpha_0 + \alpha_1 INT_t + \alpha_2 EXR_t + \alpha_3 GDPG_t + \alpha_4 INFL_t + \alpha_5 FKF_t + \alpha_6 TRD_t + \mu_t \quad (3.2)$$

μ_t is the error term. The a priori expectation is such that $\alpha_1, \alpha_3, \alpha_4, \alpha_5, \alpha_6 > 0$ and $\alpha_2 < 0$.

Our VECM is specified as

$$\Delta Y_t = \sum_{j=1}^{k-1} \gamma_j \Delta Y_{t-j} + \alpha \beta' Y_{t-k} + \mu + \varepsilon_t \quad (3.3)$$

The error-correction component and Vector Autoregressive (VAR) component in the first differences are $\alpha \beta' Y_{t-k}$ and $\sum_{j=1}^{k-1} \gamma_j \Delta Y_{t-j}$. Y_t is integrated of order one and a $P \times 1$ vector of variables. The lag structure is k , μ is a $p \times 1$ vector of constants, ε_t is a vector of error terms. The short-term adjustments among variables across p equations at the j th lag is represented by γ_j which is a $p \times p$ matrix. β' denotes a $p \times r$ matrix of cointegrating vectors while the speed of the error correction mechanism is denoted by α which is a $p \times r$ matrix.

Before embarking on the Johansen cointegration test and VECM analysis, we first check for the unit root properties of the variables using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. These tests will help determine whether the variables are integrated. The Johansen cointegration test is suitable for testing for cointegration in multivariate vector autoregressive (VAR) models. The test seeks to find a linear combination that is stationary by relying on the link between the eigenvalues and the rank of a matrix. We reiterate that the concept of cointegration, in the Johansen sense, presupposes that only variables that have the same order of cointegration can be cointegrated. In this paper, the choice of the most appropriate lags is determined using the Akaike Information Criterion (AIC). Liew (2006) notes that this criterion is the most efficient when we have 60 or fewer observations.

To establish whether long-run relationships exist among the variables, we employ the Johansen cointegration test. The technique is based on the trace and maximum eigenvalue test. These tests will help establish the number of cointegrating relationships that exist among the variables. Once we have established the existence of long-run cointegrating relationships as well as the order of cointegration, we proceed to choose and analyze the cointegrating vector and speed of adjustment coefficients.

Our proxy for stock market performance is market capitalization (MCAP) which is the ratio of capitalization of the market to gross domestic product. The selected macroeconomic variables are interest rate (INT), exchange rate (EXR), gross domestic product growth rate (GDPG), inflation (INF), foreign capital flows (FKF) and trade (TRD). In this paper, interest rate (INT), exchange rate (EXR), gross domestic product growth rate (GDPG), foreign capital flows (FKF) and trade (TRD) are proxied by prime lending rate, nominal exchange rate, growth in the real GDP, the ratio of foreign direct investment to gross domestic product and the ratio of trade to gross domestic product, respectively. Except for exchange rate, a rise in all other macroeconomic variables is expected to improve capital market performance. In Table 1, we present the descriptive statistics of the variables.

From the foregoing, the following hypothesis emerge:

H1: Macroeconomic variables are cointegrated with stock market performance in the long run.

H2: An increase in interest rate (INT) and trade (TRD) should result in a decline in the performance of the capital market.

H3: An increase in GDP growth rate (GDPG) and foreign capital flows (FKF) should result in improved performance of the capital market.

H4: An increase in inflation (INFL) and in the exchange rate (EXR) should result either in a decline or improvement in the performance of the capital market.

3.2. Data description & variable measurement

The data employed in this study comprises the following macroeconomic variables: interest rate (INT), exchange rate (EXR), gross domestic product growth rate (GDPG), inflation (INF), foreign capital flows (FKF) and trade (TRD). Capital market performance is measured with market capitalization (MCAP). Our study period covers 1981 to 2018 while the data sources are the World Development Indicators and Central Bank of Nigeria statistical bulletin. Some descriptions of the data are given below.

3.2.1. Market capitalization

This is traditionally measured by the ratio of capitalization of the market to gross domestic product. Market capitalization (also known as market value) is the share price times the number of shares outstanding (including their several classes) for listed domestic companies in a given stock market. Market Capitalization (MCAP) is a ratio that can be used to determine the overall performance of a given capital market. We however employ total market capitalization that includes government securities and the equities of companies traded in the stock market. This provides a more holistic measure of market capitalization than just employing equities traded by listed companies. Data for this is sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, 2018.

3.3. Macro-economic variables

3.3.1. Interest rate

The prime lending rate is used as a proxy for interest rate (INT). The choice of this monetary policy rate is based on the fact that the rate is the fulcrum upon which other rates revolve in a mixed economy (Olokoyo et al., 2009). This is sourced from the World Bank's World Development Indicators (WDI), 2018.

3.3.2. Exchange rate

The exchange rate (EXR) used is the real effective exchange rate measured by the product of the nominal effective exchange rate and the effective relative price indices. This is sourced from CBN Statistical Bulletin, 2018.

3.3.3. Gross domestic product growth

The growth in the economy is measured by growth in the real gross domestic product (GDPG). Source is the CBN Statistical Bulletin, 2018.

3.3.4. Inflation

Inflation (INF) is the growth in consumer price index—CPI. Source is WDI, 2018.

3.3.5. Foreign capital flows

Foreign capital flow (FKF) is measured by the ratio of foreign direct investment to gross domestic product. This is sourced from WDI, 2018.

3.3.6. Trade

Trade (TRD) is measured by the ratio of trade to gross domestic product. This is sourced from WDI, 2018.

Table 1. Descriptive Analysis

	MCAP	INT	EXR	GDPG	INFL	FKF	TRD
Mean	10.60	17.76	88.54	4.11	19.32	1.76	32.26
Median	6.85	17.57	97.02	4.12	12.55	1.63	33.95
Maximum	39.95	31.65	306.08	13.63	72.84	5.79	53.28
Minimum	3.05	8.92	0.62	-7.88	5.38	0.26	9.14
Std. Dev.	8.41	4.84	87.14	4.24	17.26	1.25	12.56
Obs.	38	38	38	37	38	38	38

Source: Authors' computation.

4. Results & discussion

4.1. Descriptive statistics

Table 1 presents the descriptive statistics of all variables adopted in the study. The standard deviation of Market Capitalization (MCAP) at 8.41 is high revealing a high degree of variation from the mean value. This reflects the volatility of the Nigerian stock market. The mean value of the lending interest rate (INT) at 17.76% is high. This reveals the high interest rate charged by commercial banks and other institutions in the country's money market. This should have a negative effect on the performance of the stock exchange. With a minimum value of 0.62 and a maximum value of 306.08, the exchange rate (EXR) in the country has over the study period (1981–2018) undergone server depreciation in its value. It also has the highest standard deviation of 87.14. This reveals the high volatility of the country's exchange rate. The exchange rate could either have a negtaive or positive effect on the performance of the stock market in the country. With a mean value of 4.11, the growth rate of gross domestic product (GDPG) in the country is low. This reveals the slow rate of growth of economic activities in the country. This is expected to have a negative effect on the performance of the Nigerian stock market. With an average of 19.32%, the rate of inflation (INFL) in the country is high. This is expected to have either a negative or positive effect on the performance of the country's capital market.

4.2. Empirical results

Table 2 presents the results of the unit root test. While the ADF test reports that all the variables, with the exception of inflation and GDP growth, are nonstationary and only become stationary at their first difference, the PP test reports that all variables only become stationary at first difference. Since both tests yield similar results, we side with the results of the PP test that all variables are integrated, that is I(1).

Table 2. Unit root test

	ADF		PP		Order of Integration
	Level	First Diff.	Level	First Diff.	
MCAP	-3.27	-5.87***	-3.33	-8.60***	I(1)
INT	-0.20	-2.64***	-2.22	-6.95***	I(1)
EXR	1.95	-4.54***	-1.12	-4.37***	I(1)
GDPG	-3.96**		-3.21	-17.87***	I(1)
INFL	-3.96**		-2.82	-10.34***	I(1)
FKF	-3.21	-5.48***	-3.11	-22.28***	I(1)
TRD	-2.33	-7.35**	-2.25	-11.27***	I(1)

*** and ** indicate significance at 1% and 5% levels, respectively.

Having established that our variables have the same order of integration, a key precondition for Johansen cointegration, we proceed to carry out the cointegration test. Before proceeding with the Johansen cointegration test and VECM estimation, we first determine the appropriate lag selection criteria. We select a lag length of 1 based on the AIC criterion. In Table 3, we present the result of the Johansen cointegration test. Both the trace test λ_{trace} and the maximum eigenvalue λ_{max} test indicate that we have one cointegrating relationship. We therefore reject the null hypothesis that the variables are not cointegrated at the 5% significance level. Based on the reported result, we conclude in favor of a long-run relationship among macroeconomic variables and stock market performance in Nigeria. Equation (3.6) specifies the long-run cointegrating relationship. By normalizing with respect to the coefficient for MCAP, we arrive at the following cointegrating vector: $\beta = (1.00, 0.79, -0.13, -0.89, 0.12, -10.78, 0.47)$. This yields the following cointegrating relationship:

$$MCAP_t = -0.79 \times INT_t + 0.13 \times EXR_t + 0.89 \times GDPG_t - 0.12 \times INFL_t + 10.78 \times FKF_t - 0.47 \times TRD_t \quad (3.6)$$

From the reported results, it is evident that interest rate (INT), inflation (INFL) and trade openness (TRD) bear a negative relationship with market capitalization (MCAP) while exchange rate (EXR), GDP growth rate (GDPG) and foreign capital flows (FKF) bear a positive relationship. This means that in the long run, an increase in interest rate (INT), inflation (INFL) and trade (TRD) will slow the performance of Nigeria's stock market. On the contrary, our results suggest that a rise in exchange rate (EXR), GDP growth rate (GDPG) and foreign capital flows (FKF) will improve stock market performance (MCAP) in the long run. We must also point out that the coefficients of these variables, except for inflation, are all significant at either the 1% or 5% significance level. This means that these variables contribute significantly to the cointegrating relationship.

We provide some possible explanations for the results obtained above. First, we find a negative relationship between interest rate and stock market performance. It is well known that a higher cost of borrowing discourages borrowing and slows down investments, with the attendant impact on the performance of listed firms that often require loans to finance their productive activities. This result is consistent with the findings of Al-Sharkas (2004), Humpe and Macmillan (2007), Adam and Tweneboah (2008), Mahmudul and Gazi (2009), Geetha et al. (2011), and Alshogearhi (2011). The high rate of interest charged by financial institutions to enterprises that require loans to cover the high cost of conducting business in the country has therefore contributed negatively to the performance of the Nigerian stock market. Our study also finds a positive relationship between exchange rate and capital market performance. This result stems from the fact that currency depreciation will attract investment from foreign firms and individuals into a country. And this will in turn have a positive effect on the performance of capital markets. Our result is however not consistent with the results of studies conducted for other countries such as Maysami and Koh (2000), Doong et al. (2005), Talla (2013), and

Table 3. Johansen cointegration test

H_0	Eigenvalue	λ_{trace}	5% critical value	λ_{max}	5% critical value
$r = 0$	0.77	139.43*	125.62	51.77*	46.23
$r \leq 1$	0.67	87.66	95.75	38.90	40.08
$r \leq 2$	0.41	48.76	69.82	18.31	33.88
$r \leq 3$	0.33	30.46	47.86	14.10	27.58
$r \leq 4$	0.26	16.35	29.80	10.75	21.13
$r \leq 5$	0.14	5.60	15.49	5.39	14.26
$r \leq 6$	0.01	0.22	3.84	0.22	3.84

*Denotes rejection of the hypothesis at the 5% level.

Ouma and Muriu (2014). An increase in capital flows is expected to increase capital market performance as it leads to an increase in the volume of transactions by listed firms on the stock exchange. This is consistent with our results. In particular, an increase in FDI inflows to Nigeria leads to improvement in the country's stock market performance. This has both a direct and indirect channel. The direct channel occurs when a foreign firm acquires 10% or more equity in a Nigerian enterprise. The greater the scale in which this occurs, the larger will be the increase in the volume of transactions in the country's stock market. As such, the improvement in the performance of the Nigerian capital market since the late 1980s can be linked to the increase in foreign direct investment into the country.

The beneficial impact of growth in economic activities also echoes a widely held view that capital market performance is strongly linked with economic performance. Chen et al. (1986) report that stock returns are strongly linked with the level of economic activities. This is consistent with our results as we find a positive relationship between growth in GDP and stock market performance. We however report a negative relationship between inflation and capital market performance in the long run. This is consistent with the findings of Maysami and Koh (2000) and Talla (2013). According to Fama (1981), the negative relationship between stock returns and inflation might be because real activity is a more important determinant of stock market performance. A negative relationship arises because of the lack of a substantial variation of the nominal quantity of money with respect to real activity.

Another important result that has emerged from this study is the negative effect of trade on stock market performance. This is however not surprising given the fact that Nigeria is essentially a mono economy given its heavy reliance on proceeds from the export of crude oil. In addition, a good number of listed firms are involved in the upstream and downstream sectors of the petroleum industry. Banks are also heavily involved in financing imports and exports. Thus, shocks in the international market for crude will affect economic activity in the country, which will in turn have a negative effect on the performance of listed firms, resulting in the worsening of the stock market performance. A good example is the oil price shock of 2016 that saw the total transactions on the Nigerian stock exchange to fall from 30.9 billion naira in 2015 to 26.6 billion naira in 2016. Aside shocks from fluctuations in oil prices, the Nigerian economy, being predominantly an import-based economy is also susceptible to other forms of external shocks. A good example of this is the 2008–09 global financial crisis where the deterioration of economic activities in the United States soon spread to other countries, including Nigeria. Market capitalization of the Nigerian stock market fell from 12.6 trillion naira in March 2008 to 6.96 trillion naira by December 2008. It further declined to 4.48 trillion naira in March 2009 (CBN, 2011).

In Table 4, we present the adjustment coefficients in the VECM. These coefficients will help establish the speed of adjustment to long-run equilibrium as well as test for weak exogeneity. In order to check for weak exogeneity of the adjustment coefficients, we examine the variables that adjust to restore equilibrium following a short-run shock that causes deviations from the long-run relationship. As is evident from Table 4, the coefficients of exchange rate (EXR), GDP growth rate (GDPG), inflation (INF) and trade (TRD) are not significant. We can therefore deduce that these variables are weakly exogenous. This means that anytime deviations from long-run equilibrium occur, the other variables (MCAP, INT and FKF) will adjust to restore long-run

Table 4. Error-correction model

	$\Delta MCAP_t$	ΔINT_t	ΔEXR_t	$\Delta GDPG_t$	ΔINF_t	ΔFKF_t	ΔTRD_t
ECM(−1)	−0.29**	0.17***	0.48	0.13	0.47	0.05***	−0.28
	(−2.28)	(2.58)	(1.18)	(1.56)	(1.23)	(2.66)	(−1.39)
R^2	0.23	0.44	0.34	0.38	0.18	0.88	0.26

Note: ***, ** and * indicate significance at the 1 %, 5% and 10% significance levels, respectively. The values in parentheses are t-statistics.

Table 5. VECM diagnostic tests

	H₀	df	Prob.
VEC Residual Serial Correlation LM Tests	no serial correlation at lag order h	49	0.34
VEC Residual Heteroskedasticity	Residuals are homoskedastic	448	0.26
VEC Residual Normality Tests	residuals are multivariate normal	14	0.00

Note: If $p > 0.05$, we accept H_0 . df—degrees of freedom.

equilibrium. In other words, the weakly exogenous variables do not drive the adjustment process. The results show that when there is a deviation from long-run equilibrium, it is the stock market, interest rate and foreign capital flows that adjust to ensure that the long-run link is restored. We estimate that disequilibrium in interest rate is fully corrected in one year while 29% and 5% of the disequilibrium in the stock market and foreign capital flows are corrected in one year.

Our results show that while the coefficient of the error correction term of stock market capitalization has a negative sign, the coefficient for interest rate and foreign capital flows is positive. What is most important however is that the sign of stock market capitalization, which is our variable of interest, is negative.

Meanwhile, to ensure that our model has a good fit, we perform VECM diagnostic tests for serial correlation, heteroscedasticity and normality.

The result presented in Table 5 shows that the residuals are homoscedastic and do not suffer from serial correlation. They are however not jointly normally distributed; although three of the variables were found to be normally distributed.

5. Conclusion & recommendation

This study has investigated the impact of macroeconomic indicators on capital market performance in Nigeria. To achieve the stated objective, we have employed the Johansen cointegration procedure and Vector Error Correction Model analysis. Motivated by the apparent dearth of empirical studies in this area, this study sought to ascertain how movements in macroeconomic variables affect stock market performance in Nigeria. The macroeconomic variables are interest rate, exchange rate, GDP growth, inflation, foreign capital flows and trade.

Results from the empirical analysis confirm that the macroeconomic variables are cointegrated with stock market performance in the long run. We perform a VECM estimation and our results reveal that interest rate (INT), inflation (INFL) and trade (TRD) bear a negative relationship with market capitalization (MCAP) while exchange rate (EXR), GDP growth rate (GDPG) and foreign capital flows (FKF) bear a positive relationship.

The negative relationship between stock market performance and interest rate stems from the tendency of firms to borrow when cost of borrowing is low. It is therefore expected that a higher cost of borrowing will discourage borrowing and investments. When firms are discouraged from borrowing to finance organic investments, their performance will be hindered. Consequently, capital market performance will worsen. We however report a positive relationship between exchange rate and capital market performance. This result stems from the fact that currency depreciation will attract investment from foreign firms and individuals into a country. Hence, there will be a resultant positive effect on the performance of capital markets. Our findings also report that an increase in capital flows does improve capital market performance.

We report a negative relationship between inflation and stock market performance in the long run while the beneficial impact of growth in economic activities on stock market performance echoes a widely held view that stock market performance is strongly linked with economic performance. A key empirical result that has also emerged from this study is the negative effect of trade on stock market performance. This is however not surprising given the fact that Nigeria is essentially a mono economy given its heavy reliance on proceeds from the export of crude oil. Also, a good number of listed firms are involved in the upstream and downstream sectors of the petroleum industry. Banks are also heavily involved in financing imports and exports. Thus, shocks in the international market for crude will affect economic activity in the country, which will in turn have a negative effect on the performance of listed firms, resulting in the worsening of the stock market performance. Aside shocks from fluctuations in oil prices, the Nigerian economy, being predominantly an import-based economy is also susceptible to other forms of external shocks.

Finally, we show that when there is a deviation from the long-run relationship, it is the stock market, interest rate and foreign capital flows that adjust to ensure that the long-run link is restored. We estimate that disequilibrium in interest rate is fully corrected in one year while 29% and 5% of the disequilibrium in the stock market and foreign capital flows are corrected in one year.

Our results offer new insights and provide answers to the raging issues in the literature regarding the links between macroeconomic variables and stock market performance. We believe our empirical findings will strengthen the understanding of domestic and foreign investors on the impact of macroeconomic variables on Nigeria's stock market performance and, in particular, the appropriate macroeconomic variables to monitor. Future studies could pay particular attention to the interrelationship between the interest rate with other macroeconomic variables and its implication on the performance of the capital market.

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