



## Nigerian Stock Market Performance and Economic Growth: An Error Correction Model (ECM) Approach

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*This paper investigated Nigerian stock market performance and economic growth: an error correction model (ECM) approach using time series data from the Central Bank of Nigeria (CBN) Statistical Bulletin. The study employed the error correction model (ECM) technique in estimating our specified models. We specifically investigated both the direction and magnitude of the impact of stock market performance (as proxied by market capitalisation, stock market turnover and stock market returns) on economic growth over the sample period covered by the study. Our main findings indicate that market capitalisation had a positive and significant impact on economic growth in Nigeria. Similarly, the stock market turnover ratio and stock market returns were found to exert a positive and significant influence on economic growth. We, therefore, infer that the respective outcomes of stock market performance support the position of theoretical expectation that stock market performance should be positively related to economic growth. Moreover, for each of our estimated models, we found that stock market performance is jointly significant in explaining economic growth in Nigeria over the period of the study.*



ABSTRACT

**Keywords:** Stock Market Performance; Economic Growth; Error Correction Model

## Introduction

The stock market development is an important part of the economy of any country. It plays a crucial role in the growth of the industry as well as commerce that ultimately affects the economy of a particular nation to a great extent. For this reason, the government, central banks and industrial sectors of any country keep a very close watch on the activities of the stock market (Kisang, Kogei & Ochieng, 2017). The stock market remains one of the most key sources where companies can raise funds. This allows firms to be publicly listed and have their stocks traded publicly on the floor of the Nigerian Stock Exchange. The stock markets are vital for economic growth as they ensure the flow of needed resources to the most productive investment opportunities.

Matadeen (2017) asserts that in the recent past, a number of empirical studies have shifted attention to whether the development of the stock market, in particular, enhances economic growth. From the theoretical viewpoint, several studies highlighted the significance of the services provided by stock markets in promoting economic growth either directly or indirectly. Indeed, there are several channels through which stock market development is understood to boost economic growth. These include enhanced mobilization of savings, improved liquidity and dissemination and acquisition of information and risk diversification (Worlu & Omodero, 2017). In line with these important roles, assessing the linkages among financial intermediary development as well as the stock exchange remains a vital issue for discussion.

Many researchers have focused on the different viewpoints of the relationship both practically and theoretically (Khan, 2017). The previous empirical investigation points to the fact that the financial intermediary is an essential factor in the stock market (Levine & Zervos, 1996). Therefore, the current study buttresses the relationship between economic growth and stock market development, and the influence of financial intermediaries.

However, with developments in economic growth theory, there has been a change in the focus of growth dynamics from the traditional elements (like capital, technology and labour) to other determinants that might also impact the growth process. These other factors comprise stock market development, macroeconomic factors, foreign direct investment, and political stability among others. Stock market development facilitates the allocation of capital, hence enhancing the prospects of long-term growth of the economy. A liquid and efficient stock market development offer the potential for investors to effectively spread their portfolios thereby mitigating the possible risks associated with their investment, thus, facilitating investments in projects that are more rewarding and profitable (Ezeabisili & Alajekwe, 2012). Without a liquid stock market, numerous profitable long-term investments would not be ignored because savers would be unwilling to tie up their investments for longer periods (Okonkwo, Ogwuru & Ajudua, 2014).

Azam, *et al.* (2016) argue that the existence of a stable and dynamic stock market is essential in driving the rate of economic growth. Forson and Janrattanagul (2013) also contend that stock markets play a pivotal role in boosting the growth of an economy by increasing liquidity and making capital available for private and corporate investors which would essentially stimulate economic development. Stock price movements are basically random, with prices adjusting swiftly in response to economic news as well as expectations.

Theoretically, Hoque and Yakob (2017) assert that the stock market provides the platform for firms to raise funds for investment and capital expenditures. It also plays a critical role in promoting the industrial and economic growth of a country. Indeed, from a reverse standpoint, macroeconomic variables also enhance stock market performance. Given such an interrelationship, Pradhan *et al.* (2013) suggest that stock market development may have a causal impact on economic growth, and it is arguable whether causality flows from economic growth to stock market development or vice versa.

Having an understanding of the linkages between macroeconomic indicators and the various measures of stock market development, including market capitalization, stock market return and stock market turnover (or liquidity) not only enables investors to improve their asset portfolios but also helps policymakers in formulating policies that would aid stock market development in Nigeria and increase accessibility to financial capital through financial markets (Garonfolo, 2011).

## Review of Related Literature

Although a number of empirical studies have examined the relationship between stock market development and economic growth, the results from such studies vary greatly from country to country. For instance, Omorokunwa and Ikponmwosa (2014) examined the relationship between stock price volatility and selected macroeconomic indicators such as GDP, inflation, interest rate, and exchange rate. Annualised time series data from 1980 to 2011 was used in the analysis. The generalized autoregressive conditional heteroskedasticity (GARCH) model was employed in the empirical analysis. The findings of the study revealed that stock prices in Nigeria display signs of volatility. And that past information in the stock market has an effect on variations in stock price volatility in Nigeria. In addition, the study indicated that exchange rate and interest did not have an effect on the stock price.

Oseni and Nwosa (2011) employed the LA-VAR Granger Causality test to analyse the connection between stock market fluctuations and macroeconomic variables in Nigeria for the periods 1986-2010 using annual time-series data. The results of the findings showed that there exists a bi-causal relationship between GDP and stock market volatility in Nigeria, and no causal relationship was found between stock market volatility and other variables like interest rate and inflation rate.

Asaolu and Ogunmuyiwa (2011) investigated the impact of macroeconomic indicators on Average Share Price and goes further to examine whether changes in macroeconomic indicators explain movements in stock prices in Nigeria from the period, 1986-2007. The Granger Causality test, Johansen Cointegration and Error Correction Method were adopted in analyzing the data. The results indicated that a weak relationship exists between Average Share Price and macroeconomic variables in Nigeria. The findings further revealed that Average Share Price is not a leading indicator of macroeconomic performance in the Nigerian context, even though, a long-run relationship was found between Average Share Price and macroeconomic indicators for the period under review.

Nkechukwu, Onyeagba and Okoh (2015) assessed the effect of macroeconomic variables on stock market prices using annual data for Nigeria for the period 1980-2013. The study employed Johansen cointegration and VECM in the analysis. The macroeconomic variables utilised were gross domestic product (GDP) and broad money supply (M2). The results of the findings indicate that Nigerian stock market prices had a long-run association with macroeconomic variables. However, the gross domestic product has a significant long-run negative effect on stock prices contrary to *a priori* expectation that gross domestic product had a significant positive effect on stock prices. But M2 has a significant long-run positive effect on stock prices, the result being consistent with a priori expectation. Again, there is a unidirectional causal effect between GDP and stock prices with direction running from stock prices to GDP. Whereas there is no causal effect between stock prices and broad money supply. However, in the short-run both GDP and M2 have a positive but insignificant effect on stock prices in Nigeria. This result suggests that the stock market in Nigeria is informational inefficient. It shows that predicting stock prices based on macroeconomic factors is difficult.

Osamwonyi and Evbayiro-Osagie (2012) analysed the relationship between macroeconomic variables and the Nigerian stock market index, using annual data of several macroeconomic variables of GDP and money supply from 1975-2005. The VECM was adopted to examine the short-run dynamics and the long-run relationship between the stock market index and the selected macroeconomic variables from the Nigerian economy. The major finding is that macroeconomic variables influence the stock market index in Nigeria.

Kalu and Okechukwu (2014) examined the impact of macroeconomic indicators on stock market return volatility in Nigeria, using GARCH-X model on monthly data from January 1996 to March 2013. Selected macroeconomic variables namely, GDP, consumer price index, exchange rate, broad money supply, credit to the private sector, and the net foreign assets were obtained. The results suggested that the stock market return volatility is positively influenced by variations in exchange rates and credit to the private sector but negatively influenced by estimated changes in money supply and consumer price index. Then again, changes in net foreign assets showed a negative but insignificant influence on changes in the stock market return.

Yartey and Adjasi (2007) investigated the economic importance of stock markets in Africa. The results of the paper showed that the stock markets have contributed to the financing of the growth of large firms in certain African countries. An econometric assessment of the impact of stock markets on growth in selected African countries, however, found inconclusive evidence although stock market value traded appeared to be positively and significantly related to growth.

In the Kenyan context, Elly and Oriwo (2012) evaluated the relationship between macroeconomic variables on the All-share index (ASI) and also determined whether changes in macroeconomic variables can be used to forecast the future ASI. Datasets for the periods from March 2008 to March 2012 were collated. The findings in the study revealed that 91 – day T bill rate had a negative relationship with the ASI while inflation did not have a strong positive relationship with the ASI.

Ho (2017) examined the macroeconomic determinants of stock market development in South Africa over the period, 1975-2015. Specifically, the paper examined the impact of economic growth, banking sector development, inflation rate, trade openness, and real interest rate on the development of the South African stock market. This paper enriched existing literature by investigating the linkages using the ARDL bounds testing technique. The results found that economic growth and banking sector development had a long-run positive impact, whereas inflation rate and trade openness had a long-run negative impact on stock market development. In the short run, the results showed that economic growth had a positive influence on stock market development.

Ahmad, Abdullah, Sulong and Abdullahi (2015) investigated the causal relationship between stock market returns and macroeconomic variables in Nigeria. The study used Autoregressive Distributive Lag (ARDL) and Vector Autoregressive Model (VAR) on annual data from 1984-2013. The Bound test procedure showed that the stock market returns and the macroeconomic variables were cointegrated and entail that a long-run equilibrium relationship exists between them. Similarly, the Granger causality tests revealed that economic growth had bidirectional causality with the stock market returns; while other variables had unidirectional causality. The variance decomposition test revealed that the stock market returns can be explained by gross domestic savings as well as nominal effective exchange rate.

### **Theoretical Framework**

The theoretical framework of this study was anchored on the Proxy Effect Hypothesis which was proposed by Fama and Schwert (1977) and further explained in Fama (1981).

### **Proxy Effect Hypothesis**

The Proxy Effect Hypothesis suggests that there is a negative relationship between stock returns and both expected inflation and current inflation. Inflation as highlighted in Fama's theory is basically a proxy for expected real economic activities which are key determinants of stock returns (Ely & Robinson, 1989). The real activities as used in Fama's outline may include output, the real rate of return on capital, capital expenditures etc. (Schmeling & Schrimpf, 2008). When economic activities decline, it is expected to impact negatively on future corporate profits and consequently on stock prices. Balduzzi (1994) further discussed the proxy effect hypothesis and argued that high stock returns have a positive correlation with growth rates of aggregate economic activity.

### **Data and Method**

Data for the study are basically secondary data and were obtained from the Central Bank of Nigeria Statistical Bulletin. We collated data on gross domestic product growth rate (GDPgr), market capitalization (MCAP), stock market return (SMR), stock market turnover (SMT), interest rate (INTR) and inflation (INFR) over the period, 1988-2020.

**Model Specification**

**H<sub>01</sub>:** Stock market performance does not have positive and significant effect on economic growth

$$\Delta GDPgr_t = \beta_0 + \sum_{i=0}^n \beta_1 \Delta GDPgr_{t-1} + \sum_{i=0}^n \beta_2 \Delta MCAP_{t-1} + \sum_{i=0}^n \beta_3 \Delta SMT_{t-1} + \sum_{i=0}^n \beta_4 \Delta SMR_{t-1} + \sum_{i=0}^n \beta_5 \Delta INF_{t-1} + \sum_{i=0}^n \beta_6 \Delta INT_{t-1} + \beta_6 ECT_{t-1} + \varepsilon_t \text{ ----- (2)}$$

Where:

- GDPgr = Gross domestic product growth rate
- MCAP = Market capitalization (% of GDP)
- SMT = Stock market turnover ratio
- SMR = Stock market returns
- INF = Inflation
- INT = Interest rate
- β<sub>0</sub> = Intercept
- β<sub>1</sub>- β<sub>6</sub> = Coefficients
- ε = error term
- ECT = error correction term
- Δ = differencing operator

**Results and Discussion**

**Table 1. Descriptive Statistics**

	<b>GDPGR</b>	<b>MCAP/GDP</b>	<b>SMT</b>	<b>SMR</b>	<b>INF</b>	<b>INT</b>
Mean	5.046588	11.27724	6.659635	24.63108	19.94172	22.88806
Median	5.487793	7.562581	5.484048	31.91789	12.16854	22.41598
Maximum	14.60438	39.95010	34.78530	130.9388	76.75887	36.09000
Minimum	-1.583065	3.053461	0.816748	-45.76535	0.223606	11.75000
Std. Dev.	3.833747	8.568015	6.886077	35.65644	19.15134	5.135064
Skewness	0.332086	1.264886	2.281453	0.435082	1.628418	0.247327
Kurtosis	2.606467	4.750845	9.707623	3.919300	4.509918	3.534268
Jarque-Bera	0.819491	13.01465	90.49193	2.136396	17.71940	0.728922
Probability	0.663819	0.001492	0.000000	0.343627	0.000142	0.694571
Sum	166.5374	372.1489	219.7680	788.1947	658.0767	755.3060
Sum Sq. Dev.	470.3237	2349.148	1517.378	39412.83	11736.77	843.8043
Observations	33	33	33	32	33	33

Source: Author’s Computation, 2019.

Table 1 presents the descriptive statistics of our model variables. The results revealed that the average GDP growth rate was 5.05% between 1987 and 2020. The highest rate of GDP growth was 14.60% in 2002 and the lowest at -1.58% in 2016. Market capitalization as a ratio of GDP averaged 11.285 while the mean of stock market turnover ratio (SMT) and stock market returns stood at 6.66% and 24.63%. The inflation rate (INF) ranged between 0.22% and 76.76% and averaged 19.94% during the sample period. On the other hand, interest rates (INT) averaged 15.00% between 1985 and 2020.

**Table 2. Unit Root Test Results**

<i>Variable</i>	<i>ADF-Statistic</i>	<i>5% critical value</i>	<i>P-value</i>	<i>Order of Integration</i>
<i>GDPgr</i>	-7.480425	-3.562882	0.0000	I(1)
<i>MCAP</i>	-6.100481	-3.562882	0.0001	I(1)
<i>SMT</i>	-5.581161	-3.622033	0.0008	I(1)
<i>SMR</i>	-6.451186	-3.574244	0.0001	I(1)
<i>INF</i>	-5.449078	-3.612199	0.0010	I(1)
<i>INT</i>	-7.031282	-3.562882	0.0000	I(1)

Results of the stationarity test in Table 2 reveal that our variables are stationary at the same orders of integration. Each of the variables has no unit root and attained stationarity after first differencing [i.e. I(1)]. Based on the fact that all our variables are I(1), we employ the error correction model (ECM) regression technique in analysing our model.

**Table 3. Error Correction Model (ECM) Regression Result**

Dependent Variable: D(GDPGR)

Method: Least Squares

Sample (adjusted): 1987 2020

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.069216	0.602468	-0.114888	0.9095
D(MCAP/GDP)	0.057800	0.144222	0.400775	0.0021
D(SMT)	0.187209	0.141660	1.321538	0.0000
D(SMR)	0.018848	0.018319	1.028890	0.0038
D(INF)	-0.050094	0.038276	-1.308765	0.0030
D(INT)	-0.174280	0.129907	-1.341576	0.1923
ECT(-1)	-0.629769	0.204066	-3.086108	0.0051
R-squared	0.786226	Mean dependent var		-0.034699
Adjusted R-squared	0.732783	S.D. dependent var		3.761863
S.E. of regression	3.295051	Akaike info criterion		5.418400
Sum squared resid	260.5767	Schwarz criterion		5.742204
Log likelihood	-76.98520	Hannan-Quinn criter.		5.523952
F-statistic	12.57060	Durbin-Watson stat		2.028896
Prob(F-statistic)	0.000362			

From the Table above, it can be observed that MCAP has a positive and significant impact on economic growth in Nigeria, as proxied by GDP growth (GDPgr). This was explained by the positive coefficient value of our explanatory variable MCAP and the corresponding probability value  $0.0021 < 0.05$ . The coefficient of the independent variable is 0.058, which entails that when market capitalisation increased by 1%, economic growth increased by 5.8%. This is consistent with a priori expectation that stock market development is positively related to economic growth.

The results also revealed that stock market turnover ratio (SMT) has positive and significant impact on economic growth. The coefficient of SMT is 0.187 with a corresponding p-value of  $0.0000 < 0.05$ . This outcome entails that when SMT increased by 1% economic growth increased by 18.75% during the sample period.

Our findings further showed that stock market returns (SMR) have a positive and significant influence on economic growth in Nigeria within the reference period, 1987-2020. This was explained by the positive coefficient value of SMR (0.019) and the corresponding p-value is 0.0038. This implies that 1% change in stock market returns led to about 1.9% increase in economic growth (GDPgr).

Moreover, inflation is found to have exerted a negative and significant influence on GDPgr over the period covered by the study. When inflation increased by 1%, GDPgr declined by 5%. We also observed that interest rate (INT) had a negative and non-significant impact on GDPgr. In other words, when the interest rate rose by 1% GDPgr declined by 17.4%. The error correction term (ECT) indicated that deviations from long-run equilibrium were corrected at the speed of 62.98% annually.

### **Conclusion and Recommendation**

Assessment of the effect of stock market performance on economic growth has continued to attract attention from researchers. Most of the existing empirical studies failed to look at various stock market development indicators to determine how they individually affect economic growth. In view of the observed gap, we attempt to analyse the impact of stock market development indices on stock market development (as proxied by market capitalisation, stock market turnover and stock market returns) on economic growth in Nigeria over the period, 1985-2020. From the findings of this study, we conclude that market capitalisation had a positive and significant impact on economic growth in Nigeria. Similarly, the stock market turnover ratio and stock market returns were found to exert a positive and significant influence on economic growth. We, therefore, infer that the respective outcomes of stock market performance support the position of theoretical expectation that stock market performance should be positively related to economic growth. Moreover, for each of our estimated models, we found that stock market performance is jointly significant in explaining economic growth in Nigeria over the period of the study. We recommend that there is a need to formulate policies that would ultimately stimulate economic growth and boost investment in Nigeria. For instance, ensuring that the Nigerian capital market is made more efficient and attractive for raising capital as well as saving mobilisation. This would translate into more activity in the stock exchange, with the listing of more firms, an increase in trading activities on the exchange, and recapitalisation of existing firms with an attendant positive effect on economic activities, hence growth.

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