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ECONOMIC GROWTH, FOREIGN RESERVE AND THE PERFORMANCE OF NIGERIA CAPITAL MARKET

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Abstract

Capital market performance is generally considered to be a reflection of financial and economic healthiness of a country. There are a number of macroeconomic and sector-related factors that potentially influence the performance of the economy's companies or industries that are listed on a stock exchange, which ultimately influences the performance of the capital market as a whole. The capital market in Nigeria has existed for almost six decades, but its performance cannot be compared favourably with those of developed countries. Even on African continent, it is not the best performed market. This paper empirically examined the effect of some selected macroeconomic variables (Gross Domestic Product growth rate, inflation rate, foreign reserves). Annual time series data of the variables, covering the period between 1986 and 2020 were considered using the Unit root test. Thus, using Vector Error Correction Model (VECM) and the Autoregressive Distributed Lag (ARDL) approachs in the investigation of the impact of the selected macroeconomic variables on the All-Share index results revealed quite discernable ideas Also, the bounds-test confirmed the existence of long-run relationship among the variables.. It is therefore obvious that, the Nigerian capital market will respond to changes in the selected macroeconomic variables, both in the short-run and long-run. The overall effect of the adjusted R2 value of 0.9449 thus shows that, 94% of the total variations in the performance of the capital market in Nigeria, is explained by the combined influence of the explanatory

variables. Based on the findings it is recommended that government should enact policies that will bring about the desired changes in these variables, such as, boosting aggregate demand; stabilizing inflation rate; increasing foreign reserve; so as to promote the growth and performance of the capital market in Nigeria.

Keywords: Economic Growth, Foreign Reserves, Vector Error Correction, Capital Market, Deepening

INTRODUCTION

In recent times the financial market in Nigeria has attracted a lot of attention as a result of the global financial crisis which led to the melt down in the capital market. This has led to several studies and discourse on capital market and as consequence the factors influencing its growth and its expected performance needed so much emphasis. Yet, an in-depth evaluation of the macroeconomic environment in which the capital market operates and its effect on the performance of the market has not attracted the desired attention of scholars. In this regard, there is need for a study on the effect of macroeconomic variables on the performance of the capital market. This is essential because, if the Nigerian capital market is deepened, it will perform its functions more efficiently and aid in the development of the economy as a whole. Similarly, despite the existence of the Nigerian capital market for more than five decades, its performance cannot be compared favourably with that of other developed capital markets like those in the United States and the United Kingdom. Even on the African continent, it is not the best performed market. The level of its sophistication, types of instruments traded and its general activities are still shallow. African capital markets (with the exception of Johannesburg stock exchange) are usually characterized by low capitalization and are still regarded as infants in the world stock exchanges. The Johannesburg Stock Exchange (JSE) has emerged as one of the best in the world, as it has a more matured capital market and was ranked one of the world's largest stock exchange by market capitalization ($1.007bn) as at the end of 2015 (Courage, Andrew and Kin, 2015). The JSE All-Share index called the FTSE/JSE Africa Index Series closed the year 2017 with 59,504.67 basis points, while the Nigerian Stock Exchange (NSE)'s All-Share index closed at 38,243.2 basis points. The Johannesburg Stock Exchange, FTSE/JSE Africa Index Series is an index partnership between JSE and the Financial Time Stock Exchange (FTSE) Group of London. Similarly, the JSE has 400 listed companies trading on its floor; but the NSE has only 163 listed companies trading online real time. Furthermore, the bourse at South Africa trades a diverse range of instruments and derivate, supported by cost-effective services. Such derivate include; Futures and Options, Rights, Interest Rates,

Currencies and Commodities. The NSE on the other hand trades only on a single derivative (Rights), though the NSE has put in place strategies to commence trading in other derivatives such as futures, options and swaps in the near future (NSE Fact book, 2018 and ASEA, 2018).

The selected macroeconomic variables for this study (gross domestic product, foreign reserve, inflation, interest rate and exchange rate), have not been stable throughout the period that the scope of this study covers. An unstable macroeconomic environment through variation in the rate of any of the selected macroeconomic variables may have effect on the activities of the capital market and hence its performance. For instance, there has been remarkable growth which resulted in an average annual real growth rate of GDP of over 6% between 2004 and 2012. The average real GDP growth in 2009 was 6.9%, higher than 5.98% in 2008 though it was 7% in 2007 (Factbook, 2018). Specially, the economy grew robustly at 7.45% in 2011. Foreign reserves in the country in 2013 was N46.25 billion, in 2014, it dropped to N37.5billion and further declined to N31.33 billion in 2015. In 2016, Nigeria's foreign reserves plummeted to N30.03billion, the lowest figure in recent times. However, in 2017, there was a slight increase in the nations' foreign reserves, as it rose to N40.5billion.

Within the same period market capitalization has also been on the increase, from N2.1b in 2004 to N14.8b in 2012, with a deep of N9.5b in 2007 and 7.3b in 2008. Interest rate on the other hand decreased from 20.8% in 2004 to 17.61% in 2012 (Factbook, 2018). Inflation rose to 15.7% on average in 2016 from 9.1% in 2015; in addition, the year saw a significant reduction in foreign reserves which fell to USD 25.8 billion as at year-end 2016 from USD 28 billion in the corresponding month of 2015. The capital market started on a positive note in 2014, however, total market capitalization dropped to 11.53% to N16.88 trillion, from N19.08 trillion at the start of the year (NSE Fact sheet, 2015; NBS 2015 and CBN Statistical Bulletin, 2015). In 2015, inflation remained relatively low at 9.5% and CBN left its benchmark interest rate at 13.0% for most of 2015, but took measures and tighten liquidity to support the weakening Naira. The ASI of the Exchange declined by 17.4% in 2015 closing the year at 28,642 basis points (Statistical Bulletin, 2016 and Fact Sheet, 2016). The Nigerian capital market was largely dominated by cautious and speculative tendencies in 2016, due to Nigeria's economic recession and the uncertainty built around Foreign exchange (Forex) availability. Trading activities in the capital market opened at 28,370.32 basis points of the ASI and closed at 26,874.62 basis points, shedding 1,767.6 points for the year. Market volume and turnover value of shares traded declined by 6.86^ and 40.23% to close at 86.21 billion units and N566.24billion in 2016 respectively.

It is clear from the foregoing that the selected macroeconomic variables have been volatile within the scope of this study. Against this backdrop, this study found the motivation,

and investigated empirically, the plausible effects of the selected macroeconomic variables on the performance of the capital market in Nigeria as the main objective covering the period between 1986 and 2020. The study further examined the following specific objectives:

i).To examine the causal relationship between the selected macroeconomic variables and capital market performance in Nigeria.

ii).To evaluate the impact of economic growth on the performance of the capital market in Nigeria.

iii).To analyze the impact of inflation rate on the performance of the capital market in Nigeria.

iv).To investigate the influence of foreign reserve on the performance of the capital market in Nigeria.

LITERATURE REVIEW

The study made resounding review on both theoretical and empirical underpinnings as related to the subject matter. From the theoretical perspective the following is discernible:

Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory was developed by Ross (1976). It is based purely on arbitrage. Arbitrage is the practice of taking positive expected return from overvalued or undervalued security in an inefficient market without any incremental risk and zero additional investments. An inefficient market is a market where prices do not always reflect available information as accurately as possible. Inefficient markets may result from a lag in information dissemination from one place to another and deliberate withholding of information by an insider. Inefficient markets give rise to arbitrage opportunities. Most analysts believe that no market is perfectly efficient and that some inefficiency is inevitable. In such capital markets, investors may not have enough information about the securities in other to make informed decisions about what to buy or the price to pay. In addition, few analysts follow the securities being traded. Similarly, there can be inefficient markets for stocks in new companies, particularly for new companies in new industries that are not widely analyzed. An inefficient market is the opposite of an efficient one, where enormous amounts of information are available for investors who choose to use it.

The APT is a general theory of asset pricing which holds that the expected return, of an asset can be modeled as a linear function of various macroeconomic variables or theoretical market indices, where sensitivity to changes in each factor is represented by a factor specific beta coefficient (Ross, 1976). These macroeconomic variables influencing the price of the assets are called risk factors, in other words, Arbitrage pricing theory asserts if two or more

securities or portfolios have identical return or risk, then they should sell for one price. Since Arbitrage pricing theory gives the expected price of an asset, arbitrageurs use the theory to identify and take advantage from its priced opportunities.

COMCEC (2013), posited that, in the APT context, arbitrage consists of trading in two assets with at least one being mispriced. The arbitrageur sells the asset which is relatively too expensive and uses the proceeds to buy one which is relatively too cheap. Arbitrageurs are type of investors who attempt to use profits from price inefficiencies in the market, by making simultaneous trades that offset each other and capturing risk-free profits. An arbitrageur would, for example, seek out price discrepancies between stocks listed on more than one exchange, and buy the undervalued shares on one exchange while short selling the same number of overvalued shares on another exchange, hence capturing risk-free profits as the prices on the two exchanges converge. Under this model, an asset is mispriced if its current price diverse from the price predicted by the theory. According to the theory, a correctly priced asset may be in fact a synthetic asset, meaning a portfolio consisting of other correctly priced assets. This portfolio has the same exposure to each of the macroeconomic factors as the mispriced asset. The arbitrageur creates the portfolio by identifying all correctly priced assets and then weighting the assets such that portfolio beta coefficient per factor is the same as for the mispriced asset, (Huberman and Wang 2005).

Bernard, S., Black, H. J., & Woochan, K. (2013). postulated that, the APT model explains risky asset returns which are believed to follow a factor intensity structure as follows:

$$R_j = a_j + b_{j1}F_1 + b_{j2}F_2 + \ldots + b_{jn}F_n + E_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

a_j = is a constant for asset j

F = are systematic factors

b_j = are the sensitivity of the jth asset to factor k, also called factor loading, and

E_j = is the risky asset's idiosyncratic (usual) random shock with zero mean.

The APT states that if asset returns follow a factor structure then the following relationship exists between expected returns and the factor sensitivities;

$$E(r_j) = r_f + b_{j1}RP_1 + b_{j2}RP_2 + b_{j3}RP_3 + b_{j4}RP_4 + \ldots + b_{jn}RP_n \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where

E(rj) = the asset's expected rate of return

rf = the risk-free rate

bj = the sensitivity of the asset's return to the particular factor

RP = the risk premium associated with the particular factor

The above implies that, the expected return of an asset j is a linear function of the asset's sensitivities to the n factors. However, for this to be correct, there must be perfect competition in the market, and the total number of factors may never surpass the total number of assets. According to Huberman (1981) the general idea behind APT is that two things can explain the expected return on a financial asset; macroeconomic variables/security-specific influences for any given security including inflation, production measures, investor confidence

EMPIRICAL REVIEW

Chen, Roll and Ross (1986) in their study on "Economic Forces and the Stock Market", tested whether innovations in macroeconomic variables are risks that are rewarded in the capital market, using the multifactor model in the United State of America (USA). The variables employed for the test were, consumption, oil prices, market index, industrial production, changes in risk premium, inflation and gross national product. They discovered that, consumption, oil prices, and the market index were not priced by the capital market. However, industrial production and changes in risk premium are found to be significant in explaining stock returns. The trio identified inflation and gross national product among the other variables as significant in explaining security returns, and maintained that the co-movements of asset prices suggest that presence of underlying exogenous influence. However, they were silent on the magnitude of the exogenous influence on stock returns on the capital market of the USA.

Chen (1991) further performed a second study, one the capital market of the USA. He employed the same model as that of Chen, Roll and Ross (1986). His findings suggested that future market stock returns could be forecasted by interpreting some macroeconomic variables such as default spread, term spread, one-month treasury bills, industrial production growth rate, and dividend price ratio; nevertheless, the extent to which the market can be forecasted was open-ended.

Wag, (1999) examined the causal relationship between stock returns and macroeconomic variables (oil price, real economic activity and inflation) in Norway. The results of their work demonstrated a positive linkage between oil price and stock returns as well as real economic activity and stock returns. However, their submission failed to show any significant relationship between stock returns and inflation. Also, it failed to show how the variables have collectively influenced stock returns and the market as a whole.

Yui (2015) tested the EMH model for the Chinese capital market with respect to monetary policy. In his study, the vector auto-regression (VAR) model was used to estimate the relationship between stock returns and relative macroeconomic variables (more supply, interest rate and gross domestic product|) related to monetary policy. He focused on how stock returns

are explained by macroeconomic variables to interpret the impacts of monetary policy on the capital market. The estimated VAR equation proves that there was significant impact of insulated changes in interest rate, money supply and gross domestic product ion stock returns. The results however did not indicate the direction and the magnitude of the effect of these macroeconomic variables on the stock returns. Another loop hole in this study is the fact that, the EMH model which Yui used, has been gross criticized due to its baseless assumptions and irrelevance to the relationship between capital market and macroeconomic variables, and so whatever submission that Yui arrived at is on the blink, as the most suitable theory which he should have employed is, the APT which explains the behavior of the capital market in terms of its relationship with macroeconomic variables or even the CAPM which indicate the possibility of a long-run relationship between the capital market and macroeconomic variables.

Naka (2015) employed and used vector-error correction approach to model the relationship between Japanese stock returns and macroeconomic variables. The outcome of the study revealed the existence of co-integration relation between stock prices and the macroeconomic variables engaged namely; exchange rate, inflation rate, money supply, real economic activity, long term government bond rate and call money rate. The study however, did not reveal the effect of their findings on the performance of the capital market in Japan; neither did their results show the extent to which each of the macroeconomic variables used affected stock returns on the Japanese market. Mukherjee and Naka were expected to have shown the effect of variation in the rate of each of the macroeconomic variables used in the study, on the performance of the capital market in Japan. For instance, changes in inflation rate will impact positively or negatively on the activities of the capital market and hence its performance. This they failed to bring out succinctly.

Chris, (2016) examined the relationship between the capital market and how the APT theory can best explain the Russian twenty (20) biggest equities on some macroeconomic variables, using regression analysis. His findings illustrated an insignificant relationship between equity returns and the macroeconomic variables; but one equity out of the twenty considered was significant to the anticipated changes in prices. But, this cannot be concluded that the APT does not work with assets pricing and returns in Russia. The problem could be inherent in the thesis as the macroeconomic variables were not insulated. Another issue with his findings is that, selecting only the biggest equities from a stock exchange market will not give a good picture of the overall happenings in the market. As such whatever was his outcome was already (biased) one sided, as the small and mid-cap equities were not reflected in his analysis.

Suleiman (2017) explored the correlation among macroeconomic variables and share prices of Karachi Stock Exchange (KSE), Pakistan. The study considered several quarterly data

for seven macroeconomic variables (foreign reserve, foreign exchange rate, industrial production index, whole sale price index, gross fixed capital formation, and broad money) for the period 1986 to 2008. The result showed that after the Pakistan reform in 1991, the influence of foreign exchange rate and foreign reserve significantly affected the stock prices, while the other variables like industrial price index and gross fixed capital formation did not significantly affect stock prices. The result also highlighted that endogenous factors of firms such as increase in production and capital formation were insignificant, while exogenous factors like broad money and foreign exchange were positively affected. The work however did not give a clue to the influence of his chosen macroeconomic variables on the share prices of Karachi Stock Exchange prior to the 1991 reform; neither were there any analytical comparison and the degree of influence of the macroeconomic variables before and after the 1991 reform, since the time frame he covered (1986 to 2008) would have given him this basic information.

Another work on Pakistan capital market was carried out by Abdul (2018). He investigated the dynamic interactions between some macroeconomic variables and stock prices in Pakistan, using co-integration and Granger causality tests. The results strongly suggested the existence of co-integration between the stock prices and the considered variables (consumer prices, industrial production, exchange rate and the market rate of interest). The estimates of bivariate error-correction model revealed that there is long-run bi-directional causation between the stock prices and all the macroeconomic variables selected, with the exception of consumer prices which only led to changes in stock prices. The results also provided some evidence that the stock price is affected by changes in interest rate in the short run. However, the analysis did not explore the short-run connection between the stock prices ad the remaining three macroeconomic variables. Therefore, his synopsis which seems to establish a connection between the health of the capital market in the sense of a rising share, price, and the health of the economy is only a long-run phenomenon. Another concern with the study is his selection of the macroeconomic variables. Key (conventional) macroeconomic variables, such as gross domestic product, unemployment rate and inflation rate were not included in the work.

Singh (2017) examined stock prices of listed entities on the Taiwan stock exchange from 2003 to 2015. He applied a linear regression model and tested the relationship between share prices and macroeconomic variables (exchange rate, gross domestic product, inflation rate and money supply). Empirical findings from his study revealed that exchange rate and gross domestic product seems to affect returns on all portfolios, while inflation rate, exchange rate and money supply have negative relationship with returns for portfolios of big and medium companies at the time of the study. The study did not show the effect of the variables on share prices of the small companies and what percentage o the returns for portfolios of the big and

medium companies constituted in the market. This is necessary because, the number of small companies may be large enough to eradicate any influence of the returns on the portfolios of the big and medium companies in the market.

In another study, Pilinkus and Boguslauskas (2016) used the impulse response function to test the existence of the short-run relationship between capital market prices and some selected macroeconomic variables in Lithuania; an application of the Impulse Response Function. Their study concluded that, unemployment rate, exchange rate and short-term interest rate negatively influenced prices of stocks on the capital market. However, just like Yui (2015) failed to indicate in his study the direction of the influence, so also, Pilinkus and Boguslauskas failed to address this issue.

Another study was carried out by Adebiyi, (2017)., on the impact of macroeconomic variables on Average Share Price (ASP) and goes further to determine whether changes in macroeconomic analysis such as Augmented Dickey Fuller (ADF) test, Granger causality test, Co-integration and Error Correction Method (ECM) on time series data from 1986-2007, and tested the impact of macroeconomic variables (external debt, inflation rate, fiscal deficit, exchange rate, foreign capital inflow, investment, industrial output) on the average share price in the Nigeria capital market. The average share price of twenty-five (25) quoted companies in Nigeria spanning through insurance, manufacturing, banking, service companies and real estate, were averaged between 1986 and 2007 to represent their dependent variable while the macroeconomic variables were their exogenous variables. The result of their findings revealed that, a weak relationship exists between average share price and the macroeconomic variables in Nigeria. Their findings further pointed out that, the average share price is not a leading indicator of macroeconomic performance in Nigeria. Notwithstanding, a long run relationship was found between average share price and macroeconomic variables for the period under consideration. Adebiyi, (2017) was unable to define the selection criteria for the twenty-five companies which were used in their study. Another drawback is the exclusion of companies listed under the petroleum sector on the Nigerian stock exchange in their choice of the companies. Twenty-five companies were also not a good representation of a capital market that had more than two hundred listed companies at the time of their study. (Factbook, 2018). However, their submission that the Nigerian capital market might be very sensitive to global macroeconomic factors may be valid. This is because, the year 2007/2008 signaled the global capital market meltdown, which affected the performance of capital markets of both developed and emerging markets, of which Nigeria was not an isolated case.

Canova and Nicolo (2017) carried out a study on nominal stock returns, industrial production and inflation and the capital market for the US, the UK, Germany, and Japan. They

estimated using a Vector Auto-regression (VAR) with nominal stock returns, industrial production and inflation. They discovered a significant negative relationship between real stock returns and inflation in all the four countries. On the other hand, a negative correlation between nominal stock returns and inflation is significant only in the US. Canova and Nicolo (2017), allowed for international interactions by estimating bilateral VAR's with the US as one country, and the UK, Germany, or Japan as the other country. When international influences are allowed for in this manner, the negative link between output growth and inflation, which is central to the 'proxy hypothesis disappears. However, the study failed to reveal the degree of these supposed international influences.

Asekome, M. O., & Agbonkhese, M. S. (2015 their study found that, there existed some evidence of the nonlinear and inverse relationship between the share prices on the Bogota capital market, Columbia and the interest rate as measured by the inter bank loan interest rate, which is to some extent affected by monetary policy. The model captures the conventional fact on this market as of high dependence on returns in short periods. Thee findings however, do not support any efficiency onteh main capital market in Colombia neither did it reveal and show the causation between the market and the variable employed for the study.

Bernard, S., Black, H. J., & Woochan, K. (2013).), employed multiple regression analysis to evaluate the functional relationship between money supply, inflation, interest rate, exchange rate and stock prices on the Nigerian stock exchange. In their findings, they discovered that, the relationship between stock prices and the selected macroeconomic variables are consistent with theoretical postulation and empirical findings in economics of the world. Nevertheless, their study revealed that, the relationship between stock prices and inflation does not agree with some other works done outside the shores of Nigeria.

METHODOLOGY

Data

This paper empirically examined the effect of some selected macroeconomic variables (Gross Domestic Product growth rate, inflation rate, foreign reserves). Annual time series data of the variables, covering the period between 1986 and 2020 were selected.

Model Specification

Model specification for the study is rooted in the Arbitrage Price Theory (APT) propounded by Ross (1976). The APT model states that, the expected returns on financial assets can be modeled as a linear function of various macroeconomic variables.

Thus in functional form,

ASI = f(GDPGR, INF, FRES,)---------- (1)

Where;

ASI	=	All-Share index
GDPGR	=	Gross Domestic Product Growth Rate
INF	=	Inflation Rate
FRES	=	Foreign Reserves

The stochastic and semi-logarithmic form of equation 2 is expressed as;

$\ln ASI = \beta_0 + \beta_1 GDPGR + \beta_2 INF + \beta_3 \ln FRES + \varepsilon$ ----------(3)

Where

In is the natural logarithm:

β_0 is the intercept or constant term

$\beta_1 - \beta_3$ are the parameter estimates and

ε is the stochastic or white noise error term

The stochastic model is expressed in semi-logarithmic form because of the mixed units of measurement of the variables..

In order to achieve objective one of the study, equation 3 is transformed into Vector Error Correction Model (VECM) framework which is capable of explaining the causal linkages (causality) between the macroeconomic variables and the performance of capital market in Nigeria, using the VECM framework

$$\Delta InASI_t = \alpha_0 + \sum_{t=1}^{k} \alpha_{1i} \Delta ASI_{t-1} + \sum_{t=1}^{k} \alpha_{2t} \Delta GDPGR_{t-1} + \sum_{t=1}^{k} \alpha_{3t} \Delta INF_{t-1} \sum_{t=1}^{k} \alpha_{4t} \Delta InFRES_{t-1} +$$

ECM_{t-1}

Model Estimation Techniques

The estimation techniques for this study involve the use of the ADF test to confirm the unit root or stationarity properties of the variables, the VECM causality and the ARDL techniques. The estimation techniques were carried out using the Econometric views (E-Views) version 10.0 software to justify series of tests as follows.

The Unit Root Test

A unit root test is a statistical approximation of persistent behaviour over the period of investigation (Julius, 1999). In time series modeling, it is logical to first of all examine the stationarity properties of the data.

Multicollinearity Test

Multicollinearity occurs when independent variables in a regression model are highly correlated. This correlation is a problem because independent variables are supposed to be independent.

The Jarque-Bera test

The Jarque-Bera test examines the normality of the distribution where the null hypothesis is that the distribution of the sample is a normal one and vice versa. However, if the probability value of this test is significant, then the null hypothesis is rejected, and the alternative is accepted. This suggests that the sample is not normally distributed. If each variable is statistically significant (indicated by a zero probability), then the series is not normally distributed. Furthermore, the farther the probability statistic of a variable is to zero, the lower the value of its Jarque-Bera statistic and the more normally distributed it is and vice versa. Here, the JarqueBera tests presented shows that the null hypothesis is strongly accepted for all the distribution. Hence, the variables can be described to be normally distributed.

Diagnostic and Stability Tests

To confirm the reliability of the estimates, it is required that the diagnostic test for the residuals as well as the stability test of the coefficients agrees with their respective null hypothesis.

ARDL Bounds Test

ARDL bounds test were used in the study to estimate the Long-run and Short-run Estimates of the model to analyze the policy sustainability impact

RESULTS

The unit root tests applied in this study is the Augmented Dickey Fuller (ADF) (Table 1).

Table 1 Augmented Dickey Fuller (ADF) Unit Root Test Results

Variable	ADF	Critical value 1%	5%	10%	Order of Integration
ASI	-3.452842***	`-4.498307	-3.658446	-3.268973	I (1)
INF	-2.734695***	-3.808546	-3.020686	-2.650413	I (1)
GDPGR	-3.452254***	-4.67895	-3.644963	-3.261452	I (0)
FRES	-4.360189**	-3.831511	-3.029970	-2.655194	I (0)

Significance at 1%, ** at 5% and *** at 10% levels respectively

Mackinon (1996) Critical Value for rejection

Note: A variable is stationary at a given level when the ADF value is greater than the critical value.

Descriptive Statistic of Variables

The mean and median constitute the first two descriptive statistics of measures of central tendency for the variables employed in this study, details are as shown below in table 2.

Table 2 Descriptive Statistic of Variables

	ASI	GDPGR	INF	FRES
Mean	2.765287	2.728213	4.459743	5.167173
Median	2.926830	2.801500	4.362869	5.285919
Maximum	4.106341	4.890752	4.843918	6.602711
Minimum	1.048830	0.367356	4.139226	3.474813
Std. Dev.	0.927101	0.910671	0.243724	1.081065
Skewness	-0.291256	-0.609465	0.344411	-0.212106
Kurtosis	1.909326	3.605293	1.630051	1.573562
Jarque-Bera	2.420743	2.932599	3.722790	3.506576
Sum	105.0809	103.6721	169.4702	196.3526
Sum Sq. Dev.	31.80207	30.68492	2.197843	43.24194
Observations	38	38	38	38

The study made use of the Variance Inflation Factor (VIF) to test for multicollinearity, results as indicated:

Table 3 Multicollinearity Test Result

Variable	Coefficient variance	centered VIF
GDPGR	235.4614	5.729709
FRES	49.45150	1.087529
INF	276.4046	5.928188

All the values of the Centered Variance Inflation Factor (CVIF) are less than 10 as revealed in Table 3. The Multicollinearity test result therefore, showed no evidence of multicollinearity.

Table 4 Long-run and short-run estimates of the ARDL Model

Dependent variable = lnASI (2, 3, 3, 2, 2, 3)				
Variables	**Coefficient**	**Standard error**	**T-statistic**	**P-value**
Long-run Estimates				
	0.4567	0.1318	3.4660	0.0074
GDPGR	-0.1004	0.0632	-1.5878	0.1510
INF	0.3601	0.0648	5.5560	0.0016
lnFRES	-0.1547	0.0317	-4.8731	0.0023
Constant				
Short-run Estimates				
	-0.2925	0.0939	-3.1158	0.0143
GDPGR	0.0224	0.0087	2.5881	0.0322
INF	-0.0304	0.0057	-5.2934	0.0007
lnFRES	0.5061	0.1684	3.0063	0.0256
ECM(-1)	-0.4238	0.0510	-8.3159	0.0000
Adjusted R^2	0.9449			
S.E. of regression	0.2378			
F-Stat	14.857			
Prob. (F-Stat)	0.0000			
Durbin-Watson	2.7952			

** indicates significance at 5%

The results of the long-run estimates shows that GDPGR, and lnFRES have positive and statistically significant long-run impact on the performance of the capital market in Nigeria. That is, 1% increase in GDP growth rate will lead to about 45.67% increase in ASI in the long-run. This entails that the long-run performance of the capital market can be influenced by the rate of economic growth in Nigeria. Also, evident from the results is that, 1% increase in foreign reserves will lead to about 0.3601% increase in the performance of the capital market in the long-run which also suggests that, in the long-run, foreign reserves can exert positive impact on the capital market.

Similarly, the long-run estimates indicates that, 1% increase in lnFRES rate leads to increase in the performance of the capital market by 0.50% implying that increase in lnFRES may actually be incentive for investing in the capital market, especially for foreign investments. As opined by Adebiyi, (2017).

For the short-run, the results indicated that GDPGR have positive and statistically significant impact on ASI, while FRES has positive but statistically insignificant impact on ASI. This implies that 1% increase in GDPGR, FRES will result to increase in the performance of the capital market in the short-run by 2.24%, 20.61% and 8.44% respectively. On the other hand, the short-run estimates showed that INF has negative and statistically insignificant impact on the performance of capital market in Nigeria. That is, 1% increase in INF will lead to decrease in the performance of capital market by 3.04% and 0.75% respectively. This corroborates with Abdul. (2018) and Das and Imon (2019)

The results of the error correction term (ECM) indicates that, the coefficient of the ECM (-1) , 0.4238 is negative and statistically significant at 5% level as required. This shows that, the deviation that occurs in ASI in the short-run is corrected by 42.38% towards the long-run equilibrium path every year, through the immense contribution of the macroeconomic variables. On the overall impact, the adjusted R^2 value of 0.9449 indicates that about 94.49% of the total variations in the performance of the capital market is explained by the combined influence of the explanatory variables, while the remaining 5.51% is the explained variation due to variables not explicitly captured in the model. This implies that the performance of the Nigerian capital market is grossly influenced by macroeconomic variables. Also, the overall standard error of regression, which measures the total errors incurred in estimating the relationship, is 0.2378 which is relatively low, implying a high level of precision in the estimation of the model. Similarly, the Durbin-Watson statistic as a test for detecting the presence or otherwise of order of serial or autocorrelation in a model has a value of 2.3952 which is within the acceptable region of 1.5 – 2.4 for a model to be adjudged free from serial or autocorrelation. Hence, the estimated ADRL model for this can be said to be free from serial correlation.

Table 5 Results of ADRL Bound Tests

Estimated Models	**Optimal Lag**	**F-stat.**	**Is there Cointegration?**
$InASI_t = f(GDPGR_t, INF_t, InFRES_t)$	2,3,3,2,2,3	7.092854**	Yes
Critical values	I(0)	1(1)	
1%	3.900	5.419	
5%	2.804	4.013	
10%	2.331	3.417	

Notes: The Akaike Information Criteria (AIC) is used to select the optimal lag for each cointegration model. I(0) and I(1) denote lower and upper bounds of the ARDL bounds test respectively. ** shows statistical significance at 5% level.

The results of the ARDL bounds test, indicates that the F-statistics for cointegration test is greater than the upper bounds critical values at 5% level of significance. Cointegration is said to exist if the calculated F-statistic is greater than the valid long-run relationship among the variables in the co-integrating equation.

Table 6 Result of the Diagnostics Test

Test statistics	F-statistic	P-value
Serial Correlation (χ^2 SERIAL)	1.7595	0.2504
Heteroskedasticity (χ^2 ARCH)	0.7106	0.4069
Ramsey Reset (χ^2 RESET)	1.4969	0.1781
Jarque-Bera (χ^2 NORMAL)	1.4978	0.4729

The results of the diagnostic tests showed that the null hypothesis of no serial of the Breusch-Godfrey LM test and the ARCH conditional heteroscedasticity test are problem of serial correlation and heteroscedasticity. Furthermore, the result of the Ramsay RESET and the Jarque-Bera normally tests, also report probability values greater than 0.05 which implies that, the functional form of the models is correctly indicates that the stochastic error term is white noise; it has a zero mean and constant variance, thereby making the estimates from the model consistent and reliable.

Similarly, the study conducted stability test of the model using Cumulative Sum of Squares (CUSUM) test which also proved the stability of the model. The result indicates that the stochastic error term is white noise; it has a zero mean and constant variance, thereby making the estimates from the model consistent and reliable.

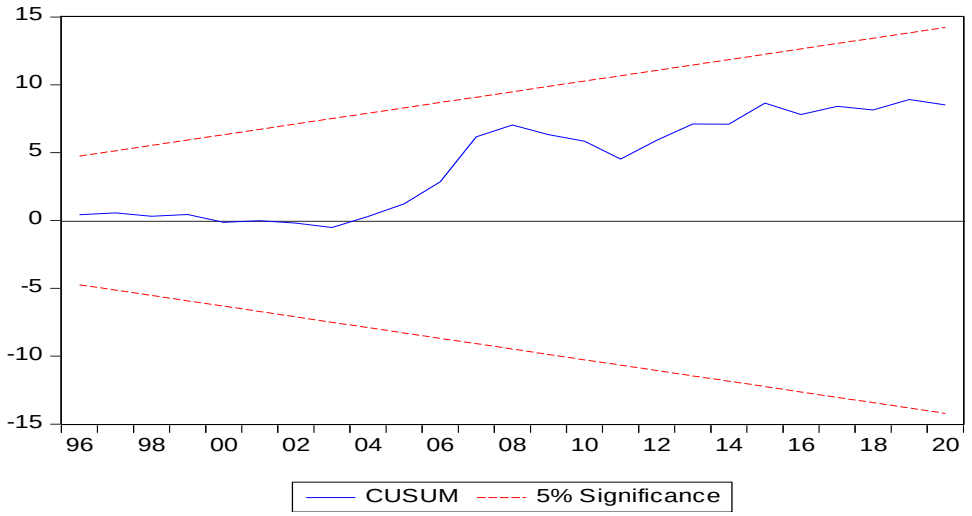

Figure 1 Stability test

CONCLUDING REMARKS

The study was guided by the main objective of examining the impact of selected macroeconomic variables on the performance of capital market in Nigeria using time series data from 1986 to 2020. The selected macroeconomic variables that were included in the study are economic growth, inflation rate and foreign reserves, while capital market performance is represented by All-shares index..

The results from the empirical analysis of this research confirmed the relevance of the theory underpinning the study, the Arbitrage Price theory (APT) model and support the conclusion that, macroeconomic variables have significant impact on the performance of the capital in an economy. This study has further buttressed the assertion of the APT model, as it revealed that macroeconomic variables have influence on the performance of the capital market in Nigeria both in the short-run and in the long-run. Based on the findings, the following recommendations are made:

1. Policies that will enhance the growth of the economy such as boosting aggregate demand, and increasing productivity should be given due attention, as this will result into enhancing the performance of the capital market.
2. The Central Bank of Nigeria should do more to curb inflation rate in Nigeria. Even though, a positive and stable inflation is good for the performance of the capital market, a very high and volatile inflation may be detrimental to the performance of the market.
3. Government should provide the needed infrastructure and encourage production for export so as to earn more foreign exchange to increase foreign reserve. Increase in foreign reserve is essential as it will stabilize the value of the naira against foreign currencies. A stable currency has a vital role, to play on a country's investment initiative.

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