

EFFECT OF MACROECONOMIC VARIABLES ON STOCK MARKET PERFORMANCE IN NIGERIA

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Abstract

The study examined the effect of macroeconomic variables on stock market performance in Nigeria. The proxies for the independent variable (macroeconomic variables) were broad money supply, all-share index, financial deepening and interest rate. On the other hand, the proxy for the dependent variable (stock market performance) was total market capitalisation. The study adopted ex-post facto research design. The source of data was time series secondary data collected from the Central Bank of Nigeria (CBN) Statistical Bulletin from 1990 - 2022. The study has thirty – two (33) observations. The method of data analysis employed in this study includes descriptive statistics and correlation analysis and unit root test. Auto-regressive distributed lag model (ARDL) technique was used to evaluate the relationship between macroeconomic variables on stock market performance. The findings of the study revealed that the lag broad money supply has significant effect on total market capitalization of the stock market. Also, all share index has significant effect on total market capitalization of the stock market. Furthermore, the lagged financial deepening has significant effect on total market capitalization of the stock market; and interest rate has not significant effect on total market capitalization of the stock market. The study recommended that policymakers should closely monitor and manage fluctuations in the money supply to ensure stability and growth in the Nigerian Exchange. Diversification strategies across sectors can help mitigate risks and capitalize on opportunities presented by fluctuations in the Nigerian Exchange. Also, policymakers and financial institutions should prioritize initiatives aimed at deepening the financial sector. Policymakers should carefully consider the potential implications of interest rate changes on investor confidence and market liquidity.

Keywords: *All-share Index, Broad Money Supply, Financial Deepening, Interest Rate, Macroeconomic Variables, Stock Market.*

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1. INTRODUCTION

Globally, the stock market of any economy plays the important role of mobilizing domestic resources for productive investments. A stable and developed stock market is regarded to be of key importance in the continuous growth of an economy. In Nigeria, economic growth has been attributed to be a result of accelerated growth in the Nigerian stock market over time (Iwegbu & Adeoye, 2020). The performance of this market is tied to the overall performance of an economy. Also, investors consider how certain macroeconomic variables like interest rate, inflation rate, exchange rate, money supply, etc. affect the performance of their stocks. According to Masuduzzaman (2012), macroeconomic variables play an important role in the performance of a stock market. They can be a yardstick to the investors to forecast the performance of the stock market, as well as a perfect alternative to get additional information about the behaviour of the stock market (Jamaludin, et. al., 2012). Particularly, the growth in the Nigerian economy can be associated with the impact of stock market on the overall economy (Bertram, 2018).

Empirical evidences from most economies have shown that changes in stock market performances are linked with macroeconomic behaviour (Anyanwu & Ohurogu, 2024; Iyodo, et. al., 2021; Iwegbu & Adeoye, 2020; Musa et. al., 2020). The Nigerian Exchange is one of the emerging stock exchange markets facing challenges that hinder the efficiency, sustainable growth and development of the market. Inflation is still a problem in Nigeria. The monetary authority is fighting tooth and nail to reduce inflation rate to a single digit. Nigerian economy is also facing the problem of currency depreciation over dollar, unemployment, population increase and poverty (Olugbenga, 2014). These factors are capable of affecting either indirect or direct economic stability of the country. Adverse fluctuations in most macroeconomic variables sometimes affects the purchasing power of the local currency. When the value of naira depreciates it affects trading in stock market in Nigeria by increasing cost of trading stocks. The currency depreciation over dollar also affects macroeconomic stability of the country which leads to inflation. Basically, sustainable macroeconomic stability may accelerate growth and performance of stock market by motivating investors to invest with positive expectation; also vice versa is true under “Ceteris Paribus”. Given the fact that there is yet not a consensus as to whether macroeconomic variables have a force to bear on stock market performance in the Nigerian stock market, the study therefore examined the effect of macroeconomic variables on stock market performance in Nigeria from 1990 to 2022.

2. LITERATURE REVIEW

2.1. Conceptual Review

2.1.1 Macroeconomic Variable

According to *Malika (2021)* macroeconomic variables are *indicators or main signposts signaling the current trends in the economy*. In a different perspective, *Aliyu (2015)* defined macroeconomic variables are *associated with economic aggregates*: a country, a region, the population of a country, all companies in a country. Macroeconomic variables are factors that impact the market, including *gross domestic product, inflation, economic growth, and unemployment figures* (*Saibu, 2014*). Also, *Osamwonyi and Evbayiro-Osagie (2012)* conceptualised macroeconomic variables as factors used to measure progress in a community, state, region, country, continent or the world. This study adopts the concept of *Malika (2021)* as *indicators or main signposts signaling the current trends in the economy*.

2.1.2 Broad Money Supply

In Nigeria, the Central Bank defines money supply in two ways: Narrow and broad money (CBN, 2006). Narrow money (M1) is defined to include currency in circulation plus current account deposits with commercial banks. Broad money (M2) measures the total volume of money supply in the economy and is defined as narrow money plus savings and time deposits with banks including foreign denominated deposits. *Obadan (2014)* defined broad money supply as a measure of the total volume of money supply in the economy and is defined as narrow money plus savings and time deposits with banks including foreign denominated deposits. Similarly, broad money supply according to *Saibu (2014)* includes currency, deposits with an agreed maturity of up to two years, deposits redeemable at notice of up to three months and repurchase agreements, money market fund shares/units and debt securities up to two years. This study adopts the concept of *Obadan (2014)* as narrow money plus savings and time deposits with banks including foreign denominated deposits.

2.1.3 All Share Index

All-share index tracks the general market movement of all listed equities on the stock market, regardless of capitalization (*Malika, 2021*). In another study, *Saibu (2014)* opined that all share index refers to a series of numbers that show the changing average of the share prices of all companies on a stock exchange, which is used as a measure of how well a market is performing.

From a different perspective, Aliyu (2015) defined A share index as a number that indicates the state of a stock market; it is based on the combined share prices of a set of companies.

2.1.4 Financial Deepening

Financial deepening generally means an increased ratio of money supply to GDP or some price index (Osamwonyi & Evbayiro-Osagie, 2012). Financial deepening according to Casadas (2015) is a term used by economists to refer to increasing provision of financial services. It can refer both a wider choice of services and better access for different socioeconomic groups. Moreso, Olugbenga (2014) conceptualised financial deepening as a term used by economists to refer to increasing provision of financial services.

2.1.5 Interest Rate

According to Ogundajo, et. al. (2019) interest rate is the addition to the borrowed amount or principal usually expressed in percentage. Interest rate according to Casadas (2015) is a cost of borrowing money, expressed as a percentage of the amount borrowed. According to Aigbovo and Uwubamwen (2014), interest rate is the amount charged over and above the principal amount by the lender from the borrower. Nwaeze, et. al. (2014) defined interest rate as the value in percentage which a borrower pays in excess of the principal. The study adopts the concept of Aigbovo and Uwubamwen (2014) as amount charged over and above the principal amount by the lender from the borrower.

2.1.6 Stock Market

Muneerah (2021) defined stock market as a complex institution imbued with inherent mechanism through which long-term funds of the major sectors of the economy comprising households, firms, and government are mobilized, harnessed and made available to various sectors of the economy. In another perspective, Olowe, et. al. (2011) opined that the stock market provides opportunities for greater funds mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal. Stock market provides an avenue for raising medium to long-term finances. This study adopts the concept of Muneerah (2021) as a complex institution imbued with inherent mechanism through which long-term funds of the major sectors of the economy comprising households, firms, and government are mobilized, harnessed and made available to various sectors of the economy.

2.1.7 Market Capitalization

Market capitalization is referred to as the total value of a publicly traded company's outstanding common shares owned by stockholders (Chukwunulu & Ibenta, 2021). Market capitalization is equal to the market price per common share multiplied by the number of common shares

outstanding (Emmanuel & Nwekemezie, 2019). Market capitalization refers to the total value of all a company's shares of stock. It is calculated by multiplying the price of a stock by its total number of outstanding shares (Andrew & Osuji, 2013). The study adopted the concept of Andrew and Osuji (2013) as the total value of all a company's shares of stock.

2.2. Theoretical Review

2.2.1 Goldsmith Theory

Goldsmith Theory Goldsmith (1969) was one of the foremost to recognize the role of financial intermediaries in the institutionalization of savings. Goldsmith analyzed the volume of assets of various financial intermediaries, trends in their types and distribution, in relation to long-run economic growth. According to Goldsmith, the development of financial intermediaries and the trend of their share in national asset and wealth particularly are important from the economist's point of view. It indicates the extent and character of financial interrelations, which in turn helps to determine how capital expenditures are financed and how existing assets are shifted among owners. These together are important in directing the flow of savings into investment and also their size, which in turn stimulates economic growth. The Goldsmith theory explained that the character of financial interrelations helps to determine the flow of investment.

2.2.2 Arbitrage Pricing Theory (APT)

The Arbitrage Pricing Theory (APT) was propounded by Stephen Ross in 1976. APT is a multifactor model where multiple risk factors are used to explain asset returns (Ross, 1976), and in which, every investor believes that the stochastic properties of returns of capital assets are consistent with factors structure. APT posits another way of relating macroeconomic fundamentals to stock market liquidity. It is however, an extension of Capital Asset Pricing Model (CAPM) based on the mean variance framework anchoring on the assumption of the process generating security. According Ross (1976), the main influences on stock returns are economic players such as unanticipated shifts in risk premiums; changes in the expected level of industrial production; unanticipated inflation and unanticipated movements in the shape of the term structure of interest rate. These factors are denoted with factor specific coefficients that measure the sensitivity of the assets to each factor. APT is a different approach to determining asset prices and it derives its basis from the law of one price. In an efficient market, two items that are the same cannot sell at different prices; otherwise, an arbitrage opportunity

would exit. APT requires that the returns on any stock should be linearly related to a set of indexes.

2.2.3 Capital Asset Pricing Model (CAPM)

The model states that prices of assets are determined in such a way that risk premiums are proportional to the systematic risk. CAPM describes the way prices of individual assets are determined in markets where information is freely available and reflected instantaneously in asset prices (Ibenta, 2005). In market equilibrium, it is expected that a security provides a return to compensate for the level of unavoidable risk. In CAPM, there is no reward for assuming any unsystematic risk which can be avoided or easily diversified. The CAPM is used to determine the appropriate price of securities and whether the security is over-priced or under-priced by the market.

2.2.4 Quantity Theory of Money (QTM)

The theory was originally formulated by a Polish mathematician, Nicholaus Copernicus in 1517 and was influentially restated by philosophers, John Lock, David Hume, Jean Bodin and also by economists, Milton Friedman and Anna Schwartz in a book titled “A Monetary History of the United States, 1867-1960 published in 1963. The quantity theory of money (QTM) states that the general price level of goods and services is directly proportional to the amount of money in circulation (money supply). Friedman and Schwartz (1963) used historical time series data and economic analysis to argue the then novel proposition that changes in money supply strongly influenced the United States economy. The inference they drew was that changes in money supply has unintended adverse effects, and that sound monetary policy is necessary for economic stability. In the same vein, Doavern and Welsser (2011) argued that variations in stock prices are in anticipation of variations in money supply.

2.3 Empirical Review

Anyanwu and Ohurogu (2024) investigated effects of interest rate and money supply on stock market liquidity in Nigeria. The study adopted an ex post facto research design. The independent variables are interest rate and money supply, while the dependent variable is stock market liquidity. The study covered the periods of 1985 to 2022. Secondary data were extracted from Central Bank of Nigeria Statistical Bulletin and Nigerian Exchange Group Reports were used in the study. Vector Auto regression estimation technique with Variance Decomposition and Impulse Response Function were employed to analyze the data. Findings suggest that

interest rate has a significant negative effect on stock market liquidity while money supply has significant positive effect on stock market liquidity in Nigeria. The study concludes that interest rate has negative effect on stock market liquidity in Nigeria, Shock from interest rate reduces stock market liquidity, also, shock from money supply increases stock market liquidity, although, shock from money supply has more explanatory power on stock market liquidity in Nigeria. The study thus recommends that the Central Bank of Nigeria should reduce the interest rates in order to stimulate the stock market liquidity in Nigeria. Also, the Central Bank of Nigeria should control money supply, the Central Bank of Nigeria needs to explore other measures such as contractionary open market operation to mop-up excess liquidity where and when necessary.

In another development, Iyodo, et. al. (2021) investigated the effect of interest rate, exchange rate and inflation rate on stock returns: evidence from listed firms in the Nigerian Stock Exchange. Stock returns proxied by return on equity (ROE) of quoted banks in Nigeria represents the dependent variable while the explanatory variables include inflation, interest and exchange rates. Based on the nature and optimal characteristics, ordinary least square regression (OLS) was considered as the most plausible approach for data analysis in this study. The findings revealed that the stock market, being an important part of the financial system had a systemic linkage with fundamentals of macroeconomic variables. The impact of these economic variables on stock returns was strong and coordinated to some extent. Therefore, investors and portfolio managers' cognition of external environmental factors in their bid to maximizing shareholders wealth were subject to some externalities, which were manageable through monetary policy framework. Base on the finding, the study recommends that sectoral allocate of credits should be administered on the stock markets to curtail the cost of capital arising from scarcity of funds, monetary authorities should design special exchange rate regime for investors in the stock exchange markets to guarantee the value of returns on investment and mitigates the effect of exchange rate volatility on stock performance, and desirable monetary policy tools should be utilized to control inflation and its negative effect on the returns on investment.

Moreover, Iwegbu and Adeoye, (2020) examined the effect of inflationary expectations on stock market returns in Nigeria. The study employed quarterly data spanning through the periods of first quarter 2007 till the fourth quarter of 2018. Using Autoregressive Distributed Lag estimation technique after the stationarity of the variables have been confirmed by ADF

and its long-run stability confirmed by Bounds co-integration test, the study found that inflationary expectations are key determinants of stock market returns in Nigeria. The Autoregressive Distributed Lag Model (ARDL) estimation technique is employed in examining the objective. The result found that inflationary expectations are key determinants of stock market returns in Nigeria. Further to this, we can conclude that inflation news leaks to the agents before its official publications. Also, another conclusion drawn from the study is that the expected output growth is not strong determinants of stock returns. The study thus recommends that monetary authorities must find effective ways of managing the increases, or changes in prices of goods and services so that expectations will not be formed on how the stock market will react to changes in price level and other macroeconomic fundamentals. Also, the study further recommends that investors in the stock market should be driven by the profitability and the returns of the listed firms and not be expectations on changes in prices of goods and services.

Similarly, Musa et. al. (2020) impact of interest rate on stock market capitalization and share index in Nigeria. The paper is aimed at revealing the impact of interest rate on stock market capitalization and share index in Nigeria. This study combines descriptive and diagnostic designs. The study employed a time series analysis covering a period of 20 years (1995- 2015). Stock market capitalization and all shares index were used as measure of performance of the Nigerian Stock Market. The population of the study is the Nigerian stock market of the period under review and this also constitute the sample size. The sample size is justified because the market capitalization is found by multiplying the total number of shares by the current price. While all shares index is used to compute the ordinary shares of the NSE. The data obtained were fitted into the equations by Ordinary least-square (OLS) regression method. The linear relationship between the dependent and the independent variables were generated. In the model specification, interest rate served as the independent variable while stock market capitalization and all share index served as the dependent variable. Findings revealed that all the variables through the Augmented Dickey-Fuller (ADF) test are stationary. The regression results for the period under review showed that interest rate has negative influences on stock market capitalization and all share index of the Nigerian Stock Exchange vi's-à-vis stock market performance. The study recommends amongst other recommendations, that the CBN should continue to exercise control in the administration of interest rate through the fixing of the monetary policy rate because of its significant correlation with the stock market performance so as to effectively use the capital market as a tool for enhancing economic growth and

development. In doing this, the CBN should ensure that the interest rate is kept moderate; this would result in more patronage of the capital market. This would enhance the performance of the stock market, which would in turn enhance economic growth and development.

In addition to the study above, Olulu-Briggs and Ogbulu (2015) examined the impact of Broad Money supply (M2) on Asset prices in Nigeria using monthly data in logarithm form for the period ranging from 2008M1 to 2012M12. The Unit Root test results showed that the variables were stationary after being first differenced; at 5% significance level. The results of Johansen Cointegration test gave evidence of one cointegrating equation which explains that a long-run equilibrium relationship exist between Stock Market Capitalisation and Broad Money Supply. The Vector Error Correction Model was used to analyze short-run adjustment dynamics and showed -0.08% speed of adjustment of prior deviations from equilibrium. The Granger Causality test demonstrated a unidirectional causality from Broad Money Supply to Stock Market Capitalisation.

However, Akani and Lucky (2014) examined whether there is a long-run as well as causal relationships between money supply and aggregate stock prices in Nigeria from 1980 to 2012. The study employed the Eagle-Granger and Johansen-Joselius method of cointegration in a Vector Error Correction Model. The study found that there exists a long-run relationship between currency in circulation and demand deposit and aggregate stock prices; Time deposit and savings deposit have negative but not significant relationship with aggregate stock prices; while net foreign asset has a negative and significant relationship with aggregate stock prices. The study also found a mixed causality between money supply and aggregate stock prices in Nigeria.

Furthermore, Nwude (2013) investigated the impact of inflation on stock market investment performance: evidence from airlines automobiles road transport and maritime sectors stocks of the Nigerian stock exchange. The study investigates the extent to which stocks of Airlines/Automobile/Road transport/Maritime firms listed in Nigerian Stock Exchange (NSE) are a hedge against the actual inflation in Nigeria over the period 2000–2011. Actual inflation was computed using the estimates of the consumer price index. The study used real rate of return on equity and regression analysis to find the stocks that provide positive real return and offer inflation-hedging property respectively. The findings revealed that in terms of real return based on shareholders' funds and total return to equity, all the firms were not susceptible to

adverse effect of inflation but when based on dividend yield all the firms offered no significant hedge against inflation.

In a related development, Daferighe and Charle (2012) examined the impact of inflation on stock market performance in Nigeria. This paper investigated the impact of inflation on stock market performance in Nigeria using time series data for twenty years from 1991 -2010. The regression analysis was used to evaluate the influence of inflation on various measures of stock market performance; market capitalization (MCAGDP), total value traded ratio (TVMS), percentage change in All-share Index ($\% \Delta \text{ASI}$) and turnover ratio (TOR). It was revealed that these measures were negatively related to inflation in convergence to a priori expectation except for TOR which showed a positive relationship. This seemingly low level of influence of inflation ranging between 14.6% and 0.3% revealed that stock market investments are regarded as a good hedge against inflation in Nigeria. However, the Securities and Exchange Commission (SEC) and the Nigerian Stock Exchange (NSE) should engage in public enlightenment and improve on corporate governance framework to encourage more investment and improve transactions in the market considering its present low level of activities. It was recommended that the Central Bank of Nigeria (CBN) should formulate and use policy statements that will maintain inflation at low ebb in order not to erode the value of gains by investors on stock.

3. METHODOLOGY

The study adopted *ex-post facto* research design. This was hinged on two main reasons. Firstly, the study relied on historic accounting data obtained from Central Bank of Nigeria Statistical Bulletin, 2021, as such the event under investigation had already taken place and the study does not intend to control or manipulate the independent variables. Secondly, *ex-post facto* research design is also called causal comparative research; which is used when the study intends to determine cause-effect relationship between the independent and dependent variables with a view to establishing a causal link between them. The source of data for this work is secondary. The data were time series collected from the Central Bank of Nigeria (CBN) Statistical Bulletin from 1990 - 2022. The study has thirty – two (33) observations. The method of data analysis employed in this study includes descriptive statistics and correlation analysis and unit root test. The unit root test (the Augmented Dicky Fuller) was conducted to avoid spurious regression results. A non-stationary time series invalidates the normal statistical test because of time varying variance. Therefore, series should be stationary, which is, having a constant mean,

constant variance and constant auto-covariance. The Auto-regressive distributed lag model (ARDL) technique was used to evaluate the relationship between macroeconomic variables and stock market performance.

Model Specification

The model used in the study is anchored on Izedonmi and Ibrahim (2011) and Okoebor (2022). The model of Izedonmi and Ibrahim (2011) was given by:

$$R_i = \beta_0 + \beta_1 MC + \beta_2 EXC + \beta_3 INF + \epsilon_i \quad \text{--- 1}$$

Where: R_i is the realized return on sectoral portfolio and b_i is the reaction coefficient measuring the change in portfolio returns for a change in risk factor and MC is the macroeconomic factor (Market capitalization); EXC = Exchange rate; INF = Inflation; and ϵ_i = A residual error for sector portfolio.

The model of Okoebor (2022) was given by:

$$ASP_t = \beta_0 + \beta_1 (PSC_t) + \beta_2 (EXCHR_t) + \beta_3 (INT_t) + \beta_4 (INFL_t) + \mu_t \quad \text{--- 2}$$

Where: ASPI = All Share Price Index; PSC = Private Sector Credit. The proxies for the independent variables were EXCHR = Exchange rate; INT = Interest rate; while INFL = Inflation rate served as Control variable; μ = Error or stochastic term; t = Signify time series data; β_0 = Constant; and β_1 - β_4 = Regression coefficients.

In consonance with equation (1) and (2) above the current study expressed the performance of the stock market as a function of macroeconomic variables by the equation given below:

$$TMC = f(BMS, ASI, FDI, INR) \quad \text{--- 3}$$

The related econometric model is stated as:

$$RGDPF = \beta_0 + \beta_1 BMS + \beta_2 ASI + \beta_3 FDI + \beta_4 INR + \mu \quad \text{--- 4}$$

Where: TMS = Total Market Capitalisation; BMS = Broad Money supply; ASI = All Share Index; FDI = Financial Deepening; INR = Interest Rate; β_0 = Intercept; β_1 , β_2 , β_3 & β_4 = Coefficients of the regression equation; and μ = Stochastic or error term.

The study made use of dependent and independent variable. The dependent variable was financial sector development. The independent variable was financial intermediation. The proxy used for the dependent variable (stock market performance) was Total Market Capitalisation. The proxy used for the independent variable were Broad Money Supply (BMS), All Share Index (ASI), Foreign Direct Investment (FDI) and Interest Rate (INT). Following a

detailed review of previous studies, the study expressed the performance of the stock market as a function of macroeconomic variables.

Equation is translated into autoregressive distributed lag (ARDL) equation in accordance with Pesaran et al. (2001):

$$\Delta TMC_{it} = \beta_0 + \beta_1 BMS_{it} + \beta_2 ASI_{it} + \beta_3 FDI_{it} + \beta_4 INR_{it} + \sum_{i=1}^k a_2 \Delta BMS_{it-i} + \sum_{i=1}^k a_3 \Delta ASI_{it-i} + \sum_{i=1}^k a_4 \Delta FDI_{it-i} + \sum_{i=1}^k a_5 \Delta INR_{it-i} + i\mu_{it} \quad \dots (4)$$

Where: μ_{it} is the error term.

4. RESULTS AND ANALYSIS

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

	TMC	BMS	ASI	FD	INR
Mean	9843.001	11854.12	21076.62	16.43879	18.33848
Median	5120.9	3797.91	23393.65	14.41	17.95
Maximum	42054.5	58228.96	50424.7	24.9	29.8
Minimum	16.3	47.42	423.66	8.46	11.55
Std. Dev.	11641.56	14897.89	15492.58	5.505729	3.56317
Skewness	1.166785	1.339926	0.24348	0.173714	1.040486
Kurtosis	3.641713	4.151619	1.954915	1.391774	5.214509
Jarque-Bera	8.053854	11.69827	1.827831	3.72226	12.69742
Probability	0.017829	0.002882	0.400951	0.155497	0.001749
Sum	324819	391186	695528.5	542.48	605.17
Sum Sq. Dev.	4.34E+09	7.10E+09	7.68E+09	970.0176	406.2778
Observations	33	33	33	33	33

Source: Researchers EViews Computation, 2024

Table 1 presents the descriptive statistics. Firstly, examining the Total Market Capitalization (TMC), the mean value of ₦9,843.001 billion indicates the average market value of listed securities. However, the significant positive skewness (1.166) and leptokurtic distribution (kurtosis = 3.642) suggest that the distribution of TMC is skewed to the right with heavier tails than a normal distribution, implying occasional extreme high values. This could signify periods of market booms or bubbles, potentially influenced by various macroeconomic factors.

Broad Money Supply (BMS) plays a crucial role in the economy and financial markets. The mean value of ₦11,854.12 billion reflects the average amount of money circulating in the economy. Similar to TMC, BMS exhibits positive skewness (1.340) and leptokurtic distribution (kurtosis = 4.152), indicating a right-skewed distribution with heavier tails. This suggests that there are periods of significant monetary expansion or contraction, which could impact market liquidity and investor sentiment.

The All Share Index (ASI) serves as a barometer of the overall stock market performance. With a mean value of 21,076.62, the ASI reflects the average level of stock prices. Unlike TMC and BMS, ASI demonstrates a relatively symmetric distribution with a skewness close to zero (0.243) and a kurtosis indicating leptokurtosis (1.955). While the Jarque-Bera test indicates no significant departure from normality.

Financial Deepening (FD), representing the development and sophistication of financial markets, exhibits relatively lower variability compared to TMC and BMS, with a standard deviation of 5.51. The distribution appears slightly positively skewed (skewness = 0.174) and mesokurtic (kurtosis = 1.392), indicating a more symmetric distribution with moderate tails. This suggests that financial deepening in the Nigerian market experiences less extreme fluctuations compared to market capitalization and monetary aggregates.

Interest Rate (INR) serves as a crucial macroeconomic variable influencing investment decisions and market dynamics. The mean interest rate of 18.34 reflects the average cost of borrowing or return on investment. However, INR exhibits significant positive skewness (1.040) and leptokurtosis (kurtosis = 5.215), indicating a right-skewed distribution with heavier tails. This suggests that interest rate fluctuations may have asymmetric effects on market performance, potentially leading to periods of heightened volatility or market reactions to monetary policy changes.

4.2 Correlation Analysis

	TMC	BMS	ASI	FD	INR
TMC	1				

BMS	0.917934	1			
	0.0000	-----			
ASI	0.724986	0.697521	1		
	0.0000	0.0000	-----		
FD	0.753229	0.651577	0.654489	1	
	0.0000	0.0000	0.0000	-----	
INR	-0.63167	-0.52764	-0.58287	-0.49057	1
	0.0001	0.0016	0.0004	0.0038	-----

Source: Researchers EViews Computation, 2024

The correlation analysis provided in table 2, presents the relationship between the dependent and independent variables.

TMC and BMS: A very strong positive correlation of 0.917934, which is statistically significant with a probability of 0.0000. This suggests that as the Broad Money Supply increases, the Total Market Capitalization also tends to increase.

TMC and ASI: A strong positive correlation of 0.724986, also statistically significant with a probability of 0.0000. This indicates that the All Share Index is positively associated with the Total Market Capitalization.

TMC and FD: A strong positive correlation of 0.753229, with a probability of 0.0000, indicating a significant positive relationship between Financial Deepening and Total Market Capitalization.

TMC and INR: A strong negative correlation of -0.631672, with a probability of 0.0001, suggesting that as the Interest Rate increases, the Total Market Capitalization tends to decrease. These correlations provide insights into how the independent variables (BMS, ASI, FD, INR) are related to the dependent variable (TMC) and to each other. The strong correlations suggest that these macroeconomic variables have a significant impact on the performance of the Nigerian Exchange. The negative correlations with the Interest Rate (INR) are particularly interesting, as they indicate an inverse relationship with the performance of the market.

4.3 Unit Root Test

Table 3: Unit Root Test

Variable	at levels			at 1st difference		
	t-statistic	5% level	p-value	t-statistic	5% level	p-value
TMC	-3.284266	-3.562882	0.0876	-4.893016	-3.595026	0.0030
BMS	2.998288	-3.612199	1.0000	-0.462714	-3.622033	0.9779
ASI	-3.495684	-3.562882	0.0574	-5.956196	-3.568379	0.0002
FD	-1.074351	-3.557759	0.9179	-3.394526	-3.562882	0.0705
INR	-5.756104	-3.557759	0.0002	-6.430727	-3.568379	0.0001

Source: Researchers EViews Computation, 2024

Table 3 presents the ADF stationarity test for the variables in its raw form. From table 3, The Unit Root Test results at levels and at first difference are as follows:

Total Market Capitalization (TMC):

At levels: The t-statistic is -3.284266, which is higher than the critical value of -3.562882 at the 5% level, and the p-value is 0.0876, indicating that TMC is non-stationary at levels.

At first difference: The t-statistic is -4.893016, which is lower than the critical value of -3.595026 at the 5% level, and the p-value is 0.0030, indicating that TMC becomes stationary at the first difference.

Broad Money Supply (BMS):

At levels: The t-statistic is 2.998288, which is significantly higher than the critical value, and the p-value is 1.0000, indicating that BMS is non-stationary at levels.

At first difference: The t-statistic is -0.462714, which is higher than the critical value of -3.622033 at the 5% level, and the p-value is 0.9779, indicating that BMS remains non-stationary even at the first difference.

All Share Index (ASI):

At levels: The t-statistic is -3.495684, which is close to the critical value of -3.562882 at the 5% level, and the p-value is 0.0574, suggesting that ASI is marginally non-stationary at levels.

At first difference: The t-statistic is -5.956196, which is lower than the critical value of -3.568379 at the 5% level, and the p-value is 0.0002, indicating that ASI becomes stationary at the first difference.

Financial Deepening (FD):

At levels: The t-statistic is -1.074351, which is higher than the critical value of -3.557759 at the 5% level, and the p-value is 0.9179, indicating that FD is non-stationary at levels.

At first difference: The t-statistic is -3.394526, which is close to the critical value of -3.562882 at the 5% level, and the p-value is 0.0705, suggesting that FD is non-stationary at the first difference.

Interest Rate (INR):

At levels: The t-statistic is -5.756104, which is lower than the critical value of -3.557759 at the 5% level, and the p-value is 0.0002, indicating that INR is stationary at levels.

At first difference: The t-statistic is -6.430727, which is lower than the critical value of -3.568379 at the 5% level, and the p-value is 0.0001, confirming that INR is stationary at the first difference.

Table 4: Unit Root Test Logged

Variable	at levels			at 1st difference		
	t-statistic	5% level	p-value	t-statistic	5% level	p-value
LogTMC	-0.831013	-3.557759	0.9518	-4.826164	-3.568379	0.0028
LogBMS	-1.748687	-3.557759	0.7056	-3.771835	-3.562882	0.0320
LogASI	-2.281831	-3.557759	0.4312	-5.070632	-3.568379	0.0015
LogFD	-1.281331	-3.557759	0.8746	-3.766457	-3.562882	0.0324
LogINR	-3.725692	-3.562882	0.0354	-5.931819	-3.568379	0.0002

Researchers EViews Computation, 2024

Table 4 which also presents the unit root test for the variables but in log form, the variables have been logged to ensure stationarity across all variables as from table 3, BMS and FD were found to be non-stationary at both levels and first difference. From table 4, all variables were found to be stationary in their log form as indicated by the p-value of each variable being less than 5%. This indicates, the logged variables have been adopted for further analysis.

Table 5: F-Bounds Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	12.45462	5%	2.56	3.49

Researchers EViews Computation, 2024

The F-Bounds Test results in table 5 presents the F-statistic value is 12.45462. This value is above the upper bound critical value of 3.49 at the 5% significance level for I(1). Therefore, it suggests that there is cointegration among the variables as it implies that the variables move together over time and share a common stochastic trend.

4.4 Multicollinearity Test

Table 6: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LGBMS	0.007876	266.4213	6.745822
LGASI	0.010581	473.4312	9.036598
LGFD	0.074548	281.481	4.262182
LGINR	0.102842	426.7677	1.731479
C	1.934962	956.3447	NA

Source: Researchers EViews Computation, 2024

Based on the Variance Inflation Factors (VIF) provided in Table 6, for LGBMS, the centered VIF is 6.745822, which is below the common threshold of 10, indicating that there is no significant multicollinearity. LGASI, the centered VIF is 9.036598, which is also below the threshold of 10, suggesting no significant multicollinearity. LGFD, the centered VIF is 4.262182, well below the threshold, indicating low multicollinearity. LGINR, the centered VIF is 1.731479, indicating very low multicollinearity. The VIF results suggest that multicollinearity is not a concern as all the variables have centered VIF values below 10. This means that the independent variables do not have a high degree of correlation with each other.

4.5 Autoregressive Distributed Lag (ARDL)

ARDL is adopted for this study because it accommodates integrated variables and allows for the analysis of both short-term dynamics and long-term equilibrium relationships, making it suitable for examining the impact of macroeconomic variables on the performance of the Nigerian Exchange. Additionally, ARDL enables error correction, ensuring robustness in capturing adjustments to long-run equilibrium, providing a comprehensive framework for modelling the complex relationships inherent in the Nigerian Exchange dynamics.

Table 7: ARDL Estimation

Dependent Variable: LGTMC				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LogBMS	-0.387100	0.446057	-0.86783	0.3963
LogBMS(-1)	2.463677	0.981162	2.51098	0.0212
LogASI	0.701732	0.180905	3.879015	0.0010
LogASI(-1)	-0.905780	0.292104	-3.10087	0.0059
LogFD	0.338367	0.288852	1.171421	0.2559
LogFD(-1)	-1.820130	0.758554	-2.39947	0.0268
LogINR	0.111139	0.368164	0.301874	0.7660
C	-1.632298	1.676377	-0.97371	0.3424
R-squared	0.742165	Mean dependent var		7.936109
Adjusted R-squared	0.677706	S.D. dependent var		2.190331
S.E. of regression	0.185780	Akaike info criterion		-0.01025
Sum squared resid	0.828341	Schwarz criterion		0.544845
Log likelihood	12.15882	Hannan-Quinn criter.		0.17070
F-statistic	298.3908	Durbin-Watson stat		1.877713
Prob(F-statistic)	0.0000			

Source: Researchers EViews Computation, 2024

Table 7 presents the statistical result of the ARDL for Effect of Macroeconomic Variables on the Performance of the Nigerian Exchange. The ARDL estimation results for the dependent variable LGTMC (Logged Total Market Capitalization) are as follows:

LogBMS has a coefficient of -0.387100 with a p-value of 0.3963, indicating that it is not statistically significant at conventional levels.

LogBMS(-1), the lagged value of LogBMS, has a coefficient of 2.463677 with a p-value of 0.0212, suggesting it is statistically significant and positively affects LGTMC.

LogASI shows a positive and statistically significant effect on LGTMC with a coefficient of 0.701732 and a p-value of 0.0010.

LogASI(-1), the lagged value of LogASI, has a negative coefficient of -0.905780 and is statistically significant with a p-value of 0.0059.

LogFD has a coefficient of 0.338367 with a p-value of 0.2559, indicating that it is not statistically significant.

LogFD(-1), the lagged value of LogFD, has a negative coefficient of -1.820130 and is statistically significant with a p-value of 0.0268.

LogINR has a coefficient of 0.111139 with a p-value of 0.7660, suggesting it is not statistically significant.

The constant term C has a coefficient of -1.632298 with a p-value of 0.3424, indicating it is not statistically significant.

The model has an R-squared of 0.742165, which means that approximately 74.22% of the variability in LGTMC is explained by the model. The Adjusted R-squared is 0.677706, which adjusts for the number of variables in the model and is a better measure of fit for multiple regression models.

The F-statistic is 298.3908 with a p-value of 0.0000, indicating that the model is statistically significant overall.

The Durbin-Watson statistic is 1.877713, which is close to 2, suggesting that there is no serious autocorrelation problem in the residuals of your model.

4.6 Residual Diagnostics Test (LM Test)

Table 8: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.787176	Prob. F(2,17)	0.4710
Obs*R-squared	2.627542	Prob. Chi-Square(2)	0.2688

Source: Researchers EViews Computation, 2024

The Breusch-Godfrey Serial Correlation LM Test results indicate that there is no evidence of autocorrelation in your model at the 5% significance level. This is shown by the Prob. F value

of 0.471 and the Prob. Chi-Square value of 0.2688, both of which are above the conventional threshold of 0.05.

4.7 Heteroskedasticity Test

F-statistic	0.667899	Prob. F(11,19)	0.7509
Obs*R-squared	8.644421	Prob. Chi-Square(11)	0.6547
Scaled explained SS	2.30592	Prob. Chi-Square(11)	0.9971

Source: Researchers EViews Computation, 2024

Based on the provided results of the Heteroskedasticity Test: Breusch-Pagan-Godfrey in Table 9, there is no statistical evidence of heteroskedasticity in the regression model. The high p-values associated with the F-statistic (0.7509), Obs*R-squared (0.6547), and Scaled explained SS (0.9971) indicates that the null hypothesis of homoskedasticity cannot be rejected. Therefore, the assumption of constant variance in the errors is upheld. This means that the variances of the errors in your regression model are consistent across different levels of the independent variables.

4.8 Hypothesis Testing

Based on the ARDL regression output provided, we can assess the significance of each independent variable on the dependent variable (Total Market Capitalization of the Nigerian Exchange) to determine which null hypotheses can be rejected.

H₀1: Broad money supply has no significant effect on total market capitalization of the Nigerian Exchange.

The lagged value of LogBMS (LogBMS(-1)) is statistically significant (p-value: 0.0212), indicating that the broad money supply from the previous period does have a significant effect on the current total market capitalization. Therefore, the null hypothesis, H₀ 1 is rejected and the alternate accepted; hence, broad money supply has significant effect on total market capitalization of the Nigerian Exchange.

H₀2: All share index has no significant effect on total market capitalization of the Nigerian Exchange.

Both the current period coefficient and the lagged value of LogASI are statistically significant (p-values: 0.0010 and 0.0059, respectively). This suggests that the all share index, both in the current and previous periods, has a significant effect on the total market capitalization. Therefore, the null is rejected and the alternate accepted. Hence, All share index has significant effect on total market capitalization of the Nigerian Exchange

H₀3: Financial deepening has no significant effect on total market capitalization of the Nigerian Exchange.

The lagged value of LogFD (LogFD(-1)) is statistically significant (p-value: 0.0268), indicating that financial deepening from the previous period does have a significant effect on the current total market capitalization. Therefore, H₀3 is rejected for the lagged period. Hence, Financial deepening has significant effect on total market capitalization of the Nigerian Exchange.

H₀4: Interest rate has no significant effect on total market capitalization of the Nigerian Exchange.

The coefficient for LogINR is not statistically significant (p-value: 0.7660), suggesting that the null hypothesis cannot be rejected. Hence, interest rate does not have a significant effect on the total market capitalization based on this model.

5. CONCLUSION AND RECOMMENDATIONS

The study estimated the effect of macroeconomic variables on the stock market performance in Nigeria from 1990 – 2022 using Auto regressive distributed lag (ARDL). The ARDL model analysis reveals the dynamic relationship between the Total Market Capitalization (TMC) of the Nigerian Exchange and several key macroeconomic variables: Broad Money Supply (BMS), All Share Index (ASI), Financial Deepening (FD), and Interest Rate (INR). The study of the findings reveals that: the lag broad money supply has significant effect on total market capitalization of the stock market; **all share index** has significant effect on total market capitalization of the stock market; the lagged **financial deepening** has significant effect on total market capitalization of the stock market; and **interest** rate has not significant effect on total market capitalization of the stock market. The study concludes that All Share Index is the most consistent predictor of the Total Market Capitalization of the Nigerian Exchange. The

Broad Money Supply and Financial Deepening also play significant roles, but their effects are more pronounced when considering their values from the previous period rather than the current one. The Interest Rate, within the context of this model, does not appear to influence the market capitalization significantly.

Based on the findings, the study recommends that:

- i. Broad Money Supply (BMS), given the significant effect of lagged Broad Money Supply (LogBMS(-1)) on Total Market Capitalization (TMC), policymakers should closely monitor and manage fluctuations in the money supply to ensure stability and growth in the Nigerian Exchange. Additionally, efforts to enhance transparency and regulation within the banking sector can help optimize the impact of monetary policies on market capitalization.
- ii. All Share Index (ASI), considering the significant effects of both current and lagged All Share Index (LogASI and LogASI(-1)) on Total Market Capitalization (TMC), investors should pay close attention to market sentiment and trends reflected in the ASI. Diversification strategies across sectors represented in the ASI can help mitigate risks and capitalize on opportunities presented by fluctuations in the Nigerian Exchange.
- iii. Financial Deepening (FD), with the significant effect of lagged Financial Deepening (LogFD(-1)) on Total Market Capitalization (TMC), policymakers and financial institutions should prioritize initiatives aimed at deepening the financial sector. This includes expanding access to financial services, promoting financial literacy, and fostering a conducive regulatory environment to support market growth and resilience.
- iv. Interest Rate (INR), despite the lack of statistical significance in the coefficient for Interest Rate (LogINR), it remains an important determinant of investor behavior and market dynamics. Policymakers should carefully consider the potential implications of interest rate changes on investor confidence and market liquidity. Moreover, transparent communication of monetary policy decisions can help mitigate uncertainty and stabilize market reactions to interest rate movements.

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