An Autoregressive Distributive Lag for the Analysis of Macroeconomic Variables on Stock Market Returns in Nigeria

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ABSTRACT

This study provide an empirical investigation on the relationship between the stock market returns and macroeconomic variables in order to enhance the ability of economic agents in the analysis of stock market performance in Nigeria using Autoregressive Distributive Lag (ARDL). Annual time series data of six variables namely; broad money supply, nominal effective exchange rate, short term treasury bills rate, foreign direct investment, gross domestic per capita income, and gross domestic saving from 1984-2013 were employed to analyse the existence of short-run and long-run relationship between the selected macroeconomic variables and stock market returns. The results from the Augmented Dickey-Fuller and Phillips-Perron tests of stationarity indicated that all the variables were non-stationary at level I (0) and were stationary at first difference I (1). The Bound test procedure also revealed that the stock market returns and the macroeconomic variables were cointegrated and, thus, a long-run equilibrium relationship exists between them. Likewise, the Granger causality tests showed that some of the macroeconomic variables were having bidirectional causality with the stock market returns; while others have unidirectional causality. As a result, Policy makers, financial institutions and private investors need to take the macroeconomic indicators into consideration when formulating financial and economic policies, diversification strategies and restructuring of the portfolios.

Key word: Stock Market Returns, Macroeconomic Variables, Autoregressive Distributive Lag (ARDL).

INTRODUCTION

Capital markets play a crucial function in the monetary intermediation of any economy of the world. A competent capital market can encourage economic growth and prosperity by stabilising the financial sector and providing an essential investment channel that contributes to attracting domestic and foreign capital. The stock market serves as a valuable tool for the mobilisation and allocation of savings among competing uses that are critical to the growth and efficiency of the economy [1]. In addition, investors carefully assess the performance of stock markets by watching the composite market index, before investing funds. The market index gives a historical stock market performance, the yardstick in order to evaluate the performance of individual portfolios and also gives investors the ability to forecast future trends in the market [2].

Even though there are various of empirical studies on the impact of macroeconomic fundamentals on stock market indices, most of these studies typically focused on industrialised economies and the impact of these macroeconomic variables on the stock market indices in less developed countries is less obvious. Specifically, how do these less-industrialised markets react to changes in its
fundamental macroeconomic variables such as crude oil price, money supply, industrial production and inflation rate [3].

Over the past years, the Nigerian economy has been subjected to a chain of economic, political and social reform and policies. Prior to a decade after independence, the country was agrarian, and the various regional governments then mainly accomplished food security. In 1961, the foundation of the Nigerian Stock Exchange (formally called Lagos Stock Exchange) advanced private capital investment for growth and development so as to expand the capital markets. Present and past scholars believed that the investment that advanced economic growth and development requires long-term funding, far longer than the period for which most savers are willing to give their funds.

In the capital market, both foreign and local investors offer long-term funds in exchange for long-term monetary assets obtainable by fund clients. [4] believed that the market embrace both primary market and secondary market. Capital markets are essential in every economy and their ability to react instantaneously to fundamental problems replicated in all countries. It also encourages savings and real investment in any healthy economic environment. Aggregate savings are diverted into real investment that enhance the capital stock and therefore economic growth of the country. These attributes of the capital market make it possible for the discerning minds to assess the pulse of such an economy. Nigeria Stock Exchange is no exception, as it is required to be impacted by external shocks, which are outer the realm of capital market. External shocks are the macroeconomic variables that are anticipated to cause variation in the stock prices movement [5]. These forces are the macroeconomic indicators or variables that establish the stock returns changes in Nigeria. The changes in macroeconomic balances are frequently replicated with the magnitude and changes in stock prices, market index and liquidity of the market [6].

The responsibility of the macroeconomic policies in shaping the development of the exchange stock market activities in Nigeria has been a subject of discussion among the economists. However, the stock market has been seen as a marketplace where most factors that gear the improvement of the nation’s economic are working with each other. In Nigeria, investors have a great interest towards the stock performance is of significant interest to many researchers, including [1, 2, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19]. All these studies endeavoured to identify the link between macroeconomic variables and stock market returns. It is frequently believed that the stock market performance is established by a various fundamental macroeconomic variables such as industrial production, the inflation rate and interest rate.

Furthermore, an excellent number of studies have captured the impacts of macroeconomic indicators on the stock market returns for diverse nations. Existing theories offer various models that make available framework for examining the relationship the relationship between stock performance and macroeconomic variables [20, 1].

The main objectives of the present study are; to investigate the relationship between macroeconomics variables and stock market returns in Nigeria, and to examine the causality between the macroeconomic variables and the stock market returns in Nigeria.

The study uses annual data from 1984 to 2013. It is understood that the Understanding of this relationship by investors, as well as traders, will help them to allocate their portfolio and choose the best way for investment to enhance their return on getting the same risk that they previously had. Also, to make government/ policy makers to understand the significance of economic potential in the capital market so that to reform the market that will attract more foreign investors. Therefore, the findings of this study would increase the stock of knowledge in the field that hence, provide some meaningful insight to the practitioners and the policy makers in Nigerian stock exchange market.

This paper is organized in the following sections. First-section introduction of the study; Second-section empirical reviews of some selected literature; Third-section gives the theoretical justification and selection of variables and hence the model. In fourth step, the source of data and sample, and methodology used in the study are discussed. In the fifth and sixth, the empirical results and discussion will be reported. In the last step, the summary, conclusion and recommendation of the study is provided.

2. Review of literature:

The relationship between the stock market and macroeconomic variables has been subjected to serious economic research. Some of the major studies are reviewed in the following paragraphs.

[21], examined the impact of macroeconomic factors on Average Share Price for Nigeria from 1986 to 2007. They employed Augmented Dickey-
 Fuller (ADF) test, Johansen Co-integration procedure, Granger Causality test and Error Correction model (ECM). Their macroeconomic variables were industrial output, the inflation rate, the fiscal deficit, foreign capital inflow, investment, external debt and exchange rate. The results of their causality test showed that average share price does not Granger cause any of the nine macroeconomic variables in Nigeria in the sample period. Only exchange rate Granger caused average share price. However, the Johansen Co-integration test asserted that a long run relationship exists between the macroeconomic variables and average share price. Critically looking at this research, we can see that the year of analysis is not up-to-date; they were supposed to extend their data to 2011 or 2012, to take financial crises into consideration. This was because the 2007 data cannot fully forecast what would happen in the stock market in 2013.

Our study fills this gap by taking nominal gross domestic savings, nominal exchange rate, and foreign direct investment, trade openness index into consideration and using battery time series techniques such as autoregressive distributed lag (ARDL) model, variance decomposition (VDCs) and impulse response functions (IRFs) to show the shocks of stock price index on macroeconomic variables. Moreover, it covers the period of 1984-2013.

[22], investigates the impact of macroeconomic indicators on stock price in Nigeria by employing general ordinary least square technique. Using quarterly data range from 1985:1-2009:4, his macroeconomic variables selected were broad money, interest rates, exchange rates, the inflation rate, oil price, and gross domestic product. His finding revealed that macroeconomic variables have changing significant shock on stock prices of individual firms in Nigeria. Inflation and money supply have insignificant effects on stock price, while all the other variables have significant impacts on stock price in Nigeria. Critical analysis of this research shows that the method used for the analysis is not popular and widely use. In time series analysis, the ordinary least squares regression results might provide a spurious regression if the data series are non-stationary. Again, he did not use any theory to show a link between stock price index/return and macroeconomic variables.

Our research will be different from Adamola’s by employing battery time series techniques such as autoregressive distributed lag (ARDL) model, variance decomposition (VDCs) and impulse response functions (IRFs) and covering period from 1984-2013. Also use gross domestic savings, per capita income, nominal exchange rate, and foreign direct investment.

[23], examined the effect of macroeconomic factors such as the inflation rate, market capitalization, and exchange rate on the Nigerian stock returns for the period of 2000-2004. They have chosen the three macroeconomic variables for 20 sectors of the Nigerian stock exchange. They employ ordinary least square technique and found that there is no significant impacts of those variables on the stock returns in Nigeria. Critically analysing it, the methodology, variables and years of their analysis were not supposed to be used. This is because ordinary least square is not popular and widely used; the result might provide spurious regression if the data series are non-stationary. Years of analysis are very small and may not give a valid outcome. Again, the three variables used are not the main macroeconomic variables affecting stock market in Nigeria.

Our study will bridge this gap by using the most relevant macroeconomic variables of nominal gross domestic savings, nominal exchange rate, per capita income, money supply and short-term Treasury bill. The study will also employ battery time series techniques such as autoregressive distributed lag (ARDL) model, impulse response functions (IRFs), variance decomposition (VDCs) and take 1984 to 2013. Arbitrage pricing theory and present value model will also use to show a link between macroeconomic variables and stock price both in the short run and long run respectively.

[7], investigates the stock market volatility and macroeconomic variables volatility in Nigeria using exponential generalised autoregressive conditional heteroskedasticity (EGARCH) and lag-augmented VAR (LA-VAR) models and found bi-causal relationship between stock market volatility and real gross domestic product, and causal relationship between stock market volatility and the volatility of interest rate and exchange rate. The macroeconomic variables used were real gross domestic product, consumer price index, the inflation rate, short-term interest rate and the stock market for the period 1986 to 2010. Critical analysis of this study shows that consumer price index is not the actual measure of inflation; this is because it is not considered the price of consumer goods. That is; it may full of insignificant goods and outdated goods that are not purchased by the consumer.

Our research is a prototype of Oseni et al. study, but it differs in the methodology (ARDL) and time frame that is from 1984 to 2013. And also we use gross domestic savings, per capita income, and nominal exchange rate as a substitute for real gross domestic product and real exchange rate.

[24], investigates the role of macroeconomic variables on stock prices movement in Cote d’Ivoire using quarterly data covering the period of 1999:1 to 2007:4. They employed Johansen's multivariate cointegration test techniques and Vector autoregressive model (VAR). Macroeconomic variables were industrial production index (IPI), consumer price index (CPI), domestic interest rate (IR), real exchange rate (EXR) and real money...
supply (M2). The study identified that there is cointegration between macroeconomic variables and Stock prices in Cote d’Ivoire indicating long-run relationship. The results of Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) demonstrate that out of five macroeconomic variables selected: only consumer price index (CPI) and domestic interest rate (IR) are the key determinants of the stock price movements in Cote d’Ivoire.

[25], employed generalized autoregressive conditional heteroskedasticity and examined the effect of macroeconomic variables on the stock market for Czech Republic using quarterly data range from 2002Q1 to 2010Q2. The macroeconomic variables were real gross domestic product, government borrowing, money supply, the inflation rate, CZK/USD exchange rate, and government deficit. Stock market index is positively related to real GDP and the German and US stock market index, is negatively influenced by government borrowing GDP, the domestic real interest rate, the CZK/USD exchange rate, the expected inflation rate and the euro area government bond yield and exhibits a quadratic relationship with the ratio of money supply and GDP.

Anayochukwu [30] investigate the shock of the stock market returns on foreign portfolio investment in Nigerian employing Granger causality test and multiple linear regression analysis. He revealed that foreign portfolio investment has a positive and significant shock on the stock market returns whereas inflation rate has positive but insignificant shock on stock returns. The case of causality test result confirmed that there is a unidirectional causality running from stock returns to foreign portfolio investment in the economy, which in turn will promote stock returns in Nigeria.

[26], examined the shocks of crude oil price variations on the Turkish stock market returns. They employed vector autoregression (VAR) model using Daily observations of Istanbul Stock Exchange National Index (ISE-100) returns and Brent crude oil prices for the period between 02/01/ 1990 and 1/11/ 2011. They also analysed the relationship between stock market returns and oil prices under global liquidity Conditions by incorporating a Chicago Board of Exchange’s (CBOE) S&P 500 market volatility index (VIX), liquidity proxy variable, into the model. Their analysis found that Variance decomposition test results propose little empirical evidence that crude oil price shocks have been reasonably estimated in the Turkish stock market. Relatively, it was global liquidity forms that were found to report for the maximum amount of variation in the stock market returns.

[5], examined the determinant of the stock market returns in Nigeria by employing the OLS techniques using annual data for the period between 1984 and 2010. Their variables were consumer price index, exchange rate, broad money, interest rate and real per capital income. The findings showed that exchange rate, interest rate, money supply and previous stock return levels are the primary determinants of stock returns in Nigeria. Critical analysis of this study shows that the method used for the analysis is not popular and widely use. In time series analysis, the ordinary least squares regression results might provide a spurious regression if the data series are non-stationary. Again, consumer price index is not an accurate index for inflation; this is because the index takes the price of fixed representative basket and does not consider the price of investment.

Our study will be different by employing battery time series techniques such as autoregressive distributed lag (ARDL) model, variance decomposition (VDCs) and impulse response functions (IRFs), and also consider the effect of gross domestic savings, and nominal exchange rate. The arbitrage pricing theory and the present value theory will also be used to show a link between macroeconomic variables with stock return in the short-run and long-run respectively. Moreover, also cover 1984-2013.

[27], examined the relationship between macroeconomic variables and the stock market index in Nigeria using vector error correction model (VECM) for the period 1975-2005. The macroeconomic variables were interest rates, inflation rates, exchange rates, fiscal deposit, gross domestic product, and money supply. They found that macroeconomic variables influence the stock market in Nigeria. This research has the shortcoming of having a year of analysis not up-to-date. They were supposed to extend their data from 2005 to 2010 or 2011, to take financial crises into consideration so as to be able to predict fully what would happen in the stock market in 2012 or so.

Our study fills this gap by taking nominal gross domestic product, nominal exchange rate, and gross domestic product deflator into consideration and using vector autoregressive (VAR) model to show the shocks of stock price index on macroeconomic variables. Moreover, also it covers the period of 1985-2013.

[28] employed augmented dickey-fuller (ADF) and Kwiatkowski-Phillips-shin (KPSS) unit root test, Johson co-integration test, vector correction model (VECM) and Granger causality test to investigate the impact of macroeconomic variables such as exchange rate, foreign exchange reserve, industrial production index, interest rate, import, money supply, wholesale price index and export on stock price using monthly data range from January 2001 to December 2010. FER, IR, M, and WPI showed a positive and significance relationship between stock prices, while ER and X indicated a negative and significant relationship with stock prices. The first error correction term was significant and showed
short term adjustments towards the equilibrium path. The result of Granger causality showed the WPI and MS have bi-directional relation, while FER, ER, and M have unidirectional relationship with the stock price but IR, IPI, and X showed not any causal relationship. The major drawback of this study is that no theoretical bases have been put to show a link between stock price index/return and macroeconomic variables. This issue will be addressed by our study.

[2], investigated the relationships between five macroeconomic variables and Indian stock market Index (BSE Sensex), namely, wholesale price index, industrial production index, money supply, exchange rates and treasury bills rates over the period 1994:04–2011:06. They used Johansen’s cointegration and vector error correction model (VECM). The analysis showed that the stock market index and macroeconomic variables are cointegrated and, therefore, a long-run equilibrium relationship exists between them. It is further examined that the stock prices positively relate to the industrial production and money supply but negatively relate to inflation. The exchange rate and short-term interest rate were found to be insignificant in influencing the stock prices. In the sense of Granger causality, macroeconomic variable causes the stock prices in the long-run except in the short-run. Bidirectional causality existed between stock prices and industrial production whereas, unidirectional causality from stock price to inflation, money supply to stock price, and interest rates to stock prices were found.

[29], examined the relationship between selected macroeconomic volatilities and stock market returns volatility in Malaysia, the variables were inflation, GDP, money supply and exchange rate, interest rates using monthly data from January 2000 to June 2012. They employed generalised autoregressive conditional heteroskedasticity (GARCH) and vector autoregressive (VAR) model, and found little support on the subsistence of the relationship between macroeconomic volatilities and stock market volatility. Only volatility in inflation was shown to be Granger caused the stock market volatility, whereas out of five macroeconomic factors, only volatility in interest rates was shown Granger caused the stock market volatility. The volatilities of macroeconomic factors as a group does not Granger cause volatility in the stock market returns. The result from regression analysis confirms that only money supply volatility is significantly correlated to stock market volatility. The volatilities of macroeconomic factors as a group are also insignificantly correlated to stock market volatility.

[30], examined the empirical relationship between macroeconomic variables and the stock market using Panel Data Analysis Approach evidence from African stock markets for the period of 1988-2011. Their independent variables were external debt, money supply, and foreign direct investment. Their result showed that in the long-run FDI and EX debt exerted a positive impact on the African stock markets while negative impact on money supply. Our research will improve on this study by employing autoregressive distributed lag (ARDL) model, variance decomposition (VDCs) and impulse response functions (IRFs) and covering period from 1984-2013 and the country (Nigeria).

[31], examined the relationship between a set of four macroeconomic variables and the stock market index using vector autoregressive (VAR) model for the period from January 1996 to October 2011. The variables were exchange rate, gold, import, and ISE 100 index. They found that shares response firstly decreased and after the third period increase and then again increased. The variance decomposition determined that especially the second default of exchange, it was explained 31% by share indices.

This research will be different in terms of study area as it is going to be conducted in Nigeria, and also variables such as gross domestic savings, foreign direct investment, short-term Treasury bills, money supply, and nominal exchange rate. It will also differ from the methodology, timeframe and theoretical approach.

[18], examined the impact of selected macroeconomic variables on stock, gold, silver returns by using linear regression technique and monthly data from January 1993 to December 2012. His variables were inflation, gross domestic product, IIP, and money supply. He found that in an average 55% to 64% of the sub-period show positive returns for stocks, gold, and silver. Stock returns are significantly influenced by inflation, GDP, USS-INR and JPY-INR. Gold returns are significantly affected by money supply, and lastly silver returns are significantly influenced by money and EUR-INR. The shortcoming of this research is in the methodology and will be taken care of in our study by using an autoregressive distributed lag (ARDL) model, variance decomposition (VDCs) and impulse response functions (IRFs) to show the shocks of stock market returns on macroeconomic variables, and covering period from 1984-2013.

Dos Santos, et al [32] proposed to investigate the relation between the Brazilian stock market and macroeconomic variables from January of 2001 to December of 2011, by using a Vector Error Correction model (VEC).variables were exchange rate, interest rate, industrial production, and consumer price index. They revealed that Ibovespa responds negatively to impulses in the interest rate differential, the variations in the Selic rate and the exchange rate, and positively to the price index IPCA. In addition, an important result archived from the decomposition analysis of the variance proved that the interest rate differential, which reflects the perception of risk by the foreign investor, explains a significant variation in the Ibovespa index in the period.
[33], study the existence of causality between stock returns and macroeconomic factors in Ghana using monthly data from 1995 to 2010. Their variables were interest rate, money supply, exchange rate, foreign direct investment, consumer price index. They employ Vector error correction model (VECM) and study shows that a significant long-run relationship exists between stock returns, money supply, Foreign Direct Investment (FDI) and inflation. In the short-run, a significant relationship subsists between the stock market returns and macroeconomic factors such as inflation, interest rate and money supply. In the short-run, the relationship between FDI and stock returns is only inverted. Lastly, a causal link running from exchange rate, inflation to stock returns has been established. Then also, a causal link running from interest rate and FDI, stock returns to the money supply, has also been disclosed.

[34], investigate the time series as analysis of economic factors and the stock market by employing the Exponential Generalized Autoregressive Conditional Heteroskedasticity (EGARCH). The macroeconomic factors include gross domestic product, inflation, and interest rate. The monthly data of the indicators for the period is from December 1991 to August 2012 is used for analysis. They found that macroeconomic variables have significant influence on the stock prices. The stock prices have much shock on the economy of the country and are regard as the greatest indicators for future forecast of the market and economy as well.

[35], employed multiple regression models and examined the impact of macroeconomic variables on the stock market index in Pakistan for the period of 1991-2010. These macroeconomic variables included GDP per capita, gross domestic savings, inflation, and discount rate. Their analysis revealed that GDP per capita and gross domestic savings have a significant positive impact on KSE index, while discount rate and inflation causes a significant but negative shock on KSE index. The explanatory variables under their study accounted 98% variation in KSE index. A limitation of this study is in the method used for the analysis that is not popular and widely used because of the threat of a spurious regression. Again, the study has no theoretical basis to underpin its finding. Hence, our research will fill those gaps.

[1], they employed GARCH-Model and examined the impact of domestic macroeconomic variables on the Nigerian stock market returns. The macroeconomic variables were inflation rate, government expenditure, and foreign exchange rate, index of manufacturing output, broad money supply and minimum rediscount rate between 1985 and 2007. They found that the inflation rate, index of manufacturing output, and interest rate exerted strong significance influence on stock return. Inflation and government expenditure have a positive significance impact, while industrial manufacturing output and interest rate have negative significance influence on stock return in Nigeria. Money supply and foreign exchange rate exerted no significance. Critically looking at this research, we can see that the year of analysis is not up-to-date; they were supposed to extend their data to 2011 or 2012, to take financial crises into consideration. This was because the 2007 data cannot fully predict what would happen in the stock market in 2013. Again, the GARCH-Model is not reliable model for analysing time series data because it fails to show how the variables influence one another.

Our research will bridge this gap by covering the period of 1984-2013, and also use battery time series techniques such as autoregressive distributed lag (ARDL) model, variance decomposition (VDCs) and impulse response functions (IRFs) to show the causality and shocks of the stock market returns on the macroeconomic variables in Nigeria.

[17], investigates the impact of macroeconomic factors on the stock market behaviour considering Indian data. The five macroeconomic variables were industrial production index, inflation, money supply, short-term interest rates and the stock market index over the period 1994.4-2011:04. Vector error correction model and Johansen cointegration were applied to discover the long-run equilibrium relationship between the stock market index and macroeconomic variables. He revealed that macroeconomic variables and the stock market index are cointegrated and also long-run relationship exists between them. It also shows that the stock price is positively related to the money supply and industrial production index, but negatively related to inflation. The interest rate and exchange rate were found to be insignificant.

Critical analysis of this study shows that they took short periods in their study that is very difficult to predict and explain the situation of the market. They suppose to use at least 12 to 20 years since they used quarterly data.

Our research will be different by study area, as it is going to be conducted in Nigeria, and variables such as gross domestic savings, per capita income, trade openness, foreign direct investment, money supply, and nominal exchange rate. We also improve on this study by taking a different methodology and longer period of study.

[36], examined the determinants of macroeconomic variables on the stock market development in certain European countries using Dynamic Panel for the period 1995-2011. Their independent variables were Liquid liabilities (LL), Gross Domestic product (GDP), Stocks traded % of GDP (ST) as liquidity ratio, Stocks traded % of market capitalization (SMT) as turnover ratio, Cash surplus (CS) as budget balance, Gross domestic saving (GDS) as savings rate and Inflation consumer prices (CPI). They found that the macroeconomic
variables have an effect on the stock market development. INF and SMR have negative effects while GDS and GDP have positive effects on stock development.

[37], applied numerous time-series techniques and a new method Wavelet analysis to Investigates the causality between Stock Market Index and Macroeconomic Variables in Malaysia. Variables were consumer price index, exchange rate, short-term interest rate, export, government bond yield, and Kuala Lumpur Composite Index for the period from January 1996 to September 2013. Their findings showed that government bond, short-term interest rate and KLC are exogenous variables; in particular, the short-term interest rate is the most leading variables.

[38], investigated the Stock prices and Macroeconomic forces such as industrial output, exchange rate, money supply, oil prices, and consumer price index in Saudi Arabia, using monthly data from January 1994 to June 2013. They applied Johansen cointegration test and Vector error correction model for the analysis. The cointegration test indicated the existence of long-run relationship between the stock prices and the macroeconomic variables. Vector error correction model indicated the long-run causality from the independent variables to the dependent variables. Impulse response functions showed that industrial output shocks pushes up stock prices while consumer price index shocks pulls it down.

[39], examines the impact of Macroeconomic variables such as GDP per capita, inflation, GDP savings, exchange rate, and money supply on the stock market returns in Pakistan. They used Correlation Analysis, Descriptive Analysis, Regression analysis and Granger causality Test for the period from 1991 to 2013. They revealed that the exchange rate and GDP savings does the unidirectional cause Money supply and GDP savings unidirectional Granger cause the stock market returns in Pakistan. The findings also revealed that exchange rate, inflation, GDP savings, money supply, and GDP per capita have a significant positive impact on the stock market returns.

[40], examined the impact of macroeconomic variables namely; exchange rate, inflation, broad money supply, index of industrial production and interest rate on the Stock Market Returns in Ghana by employing the Vector error correction model and the Johansen multivariate cointegration approach. They used monthly data ranging from September, 2000 to September, 2010. The findings showed that long-run relationship exists between the stock market returns and the selected macroeconomic fundamentals. They also found that inflation and money supply has significant positive relations between the stock prices but, negatively related to the interest rate, exchange rate and industrial production.

[41], examine the shock of macroeconomic factors on the behaviour of Indian Stock market. Monthly data about six macroeconomic factors for example money supply, Call Money Rate, Foreign Institutional Investment, Exchange rate between Indian Rupees and US dollar, Industrial productivity, wholesale price index, and BSE Sensex over the period 2006:04 to 2013:07 has been taken for the study. Unit root test, Pearson’s correlation matrix, and Granger Causality tests have been applied to test the relationship. The analysis disclosed that Indian stock market is positively related to the money supply, wholesale price index, and industrial productivity. The inflow of foreign institutional investment and exchange rate are found to be insignificant to Indian Stock market. In the Granger Causality sense, industrial productivity and wholesale price index influence the stock market to a large extent.

[19], investigate a set of macroeconomic fundamentals influences domestic stock market in emerging market using quarterly data range from 1998 to 2012. The selected macroeconomic variables were10 years US government bond yield, long and short term interest rates, gross domestic product, money supply, diamond price index, inflation, exchange rate, and foreign reserves, and US share price index. They used vector error correction and disclosed that the stock price and macroeconomic variables are cointegrated; thus long run equilibrium relationships existed between them. When we critically look at this work, we observe that they took short periods in their study that is very difficult to predict and explain the situation of the market. They were supposed to use at least 10 to 15 years since they used quarterly data. It is clear that our research is an improvement in this respect.

[42], examined the dynamic relation between the Indian stock market and the macroeconomic factors namely; money supply, 91-day Treasury bills, long-term Government bonds, exchange rate, industrial production, and wholesale price index using quarterly data over the period from 1991:01 to 2008:04. They employed the Johansen cointegration test, Vector error correction model and the innovation analysis. Their findings revealed that the long-run stock market is positively related to exchange rate and output, and negatively related to short-term and long-term interest rate, inflation and money supply. The results of the innovation analysis and causality recommend that the Indian stock market influences the industrial activities and the market are expected to be more sensitive to the shocks of itself over the projected period of the study.

[43], examine the shock of different macroeconomic factors on the returns of the Saudi stock market using monthly data from December 2003 to December 2013. Their variables taken were Price Earnings Ratio, Saudi export and oil WTI.
They used Correlation and regression model for the analysis. Correlation analysis revealed that the PE Ratio and Saudi Exports were found to be highly correlated with TASI at 1% level of significance, but TASI and Oil WTI are significantly correlated at 5% level. Step-wise regression analysis of the data disclosed that the multiple regression models are significant at 1% level, and the PE Ratio was the most key determinant of TASI followed by Saudi Exports and Oil WTI. Additionally, the three independent indicators explain about 95% of the variation in the TASI previous Price.

[44], used monthly data over the periods from 1st January, 2004 to 31st December, 2013 to investigate the effects of macroeconomic indicators on CNX Bankex return in the Indian stock market. They key indicators used in the study were interest rate, inflation and exchange rate. They employed Augmented Dickey-Fuller, Coinegration test, Granger causality test and Regression. They found that interest rate and exchange has significant positive influence on the bank stock returns. They also found that there is no causal relationship between interest rate and CNX Bankex, inflation and CNX Bankex. But, Bank stock exist unidirectional causal relations on the exchange rate.

[45], investigated the dynamic relationship between macroeconomic variables and the stock prices in Kenya using quarterly data ranging from 1997Q1 to 2010Q4. They used Vector autoregressive Model and Vector error correction Model. Their variables used were consumer price index, nominal gross domestic product, and nominal exchange rate and Treasury bond rate. They found positive relationships between the stock price and the nominal gross domestic product, nominal exchange rate, and the Treasury bill rate. However, negative relationships were found in the study between the stock prices and consumer price index.

Conclusion:

The various empirical studies reviewed here show mixed results and conclusions. In some studies, strong positive relationship found to exist between stock returns and macroeconomic fundamentals and in some the relationship is a bit weak. Other researches report different results. This mixture of findings and conclusions emanates from differences in methodology, variables used and the period of study. There is also disparity in study area that fundamentally affects the behaviour of the macroeconomic variables. The magnum opus of our research, therefore, will be on these four fronts. It will bridge the gap created by some of the reviewed studies by employing a different methodology and study area. This is because where study areas liken, methodology and variables used differ. Again, the use of 1984-2013 study periods is a great improvement in the literature. Finally, the choice of the variables and the use of their nominal values will prove to be a significant stride in the literature of the stock market and macroeconomic variables relationship.

3. Financial Economic Theory:

The method of relating stock market returns and macroeconomics variables is through arbitrage pricing theory (APT) [46], where various risk factors can explain asset returns. Although earlier observed papers on arbitrage pricing (APT) focused on entity security returns, it may also be used in a cumulative stock market framework, where a transform in a given macroeconomic variable might be seen as reflecting a change in a fundamental general risk factor influencing the future returns. Most of the observed studies on APT theory, concerning the condition of the macro economy to stock market returns, are categorized by modelling a short run association between the stock price and macroeconomic variables in terms of first diversity, assuming trend stationarity.

Another, but not consistent approach is the present-value model (PVM) or discounted cash flow. This model recounts the stock price to future standard cash flows and the discount rate of these cash flows. Once more, the entire macroeconomic factors, which manipulate the discount rate, or the future expected cash flow by means of which these cash flows are discounted should have manipulated on the stock price. The development of the present value model is that it can be used to focus on the long run relationship between the macroeconomic variables and the stock market. Campbell and Shiller [47] the association between stock prices, earnings and expected dividends. They discover that a long term moving average of earnings assessment forecast dividends and the ratio of this earning variable to existing stock price is dominant in predicting stock returns over a number of years. They conclude that this evidence make stock prices and returns much too unstable to concurrence with a simple present value model.

4. Data and Methodology:

4.1. Data Description:

The time series data used in this study is secondary data obtained from statistical data bulletin from Central Bank of Nigeria (CBN), United Nation Statistical Bulletin, World Bank statistical database, Nigerian Stock Exchange (NSE), and National Bureau of Statistics. The ASI is employed as a proxy for Nigerian stock market returns. Given that it would be roughly impossible to integrate every potential aspect to explain the stock market behavior we limit to select six macroeconomic variables namely; Gross Domestic Per Capita Income (GDPc), foreign direct investment (FDI), broad money supply (M2), nominal effective exchange rate (NEER), gross domestic saving (GDS) and short run Treasury bill rate (STBR). The selection of variables for this
study is based on their theoretical importance, performance measures of the economy, and also their uses and findings in the previous empirical literature. GDPI is used as a proxy for the standard of living, broad money supply (M2), the nominal effective exchange rate of the Nigerian Naira and short-term Treasury bills rate is used to the short-run risk-free interest rate. As already discussed, these variables are extensively used in the previous literature to detain the macroeconomic activities. To achieve the research objectives, annual data from 1984-2013 (30 years) were used for the analysis. The selection of study period is based on the availability of the All Share Index. The share price index was first publicly available in the Nigerian Stock Exchange Market in 1985, with the value of 1984 as a base year.

4.2 Variables Measurement and Priory Expectations:

4.2.1 Stock market returns (SMR):

The Nigerian Stock Exchange Market All Share Index was used as a proxy for Stock Market Returns. All Share Index (ASI) is an indicator of the stock market which measures the overall performance of the market and specified as the dependent variables. Figure 1 shows the trends and patterns of All Share Index in Nigeria from 1984-2013.

Fig. 1: Time series plot of NSE All Share Index.

4.2.3 Gross domestic per capita (PI):

It is the average income of the people of the country in a particular year. Per capital, refers to measure the standard of living of people in the country. It is an indicator of financial, economic condition. The expected sign of the per capita income in the stock market returns is positive. The per capita income US dollars is used as a proxy for per capita income and the data sourced from the World Bank development database. Figure 2 shows the fluctuation of Gross Domestic per Capita Income in Nigeria from 1984-2013.

Fig. 2: Time series plot of Gross Domestic Per capita Income.

4.2.4 Gross Domestic Savings (GDS):

Gross Domestic Savings accelerate economic growth through boosting the Stock market. It also develops investment and raises the capacity of that investment [48]. [49] Oppose that heavy domestic savings in the country results in higher quantity of capital inflows into the stock markets. [75] found a positive significant relationship between Domestic Savings and stock market returns. Gross domestic savings (current US$) is used as a proxy for Gross Domestic Savings (GDS), and we also expect a positive impact on Domestic Savings (GDS) on Stock Market Returns. Figure 3 shows the movement of Gross domestic saving in Nigeria from 1984-2013.
4.2.5 Foreign Direct Investment (FDI):

FDI is an important source of the stock market returns (SMR). It can also play its task in raising domestic savings in the country through enhancement of technology transfer and creation job opportunities [50]. It would be complex to acquire such a great investment through the country’s domestic savings without foreign direct investment. [33] found positive and statistically strong relationship between FDI and stock market returns. Foreign direct investment net inflows in reporting (current US$) is used as a proxy for FDI. Figure 4 also shows the movement of foreign direct investment from 1984-2013.

Fig. 3: Time series plot of Gross Domestic Saving.

Fig. 4: Time series plot of foreign direct investment.

4.2.6 Nominal Effective Exchange Rate (NEER):

The Stock prices and nominal effective exchange rate relationship (NEER) is very vital because a change in exchange rate may result in also a change in Stock Market Prices because when the currency of a country is weak then it less likely that the foreign investors will invest in that country due to currency risk. The profitability and performance of companies and industries that are the main profound or importers users of imports are significantly affected by the exchange rate of one country’s currency against foremost currencies of the world [51]. In the country that an import dominated; depreciation of the currency will have an unfavourable shock on a domestic stock market. Moreover, if the nation’s currency is depreciating against a foremost currency, the manufactured goods become more costly. Consequently, if the demand for these goods and services is elastic, the quantity of import would raise, which in turn, causes lesser cash flows, profits and the stock price of the domestic industries and companies [1], [14, 17, 19, 23] found a negative sign and that a devaluation of the domestic currency has an indirect impact on the stock market returns. Contrarily, [16, 52], found a positive sign and that a devaluation of the domestic currency has a direct impact on the stock market returns. Thus, in this study nominal exchange rate in the local currency per US$ is used as a proxy for Nominal Exchange Rate. The research expects positive sign. Figure 5 shows the nominal effective exchange rate series maintained a consistent pattern over a period between 1984 and 2013.

4.2.7 Broad money supply is a proxy for supply of money (M2):

Broad money supply affects the overall economic activities in any country. It control has been the principal role of the fundamental monetary authority of a given economy [51]. As classified by [53] the broad money supply is a leading indicator. Increase in supply of money leads to rises in liquidity that eventually results in ascendant movement of stock prices. [28, 54] found a positive sign. Contrarily, [55] observed that there are concord of analysis in this view, that monetary growth, except
accompanied by growth in output of the commodities, leads to inflationary spiral in the economy, therefore, as investor diversify their portfolio assets away from financial assets to real assets, this force resulted in stock price to falls. This gauge is often adopted by investors to hedge against the erosive effect of inflation on financial assets. [56], in their study, “impact of macroeconomic factors on stock returns in Thailand”, found that money supply have no impact on stock returns. Also, [57, 58], examine the relationship between money growth and stock returns and found that monetary variables and stock returns do not integrate. This has led to diverse results. This study used Broad Money supply growth and was sourced from the World Bank Development Indicator. The figure 6 shows that the broad money supply maintained a consistent pattern over a period between 1984 and 2013.

![NEER Time Series Plot](image1)

**Fig. 5:** Time series plot of Nominal Effective Exchange Rate.

![M2 Time Series Plot](image2)

**Fig. 6:** Time series plot of Broad Money Supply.

### 4.2.8 Short Term Treasury Bills Rate:

Is a proxy of interest rate in the study (TBR): Interest rate varies with default risk, time, and marginal productivity of capital [59]. Increasing or decreasing of interest encourages substitution between speculative, market instrument, and the stock market. [60] Found that an increment of interest rate motivates a potential investor to transform the structure of the portfolio in favour of bond. [61] Support a positive relationship by arguing that the change in interest rates could carry information about certain changes in future fundamentals such as dividend. [62] explains the positive relationship between interest rates and stock prices in terms of a change in the risk premium. In disparity, [59,63,64,65], provide evidence on the relationship between interest rates and stock returns. The regime of high-interest rate leads to the high rate of borrowing and also reduces the economic activities. This also affects corporate profit, future cash flow of business and dividend. They agree to that an increase in interest rate lower corporate profitability and also lead to an increase in the discount rate applied to equity investors; both of which have an adverse impact on stock prices, and vice versa. They concluded that interest rates are expected to be negatively related to market returns. The data was sourced from the Statistical Bulletin of the Central Bank of Nigeria (CBN). The figure 7 shows that the short-term treasury bills series maintained a consistent pattern over a period between 1984 and 2013.

### 4.3 Statistical Methods for Data Analysis:

This study employed the time series data analysis technique to study the impact of the selected macroeconomic variables on the stock market returns. In a time series analysis, the ordinary least squares regression method might provide a spurious regression if the data series are non-stationary.
Therefore, the data series must follow the time series properties i.e. the time series data should be stationary, meaning that, the mean and variance should be constant over time and the value of covariance between two time periods depends only on the distance between the two period and not the actual time at which the covariance is computed. The most popular and widely used test for stationary is the unit root test. The presence of unit root indicated that the data series is non-stationary. Two standard procedures of unit root test namely the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) were performed to check the stationary nature of the series.

![Time series plot of Short Term Treasury bill](image)

**Fig. 7:** Time series plot of Short Term Treasury bill.

### 4.3.1 The bound test:

The study analyse the long-run and short-run cointegration relationship using an ARDL testing approach to cointegration. [66, 67, 68], consecutively build up this approach and find this method to be more proficient than other techniques. There are a number of relative advantages to the ARDL that make it more useful than others. Firstly, the ARDL is very flexible in relation to a small sample size such as the current study. The method allows for the integration of the variables regardless of their order and whether they are stationary at I(0) or I(1). Secondly, the ARDL determines a dynamic unrestricted error model (UECM) through a linear transformation. The UECM integrates the short-run dynamics with the long-run equilibrium without losing any information over time. The models for the ARDL approach to cointegration are stated below.

\[
\Delta \text{lnasi}_t = \alpha_1 + \sum_{i=0}^{n} \beta_1 \Delta \text{lnasi}_{t-i} + \sum_{i=0}^{n} \beta_2 \text{lnpi}_{t-i} + \sum_{i=0}^{n} \beta_3 \text{ln}gds_{t-i} + \sum_{i=0}^{n} \beta_4 \text{ln}fdi_{t-i} + \sum_{i=0}^{n} \beta_5 \Delta \text{lnneer}_{t-i} \\
+ \sum_{i=0}^{n} \beta_6 \text{lnm}_2_{t-i} + \sum_{i=0}^{n} \beta_7 \text{ln}tbr_{t-i} + \theta_1 \text{lnasi}_{t-i} + \theta_2 \text{lnpi}_{t-i} + \theta_3 \text{ln}gds_{t-i} + \theta_4 \text{ln}fdi_{t-i} + \theta_5 \text{lnneer}_{t-i} + \theta_6 \text{lnm}_2_{t-i} + \theta_7 \text{ln}tbr_{t-i} + \varepsilon_{1t} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (1)
\]

\[
\Delta \text{lnpi}_t = \alpha_2 + \sum_{i=0}^{n} \beta_1 \Delta \text{lnpi}_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta \text{lnasi}_{t-i} + \sum_{i=0}^{n} \beta_3 \text{ln}gds_{t-i} + \sum_{i=0}^{n} \beta_4 \text{ln}fdi_{t-i} + \sum_{i=0}^{n} \beta_5 \Delta \text{lnneer}_{t-i} \\
+ \sum_{i=0}^{n} \beta_6 \text{lnm}_2_{t-i} + \sum_{i=0}^{n} \beta_7 \text{ln}tbr_{t-i} + \theta_1 \text{lnasi}_{t-i} + \theta_2 \text{lnpi}_{t-i} + \theta_3 \text{ln}gds_{t-i} + \theta_4 \text{ln}fdi_{t-i} + \theta_5 \text{lnneer}_{t-i} + \theta_6 \text{lnm}_2_{t-i} + \theta_7 \text{ln}tbr_{t-i} + \varepsilon_{2t} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (2)
\]

\[
\Delta \text{ln}gds_t = \alpha_3 + \sum_{i=0}^{n} \beta_1 \text{ln}gds_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta \text{lnasi}_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta \text{lnpi}_{t-i} + \sum_{i=0}^{n} \beta_4 \text{ln}fdi_{t-i} + \sum_{i=0}^{n} \beta_5 \Delta \text{lnneer}_{t-i} \\
+ \sum_{i=0}^{n} \beta_6 \text{lnm}_2_{t-i} + \sum_{i=0}^{n} \beta_7 \text{ln}tbr_{t-i} + \theta_1 \text{lnasi}_{t-i} + \theta_2 \text{lnpi}_{t-i} + \theta_3 \text{ln}gds_{t-i} + \theta_4 \text{ln}fdi_{t-i} + \theta_5 \text{lnneer}_{t-i} + \theta_6 \text{lnm}_2_{t-i} + \theta_7 \text{ln}tbr_{t-i} + \varepsilon_{3t} \quad \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (3)
\]
$$\Delta \ln f d_t = \alpha_4 + \sum_{i=0}^{n} \beta_1 \Delta \ln f d_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta \ln s_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta \ln p_i t_{t-i} + \sum_{i=0}^{n} \beta_4 \Delta \ln g d s_{t-i} + \sum_{i=0}^{n} \beta_5 \Delta \ln n e e r_{t-i}$$

$$+ \sum_{i=0}^{n} \beta_6 \Delta \ln g m_{2,t-i} + \sum_{i=0}^{n} \beta_7 \Delta \ln t b r_{t-i} + \theta_1 \ln f d_{t-i} + \theta_2 \ln s_{t-i} + \theta_3 \ln p_i t_{t-i} + \theta_4 \ln g d s_{t-i} + \theta_5 \ln n e e r_{t-i} + \epsilon_{4t}$$

$$\Delta \ln n e e r_t = \alpha_5 + \sum_{i=0}^{n} \beta_1 \Delta \ln n e e r_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta \ln s_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta \ln p_i t_{t-i} + \sum_{i=0}^{n} \beta_4 \ln m_{2,t-i} + \sum_{i=0}^{n} \beta_5 \Delta \ln g d s_{t-i}$$

$$+ \sum_{i=0}^{n} \beta_6 \Delta \ln f d_{t-i} + \sum_{i=0}^{n} \beta_7 \Delta \ln t b r_{t-i} + \theta_1 \ln n e e r_{t-i} + \theta_2 \ln s_{t-i} + \theta_3 \ln p_i t_{t-i} + \epsilon_{5t}$$

$$\Delta \ln m_{2,t} = \alpha_6 + \sum_{i=0}^{n} \beta_1 \Delta \ln m_{2,t-i} + \sum_{i=0}^{n} \beta_2 \Delta \ln s_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta \ln p_i t_{t-i} + \sum_{i=0}^{n} \beta_4 \Delta \ln g d s_{t-i} + \sum_{i=0}^{n} \beta_5 \Delta \ln f d_{t-i}$$

$$+ \sum_{i=0}^{n} \beta_6 \Delta \ln n e e r_{t-i} + \sum_{i=0}^{n} \beta_7 \Delta \ln t b r_{t-i} + \theta_1 \ln m_{2,t-i} + \theta_2 \ln s_{t-i} + \theta_3 \ln p_i t_{t-i} + \epsilon_{6t}$$

$$\Delta \ln t b r_t = \alpha_7 + \sum_{i=0}^{n} \beta_1 \Delta \ln t b r_{t-i} + \sum_{i=0}^{n} \beta_2 \Delta \ln s_{t-i} + \sum_{i=0}^{n} \beta_3 \Delta \ln p_i t_{t-i} + \sum_{i=0}^{n} \beta_4 \Delta \ln g d s_{t-i} + \sum_{i=0}^{n} \beta_5 \Delta \ln f d_{t-i}$$

$$+ \sum_{i=0}^{n} \beta_6 \Delta \ln n e e r_{t-i} + \sum_{i=0}^{n} \beta_7 \Delta \ln m_{2,t-i} + \theta_1 \ln t b r_{t-i} + \theta_2 \ln s_{t-i} + \theta_3 \ln p_i t_{t-i} + \epsilon_{7t}$$

Where: $\Delta$ is the first-difference operator, and lnpi, lngds, lnfdi, lnneer, lnm2 and lntr represent the lagged dependent and independent variables respectively. $\epsilon_{1t}, \epsilon_{2t}, \epsilon_{3t}, \epsilon_{4t}, \epsilon_{5t}, \epsilon_{6t}, \epsilon_{7t}$ are error terms. And the $n$ represents the maximum lag length that is decided by the lag selection.

There are two procedures for testing the cointegration relationship between the stock market returns and macroeconomic variables. The first procedure is to estimate eq. (1), eq. (2), eq. (4), eq. (5), eq. (6), eq. (7) By ordinary least squares (OLS) procedure. Secondly, the existence of cointegration is traced by restricting all estimated coefficients of lagged level variables equal to zero. The null hypothesis signifies the non-existence of a long-term relation as $\theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7 = 0$ against the alternative hypothesis as $\theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq \theta_7 \neq 0$. Pesaran et al. [93] find upper and lower critical bound value in the F-test. If the calculated F-statistic is less than the lower and upper critical bound value, then we accept the null hypothesis and conclude that there is no cointegration between the variables under study. Nevertheless, if the calculated F-statistic is greater than the lower and upper critical bound value, then we reject the null hypothesis and conclude that there exists cointegration between the variables under study. Nevertheless, if the calculated F-statistic fall within upper and lower critical bound values, then we conclude that the result is inclusive.

The next procedure is to estimate the short-run and long-run equations by using the ECM. To ensure the convergence of the long-run equilibrium, the sign for the coefficient of the lagged error correction term ($ECM_{t-1}$) must be negative and statistically significant. Further, to conduct the diagnostic tests [91].

We similarly conducted Granger causality test based on the An Autoregressive Distributive Lag (ARDL) framework and the lagged condition to investigate the causal relationship between the stock market returns and the selected macroeconomic variables. By employing this framework, we can discover the long-run causality based on the error correction term and the short-run causality by carrying out Wald test of the restriction(s). If the error term is negative and statistically significant,
this will meet up the long-run causalities between the selected variables. Meanwhile, if the Wald statistic is significant, we meet the short-run causal relationship

\[
\Delta Y_t = \pi Y_{t-1} + \phi_1 \Delta Y_{t-1} + \phi_2 \Delta Y_{t-2} + \cdots + \phi_q \Delta Y_{t-q} + e_t \quad \cdots \quad \cdots \quad \cdots \quad (8)
\]

Where \(\Delta Y_t = [\Delta lnsi, \Delta lnp, \Delta lngds, \Delta lnfdi, \Delta lnneer, \Delta lnm2, \Delta lntbr]'\)

\[
\pi = -\left(1 - \frac{1}{q} \sum_{i=1}^{q} Z_i\right) \text{ and } \phi_i = -\left(1 - \frac{1}{q} \sum_{j=1}^{q} Z_j\right) \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad (9)
\]

For \(i=1, \ldots q-1\), \(\phi_i\) measures the short run impact of the variations in \(Y_t\). Meanwhile, the \((7 \times 7)\) matrix of \(\pi(= ab\beta)\) include both the long-run information(\(\beta\)) and speed of adjustment to the equilibrium such that \(\beta Y_{t-k}\) represents the \((n-1)\) cointegrating vector on the multivariate model. Z Test statistic is calculated by taking the sum of the Wald test statistic of \(\phi_i\) and t-statistic of \(\pi\).

5 Empirical Results:
5.1 Introduction:
This chapter discusses the empirical results of the analysis of macroeconomic variables on the stock market returns in Nigeria. The discussions are divided into steps beginning with the descriptive statistics, correlation analysis, and analysis of empirical result of unit root tests using Augmented Dickey-Fuller and Phillips-perron. This is followed by cointegration tests using ARDL bounding testing approach which initially introduced by Pesaran et al. [69]. Short run and Long run relationship between the stock market returns and macroeconomic variables through the Autoregressive Distributive Lag (ARDL). The next stage is the determination of causality between macroeconomic variables and stock market returns through Autoregressive Distributive Lag model (ARDL) Granger causality tests.

<table>
<thead>
<tr>
<th>Table 1: Descriptive statistics.</th>
<th>LNASI</th>
<th>LNPI</th>
<th>LNGDS</th>
<th>LNFDI</th>
<th>LNNEER</th>
<th>LNM2</th>
<th>LNTBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>10.89</td>
<td>1.095</td>
<td>23.174</td>
<td>1.030</td>
<td>3.642</td>
<td>2.081</td>
<td>2.443</td>
</tr>
<tr>
<td>Median</td>
<td>11.29</td>
<td>1.348</td>
<td>22.923</td>
<td>1.058</td>
<td>4.492</td>
<td>2.95</td>
<td>2.495</td>
</tr>
<tr>
<td>Maximum</td>
<td>13.31</td>
<td>3.412</td>
<td>25.764</td>
<td>2.382</td>
<td>5.059</td>
<td>3.312</td>
<td>3.292</td>
</tr>
<tr>
<td>Minimum</td>
<td>7.249</td>
<td>4.279</td>
<td>20.188</td>
<td>-0.409</td>
<td>-0.265</td>
<td>0.669</td>
<td>1.313</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1.955</td>
<td>1.054</td>
<td>1.230</td>
<td>0.620</td>
<td>1.673</td>
<td>0.723</td>
<td>0.415</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.577</td>
<td>-0.815</td>
<td>0.345</td>
<td>-0.066</td>
<td>-1.079</td>
<td>-1.048</td>
<td>-0.532</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>1.980</td>
<td>4.206</td>
<td>3.213</td>
<td>3.184</td>
<td>2.833</td>
<td>5.377</td>
<td>5.359</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>2.869</td>
<td>4.972</td>
<td>0.652</td>
<td>0.064</td>
<td>5.861</td>
<td>12.146</td>
<td>1.743</td>
</tr>
<tr>
<td>Probability</td>
<td>0.238</td>
<td>0.083</td>
<td>0.721</td>
<td>0.968</td>
<td>0.053</td>
<td>0.002</td>
<td>0.418</td>
</tr>
<tr>
<td>Sum</td>
<td>316.09</td>
<td>31.778</td>
<td>695.244</td>
<td>30.899</td>
<td>109.271</td>
<td>89.367</td>
<td>73.302</td>
</tr>
<tr>
<td>Sum Sq. Dev</td>
<td>107.03</td>
<td>31.116</td>
<td>43.940</td>
<td>11.17</td>
<td>81.200</td>
<td>14.668</td>
<td>5.001</td>
</tr>
<tr>
<td>Observation</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Correlation Analysis Matrix Test.</th>
<th>LNFDI</th>
<th>LNGDS</th>
<th>LNM2</th>
<th>LNNEER</th>
<th>LNPI</th>
<th>LNTBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNFDI</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNGDS</td>
<td>-0.251</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNM2</td>
<td>0.422</td>
<td>0.017</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNNEER</td>
<td>0.248</td>
<td>0.445</td>
<td>0.270</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNPI</td>
<td>-0.176</td>
<td>0.221</td>
<td>0.027</td>
<td>-0.331</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>LNTBR</td>
<td>0.151</td>
<td>-0.379</td>
<td>0.281</td>
<td>-0.185</td>
<td>0.003</td>
<td>1</td>
</tr>
</tbody>
</table>

To examine the existence of stochastic non-stationary in the series, the study establishes the order of integration of individual time series through the unit root test. Two unit roots test was employed.
These are Augmented Dickey-fuller (ADF) [70] and Phillips Perron (PP) [71]. The variables used in this study are: All share index (LNASI), foreign direct investment (LNFDI), Gross domestic savings (LNGDS), broad money supply (LNM2), nominal effective exchange rate (LNNEER), per capita income (LNPI) and short term treasury bills (LNTBR). According to Sayed Hossen [72] in his lecture in youtube stated that in testing unit root test you must check all the three equations that is constant, trend and constant, and none before to conclude that whether the variables are cointegrated at level, first difference or second difference. The ADF and Phillip-Perron tests have both rejected the hypothesis of non-stationarity of all the seven variables at level, but accepted the hypothesis of stationarity with the first difference of all the seven variables at level, but accept the hypothesis of non-stationarity with the first difference or second difference. The variables used are integrated in the same order that is L(1). The results are presented in Table 3 and Table 4 above. Table 3 reports the results of the ADF and PP unit root test at level using constant, trend and constant, and none. The seven variables, LNASI, LNFDI, LNGDS, LNM2, LNNEER, LNPI and LNTBR are found to be non-stationary at 1%, 5% and 10% levels of significance. Thus, the variables are non-stationary and not integrated of the same order. While, Table 4 reports the results of the ADF and PP unit root test for first difference using intercept (constant), trend & constant, and none. All the seven variables, LNASI, LNFDI, LNGDS, LNM2, LNNEER, LNPI and LNTBR are found to be integrated and stationary in both constant, trend & constant, and none at 1% levels of significance. Thus, the variables are stationary and integrated of the same order, i.e., L(1).

### Table 3: Unit root test for stationarity.

<table>
<thead>
<tr>
<th>variables</th>
<th>ADF</th>
<th>Phillip-perron</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>Constant &amp; trend</td>
</tr>
<tr>
<td>LNASI</td>
<td>-1.868</td>
<td>-1.129</td>
</tr>
<tr>
<td>LNFDI</td>
<td>-3.796***</td>
<td>-3.578***</td>
</tr>
<tr>
<td>LNNEER</td>
<td>-4.599***</td>
<td>-1.449</td>
</tr>
<tr>
<td>LNM2</td>
<td>-4.817***</td>
<td>-4.246**</td>
</tr>
<tr>
<td>LNTBR</td>
<td>-2.349</td>
<td>-2.706</td>
</tr>
</tbody>
</table>

Critical values:

- constant: -3.368 (1%), -2.972 (5%), -2.625 (10%)
- Constant & trend: -4.323 (1%), -3.580 (5%), -3.225 (10%)
- None: -2.650 (1%), -1.953 (5%), -1.609 (10%)

*, ** and *** Denotes rejection of the null hypothesis at 10% and 5% and 1% significance level.

### Table 4: Unit root test for stationarity.

<table>
<thead>
<tr>
<th>variables</th>
<th>ADF</th>
<th>Phillip-perron</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>Constant &amp; trend</td>
</tr>
<tr>
<td>LNASI</td>
<td>-5.110***</td>
<td>-4.666***</td>
</tr>
<tr>
<td>LNPI</td>
<td>-5.581***</td>
<td>-5.461***</td>
</tr>
<tr>
<td>LNNEER</td>
<td>-3.182**</td>
<td>-5.221***</td>
</tr>
<tr>
<td>LNTBR</td>
<td>-3.672**</td>
<td>-3.946**</td>
</tr>
</tbody>
</table>

Critical values:

- Constant: -3.368 (1%), -2.972 (5%), -2.625 (10%)
- Constant & trend: -4.323 (1%), -3.580 (5%), -3.225 (10%)
- None: -2.650 (1%), -1.953 (5%), -1.609 (10%)

*, ** and *** Denotes rejection of the null hypothesis at 10% and 5% and 1% significance level.

### Table 5: Lag Selection Table.

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-166.9876</td>
<td>NA</td>
<td>0.001532</td>
<td>13.38367</td>
<td>13.7238</td>
<td>13.48120</td>
</tr>
<tr>
<td>1</td>
<td>-51.05310</td>
<td>160.3248*</td>
<td>1.03e-05*</td>
<td>8.234853</td>
<td>10.94460*</td>
<td>9.015162*</td>
</tr>
<tr>
<td>2</td>
<td>-396.782</td>
<td>16.55443</td>
<td>1.74e-05</td>
<td>7.771863*</td>
<td>12.85264</td>
<td>9.234942</td>
</tr>
</tbody>
</table>

* indicates lag order selected by the criterion

Source: Research’s computation output using EViews 7

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion
Table 6: Multivariate cointegration bound test analysis.

<table>
<thead>
<tr>
<th>Variables</th>
<th>LNASI</th>
<th>LNP1</th>
<th>LNFDI</th>
<th>LNGDS</th>
<th>LNM</th>
<th>LNNEER</th>
<th>LNTBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimum-lags</td>
<td>(1,0,0,1,1)</td>
<td>(2,0,0,2,2,2)</td>
<td>(1,0,2,2,1,2,2)</td>
<td>(0,0,2,0,2,0,2)</td>
<td>(1,0,1,2,0,1,1)</td>
<td>(2,2,2,2,2,2,2)</td>
<td>(2,2,2,2,2,2,2)</td>
</tr>
<tr>
<td>F-statistics</td>
<td>5.1823**</td>
<td>1.7640</td>
<td>8.5127***</td>
<td>0.2233</td>
<td>4.3545***</td>
<td>0.3032</td>
<td>3.1582**</td>
</tr>
<tr>
<td>Critical values</td>
<td>1%</td>
<td>5%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Upper bound</td>
<td>3.90</td>
<td>5.21</td>
<td>2.89</td>
<td>2.89</td>
<td>2.89</td>
<td>2.89</td>
<td>2.89</td>
</tr>
<tr>
<td>Lower bound</td>
<td>2.73</td>
<td>2.17</td>
<td>1.92</td>
<td>1.92</td>
<td>1.92</td>
<td>1.92</td>
<td>1.92</td>
</tr>
<tr>
<td>Diagnostic Test:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.833</td>
<td>0.799</td>
<td>0.922</td>
<td>0.633</td>
<td>0.842</td>
<td>0.892</td>
<td>0.925</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.703</td>
<td>0.543</td>
<td>0.785</td>
<td>0.295</td>
<td>0.697</td>
<td>0.460</td>
<td>0.733</td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>2.7021</td>
<td>2.7025</td>
<td>2.2156</td>
<td>2.5865</td>
<td>2.057</td>
<td>2.7037</td>
<td>2.552</td>
</tr>
<tr>
<td>Serial correlation</td>
<td>0.520[0.488]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normality J-Bera</td>
<td>1.736[0.496]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heteroscedasticity</td>
<td>0.200[0.657]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is important to note that in analysing the time series the lag order is quite sensitive to the result, and therefore selection of lag length in an appropriate criterion is very essential. The Akaike Information Criterion (AIC), [73], was used to select the number of lags required. The lag length, which minimized the AIC at the lowest level is 2. The F-Bound, Short-run and Long-run ARDL model estimates based on the AIC criteria for the Nigeria is reported in Table 5 below.

Table 7: ARDL Long-run Cointegration.

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>T-Ratio[Prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>6.2800**</td>
<td>2.3783</td>
<td>2.6405 [0.019]</td>
</tr>
<tr>
<td>ALNP1</td>
<td>0.49989***</td>
<td>0.13695</td>
<td>3.6502 [0.003]</td>
</tr>
<tr>
<td>ALNGDS</td>
<td>-0.63975</td>
<td>0.10390</td>
<td>-0.61512 [0.548]</td>
</tr>
<tr>
<td>ALFII</td>
<td>0.40127**</td>
<td>0.09065</td>
<td>2.0417 [0.066]</td>
</tr>
<tr>
<td>ALNNEER</td>
<td>1.41966***</td>
<td>0.98343</td>
<td>1.43437 [0.180]</td>
</tr>
<tr>
<td>ALNM2</td>
<td>0.29390*</td>
<td>0.15837</td>
<td>1.8557 [0.085]</td>
</tr>
<tr>
<td>ALNTBR</td>
<td>-0.42026*</td>
<td>0.22642</td>
<td>-1.8562 [0.085]</td>
</tr>
</tbody>
</table>

***, ** and * show the significance at the 1%, 5% and 10% levels respectively. Figures in the squared parentheses are p-values.

The relevant critical value bounds are taken from [68] [case II with a restricted intercept and no trend and a number of regressors = 7] from [70, 71]. *** and * denotes that F-statistics falls above the 1%, 5% and 10% upper bound, respectively. These results suggest that cointegration exists between macroeconomic variables and stock market returns in Nigeria. The diagnostic tests show that the estimates are free from serial correlation and heteroskedasticity. Thus, the distributions are normally distributed.

The t-statistics and p-values are given in brackets and square brackets respectively. The coefficients for lnpi, lnfdi, lnneer, and lnm2 are positive while the coefficient for lntrbr is negative and statistically significant. On the other hand, the coefficient for lngds is negative but statistically insignificant. The intercept term is positive. In general the signs of all variables are in line with theoretical predictions except lngds. The results reveal that stock returns are positively and significantly related to the level of standard of living as proxied by the gross domestic per capita income. A positive relationship between stock returns and per capita income consistent with [54, 75], whose found a similar result for Pakistan. The positive relationship indicates that increase in disposable income and standard of living of people in Nigeria will increase the corporate earning which enhances the present value of the firm and therefore the stock prices increase. The positive long-run relationship between stock returns and nominal effective exchange rate is also surprising. This is consistent with the findings of Wongbanpo and Sharma [9, 16, 17, 23, 27, 38, 45]. The justification is that, an appreciation of the Naira leads to a decline in price of imported inputs that constitutes a huge part of factor inputs of industries in Nigeria. It also leads to an increase in the money supply and reserve. This lesser the cost of production leading to increased business activity and therefore increased stock returns. The positive relationship between stock returns and foreign direct investment coincides with Ahmed [76]. The justification is that the opportunity of the Nigerian Stock Exchange Market to non-resident Nigerians and foreign investors and the exchange control permission approved to investors to invest through theNSE without prior approval facilitated the register of highly rated foreign-owned companies on theNSE. The negative relationship between stock returns and Short-term Treasury bills rate also supported by [2, 7, 16, 17, 23, 25, 27, 34]. The justification is that, if the interest rate is high relative to other countries, the foreign investors are likely to leave their money in the bank rather than to invest in the risky stock market, will lead to a decrease the stock returns. If the interest rate is low the investors, might prefer to invest in other market.
The relationship between stock returns and broad money supply is found to be positive which indicates that broad money supply brings the economic stimulus and therefore the stock prices increase. The positive relationship between money supply and the stock price has been supported San-Diago [8, 9, 17, 28, 38, 39, 41]. The co-integration test indicates that gross domestic saving is insignificant in determining the stock returns although the sign of the coefficient is negative. This is in consistent with the study conducted in Pakistan by [75].

The result also shows that, in the long run, the stock returns are significantly influenced by Per capita income foreign direct investment, Nominal effective exchange rate, Treasury bill rate, and Broad money supply with elasticities of 0.499, 0.401, 1.419, -0.420 and 0.293 respectively, and insignificantly influenced by gross domestic saving with elasticities of -0.639.

A 1% increase in short-term treasury bills will lead to 0.42% decrease in the stock market returns. Gross domestic saving shows the negative, but insignificant relationship with stock returns in Nigeria given 0.64% response of the stock market returns to 1% decrease in gross domestic saving. A positive relationship between the stock market returns and nominal effective exchange rate in Nigeria given 1% increase in nominal effective exchange rate will lead to 1.42% increase in the stock market returns. Gross domestic per capita, broad money supply and foreign direct investment positive relationship with stock market returns in Nigeria given 0.50%, 0.29% and 0.40% response of stock market returns to 1% increase in gross domestic per capita, broad money supply, and foreign direct investment respectively.

### Table 8: Short run ARDL Cointegration

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>T-Ratio</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>3.8070***</td>
<td>1.4595</td>
<td>2.6084 [0.018]</td>
<td></td>
</tr>
<tr>
<td>∆LNPI</td>
<td>0.13906***</td>
<td>0.0474</td>
<td>2.9285 [0.009]</td>
<td></td>
</tr>
<tr>
<td>ALNGDS</td>
<td>-0.38782</td>
<td>0.059704</td>
<td>-0.64958 [0.524]</td>
<td></td>
</tr>
<tr>
<td>∆ALFDI</td>
<td>0.24326*</td>
<td>0.12834</td>
<td>1.8953 [0.074]</td>
<td></td>
</tr>
<tr>
<td>∆ALNPER</td>
<td>0.90776</td>
<td>0.25222</td>
<td>3.5991 [0.723]</td>
<td></td>
</tr>
<tr>
<td>∆ALNM2</td>
<td>0.32141***</td>
<td>0.097585</td>
<td>3.2937 [0.004]</td>
<td></td>
</tr>
<tr>
<td>∆ALNTBR</td>
<td>0.30203*</td>
<td>0.16311</td>
<td>1.8515 [0.081]</td>
<td></td>
</tr>
<tr>
<td>Ecm(-1)</td>
<td>-0.60621***</td>
<td>0.12357</td>
<td>-4.9057 [0.000]</td>
<td></td>
</tr>
<tr>
<td>Serial correlation</td>
<td>2.96[0.109]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normality-J.Bera</td>
<td>1.736[0.419]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heteroscedasticity</td>
<td>0.558[0.46]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***, ** and * show the significance at the 1%, 5% and 10% levels respectively.

Figures in the squared parentheses are p-values.

From the table, ARDL result shows the short run relationship between the stock market returns and macroeconomics variables in Nigeria. In theory, the ECM (-1) must have a negative value and significant which is exactly the case in the current study. The higher the coefficient, the more stable the long-run relationship. The estimated coefficient of the ECM (-1) is -0.60621 (at 1% significant) signifying that in the absence of changes in the independent variables, deviation of the model from the long-run path is corrected by 61% per year, which is very fast. The implication is that; it will take a little time to entirely return to long-run equilibrium if there is a shock to the macroeconomic variables. This shows that the market is efficient and therefore the existence of arbitrage activities on the stock market. The result of the estimation shows that the explanatory variables account for about 83.38% variation in the stock market returns in Nigeria. Nevertheless, the highly significant F-statistics recommends the general significance of the model.

It shows a 1% increase in short term treasury bills will lead to 0.30% increase in the stock market returns. This result implies that investors do not view Treasury bill with the associated interest rates as alternative investment opportunities. Thus, increases in Treasury bill rates leads to increased investment in stocks causing stock returns to rise. This result is somewhat consistent [6, 77]. Gross domestic saving shows the negative, but insignificant relationship with stock returns in Nigeria given 0.04% response of the stock market returns to 1% decrease in gross domestic saving. It also shows a positive, and insignificant relationship between the stock market returns and nominal effective exchange rate in Nigeria given 1% increase in nominal effective exchange rate will lead to 0.09% increase in the stock market returns. Gross domestic per capita, broad money supply and foreign direct investment shows positive but significant relationship with stock market returns in Nigeria given 0.14%, 0.32 % and 0.24% response of stock market returns to 1% increase in gross domestic per capita, broad money supply, and foreign direct investment respectively.

The stability of the ARDL parameters is observed by applying the CUSUM and CUSUMSQ tests developed by Evans, Durbin and Brown [74]. Figures 8 and Figures 9 illustrate that the plot of the statistics from the CUSUM and CUSUMSQ remain within the critical bounds at 5% significance level. This entails that all coefficients in the error correction model are stable over time. These selected models adopted in the study seem to be good
adequate and strong in estimating the long-run and short-run relationships between macroeconomic variables and Stock market returns in Nigeria.

![Plot of Cumulative Sum of Recursive Residuals](image1)

**Fig. 8:**

6 Ardl Granger Causality Analyses:

Co-integration results found that causality subsists among the co-integrated variables, but it fails to explain us the direction of the causal relationship. Engel and Granger [78], said that if the variables are found to be co-integrated afterwards there always exists an error correction representation in which the short run dynamics of the variables can be tested that are influence by the variance from equilibrium. Engel and Granger recommend that if co-integration exists between the variables in the long run, afterwards, there must be either bidirectional or unidirectional relationship between variables. The short run and long run causal relationship between the variables should be observed in an Autoregressive distributive lag (ARDL) frame work.

![Plot of Cumulative Sum of Squares of Recursive Residuals](image2)

**Fig. 9:**

| Table 9: Multivariate Short-run and Long-run ARDL Granger Causality. |
|----------------|----------------|----------------|
| Variables | Short run | Long run |
| ΔLNASI | ΔLNPI | ΔNGDS | ΔNFDI | ΔNNEER | ΔM2 | ΔTBR | ECT-
| - | - | 0.421 | 3.592 | 0.129 | 10.854 | 3.428 | -0.606 | -4.905 |
| [0.003] | [0.516] | [0.058] | [0.19] | [0.001] | [0.064] | [0.001] | (-4.905) | (-1.287) |
| ΔLNPI | 11.002*** | - | 2.822 | 3.649 | 4.103 | 4.103 | -1.643*** | -0.508 |
| [0.001] | [0.030] | [0.161] | [0.037] | [0.128] | [0.128] | [0.128] | (-0.508) | (-0.508) |
| ΔNGDS | 1.511 | 7.052** | - | 1.217 | 4.507 | 1.228 | 7.470*** | None |
| [0.219] | [0.029] | [0.270] | [0.015] | [0.024] | [0.024] | [0.024] | None | None |
| ΔNFDI | 4.917** | 11.440*** | 2.361 | - | 0.160 | 9.104*** | 2.660 | -1.297*** | -7.375 |
| [0.027] | [0.003] | [0.307] | [0.689] | [0.011] | [0.264] | [0.264] | (-7.375) | (-7.375) |
| ΔNNEER | 0.938 | 2.430 | 2.782 | 1.361 | 2.061 | 4.788* | 4.909*** | (-0.939) |
| [0.625] | [0.297] | [0.506] | [0.506] | [0.091] | [0.091] | [0.091] | (-0.939) | (-0.939) |
| ΔM2 | 17.595*** | 3.053* | 1.857 | 4.857** | 1.456 | - | 0.004 | -0.525*** | (-3.675) |
| [0.000] | [0.081] | [0.395] | [0.028] | [0.227] | [0.227] | [0.227] | (-3.675) | (-3.675) |
| ΔTBR | 3.433 | 2.684 | 8.651** | 2.643 | 5.654 | 0.555 | - | -0.934** | (-2.938) |
| [1.80] | [0.026] | [0.013] | [0.267] | [0.059] | [0.456] | [0.456] | (-2.938) | (-2.938) |

***, ** and * show the significance at the 1%, 5% and 10% levels respectively. Figures in squared parentheses and parentheses are the p-values and t-statistics respectively.

The Granger causality analyses based on the ARDL with 2 lag are conducted between the stock market returns and six macroeconomic variables. The results are summarized in Table 9. The results indicated that, there is bi-directional causality exists between Per capita income and stock market returns, Foreign direct investment and stock market returns, broad money supply and stock market returns, both in the long-run and short-run. Thus, stock market returns (ASI) do have a feedback effect on the Per capita income, foreign direct investment, and broad money supply. From the result it can be interpreted that, increase in the Per capita income, foreign direct investment, and broad money supply inspires the state of economy, the corporate profits and that it in turn lead to boost the stock market returns. At the same time, the health of the stock market, in the sense of increasing share price, turns into the health of the economy. No causal relation exists between the stock market returns, gross domestic saving and Nominal effective exchange rate in the short run. However, short-run and long-run causal relationship is found in the direction from Short-term Treasury bills rate to a stock market returns, and Short-term Treasury bills rate to nominal effective exchange rate. It is also observed that, in both short run and long-run there is bidirectional causality exists between Per capita income and gross domestic saving, Per capita income and foreign direct investment, per capital income and Broad money supply, foreign direct investment and broad money supply. But between gross domestic saving and Short-term Treasury bills rate reveals only short-run bidirectional causal relationship. The results also reveals that there is no causal relationship between gross domestic saving and stock market returns,
7. Conclusion:

This study analysed the short-run and long-run relationship and the nature of causality between stock market returns and six macroeconomic variables, namely, the broad money supply, the foreign direct investment, the gross domestic saving, the nominal effective exchange rate, the gross domestic per capita income, and the short-term Treasury bill rate using Autoregressive distributive lag (ARDL). The analysis used annual data from 1984-2013 obtained from the Central Bank of Nigeria (CBN), Nigerian Stock Exchange database, United Nation Statistical bulletin, and World Bank Statistical database. The ASI is used to represent the Nigerian Stock Market Returns. It is believed that, the selected macroeconomic variables, among others, represent the state of the economy. The data properties were analyzed to determine the stationarity of time series using the Augmented Dickey-Fuller and Philips-Perron unit root test which indicated that all the seven series are I(1). The results of the Cointegration Test based on F-bound’s procedure showed the existence of the cointegration between variables. Therefore, the variables have a long-run equilibrium relationship between them, although they may be in disequilibrium in the short-run. The estimation of the autoregressive distributive lag described how the short run and long run behaviour in the variables are reconciled. It showed that the error correction terms contribute in explaining the changes in all the variables. It also revealed the presence of short-run and long-run bi-causal causality between stock market returns and gross domestic per capita, stock market returns and foreign direct investment, stock market and broad money supply, foreign direct investment and broad money supply, gross domestic saving and short term treasury bills rate, gross domestic per capita income and gross domestic saving, foreign direct investment and gross domestic per capita income. It also shows unidirectional causal relationship between treasury bills rate and stock market returns, as well as between treasury bills rate and nominal effective exchange in Nigeria. In conclusion, the null hypothesis of no short-run and long-run relationship between the stock market returns and macroeconomics variables is rejected. Moreover, the null hypothesis of no causality between the stock market returns and macroeconomic variables may also be rejected. This study recommends that; Policy makers, financial policies and investors, need to take the macroeconomic indicators into account when formulating financial and economic policies and, diversification and structuring of the portfolio. Policy makers and government should still consider monetary policy as a useful tool for achieving the stability of the stock market due to the bi-causal relationship between broad money supply and stock market returns. The government should increase the standard of living of the people by providing essential infrastructural facilities and social amenities in order to enhance the ability of the people to save and invest in the stock market. This study confirms the belief that macroeconomic variables persist to influence the Nigerian Stock market returns. It should, however, be stressed that the results of this study are limited by the ARDL framework and only six selected macroeconomic variables. Future research should test for the robustness of these results within a larger ARDL system and including more variables with a longer period to improve the results. Enlarging the system complicates the identification procedure, however, and is beyond the scope of the current research.

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References