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THE IMPACT OF MACROECONOMIC INDICATORS ON THE NIGERIAN STOCK MARKET PERFORMANCE

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Abstract

This study investigates the impact of macroeconomic variables on stock price movements in Nigeria using VAR model and granger causality tests to analyse the long run and short run dynamics of stock price movement and the macroeconomic variables with time series data spanning from 1981 – 2014. The Impulse response and Variance decomposition used to explain the dynamic properties of the VAR model suggest that the response of ASI to one standard deviation in INF, INT, and RGDP were all fluctuating whereas its response to one standard deviation of EXR and IPI were relatively stable overtime. The study recommends that the monetary authorities and policy makers should pay attention to changes in monetary aggregates in view of their sensitivity to stock price movements in Nigeria.

Keywords: Macroeconomic data, Stock Market, VAR Model, Causality, Time Series

INTRODUCTION

Over the years several studies have been carried out investigating the relationship between stock market performance and the level of economic activities in developed, developing and underdeveloped economies. This could be as a result of the paramount role it plays in financial intermediation by channelling idle funds from surplus to deficit zones. In the words of Alile 1984, the stock market serves as a channel through which savings are mobilized and efficiently allocated to achieve economic growth (Alile, 1984). Moreover, Empirical evidences from developed economies as well as the emerging markets have proved that the development of the stock market is sacrosanct to economic growth (Asaolu and Ogunmuyiwa, 2010). This means that Stock Market Performance can impact on growth and vice versa. Growth is not macroeconomic variable that can be affected in isolation; therefore, other macroeconomic variables that have a direct or indirect relationship with growth can explain the volatility in the stock market. Specifically, Fama (1981, 1990) and Chen et al. (1986) in their study tested the relationships with the US economic data. Evidently, Fama (1981) reported from their study that there is a strong positive correlation between common stock returns and real economic variables like capital expenditures, industrial production, real GDP, money supply, lagged inflation and interest rates. In consonance to the above, Chen et al. (1986) found that changes in aggregate production, inflation, short-term interest rates, the maturity risk premium and default risk premium are the relevant economic factors which explain and predict stock prices. Hamao (1988) tested the Japanese market and found strong evidence for a positive relationship between stock prices and macroeconomic variables except for the case for Japanese monthly production. In Nigeria, several researchers have in recent time ventured into examining the relationship between stock market indexes and macroeconomic variables. According to financial theory, these macroeconomic indicators include: interest rate, foreign exchange rate, Inflation rate, real GDP, money supply and industrial output.

The study of the relationship is necessary because it is globally acknowledged that stock market activities are taken as a potent barometer for measuring the economic performance of a nation or its future growth as observed by Meristem (2008). Similarly, Nnamocha and Nwobi (2001) opine that investment in stocks or securities; generally constitute a gauge to measure economic development the same way stock prices serve as an indicator to measure economic and political conditions in a country.In the same vein, Aldin et al (2012) opine that Stock price movements are likely to be influenced by many macroeconomic factors including political events, firms' guidelines, general economic situations, inventory price index, investors' expectations, institutional investors' selections and psychological factors. Furthermore, in financial market literature, the stock market has ordinarily been expressed as an indicator of the

economy. Ajao and Oseyemon (2010) in a related study, observe that large decreases in stock prices are believed by many to be reflective of future recession, while large increases in stock prices suggest future economic growth.

Due to the role of stock market prices as both a measure of the well-being of a nation and as a leading indicator of future economic activity, Barbic and Condic-Jurkic (2011) therefore suggested that information about dynamics and direction of relationship between macroeconomic variables and stock prices is central for policymakers as it facilitates formulation of nation's macroeconomic policy. While literature provides evidence on strong relationships between fundamental economic activities and stock market returns in developed countries and Asian emerging markets, the existence of this relationship has remained unclear for developing countries like Nigeria. Fung and Lie (1990) argued that in developing countries stock market price movement may not be tied to macroeconomic fundamentals because of the inability of stock market to fully capture information about the change in macroeconomic fundamentals and as such stock prices in developing economies could be more exposed to speculative activities of irrational investors. Furthermore, Chen et al (1986) observe that the characteristic which all stock market have in common is the uncertainty which is related with the short and long term future state. This according to him is undesirable for the investor but it is also unavoidable whenever the stock market is selected as the investment tool. He therefore suggests that the best that one can do is to try to reduce this uncertainty by stock market prediction (or forecasting) which macroeconomic variables is one of the instruments in the process.

It is against this backdrop that this paper attempts to empirically examine the potential effect of selected macroeconomic variables on the stock market index for Nigeria. Previous studies on the relationship between stock market performance and macroeconomic variables in Nigeria did not consider industrial production output. This work extends by adding a proxy of industrial production to establish the strong link between stock prices and real economic activity as observed by Scwert (1990). Furthermore, this study extends the data set reaching 2014 to have enough time to establish if there exists a long run relation between stock market prices and the macroeconomic variables of interest.

LITERATURE REVIEW

Theoretical Considerations

The theoretical framework of this study is based on the Arbitrage Pricing Theory (APT) of Ross (1976). This model specifies asset returns to be explained with multiple risk factors common to that asset class. In other words, APT models a short run relationship between macroeconomic variables and the stock price in terms of first differences assuming trend stationarity (Fama,

1990). Some of these macroeconomic factors as opined by Saeed and Akhter (2012) include inflation Rate, Interest Rate, Industrial Production, Exchange Rate, growth in Gross Domestic Product, Risk Free Rate and Money Supply. As argued by Ajaoand Oseyomon (2010),these set of variables do not capture all economic risk, but it does include macroeconomic variables that are generally regarded as the more important variables that affect excess return on stocks. According to them, these variables have the additional appeal of being “exogenous” in the sense that they come from outside the stock markets. However, Ogbulu et al (2014) observe that it is often argued that macroeconomic variables may not have influence on stock prices because they are exogenous to the stock market activities. The economic choice and justification of these selected macroeconomic variables are described below.

Interest rate: Interest rate is an economic variable that depicts the cost of acquiring credit for investment in an economy. It is negatively related to investment, this means that high interest rate discourages investment while low interest rate encourages investment. It often changes as a result of inflation, productivity of capital and Federal Reserve policies and also affects both the future cash flow of firms and discount rate. According to Chandra (2004),a rise in interest rate decreases corporate profitability and likewise leads to an increase in the discount rate applied to equity investors; both of which affects the stock prices adversely. Consequently, a rise in interest rate is expected to impact negatively on the performance of the organization and thus on stock market prices.Ogbulu (2010) finds a negative long-run relationship between interest rates and stock returns in Nigeria and also a uni-directional causality running from interest rates to stock returns.

Inflation rate: This is the percentage rate of changes in the price level over time. It is generally measured by changes in Consumer Price Index (CPI). Its variation has impact on economic activities because it affects both aggregate demand and supply. High inflation means a decline in real income; investors react by selling off their assets (stocks inclusive) to enhance their purchasing power. Contrarily, low inflation motivates investors to acquire more assets. Another argument is that increase in the rate of inflation reduces stock prices because of the interaction of inflation with the tax system. Investors undervalue corporate stock during inflationary period because they fail to consider capital gain on corporate debt, and also they price stock to give an Earning Price Ratio that could be comparable to nominal rather than real interest rates (Osamwonyi and Evbayiro-Osagie, 2012). Fama and Schwert (1977) had found evidence that stock prices are negatively related to both the expected and the unexpected component of Consumer Price Index.

Exchange Rate: This is the rate at which a nation's currency is exchanged for another countries currency. The external value of each currency is presumably reflected in the country's economic conditions in general and the purchasing power of the currency relative to that of other currencies in particular. Osamwonyi (2003) observed that the performance and profitability of industries and companies that depend majorly on importation are considerably affected by the exchange rate of the Naira against major currencies of the world. If there is depreciation of the local currency, this makes the export goods to be cheaper and thus encourages export and profit. This would stimulate the growth of the economy and consequently increase the returns on Stock. The reverse is the case when there is an appreciation of the local currency. This therefore implies that the depreciation of the local currency has a positive effect on stock prices. Akinnifesi (1987) find evidence for positive relationship between stock prices and depreciation of the local currency.

Money Supply: This is the entire stock of currency and other liquid instruments in a country's economy at a particular time. It is an important macroeconomic factor that affects economic activities hence its control by the central monetary authority of any given economy (Osamwonyi 2003). Ajao and Oseyomon(2010) posit that changes in money supply will alter the equilibrium position of money, thereby altering the composition and price of assets in an investor's portfolio and secondly, changes in money supply may impact on real economic variables and having a lagged influence on stock and property stock returns. These therefore suggest that an increase in the rate of growth of money supply strengthens the rate of increase in stock prices. Conversely, a fall in the rate of growth of money supply should slow down the growth momentum of stock prices. However, there is strong empirical evidence of a direct relation between money-supply growth and long-term price inflation, at least for rapid increases in the amount of money in the economy which adversely affects stock prices. Studies such as Davidson and Froyen (1982) and Rozeff(1992) contend that money growth affects stock prices adversely.

Growth rate in GDP: GDP is the market value of all goods and services produced in a country over a period of one year and are one of the primary indicators used to gauge the economic performance of a country. Evidently, there is a positive relationship between the GDP growth rate and stock market returns. During period of high economic growth, there is increase in the demand for goods and services (stocks inclusive) because of the potential for higher profits while period of depression is associated with lower expected returns on investment assets and capital because investors' confidence on the prospect of the economy may be dampened.

Chandra (2004)find evidence for positive relation between GDP growth rate and stock market returns.

Growth rate in industrial production output: This is the measure of productivity in the industrial sector of the economy which includes manufacturing, mining and utilities. Increased productivity in the industry increases the dividend payable and the growth rate of dividend determines the future stock prices. Schwert (1990) and Chen et al. (1991) opine that output performance of the firm impacts on the dividend paying ability and its growth such that increased output increases cash inflow of a firm which can translate to profit.

Empirical Evidences

There are several empirical studies examining the relationship between stock market prices and macroeconomic variables. Prominent among them are discussed below.

In assessing the relation between stock prices and domestic and international macroeconomic variables in France, Germany, Italy, Netherlands, Switzerland and the UK, Nasseh and Strauss (2000) established a positive relationship. Their findings therefore suggest that since stock prices are influenced by production, interest rates, business expectations and the CPI, this implies that stock prices are grounded in economic fundamentals. Also, the result of the variance decomposition methods showed that domestic and international activity could forecast from 37% to 82% of stock prices after four years, depending on which European economy is viewed.

Maysami *et al* (2004) established long-term equilibrium relationships between selected macroeconomic variables and the Singapore stock market index (STI) and discovered that Singapore's stock market index form cointegrating relationship with changes in the short and long-term interest rates, industrial production, exchange rate, price levels and money supply.

Barbic& Condic-Jurkic (2011) empirically investigated the relationship between stock market returns and macroeconomic variables in selected CEE countries. They used Johansen cointegration method to test for the long run relationships between stock market index and some macroeconomic variable and Granger Causality test to gain more information about market efficiency. The result established a long run relationship between stock market indices and macroeconomic variables while the Granger causality reveals that there is no causal linkage between any macroeconomic variable and stock market index.

Hsing Y. (2013) examines the impacts of fiscal and monetary policies on stock market performance in Poland for the period 1999.Q2 to 2012.Q4 using the GARCH model. He found that the ratio of government deficits or debt to GDP do not affect the stock market index but is

negatively influenced by the money market rate. Furthermore, he established a positive relationship between Poland's stock index and industrial production and stock market performance in Germany and the U.S. and negative relationship with nominal effective exchange rate and the inflation rate.

Ralph and Eriki (2001) conducted a study on the performance of Nigeria stock market and found evidence of a negative relationship between stock market prices and inflation but stock prices is positively driven by Interest rate, Inflation, Exchange rate and the level of economic activity measured by GDP. This result was further confirmed by Udegbunam and Eriki (2001) on the Nigeria stock market.

Asaolu and Ogunmuyiwa (2010) investigate the impact of macroeconomic variables on Average Share Pricein Nigeria using various econometric techniques such as Augmented Dickey Fuller (ADF) test, Granger Causality test, Co-integration and Error Correction Methods which covered the period 1986- 2007. They found that all the macroeconomic variables have weak relationship with the share price though, a long run relationship was found between ASP and macroeconomic variables.

Olugbenga (2011) used the pooled or panel model to examine the impact of macroeconomic indicators such as money supply, interest rate, exchange rate, inflation rate, oil price and gross domestic product on stock prices in Nigeria. The result reveals that macroeconomic variables have varying significant impact on stock prices of individual firms in Nigeria.

Izedonmi and Abdullahi(2011) examines the impact of macroeconomic indicators such as Inflation, exchange rate and market capitalization using ordinary Least square method . The result reveals that there are no significant effects of those variables on stocks' return in Nigeria.

Osamwonyi and Evbayiro-Osagie (2012) in a study to determine the relationship between macroeconomic variables and the Nigerian capital market index used Vector Error Correction Model to ascertain the short-run dynamics as well as long-run relationship between the stock market index and the six selected macroeconomic variables which includes interest rates, inflation rates, exchange rates, fiscal deficit, GDP and money supply from 1975 to 2005. They document evidence of significant relationship between them and therefore recommend the adoption of appropriate economic policies which will be beneficial to the stock market.

In a related study, Asaolu and Ogunmuyiwa (2010) established a long run relationship between the average share price and macroeconomic variables in Nigeria but the Granger causality test did not confirm any relationship between the two. Other studies in Nigeria that established relatively insignificant relationship between stock market performance and the macroeconomic variables include Emenuga (1996), Nwokoma (2002).

The above review of related literature is an indication that there are varying results from different countries and even within Nigeria as suggested by different scholars on the relationship between stock market performance and various macroeconomic fundamentals. This may be as a result of the country`s financial structure, the efficiency of the countries specific stock market, theoretical or econometric approaches employed, the macroeconomic variables used or the type of data used (whether time series, cross-sectional or pooled). This study is therefore aimed at examining the extent to which interest rate, inflationary rate, foreign exchange rate, industrial output and real gross domestic product relate with the Nigerian Stock prices which the All Share Index is used as a proxy.

RESEARCH METHODOLOGY

Data Sources

The secondary data for this study is sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin of various issues, CBN Annual Report and Statement of Accounts, Nigerian Stock Exchange quarterly Bulletin and World Bank, World Development Indicators database. The period of coverage is from 1981 – 2014.

Model specification and Description of variables

The model for this study is based on the arbitration pricing model which assumes that stock returns can be explained by multiple risk factors. All share index of the Nigerian stock exchange is used to represent the stock price and interest rates, exchange rates, inflation rates, money supply, industrial output and real GDP is viewed as their associated risk factors. The Unrestricted VAR model of order one will be adopted and the dynamic properties of the VAR model will be explained with the use of impulse response function and variance decomposition applying the standard Choleski decomposition method. The choice of the selected macroeconomic variables is also to capture both monetary policy and real economic activity variables in Nigeria. Therefore, the functional relationship between stock market index and selected macroeconomic variables are expressed thus:

$$ASI = f(INT, EXR, INF, M2, IPI, LNGDP) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

The above model is represented in a linear form thus:

$$\mathrm{ASI}_t = \beta_0 + \beta_1 \mathrm{INT}_t + \beta_2 \mathrm{EXR}_t + \beta_3 \mathrm{INF}_t + \beta_4 \mathrm{M2}_t + \beta_5 \mathrm{IPI}_t + \beta_6 \mathrm{LNRGDP}_t + \mu_t \ldots\ldots (3.2)$$

Where: ASI = All share index of the Nigerian stock exchange

INT = Interest Rate proxy by Minimum Rediscount Risk (MRR)

EXR= Exchange Rate

INF = Inflation Rate proxy by consumer price index

M2 = Money Supply

IPI = Industrial Production Index

LNRGDP = Log of Real Gross Domestic Product

U_t= Error Term

$\beta_{1,}$……, β_6 =Coefficients

The model is summarized in the reduced-form VAR model as follows:

$$Y_t = \delta_0 + \sum_{i=1}^{n} \beta_i Y_{t-i} + \mu_t \quad \text{.....(3.3)}$$

Where; Y_t is a 6*1 vector of variables$(ASI, INT, EXR, INF, M2, IPI, LNGDP)$. All variables are in normal form. β_i are coefficient matrices of size 6×6 and u_t is the prediction error, δ_o is the intercept matrix of 6*1. The structural equation for the model is stated as follows:

The structural equation for the model is stated as follows:

$$\text{ASI}_t = \sigma_0 + \sigma_1\text{LNRGDP}_{t-1} + \sigma_2\text{INF}_{t-1} + \sigma_3\text{INT}_{t-1} + \sigma_4\text{EXR}_{t-1} + \sigma_5\text{M2}_{t-1} + \sigma_6\text{IPI}_{t-1} \text{..(3.3.1)}$$

$$\text{LNRGDP}_t = \lambda_0 + \lambda_1\text{INF}_{t-1} + \lambda_2\text{INT}_{t-1} + \lambda_3\text{ASI}_{t-1} + \lambda_4\text{EXR}_{t-1} + \lambda_5\text{M2}_{t-1} + \lambda_6\text{IPI}_{t-1} \text{...(3.3.2)}$$

$$\text{INF}_t = \pi_0 + \pi_1\text{LNRGDP}_{t-1} + \pi_2\text{INT}_{t-1} + \pi_3\text{EXR}_{t-1} + \pi_4\text{M2}_{t-1} + \pi_5\text{ASI}_{t-1} + \pi_6\text{IPI}_{t-1} \text{..(3.3.3)}$$

$$\text{INT}_t = \alpha_0 + \alpha_1\text{LNRGDP}_{t-1} + \alpha_2\text{INF}_{t-1} + \alpha_3\text{EXR}_{t-1} + \alpha_4\text{IPI}_{t-1} + \alpha_5\text{ASI}_{t-1} + \alpha_6\text{M2}_{t-1} \text{..(3.3.4)}$$

$$\text{M2}_t = \varphi_0 + \varphi_1\text{LNRGDP}_{t-1} + \varphi_2\text{INF}_{t-1} + \varphi_3\text{INT}_{t-1} + \varphi_4\text{EXR}_{t-1} + \varphi_5\text{IPI}_{t-1} + \varphi_6\text{ASI}_{t-1} \text{...(3.3.5)}$$

$$\text{EXR}_t = \phi_0 + \phi_1\text{LNRGDP}_{t-1} + \phi_2\text{INF}_{t-1} + \phi_3\text{INT}_{t-1} + \phi_4\text{M2}_{t-1} + \phi_5\text{IPI}_{t-1} + \phi_6\text{ASI}_{t-1} \text{.....(3.3.6)}$$

The results from the VAR test will be interpreted using the Impulse Response functions and the Variance Decompositions.

The unit root test is first conducted using Augmented Dickey-Fuller (ADF) to test for stationarity. This is necessary because the study was conducted with time series data which is prone to unit root problem. The study employed the Johansen cointegration test to establish whether the variables under investigation have a long-run equilibrium relationship (Johansen and Juselius ,1990). The data was analysed using the Ordinary Least Square (OLS) Method of regression to determine the impact of selected macroeconomic variables on stock market returns. Also Granger causality test was used to ascertain the direction of causality between all share index and the macroeconomic variables in use. We further extended the analysis of this study of stock market performance and macroeconomic variables in Nigeria by using the impulse response functions and the variance decomposition technique to investigate the dynamic effects of the selected macroeconomic variables on stock market (ASI) over the long period. Gujarati and Porter (2009) as cited in Ogbulu et al (2014) stressed that impulse respond function traces out

the response of the dependent variable in VAR system to shocks in the error terms both in the current and future periods.

EMPIRICAL RESULTS AND DISCUSSION

Following the standard procedure in time series analysis, we first test the presence of unit roots in the entire variables using the augmented Dickey-Fuller (ADF) test. The hypothesis is stated as follows: If the absolute value of the Augmented Dickey Fuller (ADF) test is greater than the critical value either at the 1%, 5% or 10% level of significance or/and if the probability value is less than 1%, 5% or 10%, then the variables are stationary either at order zero, one or two. The Augmented Dicky Fuller test equation is specified below as follows:

$$\Delta\widehat{u}_t = \beta\widehat{u}_{t-1} + \sum_{i=1}^{k}\Delta\widehat{u}_{t-1} + \varepsilon_t \quad \text{.. (4.1)}$$

Table 1: The Unit root test table

Augmented Dickey Fuller ADF test					
Variable	Level difference	Probability	First difference	probability	Order of integration
ASI	-3.081550	0.1272	-5.587791	0.0004	I(1)
INT	-2.898352	0.1759	-6.909933	0.0000	I(1)
EXR	-2.043455	0.5569	-4.708810	0.0035	I(1)
INF	-3.702667	0.0367	-5.205615	0.0010	I(1)
M2	-2.475387	0.3373	-5.289036	0.0008	I(1)
IPI	-2.096632	0.5280	-4.718727	0.0037	I(1)
LNRGDP	-2.001282	0.5792	-5.417385	0.0006	I(1)

The result of the augmented Dickey fuller (ADF) test is presented in table 1 above and the result indicate that all the variables are stationary at first differencing at 5% level of significance except for INF which is stationary at level. As a result we conducted a first difference test of INF which makes all the variables to be integrated of order one I(1). This fulfils the condition for testing for cointegration.

The idea behind cointegration is that a linear combination of two or more nonstationary series may be stationary if the variables were integrated of the same order. (Engle and Granger, 1987).

Table 2: Johanson Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.872452	218.7513	150.5585	0.0000
At most 1 *	0.795676	152.8550	117.7082	0.0001
At most 2 *	0.673552	102.0375	88.80380	0.0040
At most 3 *	0.645995	66.21397	63.87610	0.0314
At most 4	0.358314	32.98377	42.91525	0.3372
At most 5	0.328581	18.78677	25.87211	0.2935
At most 6	0.171986	6.039215	12.51798	0.4553

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

From the cointegration test in table 2 above, the trace likelihood ratio results point out that the null hypothesis of no cointegration among the variables is rejected in favour of the alternative hypothesis with four cointegrating equations at 5% significant level because their trace statistics values exceeded the critical values. This implies that a unique long-run relationship exists among the variables and the coefficients of estimated regression can be taken as equilibrium values. It can thus be stated that there exists stable long run relationship between the stock market index and the macroeconomic variables of interest. This result is consistent with similar results in the literature which establish long run equilibrium relationship between macroeconomic variables and stock market index. Such studies include Asaolu & Ogunmuyiwa(2011), Abraham (2012), Hsing (2013) and Ogbulu et al (2014).

This evidence of cointegration among the variables implied that at least one direction of influence could be established among the variables. We utilized the causality test procedure developed by Granger (1969) to determine the direction of causality. The result of the Granger causality tests obtained is shown in the table 3 below.

Table 3: The Pairwise Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
EXR does not Granger Cause ASI	32	7.41735	0.0027
ASI does not Granger Cause EXR		0.55697	0.5794
INF does not Granger Cause ASI	32	0.04485	0.9562
ASI does not Granger Cause INF		1.42329	0.2584

Table 3...

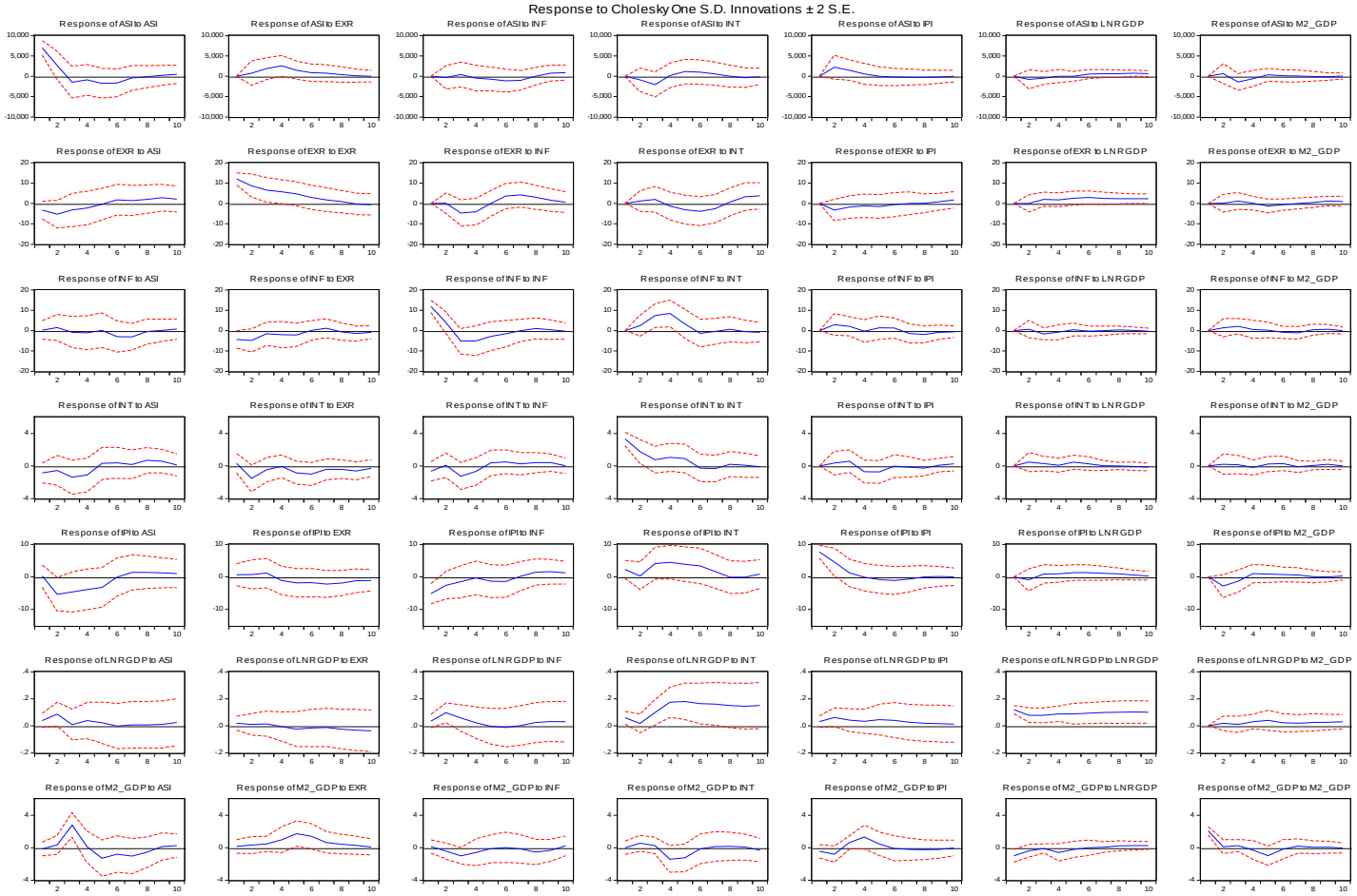
INT does not Granger Cause ASI	32	0.07419	0.9287
ASI does not Granger Cause INT		2.37230	0.1124
IPI does not Granger Cause ASI	32	5.15395	0.0127
ASI does not Granger Cause IPI		1.88600	0.1711
LNRGDP does not Granger Cause ASI	32	3.62106	0.0404
ASI does not Granger Cause LNRGDP		1.08477	0.3523
M2 does not Granger Cause ASI	32	0.02573	0.9746
ASI does not Granger Cause M2		10.8621	0.0003

The result of the causality test in table 3 above shows that at 5% level of significance, EXR granger causes ASI. This result shows a unidirectional causation running from EXR TO ASI. This finding corroborates the result of Asaolu & Ogunmuyiwa (2010).

The result also shows a uni-directional causality running from IPI and LNRGDP to ASI in the sample period. Similarly, the result shows a uni-directional causality existing from ASI to M2.These results are not surprising as they conform to economic theory and the findings of Hsing (2013) in a study of Slovakia's economy that there is positive relationship between Slovakia's stock market index and real GDP. Also in a study of USA, Fama (1981) established positive relationship between stock market returns and real economic activities such as industrial production and GNP. Furthermore, the result indicates that there are no causal relationships between INTand ASI and between INF and ASI respectively. The result of the Granger Causality test therefore implies that movement in stock prices can be explained by EXR, IPI and RGDP in the short run.

As we mentioned before now that the analyses of the dynamic properties of the VAR models, the variance decomposition and impulse response functions will be used. Figure 1 below displays the impulse responses of INT, INF, EXR, M2, RGDP IPI and ASI. The X-axis shows the time while the Y-axis shows the percentage variation in the dependent variable away from its base line level. The bold line in each graph is the estimated response while the dashed lines denote the one standard error confidence band around the estimate. There is no consensus on an explicit criterion for significance in a VAR framework. Sims (1987) however suggests that for impulse responses, significance can be crudely gauged by the how much the function moves away from zero, whilst Runkle (1987) suggests a probability range above 10 percent for variance decompositions.

Figure 1: Impulse response function



The impulse response graph in figure 1 above shows the response of macroeconomic variables to one standard deviation shock of ASI on the first column while the response of ASI to one standard deviation shock of macroeconomic variables is shown on the first row. Since our interest is to find out the impact of macroeconomic variables on ASI, we proceed to interpret only the first row of our impulse response function.

The response of ASI to one standard deviation to its own shock shows a positive but a fluctuating trend into the future up to the third year and after which it becomes negative and relatively stable up to the ninth year when it becomes positive again.

The impulse response of ASI to shocks coming from EXR shows a positive response and stabilizes along the horizon in the long run. The impulse response of the ASI to one standard deviation shock in INF is negative and stable in the short run but rises along the horizon and becomes positive in the long run. INT was negative in the first three years, becoming positive in the fourth to eighth year and reversing back to positive in the subsequent years. IPI was positive in the short run, becomes negative and stable in the long run. The

impulse response of ASI to shocks coming from RGDP shows a negative response in the short run and a positive and stable response in the long run. The impulse response function of the ASI to one standard deviation in M2 shock indicates a fluctuating trend from positive to negative both in the short run and in the long run.

Table 4: Variance decomposition test result of ASI

Period	S.E.	ASI	EXR	INF	INT	IPI	M2	LOG(RGDP)
1	6640.050	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	7768.572	82.94124	1.139118	4.08E-05	0.203581	11.58436	2.626970	1.504684
3	8181.785	75.48559	2.822928	0.021767	0.751784	15.94313	2.740680	2.234125
4	8449.790	72.57973	5.822358	0.021021	0.873033	15.03883	3.349551	2.315474
5	8754.016	67.86968	9.922409	0.133807	1.840988	14.62533	3.125736	2.482053
6	8975.480	65.03655	11.95359	1.191062	2.319906	13.96610	3.043036	2.489755
7	9142.759	63.35378	12.59741	2.677791	2.242659	13.47397	2.975627	2.678763
8	9256.001	62.13392	12.93717	2.877934	2.407507	13.33668	3.179539	3.127251
9	9348.307	60.95537	12.98621	3.009854	2.750792	13.28950	3.376548	3.631726
10	9414.811	60.11161	12.85229	3.595844	2.854330	13.10309	3.456407	4.026431

The result of the variance decomposition in table 4 above indicates that ASI own shock accounts for most of the variability over the periods, ranging between 100% in the short run to 60% in the long run. However, EXR and IPI show that some of the variability or the shock in ASI could be attributed to them, hence, they show increasing pattern from the first year; it ranges from 0% to 12% and from 0% to 13% in the tenth period respectively. Virtually all the variables accounts (though some to a negligible measure) for the shock in ASI. This means that macroeconomic variables actually accounts for the changes in ASI.

Table 5: Variance decomposition test result of IPI

Period	S.E.	ASI	EXR	INF	INT	IPI	M2	LOG(RGDP)
1	9.169102	2.676136	0.029984	18.65991	12.48345	66.15052	0.000000	0.000000
2	10.64535	9.102037	0.552817	16.29175	14.15335	59.59557	0.271883	0.032593
3	12.23031	21.87138	0.829509	12.34760	16.58874	45.98138	1.000777	1.380613
4	13.18996	23.95758	0.930605	10.98895	18.38292	41.90154	0.868869	2.969529
5	13.59706	24.65156	0.879699	11.00897	19.33705	39.70483	0.875462	3.542435
6	13.94165	24.62869	1.143430	12.39641	19.15645	37.82044	0.905077	3.949496
7	14.12489	24.54975	2.028419	12.15331	18.68699	36.92865	1.089632	4.563256

									Table 5...
8	14.34159	24.06105	3.055678	12.62665	18.20429	35.84991	1.281681	4.920738	
9	14.56942	23.38077	4.220722	13.54331	17.64610	34.74081	1.408474	5.059803	
10	14.79602	22.67174	5.607090	13.67972	17.73832	33.85461	1.384545	5.063970	

The variance decomposition of IPI depicts that most of the variabilities in IPI is explained by its own shock ranging from about 66% in the short run to 33% in the long run. However, ASI accounts also to a great changes in IPI. This is because it explained most of the shocks in IPI to the tune of 2% in the short run to about 22% in the long run. This is further strengthened by INT and INF which explained the variability in IPI to the tune of 17% and 13% in the long run. Whereas M2, EXR and LOG(RGDP) accounts for only a negligible proportion of the changes in IPI.

Table 7: Variance decomposition test result of M2

Period	S.E.	ASI	EXR	INF	INT	IPI	M2	LOG(RGDP)
1	280877.7	0.000448	0.055852	11.32722	7.249188	0.151351	81.21594	0.000000
2	486152.4	32.19307	0.018645	11.07965	3.015620	0.109707	51.24398	2.339325
3	707122.5	45.93250	0.095043	8.034648	1.584431	1.724216	40.26898	2.360185
4	930474.1	50.93581	0.184359	6.367513	1.008072	5.659657	32.79644	3.048142
5	1100564.	51.68136	0.970489	6.174702	0.817500	7.647045	29.06207	3.646832
6	1252198.	51.49798	2.627874	6.383242	0.632522	8.221871	26.97912	3.657393
7	1402572.	50.39874	5.156732	6.006409	0.529547	8.563586	25.80986	3.535128
8	1541991.	48.82057	8.209436	5.219551	0.509588	8.826905	25.04051	3.373441
9	1671559.	47.25047	11.44806	4.515874	0.485521	8.841589	24.35530	3.103190
10	1797304.	45.79492	14.75572	3.994349	0.423950	8.659114	23.59001	2.781942

The variance decomposition of M2 reveals that M2 could only account for the variability in itself in the short-run whereas in the long run, most of the shocks in M2 is explained by ASI. The result shows that the variability in M2 is explained by M2 to the tune of 81% in the short run with a decreasing trend into the long run and ASI explained more of the shocks in M2 in the long run than the variable itself. This could be as a result of high demand of share by the government when the share price index is very low. Although EXR, IPI and Log(RGDP) explained up to 14%, 8% and 2% respectively of the variability in M2 but the major one especially in the long run is ASI.

CONCLUSION AND POLICY IMPLICATIONS

This study aims at determining the impact of macroeconomic variables on Nigeria stock market performance. The APT model was employed which assumes that stock returns can be explained by multiple risk factors. Stock market price was proxy by ASI while the macroeconomic variables considered are EXR, INF, INT, IPI, LNRGDP and M2. The choice of these selected macroeconomic variables is to capture both monetary policy and real economic activity variables in Nigeria. Various robust econometric techniques were employed which includes the Unit root test, cointegration test, Causality test, OLS method, impulse response and variance decomposition. The result of the Johansen cointegration test reveals that there is a stable long-run equilibrium relation between ASI and the selected macroeconomic variables. Also the result of the Granger causality test shows that whereas there is uni-directional causality running from EXR to ASI, IPI to ASI, LNRGDP to ASI and ASI to M2 respectively, there is no causality running from INT to ASI and INF to ASI respectively. It could be reduced from the former that these macroeconomic variables are very important for stock market performance in Nigeria. The regression result further reveals that the sign of all the variables conform to economic theory, however only INT and RGDP contribute significantly to stock market performance in Nigeria. The results of the variance decomposition of ASI to shocks arising from INT, INF, EXR, M2, RGDP and IPI show that ASI own shocks accounts for most of the variability in the forecast error of the variables.

The major policy implication of the above findings is that macroeconomic policies can impact the Nigeria stock market. Consequently, stock prices and returns can be predicted via changes in some macroeconomic performance. To this effect, to maintain a healthy stock market, government should pursue economic growth through formulating effective economic policies which would lead to the increase in the demand for stocks because of the potential for higher profits. Furthermore through the adoption of an effective monetary policy, Government should also pursue a lower real interest rate which would encourage investment, boost productivity of capital and Federal Reserve policies and also affects both the future cash flow of firms and discount rate.

Meanwhile, this study like every other research work is not exhaustive in itself. This means that there is provision for further study on the factors that impact on Stock Market Performance other than macroeconomic variables such as the level of efficiency in financial market, their performance level, political instability among other factors. Moreover, the Stock Market Performance could be proxied by other parameters such as Share Prices and Share Dividend Payoff. These could be considered in further research work on this area.

REFERENCES

Abraham T. W. (2012). “Stock Market Reaction to Selected Macroeconomic Variables in the Nigerian Economy”.CBN Journal of Applied Statistics Vol. 2 No.1

Ajao, M. G. and Oseyomon, E. P. (2010). “The Predictive Content of Some Leading Economic Indicators on Stock Prices”.Journal of Research in National Development.Vol. 8, no.1

Akinnifesi, O.E (1987). “The Role and Performance of the capital market”: Economic Development in Nigeria”.Journal of Nigeria Institute of Social and Economic Research.Vol. 6.

Aldin, M., Dehnavi, D. and Entezari, S. (2012).“Evaluating the Employment of Technical Indicators in Predicting Stock Price Index Variations Using Artificial Neural Networks (Case Study: Tehran Stock Exchange)”.International Journal of Business and Management; 7, (15).

Alile, H. I. (1984): “The Nigerian Stock Exchange: Historical Perspective, Operations and Contributions to Economic Development” Central Bank of Nigeria Bullion,Silver Jubilee edition vol. II pp. 65-69.

Amadi, S. N., Odubo, T. D. (2002). “Macroeconomic Variables and Stock Prices: Causality Analysis”.The Nigeria Journal of Economicand Management Studies, 4(1 and 2): 29-41

Asaolu, T.O. and Ogunmuyiwa, M.S. (2010), “An Econometric Analysis of the Impact of Macro-Economic Variables on Stock Market Movement in Nigeria”.Asian Journal of Business Management 3(1) 72-78

Barbić, T. and Čondić-Jurkići, I. (2011). “Relationship between Macroeconomic Fundamentals and Stock Market Indices in Selected CEE Countries”. EKONOMSKI PREGLED, 62 (3-4) 113-133.

Chandra, P. (2004). Investment Analysis and Portfolio Management. New Delhi: McGraw-Hill.

Chen, N. (1991). “Financial Investment Opportunities and the Macro Economy”.Journal of Finance, 46(2): 529-554.

Chen, N.F., Roll, R., Ross, S.A. (1986). “Economic Forces and the Stock Market”.Journal of Business, (59), 3: 383-403.

Emenuga, C. (1996), “Macroeconomic Factors and Returns on Equities: Evidence from the Nigerian Capital Market” in S. Mensah (Massachusetts:Rector Press): 86- 96.

Engle, R.F., Granger, C.W.J. (1987). “Cointegration and Error-Correction: Representation, Estimation, and Testing”, Econometrica, (55), 2: 251-276.

Fama, E.F. (1981). “Stock Returns, Real Activity, Inflation, and Money”.American Economic Review, (71), 4: 545-565.

Fama, E. F. (1990). “Stock Returns, Expected Returns, and Real Activity”.The Journal of Finance, (45), 4: 1089-1108.

Fama, E.F and Schwert, G.W. (1977) “Asset returns and Inflation”. Journal of Financial Economics Vol. 5 pg. 115-146.

Fung, H.G. and C.J. Lie, (1990). Stock Market and Economic Activities: A Causal Analysis. Pacific Basin Capital Markets Research, Amsterdam

Granger, C. (1986). “Developments in the Study of Cointegrated Economic Variables“, Oxford Bulletin of Economics and Statistics, (48), 3: 213-228.

Granger; C.W.J (1969).“Some recent developments in a concept of causality”. Journal of Econometrics, Vol. 39, pp: 199-211.

Hamao, Y. (1988). “An Empirical Examination of the Arbitrage Pricing Theory: Using Japanese Data”.Japan and the World Economy Vol. 1.pg 45-61.

Hsing Y. (2013). “Effects of Fiscal Policy and Monetary Policy on the Stock Market in Poland”, Economies, Vol. 1.19-25

Izedonmi, F and Abdullahi, B.(2011), “The Effects of Macroeconomic Factors on the Nigerian Stock Returns: A Sectoral Approach”.Global Journal of Management and Business Research, 11 (7).

Johansen, S., Juselius, K. (1990). “Maximum Likelihood Estimation and Inference on Cointegration – With Application to the Demand for Money”.Oxford Bulletin of Economics and Statistics, (52): 169-210.

Maysami, R. C., Howe, L. C., Hamzah, M. A. (2004). “Relationship between Macroeconomic Variables and Stock Market Indices: Cointegration Evidence from Stock Exchange of Singapore’s All-Sector Indices”.Journal Pengurusan, 24, pp. 47–77.

Meristem Securities Limited (2008). “The Nigerian Stock Market in 2007: Review and Prospects”. www.meristemng.com Retrieved 18th November, 2009

Nasseh, A., Strauss, J. (2000). “Stock Prices and Domestic and International Macroeconomic Activity: A Cointegration Approach”.The Quarterly Review ofEconomics and Finance, (40), 2: 229-245.

Nnamocha, P.N. and Nwobi, (2001). “Share Prices As an Indicator of Economic Growth and Political Stability”.Journal of Business and Finance, Imo State University, Owerri Vol. (4): 45-48

Nwokoma, N.I. (2002). “Stock Market Performance and Macroeconomic Indicators Nexus in Nigeria: An Empirical Investigation”.Nigerian Journal of Economic and Social Studies, Vol.44 (2): 231-251.

Ogbulu, O.M. (2009). “Capital Market Development and Economic Growth in Nigeria: Application of Cointegration and Causality Tests”.Journal of Finance, Banking & Investment,Abia State University, Uturu. Vol.3, No.1, April, 1-19

Ogbulu, O. M., Abanewe, Z. C., Nnamocha, P. N. (2014). “Stock Market Price Behavior and Macroeconomic Variables in Nigeria: An Error Correction Analysis”. International Journal of Financial Economics Vol. 2, No. 2, 58-72

Olugbenga A. A(2011).“The Impact of Macroeconomic Indicators on Stock Prices in Nigeria”. Developing Country Studies www.iiste.org, I 1(2).

Osamwonyi, I. O. (2003).Forecasting as a Tool for Securities Analysis.A Paper Presented at a Three-day Workshopon Introduction to Securities Analysis, Organized by Securities and Exchange Commission, Lagos August 17th.

Osamwonyi, I. O. and Evbayiro-Osagie E. I. (2012). “The Relationship between Macroeconomic Variables and Stock Market Index in Nigeria”.Journal of Economics, 3(1): 55-63

Osuagwu, E.S. (2009). “The Effect of Monetary Policy on Stock Market Performance in Nigeria”, 2010 (http://www.unilag.edu.ng/publication/opendoc.php?sno=15495&doctype=doc&docname=$) accessed on 12th July, 2014.

Ralph, I. U., & Eriki, P. O. (2001).“Inflation and Stock Price Behavior: Evidence from Nigerian Stock Market”. Journal of Financial Management and Analysis, 14, 1-10.

Ross, S.E (1976).“The Arbitrage Theory of Capital Asset Pricing”. Journal of Economic Theory.Vol. 13 pg. 341-360.

Rozeff, M.S. (1994). “Money and Stock Prices”.Journal of Financial Economics, 65-89.

Runkle, David E. (1987) "Vector autoregressions and reality," Journal of Business and Economic Statistics, 5:437-454.

Saeed, S and Akhter, N. (2012).“Impact of Macroeconomic Factors on Banking Index in Pakistan”. Interdisciplinary Journal of Contemporary Research in Business Institute Of Interdisciplinary Business Research, (4)6.

Schwert, W. (1990). “Stock Returns and Real Activity: A Century of Evidence”, Journal of Finance, (45), 4: 1237-1257.

Udegbunam, Ralph I. and P. O. Eriki (2001).“Inflation and Stock Price Behavior: Evidence from Nigerian Stock Market”. Journal of Financial Management and Analysis, XX (14) (1): 1-10.