Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.3, No.10, 2012

DOES MACRO ECONOMIC VARIABLES HAVE EFFECT ON STOCK MARKET MOVEMENT IN NIGERIA?

Onasanya, Olanrewaju. K and *Femi J. Ayoola
*Correspondence Address: Department of Statistics, University of Ibadan, Nigeria.
Correspondence emails : onasanyaolarewaju1980@yahoo.com, ayoolafemi@yahoo.com

Abstract

Over the past decades, numerous studies have analyzed the relationship and the different results obtained from these studies have motivated further research. The relationship between Average share price and macro – economic variable has been well documented for the developed markets. However, this paper seeks to address the question of whether macro – economic variables have a significant with stock market movement using time series annual data for the period from 1985 – 2008. The selected macro – economic variables for study include external debt, inflation rate, real interest rate, investment, and exchange rate. The research entails the use of Argumented Dickey Fuller test, multivariate cointegration test, vector error correction, variance decomposition and causality analysis. The result was that all the variables were stationary at 2nd difference, four cointegrating equations were present i.e. long run relationship exists between the selected macro –economic variable and average share price. All macro – economic variables were insignificant but all negative relationship with ASP but only External debt was significant related to ASP. ASP and External debt were found to granger cause in pairs while an independent causality exists between the selected macro – economic variable and ASP. These show that ASP is not a leading indicator for the selected macro – economic variable.

Keywords: Macro-economic, Stock market, Inflation rate, multivariate cointegration test, External debt

1.0 Introduction

For many years, the following questions have been a source of continuing controversy in both academic and business cycles: To what extent are macro- economic variables do have significant on stock market movement. Answers to this question have been provided on the one hand by various econometrics / time series techniques and other chartist theories to look at the closure relationship. As it is known stock market is a very fantastic indicator in financial intermediation in both countries that are yet to developed and developed countries. Stock market tries to channels funds from surplus to deficit units in an economic. As an economy of a nation develops more stocks of supply and assets are needed to meet a speed reaction to expansion. Stock market is a public entity or a loose network of economic transactions for the trading of shares and derivatives at an agreed price. These rightly so called indicator " stock market " serves as a movement and sectioning savings among competing uses which are essential to the growth and working productivity to save money and effort of a nation economy(Alilie,1984) through organization of stock of supply. However, Stock market enhances economic growth by providing a broad road to large and long term capital through issuing of shares and other equities for industries in need of finance to expantiate on business. Thus the overall development of an economy depends or is a function of how performance the stock market is and evidence or proves as shown that capital market been is synonymous to economic growth. While countries that have been developed have been exploring the mobilization of resources through capital market, the developing countries are yet to take a position of raising funds through capital market.

Now during the introduction of SAP(structural Adjustment Programme in Nigeria, the capital market was not functioning very fluently, some few business tycoons only invested in the capital market as a result of poor awareness. But since the deregulation of the economy in 1986, the stock market has grown very significant, Thus shows a feeling of uncertainty or disbelief that a relationship exist between stock market development and growth of economy and generally stock price are believed to be determined by some macro- economic variables such as external debts, inflation rate, money supply unemployment, gdp. Proves as shows that variations in stock price are linked with macro-economic variables behavior (Mukhopadhyay and Sakar, 2003). The questions here how are macro- economic variables and to what degree do they affect changes in stock market indices in a developing country like Nigeria. This research tries to answer to this question by properly examining the relationship between stock market indices and some selected macro- economic variables (External debt, inflation rate, exchange rate, investment, real interest rate) using time series from 1985 to 2008 which captures the SAP and the AFEM regime through the uses of time series techniques such as unit root cointegration analysis, vector error correction model, variance decomposition and impulse response function analysis. The structure of this research work is sections as, section

2 discuss the literature review, section 3 describes the sources of data and the methodology adopted, section 4 describes the results and discussion, while the last describes the conclusion and the references.

2.0 Literature Review

The relationships between the stock market movement and macro-economic variable have been in existence over the series of decades back. One way of addressing the relationship between macro- economic variables and stock market indices is by arbitrage price theory (APT) which was developed by Ross (1976). The APT essentially seek to measure the risk which is been attached to some various factors that has influence on asset returns. Most recently now, Granger(1986) and Johansen and Juselious(1990) proposed to determine the existence of long term equilibrium among selected variables through cointegration analysis which is now well spread time series techniques or approach to examining the economic shock market relationship. Exploring this methodology, a growing literature has been developed. Like Andress & Macmillan(2009) which they both compare US and Japan whether macro-economic variables can explain long term stock market movement in both countries using four different macro-economic variable(industrial production, consumer price index, money supply), in each of the two countries using cointegration analysis. Their findings was that in US, a singleton of cointegrating vector was established and stock price has a positive relationship to industrial production and negatively related to consumer price index and long term interest rate. They presented that an insignificant but positive relationship between the US stock price and the money supply exists, however for Japanese, they found out that two cointegrating vector were present and stock price were influenced positively by industrial production and negatively by money supply, while the second cointegrating vector were found to be industrial production to be negatively influenced by the consumer price index and long term interest rate. Chungs (2001) investigated whether economics activities in Korea can explains stock market returns using cointegration test and Granger causality from a vector error correction model. His finding reveals that Korean stock market reflects macro-economic variables on stock market indices. He reveals also that cointegration tests and the vector error correction model illustrates that stock market indices are cointegrated with set of macro-economic variables which are production index, exchange rate, trade balance, money supply and model provides a direct long run equilibrium relationship between macro-economic variable and stock market indices. His findings still reveals that stock prices indices are not a leading indicator for economic variable. David Dickson (2010), investigate stock market integration and macro-economic fundamentals using time series data from 1980 – 1995 using output, inflation rate, interest rates as significant determinant of stock market movements. He reveals that a strong significant relationship exists between selected economic variables.

A comprehensive study on the relationship between macro-economic variables and stock market movement was conducted by Fabio (2002), investigation was carried out to identify macro-economic factors that influences Italian equities return and test the stability of their relation with securities returns. His findings were that stock returns and the macro-economic variable factor were found to be unstable. Pointing out that factors loading of individual securities were virtually uncorrelated overtime but a high percentage of shares experience a reversal of the sign of the estimated loadings. Gan et.al. (2006) investigate the relationship between New Zealand stock market index and series of macro-economic variable from 1990 to 2003 using cointegration approach and granger causality. The test reveals that there exist a long run relationship between the New Zealand stock market index and the macro variables selected. From their results also reveals that the stock market indices is not a leading instrument for changes in macro-economic variables.

In Africa research on the relationship between macro-economic variable and stock market indices was conducted by Kyereboah – Coleman and Agyire Tetley (2008) investigate the impact of macro-economic indicators on Ghana stock market that leading rates from deposit money bank have adverse effect on stock market return. Also a wonderful literature review on the impact of macro-economic variable on stock price indices was conducted by Mads(2002) investigates the relationship between stock price, asset portfolios and macro-economics in ten Europe countries. His research findings reveals that employment, imports, inflation and interest rate are inversely related to stock price, while future real activity, measures of money and the U.S yield curve were positively related to stock price. He reveals

that the association between stock price and macro-economic variables are shown to be strongest in Germany, Netherlands, Switzerland and United Kingdom.

Another comprehensive study of the relationship between macro-economic variable and stock indices was carried out by Prahan Wongbangpo and Subhash Sharma(2001) investigates stock market and macro-economic fundamental interactions in five different Asian countries (Indonesia, Malaysia, Philippine, Sias, and Thailand) using five different macro-economic variables (GNP, consumer price index, money supply, interest rate and exchange rate. Their findings reveal that long term and short term relationship exist between stock price and the selected macro-economic variables, and each of the macro-economy variables in each country were caused and are caused by stock price in Granger causality sense.

Ramin & Hamzah (2005) investigated the relationship between macro-economic variable and stock market indices of Singapore using evidence from cointegration techniques. Their studies concludes that Singapore stock market index and the property index forms a cointegration relationship with changes in the short run and long term interest rates, industrial production, price levels, exchange rate and money supply.

Investigation from Europe on relationship between macro-economic variables and stock market indices was carried out by Walter (2002) who investigated the effect of unexpected variations in many macro-economic variables on aggregate stock price indices are evaluated from Great Britain, West Germany and Switzerland using quarterly data. Founds out that the effect of macro-economic views are either very small obscured by a low signal to noise ratio.

3.0 Data Source

In carrying out this research, a time series data on average share price index was collected from the Nigeria stock exchange which spins from manufacturing, insurance, banking, services companies for the period of 1985 to 2008. The macro – economic agents used are the external debt, inflation rate, investment, exchange rate, interest rate. Investment which means the ratio of total investment in Nigeria current local currency and GDP in current local currency, it is also measure as the total value of the gross fixed capital information was collected or sited fromwww.indexmundi.com/nigeria/investment_(gross_fixed).html for the period of 1985 to 2008. The inflation rate, which furnishes the annual percentage change in consumer, compared with previous year's consumer or simple means the average consumer price indexwassitedfromwww.indexmundi/nigeria/inflation_rate_(consumer_prices).html for the period of 1985 to 2008.

The external debt, this gives the Nigeria public debts and private debt owed to non –respondents repayable in foreign currency, goods, and service and this is calculated on exchange rate basis was sourced from statistical Bulletin, economic and financial review and annual reports and statement of accounts of the central bank of Nigeria (2009). The real Interest rate is the leading rate adjusted for inflation as measured by the GDP deflator was obtained from World Bank data baseatwww.data.worldbank.org/indicator/FR.INR.RINR for the period of 1985 to 2008 while exchange rate is the exchange rate of local currency against the value of foreign currency was obtained from central bank statistical bulletin (2009).

3.1 Research Methodology

The main objective of this study is how macro- economic variable affects stock market movement and to what extent or proportion will be explained when there is a shock of error in each macro-economic variable on stock price indices and response of average share price to shocks of error in present time and future time period. This research encompasses the use of causality relationship, impulse response function analysis, and variance decomposition to study the above aims. While other time series approach such as unit root, multivariate cointegration test and vector error correction mechanism to study the short run and long run relationship that exist between the macro –economic variable and stock market movement.

In other not to have a spurious regression which may arise as a result of carrying out regression on time series data, we first subject each variables to unit root testing by encompassing the Argumented Dickey Fuller (1979)(ADF) in the presence of serial correlation and Phillip Perron test in purpose to control of serial correlation by using non – parametric statistical $_m$ methods. The model for ADF test is as follows: $\Delta y_t = B_1 + B_2 t + \delta y_{t-1} + \sum_{i=1} \alpha_i \Delta y_{t-i} + \varepsilon_t \ldots\ldots eq(1)$ Where Δy_t = the first difference of series interested. B_1 = constant term parameter, B_2 = deterministic term parameter, δ = drift term,

α_i = coefficient associated to each of the first difference of lagged series, and ε_t is the residual error.

The Eq (1) above is described as ADF test around a constant and deterministic term trend. The null hypothesis is stated as

$H_0 : \delta = 0$(unit root around a deterministic trend) *vs* $H_1 : \delta < 0$(presence of no unit root. i.e stationary)

The above null hypothesis is not rejected when the absolute value of ADF test statistic is less than the MacKinnon critical values; hence otherwise we reject the null hypothesis and conclude that the series interested is stationary.

The model for Phillip Perron test is described below:

$$\Delta y_t = \alpha + \psi T + (1 - B) y_{t-1} + \varepsilon_t .....eq(2)$$

Where Δy_t = the first difference of series interested, T = time trend, y_{t-1} = one lagged period of series interested, ε_t is the residual error and (1-B) = δ = drift term.

The null hypothesis is stated as:

H_0 : series is not stationary *vs* H_1 : series is stationary

The above null hypothesis is rejected when the absolute test statistic is greater than the MacKinnon critical value or hence otherwise is not rejected. The main reason of subjecting each of the variables is to determine the level of integrating order for the purpose to establish a long run relationship among them through the use of cointegration test technique.

3.2 Long Run Relationship

Having subjecting each of the variables to unit root test and confirmed that each of the series are having the same level of integrating order the next is to find the long run relationship i.e. cointegration test. The cointegration test was first proposed by Engle and Granger and using the two step procedure. The cointegrating regression of this research is given as:

$$ASP = C + B_0ED + B_1IF + B_2ER + B_3IV + B_4IR + \varepsilon_t .....eq(3)$$

Where ED = External debt, IF = Inflation rate, ER = Exchange rate, IV = Investment, IR =Real interest rate and ASP = Average share price and ε_t = residual error.

From Eq (3) we have many variables, Johansen (1998) and Johansen and Juselius (1990) have adopted methods for multivariate cointegration test. They developed a maximum likelihood procedure on the cointegrating vector and testing procedures for restriction on the cointegrating parameters for each set of variables. Two statistics were used to identify the number of cointegrating vector namely “trace test and the maximum Eigen value test”. The trace test statistics test that null hypothesis “that the number of cointegrating equilibrium is less than or equal to “r” against the alternative hypothesis that more than “r” cointegrating equilibrium, and which is define as:

$\lambda_{trace}(r) = -k \sum_{j=r+1}^{s} \ln(1 - \hat{\lambda}_j)$, where λ_j = is the Eigen value, k = total no of observation.

The null hypothesis for Eigen value test is almost "r" cointegrating vector is tested against "r+1" cointegrating vector which is given by: $\lambda_{\max}(r, r+1) = -k \ln\left(\hat{\lambda}_{r+1}\right)$.

Using the method described above, we apply it to Eq (3) to determine the number of cointegrating vector.

3.3 Short Run Relationship

Having done the long run relationship and confirm that long run relationship exist and likewise all the series are all integrated of the same order, the next step is to search for short run relationship which is carried out by vector error correction mechanism (VECM). This method was first introduced by Sargan and later popularized by Engle and Granger and stated that if two or more variables are cointegrated of the same order, then there order of relationship is justified by vector error correction. This method is not ideal for correction of error in a model but to look at the short run disequilibrium.

The model of VECM in this research is described as:

$$\Delta ASP = \Pi_1 ASP_{t-1} + \Pi_2 ED_{t-1} + \Pi_3 IF_{t-1} + \Pi_4 ER_{t-1} + \Pi_5 IV_{t-1} + \Pi_6 IR_{t-1} + \sum_{i=1}^{k} B_i \Delta ED_{t-i} + \sum_{i=1}^{k} \theta_i \Delta IF_{t-i} + \sum_{i=1}^{k} \omega_i \Delta ER_{t-i} + \sum_{i=1}^{k} \eta_i \Delta IV_{t-i} + \sum_{i=1}^{k} \gamma_i \Delta IR_{t-i} + Bx_t + \varepsilon_i \ldots\ldots\ldots$$

Where Δ is the difference operator, $B_i, \theta_i, \omega_i, \eta_i, \gamma_i$, where $i = (1, 2, \ldots\ldots k)$ are the coefficient of each of the macro – economic variables containing information about the short run relationship of the variables, and B contains the deterministic components, $p_i = \prod_i = \alpha\beta'$, where α and β are $(n \times r)$ adjustment and cointegrating matrices respectively. And $p_i = \Pi_i$ is the coefficient of the vector error correction. All the signs of the coefficient value of each macro –economic variable on the right hand side are expected to be negative while the dependent variable (average share price) is a stochastic variable; its sign need not to be negative. The estimation of VECM is done when number of cointegrating vector is established. The optimal lad length (k) of the VECM is determined by the smallest AIC (Alkaike information criteria) and SIC (Schwartz information criteria) which aids the best VECM model to illustrate the short run dynamic.

Having done the existence of the short run dynamic, the next step is to determine the response of average share price to error term in the current time period and in the future time period when there is a shift in one standard deviation, and the proportion explained by the shocks on each variable to average share price and to one another. And these are accomplished by introducing the impulse response function and variance decomposition.

3.4 Stability Analysis/Causality

For solution to the research question to be feasible, a stability analysis was carried out and which is the causality test to study the direction of causality between the average share price and macro-economic variables. The causality test was first proposed by Granger (1969) which aims to know whether some lagged values of variables will explain or predict

dependent variable and later reframed by Toda and Yamamoto which employs the use of Argumented level VAR (vector auto-regression model) with integrated and cointegrated processes using a modified WALD test for restrictions on the parameter of the VAR (p) model. So this method is adopted.

The test procedure for causality based on Toda and Yamamoto is illustrated in the VAR (p)

model $$\begin{bmatrix} ASP \\ ED \\ IF \\ ER \\ IV \\ IR \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \\ \alpha_6 \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \theta_{1i} & \psi_{1i} & \eta_{1i} & \gamma_{1i} & \beta_{1i} & \omega_{1i} \\ \theta_{2i} & \psi_{2i} & \eta_{2i} & \gamma_{2i} & \beta_{2i} & \omega_{2i} \\ \theta_{3i} & \psi_{3i} & \eta_{3i} & \gamma_{3i} & \beta_{3i} & \omega_{3i} \\ \theta_{4i} & \psi_{4i} & \eta_{4i} & \gamma_{4i} & \beta_{4i} & \omega_{4i} \\ \theta_{5i} & \psi_{5i} & \eta_{5i} & \gamma_{5i} & \beta_{5i} & \omega_{5i} \\ \theta_{6i} & \psi_{6i} & \eta_{6i} & \gamma_{6i} & \beta_{6i} & \omega_{6i} \end{bmatrix} \begin{bmatrix} ASP_{t-i} \\ ED_{t-i} \\ IF_{t-i} \\ ER_{t-i} \\ IV_{t-i} \\ IR_{t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \\ \varepsilon_{6t} \end{bmatrix} \quad \ldots\ldots\ldots\ldots eq\,(5)$$

Where ASP = Average share price, ED = external Debt, IF = inflation rate, ER = Exchange rate, IV = Investment, IR = Interest rate. Where $\alpha_1, \alpha_2\alpha_3\alpha_4\alpha_5\alpha_6$ the constant terms in the VAR (p) model are, $\theta_s', \psi_s', \eta_s', \gamma_s', \beta_s'$ and ω_s' are the coefficients of ASP, ED, IF, ER, IV, IR respectively, and $\varepsilon_{1t}, \varepsilon_{2t}\varepsilon_{3t}\varepsilon_{4t}\varepsilon_{5t}\varepsilon_{6t}$ are the error term that are assumed to be white noise. Eq(5) postulate that current ASP IS expressed as a linear combination of the lagged of its self and lagged of all macro-economic variables (ED, IF, ER, IV, IR). A unidirectional causality exist from ASP to each of the ED, IF, ER, IV, and IR, if the coefficient of ASP is not statistically significant but in each of the coefficient of the macro-economic variable are statistically significant. A feedback causality exist if both coefficient of ASP and coefficient of each of the macro-economic variables are both statistically significant while an independent causality exist when the coefficient of ASP and coefficient of each of the macro-economic variables are not statistically significant. A statistical significant test on the coefficient of all the variables will be base on the use of Wald test to the first P VAR coefficient matrix to make Granger cause inference. In summary, the null hypothesis can be drawn as "ED, IF, ER, IV, and IR" does not granger cause "average share price" if $\theta_{1i} = 0, \psi_{1i} = 0, \eta_{1i} = 0, \gamma_{1i} = 0, \beta_{1i} = 0, \omega_{1i} = 0$ respectively against the alternative hypothesis "ED, IF, ER, IV, IR" does granger cause ASP if $\theta_{1i} \neq 0, \psi_{1i} \neq 0, \eta_{1i} \neq 0, \gamma_{1i} \neq 0, \beta_{1i} \neq 0, \omega_{1i} \neq 0$ respectively.

4.0 Discussion

To avoid spurious regression from the time series data, we subjected each of the variables to unit root test using both ADF test and Phillip Perron test to check for Stationarity. Table 1 show that all the variables were not stationary at level form and at their first differences, but at second differences all the variables were all stationary indicating here that they are all integrated of order 2 i.e. I(2). This is in confinement with other researches concerning economic variables, that economic variables are stationary at either at first or at their second differences. Since all the variables were all stationary at second difference, we performed the Johansen multivariate cointegration test to examine the existence of long run equilibrium. Table 2 shows that 0, 1, 2, and 3 cointegrating equations were rejected at 1%, and 5% level of

significance but not rejected at 4 cointegrating equation because the likelihood ratio test for each of the hypothesized 0, 1, 2, and 3 cointegrating equations were greater than the critical value at 1%, and 5% while the likelihood ratio test of 4 cointegrating equation was not greater than the critical value at 1% and 5%. This indicates that long run relationship exist between the ASP and the selected macro – economic variables and four cointegrating vector were present. From the first normalized cointegration equation from table 3 reveals that only four variable (ED, IF, IR, and IV) are statistically significant and positive relationship exists in the long run relationship on ASP while ER is also statistically significant but not negative relationship on ASP. The second cointegration equation reveals that positive and statistically significant relationship exist between ED and (IF, IR, and IV) in the long run, while a negative and statistical relationship exist between ED and ER. Further at 3 cointegration equation, result reveals that negative and statistical significant relationship exist between ER and (IF, IR, and IV). At 4 cointegration equation, shows that investment has a positive but not statistically significant related to inflation rate but interest rate has a positive and statistically significant related to inflation rate.

From the result on VECM, in short run, table 4 shows that the coefficients of the lagged value of each of the macro- economic variables were all negative, indicating that information is contained about the short run dynamic in the macro- economic variables. The coefficient of the error in the model has the expected sign (-0.00728). This sign indicates that the average share price will converge to its long run equilibrium when there is shock in between all the macro – economic variables, this also means that the error will continue to be corrected in the long run or at about 0.7%, the error will be corrected in the next period. The vecm result still reveals that only external debt is statistically significant and negative related to ASP in the short run while others were statistically insignificant and negative related to ASP. The VECM result in table 4 was estimated at lag 1 because it was selected based on the smallest selection criteria of AIC and SIC.

The response of dependent variable of the shocks of error is very essential or the available information provided or explained by each variable depending on the shocks of error in time forecast horizon is very essential. Table 5 shows the result of the variance decomposition i.e. the proportion explained to shocks of each variable in time horizon of five periods. For shocks of ED, a proportion of 51.4% was explained in the first time period and it was decreased by 37.5% in the second time period and continually increasing for the rest of the periods, thereby indicating that a significant effect exist between ED and ASP which was justify by VECM analysis on table 4. Also concerning on the shocks of ER, a start slow value of about 5.1% was explained in the first time period and later picked up in the second, third, fourth time period which indicates that also that exchange rate has a significant effect on average share price. Shocks of Inflation rate is not left out, decrease from 1-4th time period was shown, and these indicates that IF does not have significant effect on ASP. Shocks of both IR and IV indicate that both contribute little percentage proportion from first time period up till 5th time period, indicating that both do not have significant effect on ASP.

From the causality analysis, table 6 displays the causality between ASP and (ED, ER, IF, IR, and IV). Under the null hypothesis of (ASP does not granger cause ED and vice - versa are rejected because the p – value at both hypothesis are less than 0.05 level of significance, hence indicating that a feedback causality exist between ED and ASP, that is external debt can be used as instrument in predicting ASP. Likewise also, a unidirectional causality exist between ER and ASP, since the null hypothesis of "ASP does not granger cause ER" was rejected because the P –value of the hypothesis was less than 5% level of significance and that ASP granger cause ER but the reverse was the case of the other hypothesis (ER does not granger cause ASP). But while other null hypothesis were not all rejected which indicates that ASP is not a leading indicator for other macro – economic variables and while other macro – economic variable do not predict ASP which is in conferment with other researches.

5. 0 Conclusion

In this study, the relationship between macro- economic variable and stock market movement in Nigeria is examined using time series data from the period 1985- 2008. The five macro – economic variable are external debt, real exchange rate, real interest rate, inflation rate and investment are used. This research entails the use of Argumented Dickey Fuller, multivariate cointegration test proposed by Johansen and Juselious (1990), vector error correction model proposed by Engle and Granger and causality analysis also proposed by Engle (1969) and later developed by Toda and Yamamoto (1995). The research findings was

all the variables were all stationary at 2nd difference i.e. they are I (2) and the level of integrating order was 2. Four cointegrating equations were present indicating that long run relationship exist between ASP and the selected macro – economic variable, but this result on cointegrating equations is not referring to the direction of relationship between ASP and the selected macro – economic variables. In the short run, all the macro – economic variables conforms to the signs (negative), and only external debt was statistically significant and the rest were statistically insignificant. The error coefficient confirms the present of short run disequilibrium i.e. the error will be corrected at about 0.70% in the next period and also a weak relationship exist because the coefficient of determination (3.97%) shows a small proportion explained by all the selected variables. Feedback causality exist between ED and ASP, unidirectional causality exist between ER and ASP while others experienced an independent causality with ASP, and these implication is that ASP is not a leading indicator for other macro- economic variables.

The policy implication of the above is that Nigeria stock market is not responsive to changes in macro – economic factors despite the proportion of stock market capitalization as share of the country's GDP. Here predicting stock prices through changes in macro – economic variables become affection on economic forecast, planning and growth.

6.0 References

1. Engle, R.F., and Granger, C.W.J. (1987) 'Cointegration and Error Correction Representation, Estimation and Testing', Econometrica March 1987, pp 255-276
2. Fama, E.F., 1990. Stock returns, expected returns and real activity. J. Finance, 45: 1089 – 1108.
3. Fama, E.F., 1991. Efficient Capital Markets: II.J. Finance, 46: 1575 -1618.
4. Ferson, Wayne E., and Campbell R. Harvey (1998) "Fundamental Determinants of National Equity Market Returns: A Perspective on Conditional Asset Pricing." Journal of Banking and Finance Vol. 21 Nos. 11- 12 pages 1625-1665.
5. Granger. C. W.J., 1969. Investigating causal relationship by econometric models and cross spectral methods. Econometrical. 17(2):424 -438.
6. Gujarati. D. N., 2004. Basic Econometric. Tata McGraw Hill Publishing Company Ltd., 4th Edn., New Delhi
7. Johansen, S. (1988) 'Statistical Analysis of Cointegration Vectors', Journal of Economic Dynamics and Control, Vol. 12, pp 231-254
8. 70 Stock Market Reaction to Selected Macroeconomic Variables in the Nigerian Economy T. W. Abraham
9. Kandir, Serkan Yilmaz (2008) "Macroeconomic Variables, Firm Characteristics and Stock Returns: Evidence from Turkey" International Research Journal of Finance and Economics Issue 16: 35 – 45
10. Leigh, I., 1997. Stock return equilibrium and macro- economic fundamentals. Int. Monet. Fund working Paper., 97(15): 1 -41
11. Maku, O. E. and A.A. Atanda. (2009) Does Macroeconomic Indicators exert shock on the Nigerian Capital Market? Olabisi Onabanjo University, Ago-Iwoye, Nigeria, Datatric Research Consulting, Nigeria. Online at http://mpra.ub.uni-muenchen.de/17917/ MPRA Paper No. 17917, posted 17. October 2009 /
12. Maysami, R.C., L.C. Howe, and M.A. Hamzah (2004) "Relationship between Macroeconomic Variables and Stock Market Indices: Cointegration Evidence from Stock Exchange of Singapore's All-S Sector Indices" Journal Pengurusan, 24: 47 – 77
13. 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=$.)
14. Rao, B.B. (2005) Estimating Short and Long Run Relationships: A Guide to the Applied
15. Economist. Methodological Issues (May), pp 1 – 28. Available online at http://129.3.20.41/econ-wp/em/papers/0508/0508013.pdf
16. Website: www.cenbank.org

TABLE 1 TEST OF STATIONARITY/LEVEL OF INTEGRATING ORDER.

	ADF TEST			PP TEST		
	Test statistics	Coefficient	P - value	Test Statistics	Coefficient	P - value
ASP	-2.64	0.919	0.0214	-0.846	0.0056	0.967
ED	-2.79	-1.04	0.0174	-1.377	-0.137	0.444
IF	-1.63	-0.619	0.128	-2.385	-0.424	0.0206
ER	-1.39	-0.089	0.1862	-0.786	-0.033	0.462
IV	-2.13	-1.16	0.055	-2.69	-0.609	0.0075
IR	-1.95	-1.31	0.07	-4.31	-0.93	0.004
ΔASP	-0.84	0.00568	0.967	-5.37	-1.22	0.0000
ΔED	-0.589	-0.7465	0.5689	-2.7894	-0.643	0.009
ΔIF	-3.054	-1.97	0.011	-4.204	-0.96	0.0005
ΔER	-1.122	-0.78	0.2536	-3.81	-0.87	0.0011
ΔIV	-2.13	-1.93	0.056	-4.28	-0.93	0.006

ΔIR	-2.26	-2.48	0.0448	-8.26	-1.38	0.0000
$\Delta\Delta ASP$	-2.67	-4.92	0.0234	-8.73	-1.76	0.0000
$\Delta\Delta ED$	-0.657	-0.994	0.0277	-3.75	-1.17	0.001
$\Delta\Delta IF$	-4.66	-3.644	0.0009	-7.75	-1.305	0.0000
$\Delta\Delta ER$	-2.22	-3.163	0.004	-9.2	-1.41	0.0000
$\Delta\Delta IV$	-2.28	-3.23	0.045	-7.06	-1.16	0.001
$\Delta\Delta IR$	-2.80	-4.549	0.0186	-13.64	-1.577	0.0000

Δ Means first difference, $\Delta\Delta$ Means second difference.

Table 2 **JOHANSEN COINTEGRATION TESTS (long run equilibrium 1985-2008)**

Eigen value	Likelihood ratio test	5% critical Value	1% critical Value	Hypothesis No of CES
0.977858	199.3312	94.15	103.18	None **
0.917030	119.3156	68.52	76.07	Almost 1**
0.781665	67.04088	47.21	54.46	Almost 2**
0.678995	35.08463	29.68	35.65	Almost 3*
0.389406	11.22236	15.41	20.04	Almost 4*
0.040243	0.862586	3.76	6.65	Almost 5*

*(**) denotes rejection of the null hypothesis at 5% (1%) significant level. LR test indicates 4 cointegrating equations at 5% significant level.

Table 3 **NORMALIZED COINTEGRATING COEFFICIENTS.**

1 COINTEGRATING EQUATION						
ASP	ED	ER	IF	IR	IV	C
1.000	0.007295 (0.00659)	-986.1416 (733.425)	686.4196 (588.206)	5816.347 (4768.92)	2595.084 (2246.48)	-12550.65
2 COINTEGRATING EQUATION						
1.000	0.00	-274.9009 (55.5169)	59.98824 (53.8414)	1195.518 (422.183)	1552.576 (406.220)	-22018.33
0.000	1.000	-97496.93 (21722.8	85571.18 (21067.2)	633423.7 (165193)	142907.1 (158947)	1297830
3 COINTEGRATING EQUATION						
1.000	0.00	0.000	-70.23156 (32.0883)	-774.825 (75.3783)	-168.37 (189.87)	-3574.494
0.000	1.000	0.000	39686.95 (11572.8)	-65382.07 (27185.5)	-467450.1 (68480.7)	7839159
0.000	0.000	1.000	-0.473699 (0.20216)	-7.167 (0.47488)	-6.26 (1.196)	67.09266
4 COINTEGRATING EQUATION						
1.000	0.00	0.000	0.000	-701.6333 (63.4280)	-102.50 (242.053)	-6523.470
0.000	1.000	0.000	0.000	-106741.7 (20727.8)	-504672 (79101.2)	9505588
0.000	0.000	1.000	0.000	-6.6738 (0.38962)	-5.8159 (1.486)	47.202
0.000	0.000	0.000	1.000	1.042 (0.3379)	0.9379 (1.289)	-41.98934

The value in parenthesis is the standard error.

Table 4 **VECM ANALYSIS / SHORT RUN RELATIONSHIP (1985 – 2008)**

	Coefficient	Standard Error	T - Value
ΔASP_{t-1}	0.481958	0.48908	0.98643
ΔED_{t-1}	-0.002710	0.00150	-1.80685
ΔER_{t-1}	-29.41713	147.4690	-0.19948
ΔIF_{t-1}	-35.73410	74.7116	-0.47829
ΔIR_{t-1}	-19.26672	88.6913	-0.21723
ΔIV_{t-1}	-22.94873	260.509	-0.088809
ECM	-0.007289	0.02823	-0.25822
C	1800.386	1535.81	1.17227

$R^2 = 0.397168$ Sum of Square of residual = 255E+08 F – Statistics = 1.223553
Adjusted $R^2 = 0.072566$
S.E of Equation = 4430.745 AIC = 19.91285
Mean Dependent = 2137.373 S.Ddependent=4600.820
SIC = 20.31077

p_i, (i = 1…4) is the coefficient of the error correction

Table 5 **VARIANCE DECOMPOSITION (PROPORTION EXPLAINED TO SHOCKS OF EACH VARIABLE TO ONE ANOTHER)**

	ASP	ED	ER	IF	IR	IV
PERIOD				**SHOCKS TO ASP**		
1	100.00	0.0000	0.0000	0.0000	0.0000	0.0000
2	75.64	15.02	8.12	0.24	0.061198	0.904
3	58.3	24.69	11.195	0.4899	0.423	5.16
4	59.60	24.082	8.09	0.88	0.397	6.938
5	63.639	24.481	5.7	0.35	0.44	5.376
PERIOD				**SHOCKS TO ED**		
1	51.40	48.59	0.0000	0.0000	0.0000	0.0000
2	37.516	37.911	12.941	1.139	0.5717	9.9188
3	74.48	12.777	7.189	1.0486	0.1908	4.3062
4	75.27	16.798	2.58	1.13855	0.2490	3.955
5	65.465	23.77	1.265	0.694	0.62523	8.175
PERIOD				**SHOCKS TO ER**		
1	5.134	0.124	94.74	0.0000	0.0000	0.0000
2	16.414	0.07	66.428	10.74	0.4667	5.824
3	28.874	3.009	48.5	11.38	1.084	7.137
4	43.1	3.712	31.17	17.3	0.677	4.027
5	54.81	4.639	19.29	18.11	0.4804	2.664
PERIOD				**SHOCKS TO IF**		
1	29.82	2.07	0.024	68.07	0.000	0.000
2	25.82	2.35	0.029	68.88	0.243	2.669
3	21.44	5.94	0.58	58.11	0.866	13.03
4	20.7	6.930	1.097	54.08	0.984	16.1
5	28.0	5.92	2.06	50.32	0.811	12.8
PERIOD				**SHOCKS TO IR**		
1	8.168	7.22	27.265	48.59	8.748	0.000
2	11.07	16.19	21.65	39.844	11.08	0.144
3	11.66	21.136	22.3	25.30	7.01	12.58
4	11.38	21.74	21.199	22.61	6.48	16.58
5	21.59	19.68	18.06	19.6	5.706	15.34
PERIOD				**SHOCKS TO IV**		
1	0.44	1.06	1.31	3.30	0.097	93.77
2	5.36	9.71	1.01	6.20	0.96	76.73
3	6.52	7.12	5.148	13.98	0.84	66.36
4	5.24	24.86	3.059	12.57	1.33	52.92
5	15.2	32.2	5.574	8.3	2.42	36.27

Table 6 **STABILITY ANALYSIS / CAUSALITY TEST**

Causality between ASP and ED, ER, IF, IR , IV			
Null hypothesis	No of Observation	F - value	P - value
ASP does not granger cause ED	17	49.6812	0.00103 (Reject H_0)
ED does not granger cause ASP	17	13.4339	0.01258 (Reject H_0)
ASP does not granger cause ER	18	4.98576	0.04989 (Reject H_0)
ER does not granger cause ASP	18	2.20448	0.20172 (Do not Reject H_0)
ASP does not granger cause IF	18	0.72419	0.65084 (Do not Reject H_0)
IF does not granger cause ASP	18	1.52300	0.33051 (Do not Reject H_0)
ASP does not granger cause IR	18	1.48893	0.33951 (Do not Reject H_0)
IR does not granger cause ASP	18	2.12623	0.21263 (Do not Reject H_0)
ASP does not granger cause IV	18	2.26280	0.19408 (Do not Reject H_0)
IV does not granger cause ASP	18	2.72898	0.14511 (Do not Reject H_0)