

MACROECONOMIC VARIABLES AND SHARE PRICE MOVEMENTS IN NIGERIA BREWERY INDUSTRY: EVIDENCE FROM NIGERIAN BREWERIES PLC.

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ABSTRACT: *The research aims at examining the relationship between macroeconomic variables and the movement of share prices in Nigeria brewery industry, with emphasis on Nigeria Breweries Plc; the largest beer producing brewery firm in Nigeria. The level of association of the variables is validated using the ordinary least squares method, modeled in form of multiple regression. Granger causality method was applied to examine the causality relationship among the variables in the short run. Augmented Dickey- Fuller (ADF) test was conducted on all the variables, complemented with the Phillip-Perron's (PP) test for unit root to check for data series stationary. All the variables except interest rate had the data series differenced at second difference as a result of their unit root issues. Interest rate was however differenced at level and intercept. The result indicates a positive but insignificant relationship between share price and inflationary rate, real GDP and exchange rate while a negative and insignificant relationship is found between share price and interest rate as only 13% of the variations in share price could be explained by the independent variables. Correlation between share price and all the independent variables are positive but largely weak. Granger causality test reveals no causal relationship between share price and interest rate, inflationary rate, real GDP and exchange rate in the short run. The paper recommends that macroeconomic variables should be seriously considered in setting monetary and fiscal policies because of its multiplier effect on the economy.*

KEYWORDS: Macroeconomics, Brewery, Share Prices, Regression, Causalities, Policies.

INTRODUCTION

The Nigeria brewery industry is one of the most viable industries in Nigeria especially since the global financial crisis that brought the banking industry to its knees. Apart from the federal, state and local government authorities in Nigeria, the brewery industry may be the next highest employer of labour. The industry is very capital intensive and as a result, there is huge investment outlay which is translated into heavy asset base through massive importations of machines and materials. Their production lines are largely automated.

The production of beer and other alcoholic beverages in commercial quantity commenced in Nigeria at about 1949. About this time, the foremost beer producing company in Nigeria, the Nigeria Breweries Limited, now a public company, established its first brewery at a suburb in Lagos called Igunlu. Up till 1960, the company had the monopoly of being the major beer producing company before the likes of Golden Guinea, Guinness, West Africa Breweries and North Breweries started making impact in the beer industry as they joined in 1962, 1963, 1964 and 1970, respectively (Okwo and Ugwunta, 2012). The company has grown very remarkably in asset

size, number of employees, branch networks and beer brands. It acquired three plants from Heineken in 2011 and another plant in Ameke, Umuezeani at Ngwo, Enugu State, Nigeria which is the sixth in their list of mega plants in the country. Many are of the opinion that the brewery at Umuezeani Ameke Ngwo, Enugu State could be the largest brewery plant in Nigeria and even West Africa.

However, the firm's earnings and businesses are influenced by general economic conditions, the performance of the financial markets, inflationary rates, money supply, interest rates, foreign currency exchange rates, changes in laws, regulations and policies of the Central Bank, capital market and other regulators as well as competitive factors on a global, federal, state and local government basis (Vanguard, 2007). This is why Naik and Padhi(2012) submits that the stock market avail long-term capital to the listed firms by pooling funds from different investors and allow them to expand in business and also offers investors alternative investment avenues to put their surplus funds in as they carefully watch the performance of stock markets.

Stock price movements as Aldin, Dehnavi and Entezari(2012) opines, 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. Citing Wang, Wang, Zhang and Guo (2011), the scholars concludes that the accurate prediction of stock price movements is a very challenging and important issue which the investors extensively regard in their investment decisions. Some of these factors which pivot around the forces of demand and supply, may also determine whether a stock market is bearish or bullish.

This paper therefore seeks to examine the extent to which foreign exchange rate, inflationary rate, real gross domestic product and interest rate relate with share prices in Nigeria Brewery Sector. The rest of this work is divided into four sections. Section 2 deals with the review of related literature, Section 3 focuses on the methodology for data analysis while section 4 presents the empirical results and discussion. Section 5 however concludes the study.

REVIEW OF RELATED LITERATURE

Theoretical Framework

Many divergent views trail the issue of stock price determination and the factors responsible. The proponents of efficient market hypothesis are of the view that stock prices would be determined primarily by fundamental factors such as earnings per share, dividend per share, payout ratio, size of the firm and dividend yield, management and diversification (Srinivasan, 2012). However, sequel to information asymmetry, stock market information may not be available to all stakeholders at the same time. Citing Copeland and Weston (2005), Khan(2009) submits that the source of the information asymmetry is the superior knowledge that managers have about the firm's prospects, while the investors in the firms comprise the uninformed group.

Consequently, the deficiency of Efficient Market Hypothesis saw the entrance of the Arbitrage Pricing Model. The multifactor model as opine by Saeed and Akhter (2012) is based upon the assumption that many macroeconomic factors such as Consumer Price Index, Interest Rate,

Industrial Production, Exchange Rate, Risk Free Rate and Money Supply are involved in the determination of risk and return relationship. Hence, the Arbitrage Pricing Theory is the theory underpinning this study.

Empirical Review

The relationship between industrial production index, wholesale price index, money supply, treasury bills rates, exchange rates and Indian Stock Index was examined by Naik and Padhi(2012) applying Johansen's co-integration and vector error correction as well as Granger Causality model. The result, in line with the Arbitrage Pricing Model, reveals that macroeconomic variables and the stock market index are co-integrated and hence, a long-run equilibrium relationship exists between them. Stock prices relate positively to money supply and industrial production but negatively relate to inflation while exchange rate and interest rate are insignificant determinants. Granger causality test reveals that macroeconomic variable causes the stock prices in the long-run. Bidirectional causality exists between industrial production and stock prices whereas, unidirectional causality runs from money supply to stock price, stock price to inflation and interest rates to stock prices are found.

Granger Causality model was applied after removing the effect of unit root from the data series by Rasool, Fayyaz, Mumtaz (2012) in assessing the causal relationship between the stock price index of KSE (Karachi Stock Exchange) and Exchange Rate (ER), Foreign Exchange Reserves (FER), Industrial Production Index (IPI), Interest Rate (IR), Imports (M), Money Supply (MS), Wholesale Price Index (WPI) and Exports (X). It was revealed that macroeconomics variables and stock prices relate even in the long-run as supported by Naik and Padhi(2012). FER, IR, M, MS and WPI relate positively and significantly with stock prices, while ER and X show a negative and insignificant association with stock prices. IPI has a negative but significant relationship with stock prices. Granger Causality reveals that MS and WPI have bi-directional relation; ER, FER and M have uni-directional relationship while IPI, IR and X shows no casual relationship with stock prices.

Using Augmented Dickey Fuller (ADF) test and estimate of error correction mechanism model, Odior(2013) investigates the impact of macroeconomic factors on manufacturing productivity in Nigeria. The cointegrating equation of the VECM reveals the presence of a long-run equilibrium relationship. Loans and advances and foreign direct investment have positive and significant impact on the level of manufacturing productivity in Nigeria, while broad money supply has less impact. It recommends that government should create the right environment for manufacturers in the area of infrastructure, financial, legal and property rights.

The vector error correction model (VECM), (Johansen (1991)) is utilized by Adel(2004) to determine the impact of selected macroeconomic variables such as real economic activity, money supply, inflation, and interest rate on Amman Stock Exchange (ASE). The result reveals that the stock prices and macroeconomic variables have a long-term equilibrium relationship as supported by Odior(2013) and Naik and Padhi(2012).

In an effort to validate the impact of macroeconomic factors such as Money Supply, Exchange Rate, Industrial Production, Short Term Interest Rate and Oil prices on banking index within

Arbitrage Pricing context, Saeed and Akhter(2012) using regression approach carried out the empirical analysis. The analysis results indicate that Oil Prices, Exchange Rate and Short Term Interest Rate have significant impact on Banking index while Money Supply, Exchange Rate, Industrial Production and Short Term Interest Rate show a negative relationship with banking index.

Using Ordinary Least Square (OLS), the performance of the Arbitrage Pricing Theory (APT) in the Nigerian Stock Exchange (NSE) was examined by Izedonmi and Abdullahi(2011). Inflation, exchange rate and market capitalization were specially considered and the findings reveal that there are no significant effects of those variables on the stocks' return in Nigeria.

The relationship between interest rates, consumer price index, money supply, exchange rate, gold prices, oil prices, current account deficit, export volume and Istanbul Stock Exchange (ISE) industry index is examined by Ozcan(2012) using the Johansen's cointegration test. The test result reveals that macroeconomic variables exhibit a long run equilibrium relationship with the ISE industry index as supported by.

In a related study, Mwangi(2013) tries to determine the effects of macroeconomic variables such as real exchange rate, GDP growth rate, the change in money supply (M3), average annual lending interest rates and inflation rate measured by annual percentage changes in the consumer price index (CPI) on financial performance (proxied by Return on Assets (ROA)) of aviation industry in Kenya. The results reveal that ROA has weak positive insignificant correlation with gross domestic products growth rate and annual change in money supply M3 while a weak negative insignificant correlation exist between ROA and exchange rate, annual average lending rate and annual average inflation.

Olugbenga (2011) examines 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 using the pooled or panel model. The result reveals that macroeconomic variables have varying significant impact on stock prices of individual firms in Nigeria.

The above review of related literature is an indication that there are varying results from different countries, sectors and firms within the same industry. In Nigeria which is an emerging economy, there is dearth of empirical study on the relationship between macroeconomic variables and stock prices, especially in the brewery sector. This study is aimed at examining the extent to which interest rate, inflationary rate, foreign exchange rate and real gross domestic product relate with share prices of firms within the Nigeria brewery sector.

DATA AND METHODOLOGY

Data

Annual data was obtained for interest rate, inflation rate, foreign exchange rate and gross domestic product from various issues of Central Bank of Nigeria (CBN) statistical bulletin especially the 50 years special anniversary edition while share prices as at 31st December of each year under consideration was extracted from Nigeria Stock Exchange website.

Table 1: Description of Variables under Study

INFRATE	Inflationary Rate(All items, Year on Change)
INTRATE	Interest Rate
EXCHRATE	Exchange Rate
RGDP	Real Gross Domestic Product
SHPRICE	Share Price

Methodology

The relationship between interest rate, inflation rate, foreign exchange rate, gross domestic product and share prices of quoted brewery firms in Nigeria is examined in this study, in a bivariate causality framework. The study employed an econometric model in data analysis that is consistent with the studies done by Naik and Padhi(2012), Rasool, Fayyaz, Mumtaz (2012), Odior(2013), Saeed and Akhter(2012), Izedonmi and Abdullahi(2011) and Ozcan(2012). Augmented Dickey Fuller (ADF) and Phillips Perrons'(PP) Test is applied to test for stationarity of the time series data. The Granger causality test and the Johansen (1988) co-integration test are applied to test for causality between each pair of the variables and long-run relationship between the macroeconomic variables and share prices respectively. Augmented Dickey-Fuller test and Phillips Perrons'(PP) Test reject a null hypothesis of unit root if the series are non-stationary and accept the alternate hypothesis of stationary.

Granger-causality is normally tested in the context of linear regression models and specified as follows in our bivariate linear autoregressive model of two variables X_1 and X_2 based on lagged values as applied by Pasquale (2006) and cited in Inyiama(2013):

$$X_1(t) = \sum_{j=1}^P A_{11,j} X_1(t-j) + \sum_{j=1}^p A_{12,j} X_2(t-j) + E_1(t)$$

$$X_2(t) = \sum_{j=1}^P A_{21,j} X_1(t-j) + \sum_{j=1}^p A_{22,j} X_2(t-j) + E_2(t)$$

$j = 1$ $j = 1$

Where;

p is the maximum number of lagged observations included in the equation, the matrix A contains the coefficients of the equation (i.e., the contributions of each lagged observation to the predicted values of $X_1(t)$ and $X_2(t)$,

X_1 is the share price which is constant while X_2 takes the form of various macroeconomic indices identified above and,

$E1$ and $E2$ are residuals (prediction errors) for each time series.

The primary model showing the relationship between interest rate, inflation rate, foreign exchange rate, gross domestic product and share prices of quoted brewery firms in Nigeria is specified below:

Shprice = f (Intrate, Infrate, Exchrte, Rgdp)

$Shprice = \alpha_0 + \alpha_1 Intrate + \alpha_2 Infrate + \alpha_3 Exchrte + \alpha_4 Rgdp + \varepsilon_t$.

To examine the relationship between Share Price and Interest Rate, Inflation Rate, Foreign Exchange Rate and Real GDP as adopted in Inyama(2013), the multiple regression equation is estimated in the form:

$SHPRICE_t = K + \beta_1 INTRATE_t + \beta_2 INFRATE_t + \beta_3 EXCHRATE_t + \beta_4 RGDP_t$

Where

$INFRATE_t$ = Inflation Rate in time t (All items, Year on Change)

$INTRATE_t$ = Interest rate in time t

$EXCHRATE_t$ = Exchange rate in time t .

$RGDP_t$ = Real Gross domestic product in time, t .

$SHPRICE$ = Share Price in time, t .

α_0 is a constant term, ' t ' is the time and ' ε ' is the random error term.

DISCUSSION OF FINDINGS

The data series is expected to be stationary to ensure the absence of unit root problems. To achieve stationary of the data series, the data for the analysis are examined using the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller 1981) unit root tests which is complemented for robustness of the estimates with the Phillip – Perrons (PP) Test. When the time series data which includes share price, exchange rate, inflation rate, interest rate and real GDP series were checked for stationary, the graphs reveal that there are unit root problems. The graphs were plotted to give the researcher initial signal as to the existence of unit root in the series as the line graphs failed to cross the zero line severally.



Figure 1: Graphical Representation of the Variables with Unit Root Issues

Source: Author's EView 8.0 Output.

Table 2: Augmented Dickey- Fuller (ADF) Test Results

Variable	Test Critical Values			ADF Stat	Status
	1%	5%	10%		
Share Price	-4.297073	-3.212696	-2.747676	-6.101887	1(2)
Inf. Rate	-2.847250	-1.988198	-1.600140	-4.550151	1(2)
Int. Rate	-4.121990	-3.144920	-2.713751	-4.315037	1(0)
Real GDP	-5.295384	-4.008157	-3.460791	-12.39939	1(2)
Exch. Rate	-4.297073	-3.212696	-2.747676	-5.453782	1(2)

Source: Author's EView 8.0 Computation

Table 3: Phillip- Perrons' Test Results

Variable	Test Critical Values			ADF Stat	Status
	1%	5%	10%		
Share Price	-4.297073	-3.212696	-2.747676	-7.187423	1(2)
Inf. Rate	-2.816740	-1.982344	-1.601144	-8.777988	1(2)
Int. Rate	-4.121990	-3.144920	-2.713751	-4.185672	1(0)
Real GDP	-5.295384	-4.008157	-3.460791	-11.97531	1(2)
Exch. Rate	-4.297073	-3.212696	-2.747676	-8.288309	1(2)

Source: Author's EView 8.0 Computation

Tables 2 and 3 reveal that Share Price, Inflationary Rate, Real GDP and Exchange Rate achieved stationary in their data series at second difference while Interest Rate attained stationary at level and intercept. New data series emerged after differencing the series that were used in subsequent computations except descriptive statistics that used raw data.

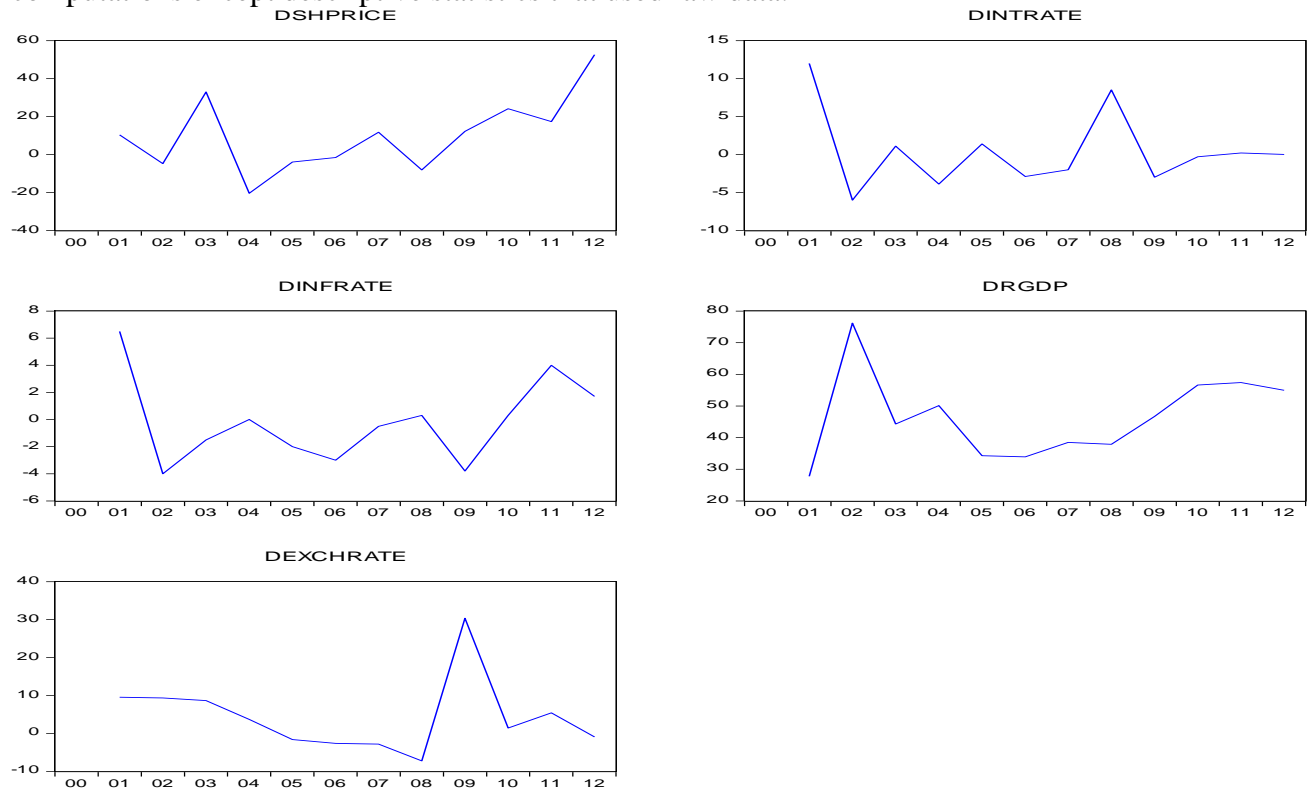


Figure 2: Line Graphs of the Variables without Unit Root Issues

Source: Author's EView 8.0 Output

The **Figure 2** above show the line graphs resulting from the new data series that emerged for both the dependent and independent variables of the study after differencing. The graphs reveal that the unit root problem is addressed as the lines crossed as many times, the zero line.

Table 4: Descriptive Statistics of the Variables

	SHPRICE	INFRATE	INTRATE	RGDP	EXCHRATE
Mean	56.40462	12.14615	11.73077	600.2962	131.5054
Median	42.80000	12.00000	12.00000	595.8000	129.2200
Maximum	147.0000	20.50000	18.90000	887.8600	155.7000
Minimum	24.62000	6.000000	6.600000	329.2000	101.7000
Std. Dev.	33.48185	4.099719	3.313202	175.6768	16.87423
Skewness	1.683588	0.301339	0.327360	0.040590	0.002673
Kurtosis	5.148227	2.582678	3.101436	1.978588	2.064057
Jarque-Bera	8.641078	0.291079	0.237763	0.568681	0.474510
Probability	0.013293	0.864556	0.887913	0.752510	0.788790
Sum	733.2600	157.9000	152.5000	7803.850	1709.570
Sum Sq. Dev.	13452.41	201.6923	131.7277	370347.9	3416.876
Observations	13	13	13	13	13

Source: Author's Eview8 Output

Table 4 reveals, most importantly, the mean, maximum and minimum values for the series. The skewness coefficients of interest rate, inflationary rate, real GDP and exchange rate have values less than 1. This indicates a normal frequency distribution while that of share price show that the frequency is not normally distributed given skewness coefficient higher than unity. Kurtosis coefficient supports this findings as only share price indicates an abnormal distribution with coefficient higher than 4. Jarque-Bera statistic which reveals that frequency distribution is not normal when the p-value is significant also supports the findings as only share price indicates a significant p-value of 0.013293. Real GDP shows a very volatile standard deviation.

Table 5: Coefficient of Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DINFRATE	2.336188	3.335210	0.700462	0.5062
DINTRATE	-0.177058	2.447116	-0.072354	0.9443
DRGDP	0.274271	0.698212	0.392819	0.7061
DEXCHRATE	0.241845	0.743816	0.325141	0.7546
C	-3.175306	33.73125	-0.094135	0.9276
R-squared	0.131421	Mean dependent var	10.19833	
Adjusted R-squared	-0.364911	S.D. dependent var	20.00762	
S.E. of regression	23.37478	Akaike info criterion	9.435529	
Sum squared resid	3824.663	Schwarz criterion	9.637574	
Log likelihood	-51.61318	Hannan-Quinn criter.	9.360725	
F-statistic	0.264784	Durbin-Watson stat	2.301789	
Prob(F-statistic)	0.891616			

Source: Author's EView 8.0 Computation

$$\text{Equation: Share Price} = -3.175306 + 2.336188(\text{INFRATE}) - 0.177058(\text{INTRATE}) + 0.274271(\text{RGDP}) + 0.241845(\text{EXCHRATE}) + \text{et}$$

Table 5 indicates that a positive but insignificant relationship exists between share price and inflationary rate, real GDP and exchange rate while a negative and insignificant relationship is found between share price and interest rate. It further reveals that only 13% of the variations in share price could be explained by the independent variables while about 87% may be attributable to error term, chance and other variables not considered. This is in line with the findings of Naik and Padhi(2012) where stock price shared insignificant relationship with interest rate and exchange rate. Izedonmi and Abdullahi(2011) also lends support to the findings.

Table 6: Correlation Results

	DSHPRICE	DINFRATE	DINTRATE	DRGDP	DEXCHRATE
DSHPRICE	1.000000	0.264569	0.073501	0.146906	0.096089
DINFRATE	0.264569	1.000000	0.697129	-0.245320	-0.190902
DINTRATE	0.073501	0.697129	1.000000	-0.603841	-0.199216
DRGDP	0.146906	-0.245320	-0.603841	1.000000	0.207064
DEXCHRATE	0.096089	-0.190902	-0.199216	0.207064	1.000000

Source: Author's EView 8.0 Computation

Table 6 depicts a positive correlation between share price and all the independent variables under study. However, very weak correlation is found in almost all the association except for rate of inflation which shows a 26.5% correlation with share price. The findings is in line with that of Olugbenga(2011).

Table 7: Pairwise Granger Causality Tests

Date: 04/02/14 Time: 22:32

Sample: 2000 2012

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DINFRATE does not Granger Cause DSHPRICE	10	3.54546	0.1100
DSHPRICE does not Granger Cause DINFRATE		4.24905	0.0835
DINTRATE does not Granger Cause DSHPRICE	10	2.46507	0.1799
DSHPRICE does not Granger Cause DINTRATE		0.11901	0.8902

DRGDP does not Granger Cause DSHPRICE	10	1.20673	0.3736
DSHPRICE does not Granger Cause DRGDP		2.72179	0.1586
<hr/>			
DEXCHRATE does not Granger Cause DSHPRICE	10	0.36467	0.7115
DSHPRICE does not Granger Cause DEXCHRATE		0.11006	0.8979

Source: Author's EView 8.0 Computation

Granger causality test shown above reveals no causal relationship between share price and interest rate, inflationary rate, real GDP and exchange rate in any direction. This is evidenced by the low F-statistic and the insignificant P-values. The findings is in line with that of Naik and Padhi(2012), Rasool, Fayyaz and Muntaz (2012), Ozcan(2012) and Saeed,and Akhter(2012). In all these studies, no short run relationship was indicated by the causality test. However, they provide evidence of a long run relationship between the independent variables (interest rate, inflationary rate, exchange rate and real GDP) and the dependent variable (share price).

CONCLUSION

An in-depth knowledge of causalities and correlations between macroeconomic indicators and share price is very important to the key beneficiaries of this work. The study is significant to policy makers, regulatory bodies, professional institutes and associations, government agencies, planning commissions and parastatals, standard setting bodies, research institutes, institutions of higher learning, financial institutions, manufacturing and service sectors and so on. Macroeconomic variables should drive the wheels of economic development in an economy. If the economic planners are aware of the interactions and inter-relationships between and among these variables, it will be a lot easier to set macroeconomic targets that are attainable. It accords to logical reasoning to believe that macroeconomic variables could influence share price either in the short or long run and in varying directions and magnitudes.

The result of the study confirms our a priori expectation to a reasonable extent. Positive but insignificant relationship exists between share price and inflationary rate, real GDP and exchange rate while a negative and insignificant relationship is found between share price and interest rate as only 13% of the variations in share price could be explained by the independent variables. Correlation between share price and all the independent variables under study are positive but largely weak. Granger causality test reveals no causal relationship between share price and interest rate, inflationary rate, real GDP and exchange rate.

However, no matter how insignificant the level of influence is, a unit increase in a macroeconomic variable could result in a serious multiplier effect capable of stimulating more than a proportionate feedback due to volatility. This implies that the direction of relationship and correlation is of paramount concern to planners, policy makers and standard setters. Since the direction and magnitude of their relationship could be estimated to a reasonable extent and considering the volatile nature of these variables, Nigeria Economic Summit Group, the Coordinating Minister for the economy, the Central Bank of Nigeria, capital market regulators and captains of brewery

industries in Nigeria should really consider these findings in their pursuit of enhanced performance and the transformation agenda of the federal government of Nigeria.

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