Interactions between Earnings and Share Prices in Nigeria Brewery Industry

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Abstract

The aim of the study is to determine the direction and significance of the interactions between earnings per share and market price of ordinary shares in the Nigeria brewery industry from 2000 to 2013. Engle and Granger 2-step cointegration and correlation approach was adopted in the analysis with an estimation of an error correction model. Stationary of time series data were tested with the adoption of Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) procedures. All the study variables were integrated of the same order I(1), signaling a cointegration. Market Price of Shares has a short term positive and significant effect on Earnings Per Share while the long run coefficient shows a negative and insignificant influence in line with our initial expectations. The error correction mechanism suggests that deviations from equilibrium could be corrected at approximately 7% per annum, implying that the distortions affecting EPS in the long term could be corrected in approximately 14 years and three months (approximately 171 months). There is a unidirectional causality running from MPS to EPS at lag 1 period, implying that MPS granger causes EPS in the short run. The result further reveals that a very strong relationship exists between MPS and EPS at approximately 80%. Firms in the brewery industry should, therefore, pursue strategies geared towards cost reduction, elimination of wastes, integrations, full automation of production lines, attractive packaging and production of low sugar alcoholic drinks in order to push up earnings and ultimately enhance the market price of their shares.
Keywords: EPS, MPS, Granger, Brewery, Cointegration, Nigeria.

1.0 Introduction

Share prices may rise and fall in response to fluctuations in the values of endogenous and exogenous variables within the industry, originating from government policies, arising from strategies adopted by competitors or as a result of reactions to published financial performance indicators and market forces of demand and supply. Investors are known to be interested in making investments in firms that promise good returns. The pattern of changes in share prices could determine the timing and extent to which people are willing to invest and generally, transact with a firm. This is because share price, at every point in time, tends to reflect public perceptions about the firm with regards to the firm's worth.

In Nigeria, the brewery industry is one of the oldest economic institutions. The firms within the industry attract huge foreign investments which enhance industrial output and indirect employment in Nigeria (Ola, 2001). The pioneer brewery firm in Nigeria is acclaimed by many to be the Nigerian Breweries Plc with production plants at Enugu, Ibadan, Lagos, Aba, Kaduna and Ameke Ngwo in Enugu. Nigeria Breweries Plc is believed to be the largest brewery firm in Nigeria and Africa. It was incorporated in 1946 with a vision to lead the beverage company in Nigeria having a culture of high performance to deliver outstanding value to stakeholders.

On the other hand, Guinness Nigeria Plc is regarded as an iconic African company that invests in social responsibilities by enriching the communities within which it operates through provision of infrastructural facilities and other social amenities. Razaq (2010) emphasized that in 1963, Guinness made an entrance into Nigeria by establishing its presence at Ikeja which became the company's first location outside the British Isles. Guinness Nigeria Plc got listed on the Nigerian Stock Exchange in 1965 and had consistently done well with regards to financial performance. Okwo and Ugwunta (2012) argued that Nigerian Breweries Limited had monopoly of beer production until 1962. Golden Guinea, Guinness, West Africa Breweries and North Breweries were built in 1962, 1963, 1964 and 1970, respectively.
Umar and Musa (2013) while citing Remi (2005) stressed that the effectiveness and efficiency of management decisions could be appraised in the light of the impact on the firm's stock price. They pointed out that one of the components of firm performance is earning per share (EPS) which is also a measure of managerial efficiency.

However, Wang, Fu and Luo (2013) posits that many factors could change the stock price, such as financial policy, monetary policy, industrial policy, foreign trade policy and other macro-economic factors, financial information, investors' expectation, market supervision and other internal factors. They strongly believe that in those factors, financial information is the specific information which can help investors to decide whether to invest in a firm's stock or not. These indicators of financial performance include book value of the firm, dividend Per Share, EPS, Price- Earnings Ratio and Dividend Cover (Gompers, Ishii and Metrick, 2003). Mlonzi, Kruger and Nthoesane (2011) argue that earnings provide critical information to shareholders about firm past performances and are also used extensively in forecasting future performance and in valuation of equity. They emphasized that the primary role of reported earnings is to provide some predictive information about future earnings to both present and potential investors in making rational investment decisions.

Citing Chandra (1981), Hemadivya and Devi (2013) opines that an analysis of which factors will affect and to what extent they affect the market price of shares helps an investor to make an investment decision, as the knowledge of fundamental factors and their impact on equity share prices is also useful to corporate firms, management of institutions, government and investors. Chang, Chen, Su and Chang (2008) pointed out that the future profit of the firm is the most fundamental factor that affects stock prices and the earnings information is believed to contain the greatest informational content of all the accounting information because it contains the important discussion concerning the relationship between accounting earnings and stock prices.

The debate on whether EPS has any predictive power on stock prices is not very clear in financial literature; and in Nigeria, the relationship between stock prices and EPS is also ambiguous (Umar and Musa, 2013). They added that while some experts argue that EPS could predict share prices, other professionals posit that it is only positive information regarding EPS that could cause the demand for a stock to increase, thereby pushing up stock prices.

The study aims at evaluating the interactions, with regards to causality, relationship, magnitude and nature of influence, between earnings and share price of firms in the Nigeria brewery industry. The rest of the research paper is organized into four sections as follows: Section 2 reviews existing literature in the area of study, section 3 enlists the methodology applied for analysis, section 4 discusses the empirical results/findings while section 5 concludes after the summary.

2.0 Review of Related Literature

The relationship between stock prices and firm earning per share (EPS) which appears to be contestable like any other performance measures was studied by Umar and Musa (2013). This study examined the relationship between stock prices and firm EPS from 2005 to 2009. Using a simple linear regression model on a panel of 140 Nigerian firms from a total population of 216 firms' operated in Nigerian Stock Exchange (NSE), it was discovered that firm EPS has no predictive power on stock prices and should not be relied upon for the prediction of the behavior of stock prices in Nigeria. This finding is however contrary to the findings of Shiller (2000), Fama and French (1992), Ball and Brown (2001), Chang and Wang (2008) which revealed that firm's stock prices movement has a positive significant relationship with firm EPS.

In a related study carried out by Hemadivya and Devi (2013), efforts were made to find out the relationship and the impact of EPS on Market price of shares of selected companies. Employing regression and correlation analysis, it was found that market price is significantly affected by changes in EPS with reference to BHEL(manufacturing sector). The correlation between market price and EPS of BHEL is 0.759 which indicates that there is a high positive and significant relationship between market price and EPS of BHEL. On the relationship between market price and EPS of TCS(service sector), the study indicates that the correlation between market price and EPS of TCS is 0.280 which indicates that there is a positive and insignificant relationship between market price and EPS of TCS. This is consistent with the findings of Malakar and Gupta (2002). They sought to find out whether EPS is a significant determinant of share price movement by considering share price of eight major cement companies in India for the period 1968 to 1988. The study reveals that Earnings per share are found to be significant determinant of share price. In his study as cited by Hemadivya and Devi (2013), Tuli and Mittal (2001) conducted a cross sectional analysis by taking into account earnings ratio of 105 companies for the period 1989-93 and found that earnings per share were significant in determining the share Price

Wang, Fu, and Luo (2013) empirically analyzed the relationship between accounting information and stock price with a few accounting information indices. The results, based on 60 listed companies in Shanghai Stock

Exchange for 2011, indicates that positive relationship exist between accounting information and stock price, but the significant degree varies; earnings per share and return on equity have the most significant correlation.

Mlonzi, Kruger and Nthoesane (2011) investigate whether there are any significant abnormal returns around the public announcement of earnings and to establish whether the efficient capital market hypothesis applies to the small ALtX market. The study focused on all the companies listed on the JSE-ALtX that announced annual earnings between 1 January and 31 December 2009 employing Capital Asset Pricing Model (CAPM). Empirical evidence demonstrates that there is substantial negative share price reaction to earnings announcements on the small ALtX stock market. The ALtX also shows the weak form of market efficiency. The study concluded that during a recessionary period, shareholders' wealth is eroded in the small ALtX market; however, the weak form of market efficiency provides an opportunity for entrepreneurs and investors to exploit the market for profits when the market is performing well.

The relationship between earnings figures and stock returns has been a topic of international research since decades and was studied by Dimitropoulos and Asteriou (2009). The main purpose of the paper was to investigate the above relationship in the context of the Greek capital market between 1994-2004, applying four models, proposed by Kothari and Zimmerman (1995). The use of cross-sectional and time-series aggregated data results in a large increase in the explanatory power of earnings for returns yielding more significant Earnings Response Coefficients.

Ebrahimi, and Chadegani (2011) examined whether the current period earning divided by stock price at the beginning of the stock market period, current period dividend divided by stock price at the beginning of the stock market period, prior dividend divided by stock price at the beginning of the stock market period and the reverse of stock price at the beginning of the stock market period are relevant to explain stock market returns in Iran. The study used cross-section, pooled data and panel data regression models for testing the effects of the above variables on stock returns and found that in some years, shareholders pay special attention to dividends and also the variable prior dividend divided by stock price at the beginning of the stock market period affects stock return. It revealed a significant relationship between current period earning divided by stock price at the beginning of the stock market period and stock return, implying the existence of relationship between earning, dividend and stock return.

Chang, Chen, Su, and Chang, (2008) used panel cointegration methods to investigate the relationship between stock prices and earnings-per-share (EPS). The empirical result indicated that the cointegration relationship existed between stock prices and EPS. The result further reveals that for the firm with a high level of growth rate, EPS has less power in explaining the stock prices; however, for the firm with a low level of growth rate, EPS has a strong impact in stock prices.

The foregoing review of related literature indicates that no research on the interaction between earnings per share and share price has been done in Nigeria and domiciled in the Nigeria brewery sector. The industry contributes about a quarter of Manufactured Value Added in Nigeria (Okwo, Ugwunta and Agu, 2012) and it has only about four companies that are presently and actively participating in trading activities on the floor of Nigerian Stock Exchange. Globally, the very scanty studies carried out in this area were done in more developed economies and in financial and service sectors. This development caught the interest of the researcher and efforts were hereby made to examine the interactions between earnings per share and market price of equity shares in the Nigeria brewery sector.

3.0 Methodology
The Engle-Granger (1987) two-step error correction model procedure discussed in Rao (2005); cited and adopted in Abraham (2013) is employed for model estimation. The models are as specified below:

$$\Delta MPS_t = a_0 + a_1 EPS_t + a_2 U_{t-1} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$\Delta MPS_t = a_0 + a_1 EPS_t + a_2 RES_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where:
- Δ represents the first difference computation on the respective variables;
- a_1 denotes the coefficient indicating the short run equilibrium relationship linking the two variables;

- a_2 denotes the coefficient indicating the long run relationship linking the variables with *a priori* expectation of -1;
- U_{t-1} or RES_{t-1} is the residual obtained from the linear regression of variables integrated in same order I(1). The residual is lagged by one to fulfill the requirement of the granger representation theorem.
- ε_t is the disturbance term for the model.

Table 1:   Description of Variables

Acronym	Details	Mathematical Expression
MPS	Market Price of Equity Shares	(High Price + Low Price)/2(High Price + Low Price)/2
EPS	Earnings Per Share	*EPS = Net Profit After Tax – Preference Dividend/ No. of outstanding shares*

Source: Author's Arrangement.

- **Market Share Price (MPS)**

Market Share Price is the value of a firm's equity per unit of the outstanding shares. Equity share is a measure of the unit of ownership of a company. Companies make new issue of shares to the public to generate fund for expansion, diversification, investment and generally growth. In the stock exchange, price of equity shares is determined ultimately through the interactions of the forces of demand and supply. This demand and supply forces are also believed to be propelled by other forces and factors which may not be unconnected with the earnings capacity of the firm.

- **Earnings Per Share (EPS)**

When a company shows convincing signs that it has the capacity and potentials of earnings both in the short and the long term, investors are most likely to be attracted to such company. This attraction, logically, could lead to an increase in demand of its equity shares and by extension, the market share prices. Earnings Per Share is measured by dividing the company's total earnings or income by the number of shares the company has outstanding.

Time series data were collected from annual report and accounts of Nigerian Breweries Plc and Guiness Nigeria Plc. The collected data were tested for stationarity. Non-stationary data series could lead to spurious regression which could mislead the users of the research outcome. An idea as to whether the time series data were stationary was obtained through graphical representations as shown in Figure1. It reveals non stationarity status for both variables because the line graphs failed to cross the zero line severally.
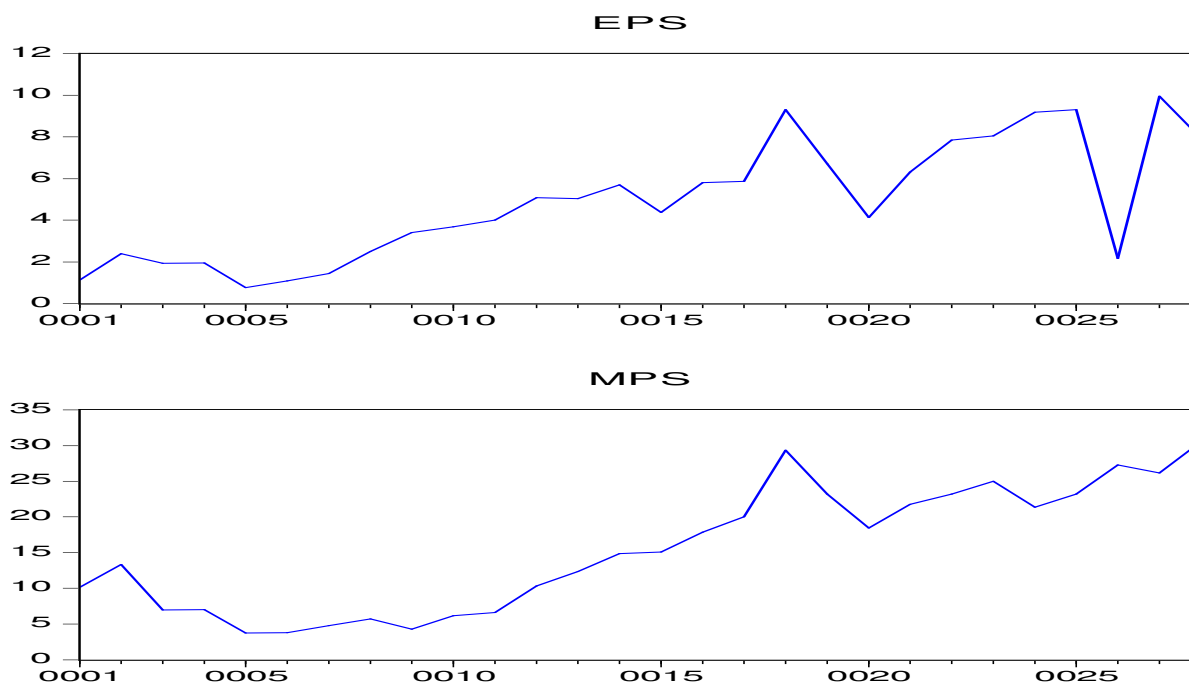
Figure 1: Graphical Representation of the Variables with Unit Root Issues
Source: Author's EView 8.0 Output.

Unit Root Test

Unit root test was conducted on the time series data to avoid spurious regression which tends to accept a false relationship or reject a true relationship as a result of the use of non-stationary data series for the analysis. The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) procedures were adopted in testing for existence of unit root in the time series data and the order of integration of both variables.

Table 2: Augmented Dickey Fuller (ADF) Unit Root Test Results-Nigerian Breweries Plc

Variables	Test Critical Values			Test Statistics	Status
	1 %	5 %	10 %	ADF	(Stationarity)
EPS	-3.769597	-3.004861	-2.642242	-5.065441	I(1)
Share Price	-3.711457	-2.981038	-2.629906	-5.621229	I(1)

Source: Researcher's EView 8.0 Computation

Table 3: Phillips-Perron (PP) Unit Root Test Results

Variables	Test Critical Values			Test Statistics	Status
	1 %	5 %	10 %	PP	(Stationarity)
EPS	-3.711457	-2.981038	-2.629906	-25.83203	I(1)
Share Price	-3.711457	-2.981038	-2.629906	-5.612309	I(1)

Source: Researcher's EView 8.0 Computation

Tables 2 and 3 reveal that the time series data from both firms (Nigerian Breweries Plc and Guiness Nigeria Plc) under the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) procedures, achieved stationarity at first difference. When time series data of study variables are integrated of the same order I(1), the data tend to cointegrate (Engle and Granger, 1987) and the consequences of such cointegration includes that the;

- Cointegrated series share a stochastic component and a long term equilibrium relationship.

- Deviations from this equilibrium relationship as a result of shocks will be corrected over time.
- We can think of ΔYt as responding to shocks to X over the short and long term.

Therefore the outcome of the unit root tests resulted in the generation of data series, free from unit root as shown in the Figure 2.
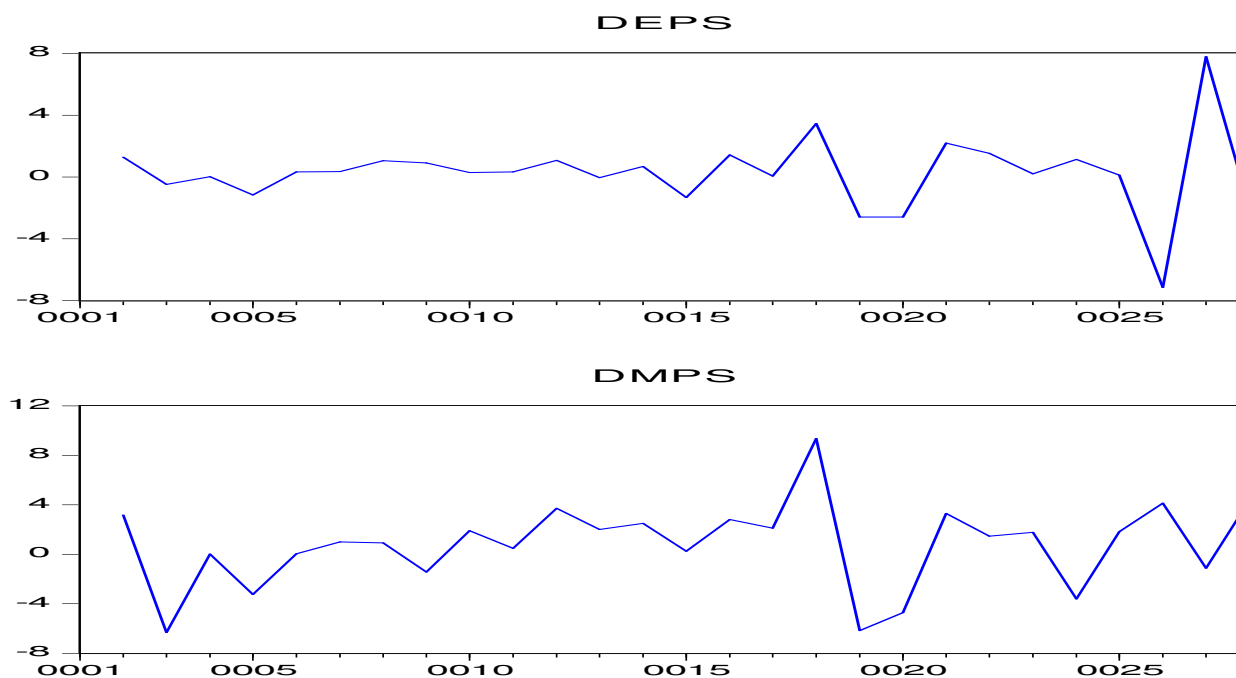

Figure 2: Graphical Representation of the Variables after differencing at I(1)
Source: Author's EView 8.0 Output.

Table 5: Descriptive Statistics (Insert Table 5)

STATISTICS	EPS	MPS
Mean	2.865000	64.22571
Median	2.450000	44.92500
Maximum	5.700000	167.9000
Minimum	0.770000	24.62000
Std. Dev.	1.630676	43.92798
Skewness	0.393132	1.429552
Kurtosis	1.837475	3.770403
Jarque-Bera	1.148978	5.114666
Probability	0.562993	0.077511
Sum	40.11000	899.1600
Sum Sq. Dev.	34.56835	25085.67
Observations	14	14

Source: Author's EView 8.0 Output.

Table 5 describes the statistics of the study which includes earnings per share and market price of equity shares. It reveals the mean/average values of EPS and Market Values of shares. It further reveals deviations from the mean (if any). It indicates the maximum and minimum values for the time series data under consideration. The coefficient of skewness for EPS is below one (1) and for MPS, the value is above one (1) signifying a normal frequency distribution for EPS and otherwise for MPS. Kurtosis coefficient is 1.837475 and 3.770403 for EPS

and MPS. Jarque-Bera statistic shows that earnings per share and market price of equity shares have insignificant p- values of 0.562993 and 0.077511 respectively. Both Kurtosis and Jarque-Bera statistic confirm that the time series data for EPS were normally distributed. The standard deviations were not volatile.

Granger-Causality test is conducted in the context of linear regression models and specified in 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):

$$X_1(t) = \sum_{j=1}^{P} A_{11,j}X_1(t-j) + \sum_{j=1}^{p} A_{12,j}X_2(t-j) + E_1(t) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(5)$$

$$X_2(t) = \sum_{j=1}^{P} A_{21,j}X_1(t-j) + \sum_{j=1}^{p} A_{22,j}X_2(t-j) + E_2(t)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

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 earnings per share which is constant while X_2 takes the form of various prices of equity shares and,
*E*1 and *E*2 are residuals (prediction errors) for each time series data.

Table 6: Pairwise Granger Causality Test
Date: 10/02/14   Time: 04:08
Sample: 0001 0028
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MPS does not Granger Cause EPS	27	9.51839	0.0051
EPS does not Granger Cause MPS		1.51057	0.2310

Source: Author's EView 8.0 Output.

Table 7: Pairwise Granger Causality Tests
Pairwise Granger Causality Tests
Date: 10/02/14   Time: 04:10
Sample: 0001 0028
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
MPS does not Granger Cause EPS	26	2.56826	0.1005
EPS does not Granger Cause MPS		1.11287	0.3472

Source: Author's EView 8.0 Output.

On causalities as shown in Table 6 and 7, there is a unidirectional causality running from MPS to EPS at lag 1 period. Table 7 indicates that at lag 2, there is no causality running from either MPS to EPS or from EPS to MPS. The implication is that MPS granger causes EPS in the short run. The residual graph of the parsimonious model in Figure 3 reveals that the line graph of the fitted observations is very close to the graph of the corresponding observed values.
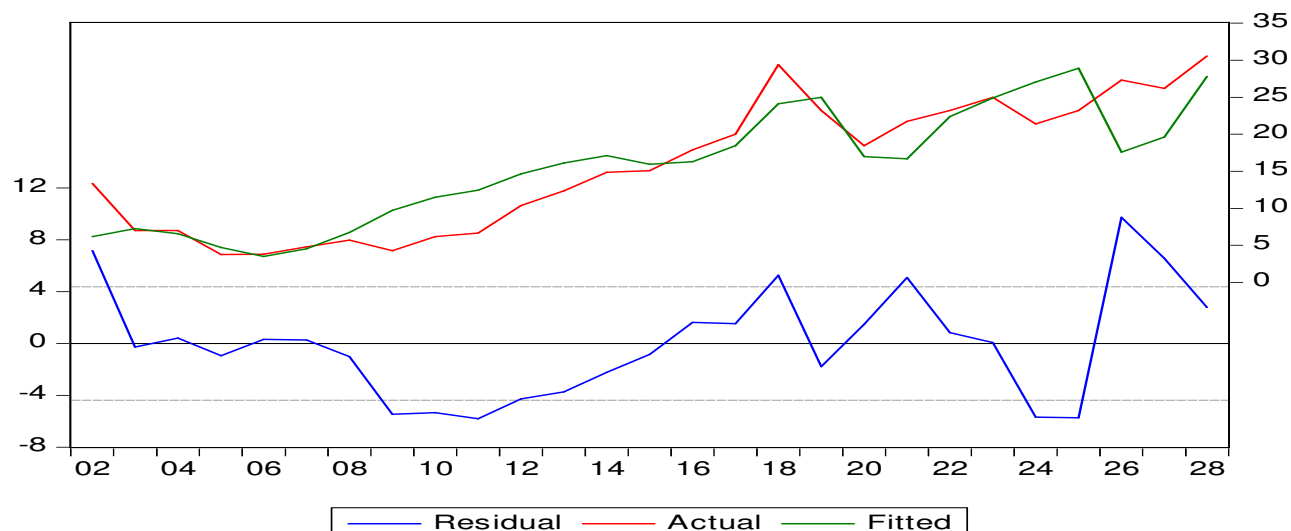
Figure 3: Residual graph of the parsimonious model
Source: EViews 8.0 Output

Table 8: **Residual Test for Stationary**
Null Hypothesis: RES has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.486484	0.0001
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RES)
Method: Least Squares
Date: 10/02/14   Time: 04:41
Sample (adjusted): 0004 0028
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RES(-1)	-2.196553	0.400357	-5.486484	0.0000
D(RES(-1))	0.485128	0.256521	1.891186	0.0718
C	-0.075175	0.430836	-0.174486	0.8631

R-squared	0.784914	Mean dependent var	-0.055797
Adjusted R-squared	0.765361	S.D. dependent var	4.415737
S.E. of regression	2.138963	Akaike info criterion	4.470686
Sum squared resid	100.6536	Schwarz criterion	4.616951
Log likelihood	-52.88358	Hannan-Quinn criter.	4.511254
F-statistic	40.14238	Durbin-Watson stat	2.149849
Prob(F-statistic)	0.000000		

Source: EViews 8.0 Output

Table 8 reveals that the variables are co-integrated at both 5 and 10 percent significance levels. According to the Granger Representation Theorem, when the variables under study are integrated in the same order I(1) and are found to be cointegrated, an error correction model can then be estimated. The output of the regression analysis is presented in Table 9.

Table 9: Regression Analysis Result
Dependent Variable: EPS
Method: Least Squares
Date: 10/02/14 Time: 08:18
Sample (adjusted): 0003 0028
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPS	0.253538	0.039020	6.497563	0.0000
RES(-1)	-0.070964	0.140901	-0.503645	0.6193
C	1.149147	0.700801	1.639763	0.1147

R-squared	0.647890	Mean dependent var		5.133462
Adjusted R-squared	0.617272	S.D. dependent var		2.803279
S.E. of regression	1.734250	Akaike info criterion		4.047194
Sum squared resid	69.17533	Schwarz criterion		4.192359
Log likelihood	-49.61352	Hannan-Quinn criter.		4.088996
F-statistic	21.16024	Durbin-Watson stat		2.138426
Prob(F-statistic)	0.000006			

Source: EViews 8.0 Output

Table 9 reveals that MPS has a short term positive and significant effect on EPS while the long run coefficient shows that MPS has a negative and insignificant influence on EPS. The error correction mechanism suggests that deviations from equilibrium are corrected at approximately 7% per annum. This implies that the distortions affecting EPS in the long term could be corrected in approximately 14 years and three months (approximately 171 months).

Table 10: Correlation Results

	MPS	EPS
MPS	1.000000	
EPS	0.795176	1.000000

Source: EView 8.0 Computation Output.

Table 10, reveals a positive relationship between Market Price of Shares (MPS) and Earnings Per Share (EPS). There is a very strong relationship between MPS and EPS at approximately 80%.

4.0 Conclusion

The purpose of the study is to determine the extent to which EPS is influenced by MPS and vice versa and the direction and magnitude of their granger causalities. The 2-step cointegration and error correction model of Engle and Granger (1987) in a simple regression framework was applied by the researcher. MPS has a short term positive and significant effect on EPS while the long run coefficient shows a negative and insignificant influence. There is a unidirectional causality running from MPS to EPS at 1 year lagged period and no granger causality at lag 2. The implication is that MPS granger causes EPS only at the short run. The long term negative and insignificant relationship is in line with our a priori expectation that if the MPS remains high over a long period, demand for the shares could fall resulting in a negative effect on earnings. This is because investors prefer to buy shares when the price is low and to sell when the price rises.

Secondly, the outcome of the analysis that MPS granger causes EPS but not vice versa in the short run is also supportive of the fact that increase in share price is a signal that a firm is performing and may continue to perform at least in the short run, *ceteris paribus*. Sequel to this development, the confidence of investors, banks, customers, suppliers and even the public will be heightened and this, by extension, could be translated into more profitable business deals with the firm.

The analysis reveals a strong positive relationship between MPS and EPS. This implies that an increase in EPS is expected to be associated with a corresponding increase in MPS. This is in line with the findings of Chang, Chen, Su, and Chang, (2008), Ebrahimi, and Chadegani (2011), Shiller (2000), Fama and French (1992), Ball and Brown (2001), Chang and Wang (2008), Hemadivya and Devi (2013), Wang, Fu, and Luo (2013). The findings were not, however, consistent with that of Umar and Musa (2013) that firm EPS has no predictive power on stock prices and should not be relied upon for the prediction of the behavior of stock prices in Nigeria. This disparity could be attributed to their method of sample selection which technically excluded the brewery firms in Nigeria by considering only the firms with the highest EPS, the firm with the lowest EPS, the most performing Stock and the least performing stocks. Firms in the brewery industry should, therefore, pursue strategies geared towards cost reduction, elimination of wastes, integrations, full automation of production lines, attractive packaging and production of low sugar alcoholic drinks in order to push up earnings and ultimately enhance the market price of their shares.

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