IMPACT OF STOCK PRICE FLAKINESS ON DEVELOPMENT OF NIGERIAN EXCHANGE GROUP

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KEYWORDS

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ABSTRACT

This study is aimed to investigate what is happening in the Nigeria Stock Market under its new name, "Nigeria Exchange Group", with respect to the uncertainty nature of share price behaviour in the capital market. Hence, the month end stock prices of four listed consumer companies from the period January 2017 to December 2022 were used as proxies. The study made use of the Autoregressive Conditional Heteroskedasticity (ARCH) to estimate and find out the presence of the volatility. The study identified the presence of volatility in all the four consumer stock prices used, while the volatility of stock price was then regressed against stock prices to determine their certainty. The results however revealed that out of the four consumer goods companies, only two consumer goods companies' stock prices were predicted by volatility, while past stock prices predicted current stock prices implying that the market does not follow a random walk. The study therefore recommended that activities of corporate insiders should be critically scrutinized to reduce the predictability of stock prices. Also, that Information should be made available and in clear terms to stakeholders and all investors in particular. Also, that policy makers should carefully review their economic policies in their use

of the Nigerian bourse as a barometer to measure performance in the general economy to avoid misleading the investing public.

Introduction

As long as human beings exist and have continued to demand new products and services for consumption to befit their statuses, successive researchers have continued to take turns to unravel the nature of financial market return process which has always been described as a combination of change flakiness. This may affect the smooth functioning of the financial system and also affect economic performance (Stephen, Victor and Farida, 2015). Stock price flakiness is an indicator that is most often used to find changes in trends in the markets. The increase or decrease in flakiness results from changes in investors' emotions in the market. Stock price flakiness tends to rise when new information is released into the market. However, the extent to which it rises is determined by the relevance of the new information as well as the degree to which the news capture investors. However, economists and financial experts have propounded theories on what causes flakiness. Some financial economists see the causes of flakiness embedded in the arrival of new and unanticipated information that alters expected returns on a stock (Engle, 1982). Others claim that volatility is caused mainly by changes in trading volumes, practices or patterns which in turn are driven by factors such as modifications in macroeconomic policies, shift in investors' tolerance of risk and increased uncertainty (Rajni & Mahendra, 2017).

Furthermore, stock market flakiness has a number of negative implications. One of the ways in which it affects the economy is through the effect on consumer spending (Campbell, 1996; Star-McCluer, 2018; Ludrigson & Standel, 2019; Poteba, 2020; Rajni & Mahendra, 2017). Stock market flakiness may also affect business investments (Tah, 2013), and economic growth directly (Oloweny and Omondi, 2021). A rise in stock market flakiness can often be interpreted as a rise in equity and thus a shift of funds to less risky assets, this move has led to rise in the cost of funds to firms and thus new firms (new entrants) might bear this effect as investors turn to the purchase of stocks in largely, well known firms (Rajni and Mahendra, 2017).

The understanding of flakiness in a stock market will be useful in the determination of the cost of capital and in the evaluation of asset allocation decision. Policy makers therefore rely on market estimates of flakiness as a barometer of the vulnerability of financial markets (Olowe, 2019). However, the existence of excessive volatility in the capital market undermines the usefulness of stock prices as a signal about the true intrinsic value of firms, a concept that is core to the paradigm of the informational efficiency of markets (Ovat, 2012). In Nigeria, activities of the recent past such as the recapitalization of the banking industry in July 2010, and the insurance industry in September 2014, boosted activities through the number of securities listed on the stock market, increased public awareness and confidence about the stock market (Dania & Spillan, 2013). The increased trading on the stock market could have affected the flakiness of the stock market. Apparently, investors have been worried about the falling stock prices on the Nigeria stock market (Olowe, 2019). Also, the Nigeria stock market is a developing and inefficient one characterised by time lag between information availability about a stock and its full reflection in the price of the stock, poor infrastructural facilities in the country which virtually hinders free flow of information and speedily enough to actual and potential investors, activities of corporate insiders and insider abuses.

Hence, an evaluation of volatility and stock price prediction in Nigeria stock market is imperative as it helps to predict the path of its economic growth and also determines the efficiency of the stock market which will serve as an indicator of economic growth and development in Nigeria and in turn attract foreign portfolio investments (FDI).

The scope of this study is limited to the Nigerian Capital Market with specific reference to the stock prices of selected consumer goods companies in the Brewery, Food and Beverage, and Petroleum industry. For the study, month-end stock prices were analysed for the period spanning from January 2017 to December, 2022.

Review of related literature

Conceptual framework

Volatility is simply defined as a measure of dispersion around the mean or average return of a security. It is a measure of the range of an asset's price about its mean level over a fixed amount

of time (Abken & Nandi, 2016). It follows therefore, that volatility is linked to the variance of an asset price. If a stock is labelled as volatile, then the price will vary greatly over time. Conversely, a less volatile stock will have a price that will deviate relatively a little over time. Volatility is calculated as the standard deviation from a somewhat continuously compounded return over a given period of time. It forms an important measure to quantify risk, for example, a security with a volatility of 50% is considered very highly risky because it has the potential to increase or decrease up to half its value. Volatility is a measure of risk based on the standard deviation of the asset's return. It is a variable that appears in options pricing formulas, where it denotes the clustering of the underlying asset return from now to the expiration of the options (Karolyl, 2011; Mordi, 2016).

Stock prices are conditioned by volatility when significant changes occur, causing investors tending to panic. Different factors influence the movement in stock prices. Notable among the factors are arrival and disclosure of new information, demand and supply forces, investor psychology, economic strength of the market, uncertainty about the future economic outlook.

Determination of Share Price

Determination of Share price is the act of trying to identify the future value of a company's stock or other financial instruments traded on a financial exchange. The successful prediction of a stock future price could yield significant profit. Some believe that stock price movements are governed by the random walk theory and thus unpredictable. Others disagree and those with this view possess a myriad of methods and techniques that purportedly allow them to gain knowledge about the future price. Within the last two decades, a great deal of attention has been focused on the idea of predicting stock prices and price fluctuations (Wojciech, 2017). In this regard, a look at the degree or extent to which already existing theories have effectively succeeded in predicting stock prices is imperative.

The widely accepted theory of how the stock market works is the EMH-Efficient Market Hypotheses (Warneryd, 2011), which in its simplest form, states that stock prices always reflect all the available information about the market and companies in question. The theory also assumes that every investor has access to all the required information to value a stock. This problem of

"perfect information" is its interpretation while financial statements and economic statistics are widely available, one cannot assume that such information is interpreted by all investors (Okodua & Ewetan, 2013). Indeed, this interpretation often depends on how information is framed and where it comes from (Afolabi, 2015). Furthermore, well documented stock market anomalies such as an increase in share prices in January and a continuation of Friday trends on Mondays run counter to the idea of unpredictable and perfectly efficient markets (Dimson, 2018). In terms of large groups, one of the major problems with the EMH is that the assumptions imply investors act independently of each other: a naïve investor making mistakes will be taken advantage of by a rational investor. However, it is often the case that investors are in unison as can be seen during periods of irrationally increasing prices (Shlefier, 2011).

Fundamental and technical analyses are other means of predicting stock prices. Whereas fundamental analysis looks at many different aspects of a company, including industry and economy to identify factors that influence stock prices, their behaviour and movements for the purpose of predicting how well a stock will perform in the future. Technical analysis is often defined as "the process of analysing a security's historical data (prices and volume) in an effort to determine probable future prices" (Achelis, 2011; Murphy, 2016). Proponents of the technical factors influencing stock price movements in a market holds that fundamental factors are indeed important and reflected in the price behaviour of stocks in the market. They however argued that psychological and other factors like investors' emotions which epitomised the sometimes irrational behaviour of investors are also important in determining the behaviour of stock prices in the market. Thus, it is possible to predict the future of a stock by diligent and painstaking study of the historical price movements of the stock in the market (Osaze, 2017).

The use of technical analysis within investment decisions has been controversial. According to efficient market hypothesis, investors act completely rational and have access to all required information to value a stock price during the present as such, a stock current price reflects its value at that time, and has no connection with past prices. Such assumptions have been criticised and statistical analyses of technical indicators have shown their usefulness in predicting trend reversals and share price fluctuations (Okonkwo, Ogwuru & Ajudua, 2014). One of the problems with technical analysis is that so many tools exist, many of the details are subjective, it is still up to the

investor to choose values for the variables with each tool, and it is the investor's decision to follow a buy or sell signal from a technical indicator.

In spite of the arguments of the technical and fundamental analysis about the price behaviour of stocks in the market rape which profits can be made, there is the majority underlying theory of stock price behaviour which contends that the market is efficient that one cannot beat it with any of the techniques discussed so far. This is the Random Walk Theory. The central idea behind the random walk theory is that the randomness of stock price renders any attempts to find price patterns or take advantage of new information futile. In particular, the theory claims that day-to-day stock price movement is independent of each other because there is no serial correlation between price changes from one period to another, meaning that momentum does not predict future growth (Malkiel, 2013).

Theoretical framework

Prediction of stock prices is generally believed to be a very difficult task if a nation's economy is being affected by inflation and fluctuations of exchange rate. In recent years, the role of information in stock pricing has attracted wide interest in arrears of finance and economic literatures (Okan, *et al,* 2019). This attention has been driven by the recent advances in market microstructure literature which greatly enhance our understanding of the incorporation of information into asset price and volume. As documented widely in finance literature, trading volume and price volatility display a positive correlation. Schwert (2019), evidenced a positive relationship between estimated volatility and current and lagged volume growth rates through the linear distributed lag and Volatility Autoregressive (VAR) model for the monthly aggregates of daily data on standard and Poor (S&P) index. Roni and Shouyang (2020), in a seminar work using the individual stocks from the S&P index reported a positive conditional volatility- volume relationship in models with the Gaussian errors and Gaussian Autoregressive Conditional Heteroskedasticity (GARCH) type volatility specifications. One of the earlier models to explain the positive volume and volatility correlation is mixture of distribution hypothesis that posits a joint dependence of returns and volume of an underlying latent event or information flow variable. That is both trading volume and price respond contemporaneously to new information (Omoregie, Eromosele & Edo, 2016).

Many financial time series have been modelled after the use of GARCH model (Bollerslev, 2016). Thus, the GARCH effect is explained by considering the rate of arrival of information flow as the mixture variable. Accordingly, Brailsford (2016), tested the relationship among the trading volume and conditional return volatility in Australian stock market using the GARCH (1,) model. He concluded that for absolute returns, the results provide a strong support to the influences of Lamoureux and Lastrapes (2020). In contrast, some of the latter studies (Chen, *et al.,* 2011; Aroga & Nieto, 2014), suggest no reduction in the persistence of volatility. Sequential information arrival hypothesis is another framework to explain volume and volatility correlation developed and extended by the studies of Copeland (1976), Jennings, *et al.,* (1981), Jennings and Barry (1983), and Starks (1985). In this model, new information is disseminated sequentially to investors. Thus, the correlation between trading volume and price volatility arises in a sequential manner.

Akgiray (2019), presented evidence about the time series behaviour of stock prices. Daily return series exhibited significant levels of second-order dependence and they could not be modelled as linear white-noise process. A reasonable return-generating process was empirically shown to be a first-order autoregressive process with conditionally heteroskedastic innovations. Corhay and Rad (2014), indicated that conditional heteroskedasticity was a prime feature of daily returns behaviour of five European equity indices. They exhibited non-linear dependence that could not be captured by the random walk model. The class of autoregressive conditional heteroskedastic models was generally consistent with the stochastic behaviour of these returns series. The evidence presented by them revealed that the GARCH-t (1, 1), i. e. a GARCH model with conditional errors that were t-distributed, fitted the data best. Thus, their results confirmed that this class of model was appropriate for studying the behaviour of stock returns on a small equity market. They are supported that GARCH model could indeed provide better forecasts of valuation models.

While most empirical studies have been limited to the US and European markets, limited number of researchers have applied the literatures by examining trading volume, price (return) and volatility relationships in emerging markets. Moosa and Al-Loughani (2015), used monthly data to examine four Asian stock markets which are Malaysia, Philippines, Singapore and Thailand, while Saatcioglu and Stalks (2018), scrutinised six South American stock markets that are Argentina, Brazil, Chile, Columbia, Mexico and Venezuela. Besides Olowe (2019), examining volatility in the Nigerian stock market, Keania, Okidim and Godwin (2021), examined the 25

individual stocks traded in Istanbul stock exchange in this respect. In brief, it is generally accepted that there is relationship between trading volume and price volatility indicated by different models and methods.

Methodology

The longitudinal survey research design was adopted for this study because, stock price movements in the selected companies over time were studied and the data was collected at different points in time without any attempt to influence them. Data obtained showed changes in the variable stock prices of interest overtime. The population of the study comprises quoted firms in the Nigeria Exchange Group from January 2017 to December 2022. However, four major companies (Dangote sugar, Nigeria Breweries, Nestle Foods and Mobil Petroleum) based on trading volumes and active industrial classification constitutes the sample of this study. The data collected and used for this study were obtained from secondary sources. The data comprises the month end stock prices covering January 2017 to December 2022. The data were obtained from the official website of Cash Craft Asset Management (member of the Nigerian Exchange Group).

Model Specification

The study adopted the following models:

Model 1: Stock prices

Following the literature on volatility measurement we used an ARCH (2) model in testing for the presence of volatility in the selected sampled companies' stock prices.

The ARCH (2) model is given as follows:

$$\boldsymbol{p_l = \alpha_0 + e_l} \text{.....(1)}$$

Estimating equation (1) using a regression technique and obtaining the error term (e_1)

$$\boldsymbol{e_l^2 = \beta_a + \beta_1 e_{l-1}^2 + \beta_2\, e_{l-2}^2 + \mu_t} \text{ ..... (2)}$$

Equation two test for the presence of ARCH effect and the presence of ARCH effect implies that there exists cluster or volatility in time series.

In measuring. volatility in stock market prices adopted ARCH (1) mode and the estimation prices is shown as follows:

$$p_t = \beta_2 + \mu_t \quad \text{.....} \quad \text{(3)}$$

$$\mu_t - \Delta P_t^r - \Delta P_t^r \quad \text{.....} \quad \text{(4)}$$

Thus, μ_t is the mean adjusted relative change in the time series? Now we can use μ_t^2 as a measure of volatility. Being a squared quantity, the value will be high in periods when there are big changes in the price of financial assets and its value will be comparatively small when these are modest changes in the prices of financial assets.

Model 2: Prediction of Stock Prices

The stock price mode prediction model that integrates volatility will be specified as follows:

$$p_t = \Lambda_0 + \Lambda_2\, p_{t-2} + \Lambda_2\, p_{t-2} + \Lambda_3\, U_t^2 + \emptyset \quad \text{..... (5)}$$

This model suggests that stock market price production depends on past stock prices (i.e. the random walk hypothesis does not hold) and stock price volatility.

Where:

p_t = Current stock prices of selected firm

$p_t - i$ = Past stck prices such that

$p_t - i$ (1 year lag stock prices) and

$p_t - 2$ (2 years lag stock prices)

U_t^2 = ARCH measure of stock price volatility.

Hypotheses

$H_0$1: There is no significant indication of volatility in the Nigerian stock market.

$H_0$2: There is no significant relationship between the eve of volatility and stock price prediction in the Nigerian stock market.

Method of Data Analysis

The focus of this study is to support or refute the volatility of stock prices in the Nigerian exchange group. To achieve this, the Auto-Regressive Conditional Heterskedasicity (ARCH) models

introduced by Engel (1982), were employed. The appeal of the model is that it captures both volatility clustering and unconditional returns distribution with heavy tails.

Data Presentation and Analysis of Results

Model 1: Stock Price Volatility

The mean and standard deviation tends to capture volatility in stock prices and it is a dispersion or variation from the norm. A high standard deviation is indicative of a higher volatility while a lower standard deviation indicates a lower volatility in the prices of stocks. Based on Table 1, out of the four companies analysed, Nestle stock prices have higher level of volatility because the estimated standard deviation are 63.01 and 42.05 respectively, which are higher than other companies' standard deviation. Hence, it can be deduced that the prices of Dangote sugar and Nigerian Breweries stocks are more stable compared to that of Mobil and Nestle during the period under consideration while there is higher degree of dispersion in the prices of Mobil and Nestle stocks during the same period.

Following the results in Table 2, we can infer that there is ARCH effect in the stock prices of the four selected firms. This is because the t-values are 7.4662, 3.9916, 4.1981 and 3.5266 respective and statistically significant at 5% level as each of this value is higher than t-critical value of 2.000. Besides, since the value of e_1^2 is not equal to the value of the intercept $(\propto_0)$, it shows the presence of the ARCH effect.

Model 2: Stock Price Prediction

Following the results in Table 3, which represents the prediction of stock prices, the result shows that about 67%, 77%, 56% and 65% of the systematic variations in Mobil, Dangote sugar, Nigeria Breweries and Nestle stocks prices, respectively are explained by past stock prices ($P -_{t\,1}$ and $P -_{t\,2}$) and stock price volatility. The F statistic in the model shows that the model is generally significant since the F- calculated value for each of the four stocks is greater than their respective f- critical values at 5% level of significance. In predicting the stock prices of each of the four firms under consideration, the results shows that one period lag (past) stock price had positive and significant impact on current prices as the t-values of -7.1376; -7.099; -5.366 and -5.4690 for Mobil, Dangote sugar, Nigeria Breweries and Nestle stocks respectively were all greater than t-critical value of -2.000 at 5% level of significance. In the case of the second period lag (past) stock price impact on the current stock price was statistically insignificant for all the four stocks because

the t-values of -1.3997; -0.2436; -0.2558 and -0.3509 each is less than the critical value of -2.000 at 5% level of significance. However, volatility in stock prices as an explanation of current stock prices was statistically insignificant for Mobil and Nigeria Breweries stocks as their individual t-value of -2.037 and -0.369 respectively is less than the critical value. However, such volatility in stock prices as an explanation of current stock was statistically significant for Dangote sugar and Nestle stocks. From the aforementioned, there is therefore empirical evidence to state that random walk hypothesis does not hold in any of the four stocks analysed (which can therefore be generalised for the entire Nigerian stock market). Besides, while stock market price volatility significantly drives Dangote sugar and Nestle stocks prices, it does not drive Mobil and Nigeria Breweries stock prices during the period under consideration.

Test of Hypotheses

In testing the hypotheses of this study, the F-statistic was used. The study adopted 5% level of significance.

$\mathbf{HO_1}$: There is no significant indication of volatility in Nigeria stock prices.

The empirical result from ARCH (2) for each of the four stock prices analysed showed that the F-calculated values were all greater than their respective critical values. Therefore, the null hypothesis is rejected and the alternate hypothesis which states that there exists significant indications of volatility in Nigeria stock prices is accepted.

$\mathbf{HO_2}$: There is no significant relationship between the level of volatility and stock price prediction in the Nigeria stock market.

The empirical result from ARCH (1) for Dangote sugar and Nestle stocks showed that their t-calculated value is greater than the t-critical value of 2.000 at 5% level of significance. Therefore, the null hypothesis is rejected and the alternate hypothesis which states that there exists a significant relationship between the level of volatility and stock price prediction in the Nigeria stock market accepted. Whereas for Mobil and Nigerian Breweries stocks, the analysis showed that their t-calculated values are less than the t-critical values at 5% level of significance, hence we reject the alternate hypothesis and accept the null hypothesis which states that there was no significant relationship between the volatility and the stock price prediction in the Nigeria stock market.

In conclusion, it was observed that while volatility could not predict current stock prices of some companies, in other cases volatility predicts current stock prices of other companies.

Summary of Findings

This study investigates the relationship existing between the level of volatility and stock price prediction in Nigeria, and the presence of volatility in stock market prices. Several findings and implications are derived from the model presentation. It was found that the Nigerian stock market prices show persistence or indicated a high level of flakiness (risk). The findings on the relationship between volatility and predicting stock prices were mixed. Based on the fact that Mobil and Nigerian Breweries stock prices flakiness could not predict their current stock prices and hence volatility in these two cases was insignificant and negative. While current stock prices of Dangote sugar and Nestle foods were significantly predicted by volatility of their stocks thereby giving an indication of a positive relationship.

One major deduction from the empirical result is that the conclusions of random walk hypotheses are as expected, thrown in doubts. The claim is consequent upon the evidence of past stock prices predicting current stock prices, as in the case of Mobil stock prices where past stock prices (one period lag) had positive and significant impact on current prices (t-value 7.1376 >t-critical value 2.000 at 5% level of significance). However, this empirical evidence was present in all other three stocks analysed. Primarily the movement of stock market prices may indeed be predicted, contrary to the efficient market hypotheses and random walk theory conclusions. For this reason, policy makers in Nigerian stock market may need to re-examine their economic policy.

However, these findings have important policy implications. For individual investors, flakiness in a firm's stock price is no longer seen as the true intrinsic value of the firm and thus investors might lose confidence in the stock market. Corporate investors should be well attuned to the development on the stock market and all available information pertaining to their investments because stock prices are very sensitive to this information. Hence a more informed portfolio management and selection should be encouraged for investors. Besides, investors can implement their own investment policy by studying the trend of flakiness in the market over time in order to be able to predict stock price movement and gain fair superior advantage far trading actively on the Nigerian stock exchange. In essence, flakiness in stock prices becomes a tool that can be used to achieve desired economic objectives. However, investors must be aware that under inefficient stock market (like Nigerian exchange Group), heavy gains are just as likely as heavy losses. Also, these findings are important because they could be crucial in areas such as the design of stabilization and drafting of economic programmes and policies for the economy as a whole. Since policy makers in the financial sector play major role in influencing the expected return-risk premium and volatility of stock market, the results of this study will help investors and portfolio managers deepen their understanding of volatility (risk) and price relationship as well as diversification implication in Nigerian stock market.

Conclusion

Flakiness is a widely researched topic in the finance literature. The performance of estimation models of varying complexity has been investigated according to a range of measures and generally mixed results have been recorded. The main thrust of this study is the empirical investigation of the indication of volatility and the relationship between volatility and financial conditions in the Nigeria capital market.

Despite other studies such as Victoria and Emem (2020); Ayadi (2014); Olowe (2019); and Okpara (2010), it was discovered that the Nigeria stock market is efficient in the weak form and stock prices follow a random walk and hence cannot be predicted, suggesting that the opportunity to make excess return on the market does not exist. This however, contradicted these findings by observing that stock prices in the Nigeria capital market do not follow a random walk and thus are predictable. However, the results and findings of this study discovered that the Nigeria stock exchange is not efficient in the weak form.

In conclusion, risk occurs to some degree in all investment markets, and flakiness is one reflection of this risk. Contrary to popular opinion, volatility should be recognised as a necessary part of the risk and return relationship. A reasonable amount of flakiness in an investment is the trade-off for higher long-term returns expectations. Investors should not alter their asset allocation plan in response to short-term changes in flakiness, but should review the reasonable long-term expectations for volatility when creating their strategic assets allocation.

Recommendations

From the findings of this study, the following recommendations are hereby put forward for policy implications. Information disclosure- availability of information on the attributes of firms is desirable in assessing the viability of these firms. As such, information goes a long way in enhancing the efficient pricing of the securities of firms, companies, in disclosing vital information concerning the state of affairs of their firms should also ensure that they are timely. This will help market participants in evaluating the performance of these firms, and hence the pricing of their securities. Thus, most information about the firms should not be the exclusive reserve of insiders.

The Nigerian stock exchange and the Securities and Exchange Commission should encourage the setting up of rating agencies which will be concerned primarily with analysing the performance of firms and which will in turn help in the efficient price adjustment of securities in line with price mechanism.

Institutional investors, government and their agents are known to acquire large a number of securities. Because of their buy and hold strategy, there is paucity of such securities. The demand for such securities in the market is rarely or never met since there is no adequate supply. The absence of adequate supply negates the establishment of efficient price level(s) by the interaction of the forces of demand and supply. The market regulators should make a policy that would ensure that only a very small percentage of new issues are acquired by these groups of investors.

There should be more sustained effort on the part of government geared at providing basic infrastructural facilities that aid development and facilitate activities on the stock exchange as this will bring about increased access to new information by investors. The inadequate access to such facilities has hindered the growth and development of the Nigeria stock market thereby affecting the depth and breadth of the market. There is need to create a stable political environment free from terrorism and other vices as against the current trend of insecurity ravaging the country in order to attract foreign investments (portfolio and listing) to strive in the stock market as this will boost the confidence of the international community in Nigeria stock market.

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Appendix 1:

Stock Prices Statistics

	Mobil	**First Bank**	**Nigeria Brewery**	**Nestle Nigeria**	**General**
Mean	182.031	32.6765	41.69566667	204.1643333	115014188
St. Error	8.134319704	1.498904173	1.03008184	5.429394678	5.6421122
Median	172.99	32.67	41.07	201.25	77.455
Mode	180	32	35	190	180
St. Deviation	63.01204248	11.6104610	7.975979665	42.05591034	87.407227
Sample Var	3970.517497	134.8028231	63.6641165	1768.699594	7640.0233
Kurtosis	2.051442391	-0.51054319	-1.11249349	1.375864943	0.648343
Skewness	1.373475161	004754785	0.141811572	0.626221331	0.614207
Range	263.63	-189	30.99	213.41	341.69
Minimum	92.01	14	26.01	133.41	14
Maximum	355.69	62.9	57	34714	355.69

Sum	10921.86	19605.9	2501.74	12249.86	2763405
Count	60	60	60	60	240

Appendix 2:

ARCH(2) Regression Result Dependent Variables e_t^2

	1	**2**	**3**	**4**
Intercept ($\propto_0$)	854.60 (1.375)	64.927 (2.6855)	21.933 (2.4309)	1168.97 (2.6367)*
e_{t-2}^2	0.9736 (7.4662)*	0.5301 1(3.9916)*	0.5525 (4.1981)*	0.4625 (3.5266)*
e_{t-2}^2	-0.1740 (-1.3352)	0.0036 (0.0265)	0.1240 (0.9429)	-0.1318 (-1.007)
Å	0.69	0.25	0.38	0.15
N	60	60	60	60

Source: Author's Computation, 2022.

Appendix 3:

Stock Price Predictability and Volatility Results

Dependent Variable P_t

	1	2	3	4
Intercept ($\propto_0$)	45.109 (3.215)*	3.977 (1.831)	15.481 (5.120)*	80.135 (5.865)*
P_{t-1}	0.9312 (7.138)*	0.9431 (7.099)*	0.677 (5.336)*	0.634 (5.496)*
P_{t-2}	-0.1759 (1.3997)*	-0.029 (-0.244)	-0.029 (0.256)	-0.036 (-0.350)
$\cup_t^2$	0.00040 (0.2037)	-0.035 (-2.575)	-0.004 (0.369)	0.006 (3.580)*
R^2	067	0.77	0.56	0.65
F	41.25	67.89	26.75	38.08
N	60	60	60	60

Source: Author's Computation, 2022.

NB: 1 Mobil stock prices, 2- First Bank stock prices, 3- Nigeria Brewery stock prices, 4- Nestle stock prices. Where the parenthesis represent the t- Values,*Indicates 5% level of significance.

Appendix 4:

Mobil Stock Prices Volatility Test (i)

REGRESSION STATISTICS	
Multiple R	0.835434555
R Square	0.697950896
Adjusted R Square	0.087352682
Standard Error	4283701595
Observations	60

Appendix 5:

Mobil Stock Price Volatility Test (ii)

	Coefficients	Standard Error	T Stat	P-value
Intercept	854.5958803	621.6988616	1.374614	0.174631415
RESIDLAG1 2	0.973641853	0.130406224	7.466222	5.31529E- 10
RESIDLAG2 2	-0174025751	0.130336614	-1335202	0.187118201

Appendix 6:

First Bank Stock Prices Volatility Test

	Coefficients	**Standard Error**	**T Stat**	**P- value**
Intercept	64.92752363	24.17736575	2.685467238	0.00947002
RESIDLAG1 2	0.530055118	0.13279356	3.991572479	0.0001893
RESIDLAG2 2	0.00356774	0.134404113	0.026544873	0.97891546

Appendix 7:

Nigerian Brewery Stock Prices Volatility Test (i)

REGRESSION STATISTICS	
Multiple R	0.637011873
R Square	0.405784126
Adjusted R Square	0.384934447
Standard Error	46.43836812
Observations	60

Appendix 8:

Nigerian Brewery Stock Prices Volatility Test (ii)

	Coefficients	**Standard Error**	**T Stat**
Intercept	21.93287745	9.02223991	2.430979188
RESIDAG1 2	0.552569908	0.131622251	4.198149645
RESIDAG2 2	0.124036619	0.131538421	0.942968739

Appendix 9:

Nestle Stock Price Volatility (i)

REGRESSION STATISTICS	
Multiple R	0.426526721
R Square	0.181925044
Adjusted R Square	0.15322066
Standard Error	2871.509557
Observations	60

Appendix 10:

Nestle Stock Price Volatility Test (ii)

	Coefficients	**Standard Error**	**T Stat**
Intercept	1168.979785	143.3443105	2.63673122
RESIDLAG1 2	0.462512442	0.131148605	3.526628768
RESIDLAG2 2	-0.131806593	0.1303893562	-1.006975368

Appendix 11:

Nestle Stock Price Predictability and Volatility

REGRESSION STATISTICS			
Multiple	0.819208295		
R Square	0.67110223		
Adjusted R Square	0.653482707		
Standard Error	24.7565142		
Observations	60		

ANOVA					
	Df	**SS**	**MS**	**F**	**Significance**
Regression	3	70031.71633	23343.90544	38.08655759	1.50144E-13
Residual	56	34321.55974	612.8849954		
Total	53	104353.2761			

	Coefficients	**Standard**	**T Stat**	**P-value**
Intercept	80.13520921	13.66412116	5.864644223	2.5213E-07
PRICE (- 1)	0.634319037	0.115413166	5.496071693	9.88053E-07
PRICE (-2)	-0.035208606	0.103161995	-0350987846	0.726914501
VOLATILITY	0.--652323	0.001823446	3.580160228	0.00718343

Appendix 12:

Nigerian Brewery Stock Price Predictability and Volatility

REGRESSION STATISTICS		
Multiple	0.767462531	
R Square	0.588998737	
Adjusted R Square	0.566980812	
Standard Error	5.250503215	
Observations	60	

ANOVA					
	Df	**SS**	**MS**	**F**	**Significance**
Regression	3	2212.386969	737.462323	26.75087	7.23741E-11
Residual	56	1543.795904	27.56778401		
Total	59	3756.182873			

	Coefficients	**Standard**	**T Stat**	**P-value**	
Intercept	15.48115063	3023245804	5.120705241	3.88E-05	
PRICE (-1)	0.67721594	0.12689905	5.336650988	1.77E-06	
PRICE (-2)	-0.028754064	0.112396942	0.255826033	0.799023	
VOALITILITY	-0.004103458	0.011921832	-0.369360826	0.713252	

Appendix 13:

First Bank Price Predictability and Volatility

REGRESSION STATISTICS					
Multiple	0.88564361				
R Square	0.784364603				
Adjusted R Square	0.772812707				
Standard Error	5.534030037				
Observations	60				
ANOVA					
	Df	**SS**	**MS**	**F**	**Significance**
Regression	3	6238.339	2079.446	67.89921	1.18918E-18
Residual	56	715.027	30.62549		
Total	59	7953.367			
	Coefficients	**Standard**	**T Stat**	**P-value**	
Intercept	3.977106934	2.171925	1.831144	0.072401	
PRICE (-1)	0.943137218	0.132854	7.09904	2.37E-09	
PRICE (-2)	-0.029600005	0.121497	-0.24363	0.80841	
VOLATILITY	-0.035219419	0.013677	-2.5751	0.01269	

Appendix 14:

Mobil Stock Price Predictability and Volatility

REGRESSION STATISTICS					
Multiple	0.829730457				
R Square	0.688465908				
Adjusted R Square	0.671776581				
Standard Error	36.10009455				
Observations	60				
ANOVA					
	Df	**SS**	**MS**	**F**	**Significance**
Regression	3	161280.39	53760.13	41.25187	3.32836E-14
Residual	56	72980.1423	1303.217		
Total	59	234260.5323			

	Coefficients	**Standard**	**T Stat**	**P-value**	
Intercept	45.10962025	14.03121246	3.214948	0.002167	
PRICE (-1)	0.931234222	0.130467133	7.137692	2.05E-09	
	-0175361552				
PRICE (-2)	0.000403415	0.125643313	-1.39969	0.167122	
VOLATILITY		0.001980408	0.203703	0.839324	