

## Testing for Linearity of Stock Returns in the Nigerian Food and Beverage Industry - A Study of Nestle Plc and Cadbury Plc

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### **Abstract**

*The study tested linearity of stock returns in the Nigerian food and beverage industry using Nestle Plc and Cadbury Plc as selected firms of study. The objectives of study being to establish the existence of a linear relationship between market capitalization and value of equity on one hand and the impact of market capitalization and stock returns on the other. The methodology used in testing the hypotheses was simple regression where the capitalization and valuation were the determining variables varying the magnitude and direction of stock returns the findings indicated that for both hypotheses, capitalization had a linear and positive relationship which has a significant effect on stock returns. In conclusion, the fundamental role of stock market is to provide adequate guarantee to shareholders of Cadbury Plc and Nestle Plc by carrying out studies about the volatility, performance and efficiency of stock returns remains vital and essential information to investors. It was observed that market capitalization had positive and significant impact on stock returns. The research established that there is a linear relationship between market capitalization and valuation of equity for the two firms under and that stock returns for the two firms are affected by the market capitalization. This study recommends that the Nigerian Securities and Exchange Commission should create policies that will encourage increases in firms profit after tax and their dividends as these variables have been statistically proven to have strong significances on the changes in the company's performance and the value of market capitalization. New theories should be developed by further studies on the "size effect" of market returns on volume and price. Currently theoretical explanations in literature for size effect do not sufficiently explain the gaps in previous research even though there is a general agreement about the importance of size. It is important that more research be made in studying theoretical and empirical applications of models measuring weighty risk management strategies such as portfolio rebalancing. As a risk control strategy knowledge of portfolio rebalancing can be seen where an informed investor acknowledges the usefulness of compounding effect of returns on his portfolio by calculating based on compound average and not simple average.*

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**Keywords:** Testing, Linearity, Stock Returns, Nestle Plc and Cadbury Plc

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### **Introduction**

There is a very significant correlation between money supply, deflated for changes in the consumer price index, and the general level of stock prices. Increases in the money supply provide liquidity, however increases in the consumer price index decreases liquidity. Evidence have been provided in the studies of many stock market models by academics ranging from rigorous analytical frameworks to questionable intuitive reasoning suggesting that liquidity plays a significant role in explaining the cross-sectional variation in stock returns. According

to Mazumdar, (2004), changes in liquidity measured by increase in market capitalization are also a casual factor producing immediate changes in stock returns.

Adequate market liquidity motivates investors to adjust their wealth portfolios in such a manner as to yield predictable movements in the prices of securities. Liquidity considerations correspond to the individual's attitude to risk, the risk preference of the investor influences the individual's choice for precautionary-liquid balances. Generally as the size of an individual's portfolio increases the smaller will be the portion of highly liquid assets held.

Demand pressure, exogenous trading costs, inventory risk, search frictions, and asymmetric information are common denominators affecting liquidity in the market. There is increased cost to the investor who holds assets that are less than perfectly liquid hence there is a positive relationship between stock returns and illiquidity, conversely, the relationship between stock returns and liquidity should be negative. Patient investors who make long term investments in assets that are sensitive to liquidity expect higher returns as a compensation for additional risks. That is why there should be liquidity risk premium in stock pricing (Amihud, 2002).

Amihud et al (2005) studied the implications of liquidity on stock returns defining the degree of market liquidity as the cost of immediate execution. They also indicated that the bid-ask spread contains a premium for immediate purchase or sale, and also that the spread between supply and demand is a natural measure of liquidity. Amihud et al (2005) proved that in an equilibrium context there is an increasing and concave relationship between required return rate and the degree of liquidity of financial assets. They also show that financial assets spreads are negatively correlated with certain measures of liquidity such as trading volume.

Amihud et al (2005) indicate that measuring the degree of liquidity compared to bid-ask spread is critical since the spread contains an information asymmetry component. In other words the effects of liquidity with information asymmetry may often be measured by the variable component of transaction costs. As anticipated return increases expectedly market liquidity reduces but time forecast return excess compensates market's anticipated liquidity. Amihud (2002) proves that anticipated market illiquidity has a positive and significant effect, while non-anticipated illiquidity has a negative and significant effect. Market-wide liquidity is a factor for pricing common stocks. Expected stock returns are related cross-sectionally to the sensitiveness of stock returns to innovations in aggregate liquidity. Stocks that are more sensitive to aggregate liquidity have substantially higher expected returns, even after accounting for exposures to the market return as well as size, value, and momentum factors.

Dimitri and Jiang (2012) used liquidity measures capturing dimensions associated with the strength of volume-related return reversals. Liquidity measures are characterized by significant commonality across stocks, supporting the notion of aggregate liquidity as a priced state variable. Smaller stock are less liquid, according to our measure, and the smallest stocks have high sensitiveness to aggregate liquidity.

### **Brief history of the firms under study**

#### **Nestle Nigeria Plc**

This is a publicly listed food and beverage specialty company headquartered in Lagos. It is majority owned by Nestle S.A of Switzerland. The company was founded in 1961 and conducted trading under the name of Nestle Products Nigeria Limited. It has its main factory in Agbara Industrial Estate, Ogun. They began business with the trade name of Nestle Products Nigeria, in 1969; the name was changed to Food Specialties Limited. It began trading on the Nigerian Stock Exchange in 1979 as Nestle Nigeria Plc. The firm has two factories at Ogun

State and distribution center at Ota. Brands of Nestle such as Cerelac, Milo, and Maggi cube which have gained household status.

### **Cadbury Nigeria Plc**

Cadbury Nigeria is a food, sweets and Drink Company headquartered in Lagos, Nigeria and traded on the Nigerian Stock Exchange. They began operations in Nigeria as Cadbury Schweppes history in Nigeria dates back to the 1950s when it began sourcing for Cocoa and also importing bulk products and repacking it into tins for sale in the country. Later finding market opportunities in the country, the group set up a manufacturing facility in January in 1965.

### **Objectives of research**

- (i) The research intends to establish if there is a linear relationship between market capitalization and valuation of equity for the two firms under study.
- (ii) The study also wants to see if subsequent to the first objective, if the stock returns for the two firms are affected by the market capitalization.

### **Research hypotheses**

Ho<sub>1</sub> That there exists a linear relationship between market capitalization and valuation of equities for the two firms under study.

Ho<sub>2</sub> That subsequent to the first objective, that the stock returns for the two firms under study are affected by market capitalization.

## **2.0 Literature review**

Investment strategy of an investor will consider the overall risk and return of the portfolio rather than of an individual security. However, if markets are not efficient, higher returns can be made by correctly picking winners (Rutterford, 1993). It has been empirically proved that most western equity markets are more efficient in comparison to their developing countries counterparts (Gupta and Basu, 2007). Like fair game in game theory the expected return from efficient market is also zero (Fama, 1965). Fama (1970) and (1991) provided the formal definition of "Market Efficiency". Fama categorized market efficiency into three classes which are weak form, semi strong form and strong form. In Weak form of efficiency the stock yields are serially un-correlated and have a perpetual mean. In other words, a market is considered weak form efficient if current prices completely imitate all information incorporated in past prices, which means that no investor can toil a plan on the basis of past price patterns alone with the purpose of earning abnormal returns. Semi strong efficiency suggests that only information that is not publicly available can benefit investors seeking to earn abnormal returns on investments. All other information is accounted for in the stock price and, regardless of the amount of fundamental and technical analysis one performs, above normal returns will not be had. The last of the market efficiency ideology is the strong market efficiency which implies that profits exceeding normal returns cannot be made, regardless of the amount of research or information investors have access to, the premise being that all market information public or private is accounted for in the stock price.

The efficient market hypothesis posits that stocks are priced efficiently to reflect all available information about the intrinsic value of the security as it has been said that an efficient market is one where all unexploited profit opportunities are eliminated by arbitrage (Ajayi, Mehdiyan and Perry, 2004). A considerable volume of literature has, however, documented several persistent and potentially exploitable daily patterns on stock market liquidity and these anomalies present legitimate challenges to an efficient stock market.

Seasonalities in security market returns have been extensively documented. Among the different seasonal effects observed in stock markets, an interesting one is the seasonality across the days of a week. Its discovery goes back to Fields (1931). Fields observed that the US stock market consistently experienced significant negative and positive liquidity on Mondays and Fridays respectively. The observation once again started receiving increasing attention during the 1980's (French, 1980; Gibbons and Hess, 1981; Lakonishok and Levi, 1982), especially when it was discovered that capital markets of many other countries also experience similar seasonality (WesterField, 1985; Peiro, 1994; Agarwal and Tandon, 1994). This “day of the week effect”, in sharp contrast to the theories of efficient market, was considered a puzzle and despite different theories, so far the puzzle has not been satisfactorily resolved.

As more and more empirical evidence are obtained from different stock markets all over the world, the puzzle far from being solved seems to have increased. Using a long time series data from 1962–1993, Wang *et al* (1997) found out that the US capital market enhances liquidity. Also studying liquidity in the US market, Peiro (1994) observed that there were positive stock market returns. Of late, studies have incorporated volatility of market returns in the framework of analysis (Ho and Cheung, 1994; Choudhry, 2000).

A market is characterized as efficient if stock prices promptly reflect any new publicly available information and it is called efficient when all available information whether available publicly or privately affects stock market returns. It is against the concept of how efficient the Nigerian stock market is that, this study examined the impact of liquidity and volatility on stock market returns of the Nigerian stock market.

Over the years, Economists have been emphasizing the need for effective mobilization of resources as a catalyst for national development in any economy, which can only be achieved through the effectiveness in the mobilization and allocation of funds to different sectors of the economy. Basically, the capital market is primarily created to provide avenues for effective mobilization of idle funds from the surplus economic units and channel them to the deficit economic units for long-term investment purpose. It, therefore, serves as a linkage or mechanism between the deficit sector and the surplus sector in any economy. The suppliers of funds are basically individuals and corporate bodies as government rarely supply funds to the market. The users of funds, by contrasts, consist mainly of corporate bodies and government.

The vital roles played by the capital market in the achievement of economic growth thereby enables governments, industries and corporate bodies to raise long-term capital for the purpose of financing new projects and for expanding and modernizing industrial concerns. A unique benefit of the capital market to corporate entities is the provision of long-term, non-debt financial capital. To determine the impact of stock market on the Nigeria economy, more funds are needed to meet the rapid development and expansion of the economy. The stock market serves as a veritable tool in the mobilization and allocation of savings among competing ends which are critical and necessary for the growth and efficiency of the economy. Therefore, the determination of the overall growth of an economy depends on how efficiently the stock market performs its allocation functions of capital.

In capital markets, the stock in trade is money which could be raised through various instruments under well-governed rules and regulations, which are carefully administered and adhered to by different institutions or market operators. It is, therefore, a fact not disputed that the rate of economic growth of any nation is inextricably linked to the sophistication of its financial market and specifically its stock market efficiency. The fund required by the corporate

bodies and governments are often huge, sometimes running into billions of naira. It is, however, usually difficult for these bodies to meet such funding requirements solely from internal source. Hence, they often look up to the stock market because it is the ideal source as it enables corporate entities and government to pool monies from a large number of people and institutions.

Recently, the volatility of stock market return on the Nigerian stock market has been of concern to investors, analysts, brokers, dealers and regulators. Stock return volatility which represents the variability of stock price changes could be perceived as a measure of risk. The understanding of the volatility in a stock market will be useful in the determination of the cost of capital and in the evaluation of asset allocation decisions. Policy makers therefore rely on market estimates of volatility as a barometer of the vulnerability of financial markets. However, the existence of excessive volatility, or “noise,” in the stock market undermines the usefulness of stock prices as a “signal” about the true intrinsic value of a firm, a concept that is core to the paradigm of the informational efficiency of markets (Karolyi, 2001).

Financial markets are well known for their uncertainty, especially the irregularity in the behaviour of certain financial indices, such as stock prices, exchange or interest rates, government bonds, treasury bills and so on, that are prone to constant variability. Such variability, otherwise known as volatility can generate very high frequency series of random variables which are stochastic in nature, the dynamics of which can best be described by means of models.

Numerous studies have documented evidence showing that stock market returns exhibit phenomenon of volatility clustering, leptokurtosis and Asymmetry. Volatility clustering occurs when large stock price changes are followed by large price changes, of both signs, and small price changes are followed by periods of small price changes. Leptokurtosis means that the distribution of stock market returns is not normal but exhibits fat-tails. In other words, Leptokurtosis signifies high probability for extreme values than the normal law predicts in a series, meaning that a fall in return is followed by an increase in volatility, greater than the volatility induced by an increase in returns. This implies that more prices wander far from the average trend in a crash than in a bubble because of higher perceived uncertainty (Mandelbrot, 1963; Fama, 1965; Black, 1976). These characteristics are perceived as indicating a rise in financial risk, which can adversely affect investors’ assets and wealth. For instance, volatility clustering makes investors more averse to holding stocks due to uncertainty. Investors in turn demand a higher risk premium in order to insure against the increased uncertainty. A greater risk premium results in a higher cost of capital, which then leads to less private physical investment.

There is ample evidence that liquidity and volatility affects asset returns. There are market-wide liquidity risks and volatility factors, stock with higher sensitivity to innovations in aggregate liquidity have higher expected returns. However, there is still a considerable debate on the precise definition and role of liquidity and its link to volatility.

Studies on the relationship between stock market returns, market liquidity and volatility in the Nigerian Capital Market are few. But for the much of the study that is available the validity of volatility measures used has been called to question considering contradictions to theory.

The limitations of the traditional procedures motivate the different approaches for measuring and analyzing properties of volatility and market liquidity and scholars such as Dimitri and



Jiang (2012) assumed in their premise that asymmetric nature of information influences the speed and magnitude at which information reflects in prices and have consequences on the level of liquidity and volatility by causing the prices to wander away from the intrinsic value especially in periods of low liquidity. Forgha (2012) stated that this mispricing makes investors to feel disappointed when their high risk premium falls short of expectations causes increases in the cost of capital.

Since Keynes' stock market critique in 1936, stock price volatility has been related to low transaction costs which allegedly facilitate destabilizing financial speculation. Although existing empirical evidence mostly suggests that higher transaction costs foster rather than mitigate financial price volatility, it suffers from serious methodological problems related to the data structure and biased volatility measurement. The rate of regulatory, organizational and technological progress seen in more developed markets is not the same in Nigeria so the effect on reduction of transaction costs in the Nigerian market is not significantly felt subsequent to which the profit and dividend expectations dwindle due to high costs of transactions in the course of transferring or conversion of assets.

Sarr and Lybek (2002) mentioned high transaction of liquidity problems and consequently creating more uncertainty. Ekundayo (2002) interprets uncertainty as risky and may lead many whose costs as a frequent cause are risk averse to invest funds in less risky funds outside the capital market, this affects the variables measuring liquidity and volatility such as the All Share Index, volume and value of shares traded and market capitalization. In the long run this impact can cause reduction in foreign and domestic investment and increase the opportunity costs associated with not trading in market at a time it would have been more profitable to do so as observed by Banaji (2002) in his work on foreign portfolio effects on the equity segment of the Indian stock market.

One line of research views liquidity as a characteristic that influences returns beyond trading costs. Nyong (2005) identifies high costs of transactions as a liquidity constraint. He specifically mentioned that the fixed elements of transaction costs are unfairly tilted against small volume investors. Onwumere (2005) opines that transaction costs can cause one transaction or market to be more profitable than the other but they are not reflective on the share price directly hence in the short run they have liquidity implications but no volatility significance. Ajayi (2004) stressed that volatility in the Nigerian capital market is common in periods where investor behaviour changes, he also stated that market reactions are linked to sensitiveness of returns to fluctuations in aggregate liquidity.

Ekundayo (2002) identifies liquidity constraints as caused by unfair valuations in pricing securities and informational asymmetry and so concluded that the Nigerian capital market was inefficient. The degree of efficiency of the stock market often depend on the level of information disclosure and the speed with which that information is processed by the market and incorporated in returns. Stock markets have been found to be fairly efficient in advanced economies as well as in a number of emerging markets (Pandey, 2005). However, given the peculiarities of the Nigerian environment, the attributes of an efficient stock market have not been achieved. An efficient stock market enhances liquidity and ensures fair valuations of shares prices thereby encouraging investors to invest. Over time in Nigeria, this attributes of efficiency such as no entry barrier, large number of buyers and sellers, divisibility of financial assets, absence of transaction cost, no tax differences and free trading has not been achieved.

Another problem which has also bedeviled the Nigerian investors from enjoying liquidity thereby reducing confidence is the incidence of tax abnormalities and information asymmetries. Choudhry (2000) also mentioned tax abnormalities as a constraint especially in countries with higher company tax prevalence. Most economies have varieties of taxes and tax incentives which enhances confidence however, the different types of taxes such as capital gain tax, vat etc have reduced benefits which would have accrued to the investor. Again, most financial information is published and is publicly available. But sometimes, certain persons may have superior information than others. In Nigeria, the quality of information is low as all available information are not easily processed and incorporated into shares prices. Investors therefore, interpret lack of information as an increase in the risk of equity investment and consequently they shift their funds to less risk businesses.

Size and stock liquidity are closely correlated, this makes it difficult to disentangle these two effects. Studying the Nigerian Stock Exchange offers a unique opportunity to address this issue due to the widespread coexistence of tradable and non-tradable securities in listed companies. In other markets where similar research was carried out the size of non-tradable securities has a significantly negative relation with expected returns, after controlling for common liquidity measures. However, its impact on stock returns is substantially weaker than that of the size of tradable shares.

Dimitri and Jiang (2012) maintained that liquidity is important, but not the only source of the size effect in stock returns and that Asian markets stock returns studied exhibit cross sectional patterns strikingly similar to those documented for developed markets. The mainstream asset pricing theory contends that the expected return of a security is mainly determined by its systematic risks as seen in earlier empirical tests (Fama and MacBeth (1973), Roll and Ross (1980)), more recent research has documented some intriguing regularities that cannot be easily reconciled with this paradigm. Various theories have been put forth to explain the size effect. One of the most frequently mentioned explanations holds that small stocks contain some systematic risks that are not adequately measured by empirical researchers.

Because the market uses a high discount rate to capitalize its future cash flows, or because they have lost market values due to poor past performance small firms have cash flow problems and less likely to survive adverse economic conditions. Since these risks cannot be easily captured by empirical models, small stocks tend to exhibit a higher risk-adjusted return. Larger stocks are generally more liquid, and investors are willing to compromise returns for higher liquidity. Therefore equilibrium returns of larger stocks are lower. A significantly positive relation has been found between expected stock returns and various measures of liquidity such as bid-ask spread, price impact of trading, turnover rate or trading volume. These results suggest that the size effect may simply be a liquidity effect. A difficulty in testing the liquidity-based explanation against the risk-based explanation lies in the fact that stock liquidity is very hard to measure, and is usually inextricably correlated with size of the firm or market.

Of interest to research is not just whether small stocks yield higher returns than large stocks but also the where the compensation for risk lies. Many academicians adopt the three-factor model for a wide variety of purposes. The apparent tension between the ongoing academic debate and the widespread use of these models warrants a critical review of the available evidence and the theoretical justifications of the size effect. The size effect is strongest for very small stocks and there is evidence suggesting that stock returns are approximately linear in size as measured by logarithm of market value. The study of size effect in markets facilitates the evaluation of corporate finance and investment decisions in those countries. Secondly, the

strength of the size effect may depend on market characteristics such as the trading mechanism, type of investors, and market efficiency in general. Thirdly, the finding that the size effect exists in different markets and in different time periods would constitute a strong argument against data snooping concerns.

Using relatively long horizons may prevent problems related to non-synchronous trading and seasonal patterns in returns. Amihud and Mendelson (1986) present a theoretical model in which expected returns are increasing in the bid-ask spread. The basic intuition is that investors require a compensation for expected trading costs. The model predicts that the investors require a compensation for expected trading costs. The model predicts that investors with longer holding periods select securities with larger spreads. Therefore, the larger the spread, the smaller the compensation required for an additional increase in the spread, as transaction costs amortized over a longer holding period. Hence, the relation between expected return and spread is concave. This theoretical prediction is borne out in an analysis of the data set of Stoll and Whaley (1983).

Fama-MacBeth regressions reveal that size is the only variable that shows up significantly. Several other authors examine the relationship between expected stock returns and various measures of liquidity. Brennan and Subrahmanyam (1996) contend that the quoted bid-ask spread is a noisy measure of liquidity, as many transactions occur inside or outside the spread and the price impact of a trade is not taken into account properly. The authors study intraday transaction data for NYSE stocks over the period 1948-1988 and use market microstructure models to estimate fixed and variable transaction costs are positively and significantly related to returns, consistent with a significant risk premium on liquidity. Both liquidity measure and market size have a significant effect of the expected sign, however, suggesting that the liquidity variable does not capture the size effect completely. Recent studies consider the possibility that market liquidity is a priced state variable. If the returns of small stocks are more sensitive to this state variable, part of the size effect may be related to liquidity risk. Amihud (2002) runs time-series regressions of the returns on expected and unexpected market liquidity, small firms are more sensitive to market liquidity. Time-variation in the size effect may therefore be related to time-variation in the price of liquidity risk. Portfolios of firms with high liquidity betas have substantially higher returns relative to Fama and French (1993) three-factor model.

A reversal of the size effect in certain periods does not necessarily imply that small firms do not earn higher returns on average than their beta suggests. Bonds also occasionally outperform stocks over prolonged periods of time, yet few economists would dispute the proposition that on average stocks yield higher returns than bonds as a compensation for their higher systematic risk. However, if these reversals occur often and/ or over extended time periods, this may shed doubts on the reliability of the empirical findings.

### **3.0 Methodology**

#### **3.1 Research Design**

The research attempts at investigating the linear relationship between capitalization on one hand and valuation on the other hand.

This is similar to Kim and Singal (1993) where they adopted an ex-post facto research design. A situation where the independent variable has already occurred and the researcher starts with the observation of dependent variable on premise that a casual link exists between them and the independent variable.



### 3.2 Nature and Sources of Data

The data used for this research is secondary data got from the NSE daily reports and is considered adequately appropriate to solve the problem at hand. OPEC annual reports.

### 3.3 Model Specification

The model for this study was expressed in line with the hypotheses stated as follows

Ho<sub>1</sub> That there exists a linear relationship between market capitalization and valuation of equities for the two firms under study.

Ho<sub>2</sub> That subsequent to the first objective, that the stock returns for the two firms under study are affected by market capitalization.

In the E-view statistics using least squares (NLS and ARMA) the linear equation was used the dependent variable followed by least of regressors including ARMA and PDL terms involved an explicit equation stated thus;

$$Y = c(1)+c(2)*X$$

Where Y represents the dependent variable and X represents the independent variable

A second order linear differential equation is an equation which can be written in the form

$$Y + p(x)y + q(x)y = f(x) \dots\dots\dots (1)$$

where p, q, and f are continuous functions on some interval I and Y is the dependent variable and X is the independent variable.

### 3.4 Model Assumptions

The assumptions that were adopted for this research were based on the following assumptions

1. The model specification is assumed to be error free having been used as a measure for quantifying data of a secondary nature in previous research of this nature.
2. The parameters estimated has to be commensurate with the quantity of data. If the quantity of data is not appropriate then the analysis would be flawed with problems such as those associated with multicollinearity.

In particular, we will consider the following assumptions.

- Linearity - the relationships between the predictors and the outcome variable should be linear
- Normality - the errors should be normally distributed - technically normality is necessary only for the t-tests to be valid, estimation of the coefficients only requires that the errors be identically and independently distributed
- Homogeneity of variance (homoscedasticity) - the error variance should be constant
- Independence - the errors associated with one observation are not correlated with the errors of any other observation
- Model specification - the model should be properly specified (including all relevant variables, and excluding irrelevant variables)

Additionally, there are issues that can arise during the analysis that, while strictly speaking are not assumptions of regression, are none the less, of great concern to regression analysts.

- Influence - individual observations that exert undue influence on the coefficients
- Collinearity - predictors that are highly collinear, i.e. linearly related, can cause problems in estimating the regression coefficients.

### 3.6 Variables

The variables used in the models are the dependent and independent variables, the former representing the effects while the latter represents the causes. Given that the model is statistical, the research looked at the dependent variable studied to find out variations caused by the independent variable.

### 3.7 Model Justification

According to Andrews B.H, Dean .D Matthew, Swain Robert and Cole Caroline (2013) justified the model in use by linking the assumptions of the iterative model building processes with the rigorously performed processes involved in multiple regression analysis. Autoregressive (AR) terms and one or more moving average (MA) terms will show the statistical significance of the dependent variable given the lagged values from previously made estimations. It is suitable for this research.

### 3.8 Techniques of Analysis

Regression analysis is used in modeling and analyzing the variables, since the focus is on the relationship between the dependent variable and the independent variable.

## 4.0 Data analysis and discussion of findings

**Table 4.1**

### Cadbury PLC

Group unit root test: Summary

Series: CAPITALIZATION, VALUE

Date: 03/21/19 Time: 12:36

Sample: 1 4428

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 10

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.65647	0.0000	1	4373
Breitung t-stat	-7.23083	0.0000	1	4372
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-12.2577	0.0000	1	4373
ADF - Fisher Chi-square	127.395	0.0000	1	4373
PP - Fisher Chi-square	114.991	0.0000	1	4383

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 4.2**

**Nestle PLC**

Group unit root test: Summary

Series: CAPITALIZATION, VALUE

Date: 03/21/19 Time: 12:46

Sample: 1 4428

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-70.4286	0.0000	1	4421
Breitung t-stat	-10.1942	0.0000	1	4420
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-50.1247	0.0000	1	4421
ADF - Fisher Chi-square	263.391	0.0000	1	4421
PP - Fisher Chi-square	171.759	0.0000	1	4422

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 4.3**

**Cadbury PLC**

Pairwise Granger Causality Tests

Date: 03/21/19 Time: 13:01

Sample: 14428

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
VALUE does not Granger Cause CAPITALIZATION	4421	2.49097	0.0966
CAPITALIZATION does not Granger Cause VALUE		1.52627	0.2291

**Table 4.4**

**NESTLE PLC**

Pairwise Granger Causality Tests

Date: 03/21/19 Time: 13:11

Sample: 14428

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
VALUE does not Granger Cause CAPITALIZATION	4421	2.51337	0.0954
CAPITALIZATION does not Granger Cause VALUE		1.47839	0.2264

**Table 4.5**

**Cadbury PLC**

Dependent Variable: VALUATION

Method: Least Squares

Date: 03/21/19 Time: 14:18

Sample: 14428

Included observations: 4421

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MKT CAP	0.000111	1.25E-05	8.919379	0.0001
ASI	0.000188	0.000320	0.586723	0.5788
MKT VOL	-0.000377	0.000337	-1.117971	0.3063
C	2004.749	1.089872	1839.435	0.0000
R-squared	0.960963	Mean dependent var	2011.500	
Adjusted R-squared	0.941444	S.D. dependent var	3.027650	
S.E. of regression	0.732641	Akaike info criterion	2.504852	
Sum squared resid	3.220576	Schwarz criterion	2.625886	
Log likelihood	-8.524261	Hannan-Quinn criter.	2.372078	
F-statistic	49.23307	Durbin-Watson stat	1.983732	
Prob(F-statistic)	0.000128			

**Table 4.6**

**Nestle PLC**

Dependent Variable: VALUATION

Method: Least Squares

Date: 03/21/19 Time: 14:31

Sample: 14428

Included observations: 4421

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MKT CAP	5.89E-05	8.72E-05	0.675673	0.5244
ASI	0.000708	0.000834	0.848581	0.4287
MKT VOL	-0.000888	0.000825	-1.076597	0.3230
C	2002.424	1.819009	1100.833	0.0000
R-squared	0.944883	Mean dependent var	2011.500	
Adjusted R-squared	0.917325	S.D. dependent var	3.027650	
S.E. of regression	0.870550	Akaike info criterion	2.849792	
Sum squared resid	4.547148	Schwarz criterion	2.970826	
Log likelihood	-10.24896	Hannan-Quinn criter.	2.717018	
F-statistic	34.28648	Durbin-Watson stat	1.313630	
Prob(F-statistic)	0.000359			

On tables 4.5 and 4.6 the findings indicate that the goodness of fit of the model can be seen in the coefficient of determination (R-square). The R<sup>2</sup> and adjusted R<sup>2</sup> for tables are 96% and 94.1% and 94.4% and 91.7% respectively. This means that the capitalization for Cadbury Plc and Nestle Plc have a significant effect on stock market returns for the period under study. The

adjusted R2 moderates the Rs indicating that there may be other variables other than our explanatory variables that might have an impact on the dependent variable but not represented in the equation.

These two values (R2 & adjusted R2) indicates that the regression line approximates the real data points and so is a very good fit and also shows how well observed outcomes in the analyses are replicated in the model.

The Durbin Watson statistics shows a positive serial correlation at 1.98 and 1.31. The difference between AIC, or Schwarz criterion is negligible, an indicator of a near perfect model convergence near zero. The smaller they are the better the fit of your model is (from a statistical perspective) as they reflect a trade-off between the lack of fit and the number of parameters in the model.

In table 4.1 and 4.2 showed tested for the presence of unit root in the time series data set. This was necessitated because we wanted to ensure that the parameters estimated are stationary time series data. We utilized the Augmented Dickey – Fuller (ADF). To reject the null hypothesis that the data are non – stationary, the ADF statistics must be negative than the critical values and significant. As revealed, there are no presence of stationarity since the ADF Statistics is less than the critical values at 1%, 5% and 10% for both tables respectively.

The granger causality test was conducted to test the causality of the impact of the independent variable on the dependent variable. As indicated in the tables 4.3 and 4.4 none of the variables (both dependent and independent) granger caused each other.

## **5.0 Conclusions**

This interests and debates stem in part from the implication for market efficiency, stock market bubbling, market crash and recession in some sectors of the economy. Since there was evidence of significant stock market returns efficiency, liquidity and volatility stationarity was guaranteed. This is necessary to assess the nature of the risk-return relationship and for market participants to evaluate assets pricing, dividends behaviour and risks management of quoted companies in the sock exchange markets. These are carried out to achieve the expected roles of stock valuations.

The fundamental role of stock market is to provide adequate guarantee to shareholders of Cadbury Plc and Nestle Plc by carrying out studies about the volatility, performance and efficiency of stock returns remains vital and essential information to investors. It was observed that market capitalization had positive and significant impact on stock returns. The research established that there is a linear relationship between market capitalization and valuation of equity for the two firms under and that stock returns for the two firms are affected by the market capitalization.

## **6.0 Recommendations**

The following recommendations are made in this study.

1. This study recommends that the Nigerian Securities and Exchange Commission should create policies that will encourage increases in firms profit after tax and their dividends as these variables have been statistically proven to have strong significances on the changes in the company's performance and the value of market capitalization.
2. New theories should be developed by further studies on the “size effect” of market returns on volume and price. Currently theoretical explanations in literature for size



effect do not sufficiently explain the gaps in previous research even though there is a general agreement about the importance of size.

3. It is important that more research be made in studying theoretical and empirical applications of models measuring weighty risk management strategies such as portfolio rebalancing. As a risk control strategy knowledge of portfolio rebalancing can be seen where an informed investor acknowledges the usefulness of compounding effect of returns on his portfolio by calculating based on compound average and not simple average.

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