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Multiple Regression Analysis of Nigeria Stock Exchange

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ABSTRACT

Ineffective application of effective planning in many organizations is the main reason for their inability to predict and make sound decisions, which leads to failure to achieve projected performance. This project examines the decision-making and planning process with the use of multiple regression analysis models to forecast the stock market activities of each sector listed on the Nigerian stock exchange by using the number of deals in shares and the number of shares in units to explain the strength of relationship and extent of the relationship between the value of a share in naira, i.e., market capitalization in stock for every listed trading on the Nigerian stock exchange market. This study was designed to give strategic managers practical suggestions for a better understanding of the forecast so that managers can plan their reactions effectively to enable better performance. The prime objective of this paper is to develop an operational research model that will assist investors, investment managers, and stockbrokers that participate in stock exchange trading to have an accurate forecast of trading activities on the Nigerian stock market. In the analysis part of this empirical study, which consists of an activity summary of the Nigerian stock exchange, a dynamic regression was used as an input data.

Keywords: Regression Analysis, Stock Exchange, Trade, Data Analysis, Anova

1. INTRODUCTION

The mobilization of resources for national development has been the central focus of development economists.

As a result of this, the centrality of saving and investment in economic growth has been given considerable attention in various literature. According

to Ekpo and Umoh [1], for sustainable growth and development, funds must be effectively mobilized and allocated to enable businesses and the economy to harness their human, material, and management resources for optimal output. The stock market, therefore, is an economic institution that promotes efficiency in capital formation and allocation. It should be noted that if capital resources are not provided to this economic area, especially to industries where demand is growing and which are capable of increasing production and productivity, the rate of economic expansion often suffers.

Ekpo and Udoh [1] opined that a unique benefit of the stock market to cooperative entities is the provision of long-term, non-debt financial capital. Through the issuance of equity securities, companies acquire perpetual capital for development. Through the provision of equity capital, the market also enables companies to avoid over-reliance on debt financing, thus developing and improving debt-to-equity ratios. The stock market is a market for the trading of company stock and the derivatives thereof, which are securities listed on a stock exchange and those traded privately.

According to Hagstrom Roberts, the size of the world's "stock market" is estimated at \$ 51 trillion [2]. The stocks are listed and traded on stock exchanges, which are entities (a cooperation of mutual organizations) specialized in the business of bringing buyers and sellers of stock together. Participants in the stock market range from small industrial investors to large hedge fund managers who can be based anywhere. Some stock exchanges are physical locations where transactions are carried out on a trading floor by a method known as open country. Traders in this type of exchange may enter "verbal" bids and offers simultaneously. An example of this type is the Nigerian Stock Exchange (NSE) and the New York Stock Exchange

(NYSE). The other type of exchange is a "virtual" one, composed of a network of computers where trades are made electronically via traders at computer terminals. Actual trades are based on an "action market" paradigm where a potential buyer bids a specific price for a stock and a potential seller asks a specific price for the stock. When the bid and ask price match, a sale takes place on a first come, first served basis if there are bidders or askers at a given price.

The purpose of a stock exchange is to facilitate the exchange of securities between buyers and sellers, thus providing a marketplace (virtual or verbal). The exchange provides real-time trading information on the listed securities, facilitating price discovery. Given that certain activities are performed on the stock exchange daily, which indicate economic growth in the face of recent economic policies and reforms. The recent capitalization in the banking industry, coupled with the listing of many companies, both national and multinational, on the stock exchange, brought with it an upsurge in the activities at the Nigerian Stock Exchange. The volume of trading, the value of trade, the number of daily transactions, the all-share price index, and market capitalization have all increased dramatically. The study therefore empirically investigates the patterns in these variables and also the relationship existing between them using the least squares multiple regression method of analysis on secondary data covering the period July 2006 to June 2007, which represents the daily values of the variables above obtained from the punch newspaper [3].

Following a 75% increase in the capitalization of the Nigerian stock exchange from 4 billion in June 2006 to 7 billion in June 2007, comes the need to ascertain the pattern in the variables of the stock exchange, viz: the volume of trade; the value of trade; the number of deals done; all-share index and market capitalization. Also, of

interest is to know whether there is any relationship between market capitalization and the others as independent variables. The objectives of the study was to check if there is any pattern in the daily activities on the floor of the Nigeria Stock, determine whether there is any linear relationship between market capitalization and the volume of trade, number of deals done, value of trade, and all-share index, also whether there is a linear relationship between the value of trade, the volume of trade, the number of deals done and the all-share index, to see if there is any correlation between the explanatory variables and to ascertain the significance or otherwise of the relationships: to make forecasts for the future values of market capitalization and the value of trade, assuming the other factors are known or can be estimate.

2. METHOD AND MATERIALS

2.1. Research Procedure

The data collected is the summary of the activities carried out on the floor of the Nigerian Stock Exchange. The data includes the volume of trade in millions, value of trade in N billions, the number of deals done, the All-share index and the Market Capitalization in N-trillion. These summaries are collected daily for one year from July 2006 to June 2007 [4].

2.2. Source of Data

The data which is the summaries of the daily activities on the floor of the Nigerian Stock Exchange is published daily in the Punch Newspaper. Hence, the data was collected from the Punch Newspaper.

2.3. Data collection

A formal request was made to the head of the serials section in the University of Ibadan for the stacked

newspaper for the period desired. hence, the bulk was brought from the archive and each data point copied from the pages of the punch News Paper from July 2006 to June 2007.

2.4. Data analysis and presentation

The data will be shown in tabular form with each variables forming the columns and the periods make up the rows. The scatter plot of each bivariate date will be shown i.e., the criterion variable is plotted against individual's predictor variable. Lastly, the time plots of each variable will show to be reveal the pattern inherent in the data.

The data collected is analyzed using the statistical packages for social Science (SPSS), employing the tool of multiple regression analysis to obtain desired models.

The true regression model is of the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

Thus, the matrix becomes

$$X'X = \begin{bmatrix} n & \sum x_1 & \sum x_2 & \sum x_3 \\ \sum x_1 & \sum x_1^2 & \sum x_1 x_2 & \sum x_1 x_3 \\ \sum x_2 & \sum x_2 x_1 & \sum x_2^2 & \sum x_2 x_3 \\ \sum x_3 & \sum x_3 x_1 & \sum x_3 x_2 & \sum x_3^2 \end{bmatrix}$$

To determine the standardized coefficient regression for the explanatory variables; we will need to compute the standard variation for each of the variables.

3. RESULT AND DISCUSSION

3.1. Correlations of strength of relationship between the Variables

Using the Pearson's Correlation to check the strength of relationship between the Variables (Market Cap, Stock Vol., Deals, All Share Index).

Table 1. The ANOVE table of variables

Source of variation	Sum of squares	Degree of freedom	Mean square	F
Regression	407.883	3	165.961	7122.544
Residual	6.431	276	0.023	
Total	504.314	279		

Table 2. The Unstandardized and standardized Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error			
Constant	4.345	.093		46.792	.000
Market Val	0.068	0.008	.466	8.787	.000

Table 3. The residuals statistics of values

	Minimum	Maximum	Mean	Std. Deviation	N
Prediction Value	4.4064	8.1435	4.8684	.62682	280
Residual	-2.15503	3.07928	0.00000	1.18940	280
Std. Predicted Value	-.737	5.225	.000	1.000	280
Std. Residual	-1.809	2.584	.000	.998	280

The Correlations shows a significant weak Positive Relationship of 0.426, 0.200, 0.419, and 0.196 between Market Cap. with Stock Vol. and Deal, stock Vol with all Share Index and Deals with All share index respectively (figure 1).

Also, the correlations show a Significantly Strong (almost Perfect) relationship between Market Cap. and all Share index while that between Stock Vol. and Deals shows a Strong Positive Relationship.

The Correlations shows a significant weak Positive Relationship of 0.460, 0.419, and 0.196 between Market Cap., Stock Vol. and Deal with All Share Index respectively (figure 2). Also the correlations show a Significantly Strong relationship between Market Cap. and Stock Vol (0.923) and that between Market Cap. with Deals and Stock Vol. with Deals shows a Strong Positive Relationship. (0.848 and 0.835 Respectively)

3.2. Regressions

The Model Summary table, Anova Table and the Table of Coefficients shows the coefficient of determination, the

analysis of variance table and the coefficients of the Model respectively (table 1 and 2).

3.3. Model

The market Cap. = $-2.108 + 0.0000438$ Stock Vol - 0.0000014 Deals + 0.000189 . All Share Index The Correlation Coefficient of 0.994 and Coefficient of Determination result of 0.987 which imply a strong (all most perfect) relationship exist between Market Cap and the predictors (Stock Vol., Deal, All Share Index) and that the predictors contribute about 99.4% of all variability in Market Cap for the study period [11-12].

The market Cap. = $-7.303 + 0.00745$ Stock Vol + 0.00024 Deals + 0.0002 . All Share Index The Correlation Coefficient of 0.943 and Coefficient of Determination result of 0.889 which imply a strong relationship exist between Market Cap, and the predictors (Stock Vol., Deal, All Share Index) and that the predictors contribute about 88.9% of all variability in Market Cap for the study period [13].

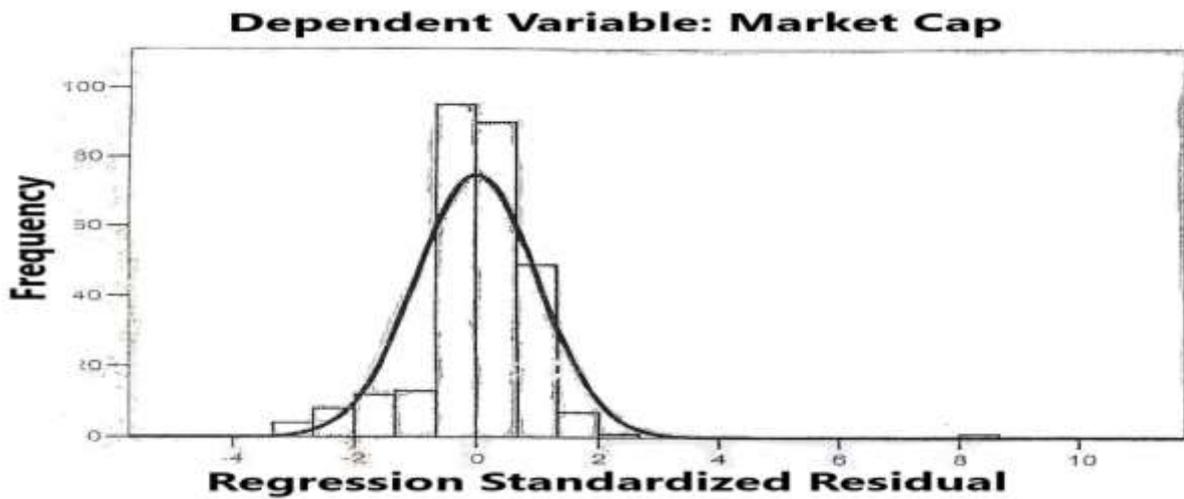


Figure 1: Dependent Variable: Market Cap (Mean=-2.76E-14; Std Dev=0.995; N=280)



Figure 2: Table of Coefficient: Dependent Variable: Market Val (Mean=-2.14E-15; Std Dev=0.995; N=280)

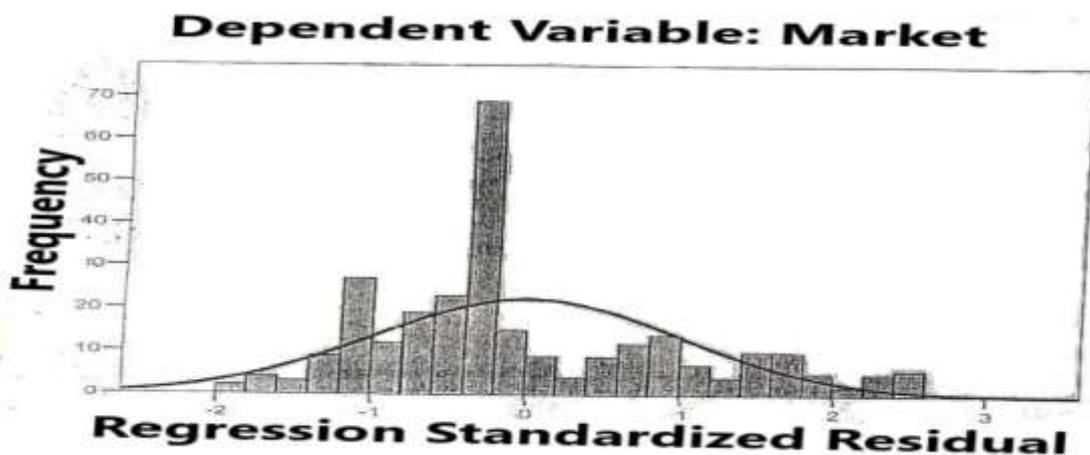


Figure 3: Table of Coefficient: Dependent Variable: Market Val (Mean=-2.64E-15; Std Dev=0.998; N=280)

The resulting sign value (P-Value) of 0.000 which is less than the 0.05 level of significance implies that there is a significant Linear Relationship between Market Cap and the Predictor Variables [14-15].

4. CONCLUSION

From the findings, the following conclusions are therefore made:

- There is a pattern inherent in the Market value of the Nigerian Stock Exchange.
- There is a linear relationship between Market Capitalization and Volume of Shares, number of deals and all share index in Nigerian Stock Exchange.
- There is also a linear relationship between value of stocks and volume of shares, number of deals and all share index in Nigerian Stock Exchange.
- There is a positive but not strong correlation (0.469) between Market Capitalization and the value of stocks.
- The linear relationships are very significant.

5. ACKNOWLEDGEMENT

NA

6. CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

7. SOURCE/S OF FUNDING

NA

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