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The Empirical Investigation of Why Stock Prices on the Nigerian Stock Exchange Exhibit Random Walk

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Abstract- This study empirically investigated whether stock prices on the Nigerian stock exchange exhibit a random walk. Using monthly data from the Central Bank of Nigeria all share index from 1985-2011, the study employed a stepwise approach where the standard linear GARCH (1.1) is applied to capture randomness in terms of volatility clustering. The result proved that the Nigerian stock market is weakly stationary, meaning stock prices on the Nigerian stock market follows a random walk, which is an indication of weak-form efficiency. Therefore, the Nigerian stock market displays a random walk process. Nevertheless, the years 1987, 1991, 1995, 1997, 2001, 2002, 2008, and 2011 demonstrated negative skewness, which is a signification of non-randomness of the market for these years. Besides these years, other years were significantly proven to follow a random walk. Therefore, the Nigerian stock market exhibits a random walk process. Accordingly, investors can obtain a more excellent perception and understanding of the stock market to improve their portfolio performance. It is recommended investors should not trust confidently any privileged information to bit the market and make an abnormal profit; which is a futile effort.

Keywords: random walk hypothesis, weak-form efficiency, volatility clustering, stock market, GARCH model ARCH, non-linearity.

I. Introduction

a) Background of the Study

The randomness of stock prices was the result of an efficient market, concluded by more curious among the academic researchers when asked the economic process that produces a random walk. (Chandra, 2004). The efficient market hypothesis assumes that information travels in a random, independent fashion and that prices are an unbiased reflection of all currently available information this means that there is little or nothing to be gained from studying past prices. The weak-form efficient market hypothesis —the random walk hypothesis suggests there is no relationship between past and future prices of securities. They are presumed to be independent over time because the random walk hypothesis maintains that current prices reflect all available information and information travels randomly, stock prices exhibit random movements, this is what the study is intended to investigate if the prices of 258 securities listed, about 200 companies with a total market capitalization of about 8.9 trillion ($57 billion) on the Nigerian stock exchange as at December 31, 2012, follows a random walk process.

Do stock price changes independently over time? That past trend in stock prices does not help predict the future price of stock? Do securities prices change independently overtime on the Nigeria stock exchange or more specifically, move in the pattern of a random walk? Past prices cannot be used to easily predict the future, and that charting and technical analysis may have limited value (Geoffrey A.H, & Standy B. Block, 2006). These are my worries.

Louis Bachellier in 1900 was the first to point out that security prices and prices of other speculative commodities follow a random walk. In 1934, Holbrook working confirmed the same result. Cowls and Jones, (1937) also produced the same result. Since then, the random walk hypothesis has been tested in hundreds of studies. Recently in Nigeria, Samuel and Yacout (1981) conducted a study on the Nigeria data; they tested for several correlations at the weekly prices of shares in 21 companies quoted on the Nigeria stock exchange in July 1999. The results of these tests support the theory that prices follow a random walk. Ayadi (1983) used non-parametric tests in the testing of the hypothesis that successive weekly price changes are independent. Olowe, (1999) using data consisting of an end of month quoted stock price of 59 randomly periods January 1981 to December 1992 on the Nigerian stock exchange and employing a sample auto-correlation test concluded that the Nigeria stock market appeared to be efficient in the weak form. Olowe's sample population though fair could be said to cover half of the quoted companies over the years; yet we will increase the sample size to cover entire sample from 1985 — 2011, using monthly data of all-share index.

Data were taken from the statistical bulletin of the central bank of Nigeria, employing GARCH (1.1) model to investigate if stock prices on the Nigeria stock

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exchange move in a random pattern. Does price change independently? If information travels randomly; there would not be undervalued or overvalued securities on the Nigeria stock exchange. The market price of a security does not reflect the intrinsic value at every point in time i.e. the errors in the market prices are unbiased. This brings to our knowledge that the price can deviate from the intrinsic value but the deviations are random and uncorrelated with any observable variable. We worry that if the deviations are random, there would not be over or undervalued security. This is what the study is intended to investigate and the findings will put to rest every worry and add knowledge to existing knowledge about the behaviour of stock prices. And also give a deep insight into a large number of profit-maximizing participants who are concerned with the analysis and valuation of securities on the Nigerian stock exchange.

To put this paper into proper perceptive, it is organized into five sections. This section introduced the study while section two reviews previous literature. Section three considered the method of Study and section four highlighted and discussed the results while section five concludes the paper.

II. Literature Review

Literature related to this study is reviewed under the following subheadings: The Evolution and Operation of the Nigerian Stock Exchange, the concept of random walk hypothesis, the theoretical foundation and the empirical basis of the study.

a) *Evolution of the Nigerian Stock Exchange*

According to Abomaye-Nimenibo (2015), the Nigerian Stock Exchange (NSE) was established in 1960 and as of March 9, 2007, it has 283 listed companies with a total market capitalization of about N15 trillion ($125 billion). All listings are included in the only index, the Nigerian Stock Exchange All Shares Index. The Nigerian stock exchange was established in 1960 as the Lagos stock exchange. In December 1977 it became the Nigerian Stock Exchange, with branches established in some of the major commercial cities of the country. At present, there are six branches of the Nigerian Stock Exchange. Each branch has a trading floor. The branch in Lagos was opened in 1961, Kaduna 1978, Port Harcourt 1980, Kano 1989, Onitsha February 1990 and Ibadan August 1990, Abuja Area Office, October 1999, Yola, April 2002 and Benin, 2005. Lagos is the head Office of the exchange. An office has just been opened in Abuja. The exchange started operations in 1961 with 19 securities listed for trading. As of recent, there are 262 securities listed on the exchange, made up of 17 Government stocks, 50 industrial loans (Debenture/Preference) stocks and 209 equity/ordinary shares of companies, all with a total market capitalization of approximately N 2.23 trillion as at August 31, 1999. As of December 31, 2012, it has a total market capitalization of about N8.9 trillion ($57 billion).

The NSE continues to evolve to meet the needs of its valued customers and to achieve the highest level of competitiveness. The Nigerian stock exchange is poised to champion the acceleration of Africa's economic development and to become "the Gateway to African Markets." Many of the listed companies have foreign/multinational affiliations and represent a cross-section of the economy, ranging from agriculture through manufacturing to services.

i. *Operation of the Nigerian Stock Exchange*

The NSE is regulated by the Securities and Exchange Commission which has the mandate of surveillance over the exchange to forestall breaches of market rules and to deter and detect unfair manipulations and trading practices. The exchange has an automated trading system. Data on listed companies' performances are published daily, weekly, monthly, quarterly and annually.

The Nigerian stock exchange has been operating an automated system (ATS) since April 27, 1999, with dealers trading through a network of computers connected to a server. The ATS has the facility for remote trading and surveillance. Consequently, many of our dealing members trade online from their offices in Lagos and all the thirteen branches across the country. The exchange is in the process of establishing more branches for online real-time trading. Trading on the exchange starts at 9:30 am every business day and closes at 2: 30 pm.

To encourage foreign investment into Nigeria, the government has abolished legislation preventing the flow of foreign capital into the country. This has allowed foreign brokers to enlist as dealers on the Nigerian stock exchange, and investors of any nationality are free to invest. Nigerian companies are also allowed multiple and cross border listings on foreign markets.

ii. *The Role of the Nigerian Stock Exchange*

The Nigerian exchange exists for the same reason that every other country's stock exchange does: To encourage and oversee the flow of income into Nigeria. The Nigerian Stock Exchange provides a stable platform for individuals and organizations that trade and invest their savings by purchasing shares. This controls the ebb and flow of money into the system by people investing to make a profit and therefore helping to beat inflation.

The Nigerian stock exchange also helps to increase the market capitalization of companies. This increases economic growth and also helps to make the companies grow stronger, all of which contributes towards a better economy.

The main goal of a stock exchange is to assist traders in trading company stocks and any other securities. It can also allow issuing and redeeming

different securities. Therefore, any stock exchange is extremely important for their particular company because they hold a lot of responsibility when it comes to the country's economy. As well as being responsible for the redistribution of wealth and corporate governance.

The stock exchange also provides valuable investment opportunities for small companies from a variety of areas.

It provides a platform to the individuals and the organizations for trading and investing their savings through the purchase of shares. It moves money into the system. People invest to make a profit and to beat inflation. Increase in the market capitalization of the companies make them strong and help in the economic growth by providing employment and by production etc. if the circulation of money will stop then the money will be plunged in the hands of the people, the growth will be stopped, so the stock exchange plays an important role in the development of the Nigerian economy.

The stock exchange plays an important role in the economy by moving money into the system. People invest their savings through the purchase of securities for making a profit and to beat inflation. This makes a flow of fund into the economy. Increase in the market capitalization of the companies make them strong and help in the economic growth by providing employment and by increasing production etc. if the circulation of money will stop then the money will be plunged in the hands of the people, the growth will be stopped, so the stock exchange is very important in any economy.

iv. *The Concept Of Random Walk Hypothesis*

The randomness of stock prices was the result of an efficient market, concluded by more curious among the academic researcher's when asked about the economic process that produces a random walk. Stated below are the key links in the arguments.

i. Information is freely and instantaneously available to all market participants.
ii. Intense competition among market participants more or less ensures that market prices will reflect intrinsic values.
iii. Prices change only in response to new information; it is unrelated to previous information.
iv. New information cannot be predicted in advance of price changes which cannot be forecast therefore; prices behave like a random walk.

An understanding of the efficient market hypothesis introduced by Eugene Fama in mid-1960s will help us to have an adequate understanding of the random walk theory. The idea is that the intense competition in the capital market leads to fair pricing of debt and equity securities. This simply means that the market price of a security is an unbiased estimate of its intrinsic value. It is important to note that market efficiency does not mean that, the market price of security equals its intrinsic value at every point in time. All that it says is that the errors in the market prices are unbiased. This brings to our knowledge that the price can deviate from the intrinsic value but the deviations are random and uncorrelated with any observable variable. The question that comes to mind is that, if the deviations are random there would not be over or undervalued security. The efficiency or inefficiency of securities has generated a lot of controversies over a couple of decades in finance and economics discussions. The fundamental analysis tries to study the company's business by publishing various historical financial statements and hence uncovering information about its profitability that will shed light on the value of the stock. An efficient market hypothesis is an express tool that supports the assertion that the stock market leads economic activities since market efficiency ensures that past and available current information are fully reflected in current stock prices, and so, investors cannot usurp any privileged information as to beat the market and make an abnormal return.

b) The Theoretical Foundation

Eugene Fama, in the mid-1960s, introduced the idea of an "efficient' capital market to the literature of financial economics. He suggested that it is useful to categorize three levels of market efficient as weak-form, semi-strong form and strong form efficiency if prices reflect all information found in the record of past prices and volumes, all publicly available information and even private information.

The random walk hypothesis otherwise called the weak form of the efficient market hypothesis which this study is aimed to investigate states that current market prices reflect all the information contained in the record of past prices. In other words, all information conveyed in past patterns of a stock's price is impounded into the current price of the stock based on information about recent trends in stock prices the fact that the price of a stock has risen for the past two or four days will give no useful information as what today's or tomorrows.

The strong form of the efficient market hypothesis states that current market price reflects all pertinent information including everything that is known whether it is public or private. In other words, the security prices reflect everything knowable, anything that a host of investment analysts could uncover using all their talent and all the tools at their disposal. No group of investors has monopolistic access to information relevant to forming an opinion about prices as to make an abnormal profit. Under such circumstance, it would be impossible to search out any information that is not already discounted in the market price of a security (French 1986) thus, an investor cannot make a supernormal return regularly for over a long run since information will be equally available to all at the same

time. The implication is that tape watching, charting and professional investment analysis are insignificant, it cannot add any positive superior performance.

Encircled in the strong form hypothesis are both the weak and semi-strong forms. The semi-strong form hypothesis states that the price of any security reflects not only past prices of the security but also all available public information i.e. this includes information about the economy, political news or individual security and any publicly available analyses or estimates of future situations based on the raw data. This form asserts that all information, news release, economic data and so forth are fully reflected by each security price in the company's financial statements.

The effect is that investors will have no other available source of information that could lead to beat the market. Therefore, it is of no significance to study closely annual reports or other published data because the market prices adjust instantly to any sort of news carried by such reports or data.

c) The Empirical Literature

The original and analytical empirical work on the random walk theory was done by Louis Bachellier (1900). He was the first to point out that security prices and prices of other speculative commodities follow a random walk that is each price change, is independent of the previous price changes, therefore price movement is said to behave randomly. His study was not recognized until Holbrook working (1934) confirmed the same result. Cowls and Jones (1937) also produced the same result. Since then, the weak form hypothesis has been tested in hundreds of studies.

In 1953, Kendall examined the behaviour of weekly changes in 19 indices of British industrial share prices, spot prices for cotton in New York and wheat in Chicago. He found a successive arithmetic difference in British stock price averages to be largely uncorrelated.

Other studies in support of random walk theory include Roberts (1959), Osborne (1950), Alexander (1961), Moore (1962), Mandelbrot (1964), Fama (1965), Samuelson (1965), Mandlebrot (1966). Fama and Blume, (1966), Niedethoffer and Osborne (1966), Van Home and Parker (1967), Shelton (1967), Kemp and Reid (1971), Black and Scholes (1973). Jennergsen and Korsuoid (1975), Wan (1980).

Recently in Nigeria Samuels and Yacout (1981) conducted a study on the Nigeria data, they tested for several correlations at the weekly prices of shares in 21 companies quoted on the Nigerian stock exchange between July 1979. They found a trace of dependence with a one-week lag in only seven shares and a two-week lag in four shares. The absolute mean serial correlation coefficient was 0.146 with one-week lag and 0.086 with a two weeks lag.

The results of these tests support the theory that prices follow a random walk, which was the result of an efficient market. It is however unfortunate that their sample population represented only about 2/10 of the entire listed companies and as such their results were likely to be biased. The primary data for their study consisting of Monday closing prices of thirty shares recorded in the daily official list of the Nigeria stock exchange using both non-parametric test (waldwolfowitz test and the number of runs test) and parametric estimation test they concluded that prices of shares quoted in the Nigeria stock exchange follow a random movement.

Ayadi (1983) used non-parametric tests in testing the hypothesis that successive weekly price changes are independent. In a sample of 30 quoted companies on the Nigerian stock exchange over the period January 1997 to December 1980. His result also supported the random walk hypothesis. Ayadi's sample population seems encouraging, yet we will increase the sample to cover the entire sample from 1985-2009. Olowe (1999) using data consisting of an end of the month quoted stock price of 59 randomly period January 1981 to December 1992 on the Nigerian stock exchange and employing a sample auto-correlation test concluded that the Nigerian stock market appeared to be efficient in the weak form. Olowe's sample population though fair could be said to cover half of the quoted companies over the years and not the entire market or approximately the entire market.

Kukah, Amoo and Raji (2006) to represent the whole market, focused their study on market indices in local currencies rather than prices of individual stocks. In other words, they used the capitalization-weighted index of all listed stock, thereby using both parametric and non-parametric test in determining the efficiency of the Nigerian stock market. According to Kukah, Amoo and Raji, the results of the parametric test showed that prices of the stock on the Nigeria capital market follow a random walk while the non-parametric test showed prices of the stock on the Nigerian stock market do not follow a random walk. (I.e. there is a regular pattern). Discrepancies in their answers have left a researcher with little or no knowledge with an inconclusive result.

Okpara (2006) also carried out a study on stock market prices and the random walk hypothesis, he employed run test and the correlogram/ partial autocorrelation function, and the result showed that the Nigerian stock market is efficient in the weak form. For time lag and a different Instrument GARCH (1.1) that can handle volatility clustering, give a significant reason for recon ducting this study, taking a detailed empirical examination of the randomness of stock prices on the Nigerian stock exchange (1985- 2011).

III. Method of Study

a) An Overview

To model the conditional mean of a random variable, conditional variance, or volatility of a variable, ARCH model introduced by Engle (1982) and GARCH (generalized ARCH) by Bollerslev (1986) and Taylor (1986). These are widely used in various branches of econometrics, especially in financial time series analysis, which will be employed to investigate the randomness of stock prices on the Nigerian stock exchange. Using monthly data from CBN statistical bulletin on all share index from Nigerian stock exchange from 1985-2011.

The beauty of the standard GARCH (1.1) is that it captures the stylized fate of stock market volatility clustering, time-variant and nonlinear- ties in generating mechanism. There are several reasons to model and forecast volatility. First, to analyse the risk of holding an asset, or the value of an option. Second, to forecast confidence intervals, this may be time-vary mg, so that more accurate intervals can be obtained by modelling the variance of the errors. Third, more efficient estimators can be obtained if heteroskedasticity in the errors is handled properly.

However, the standard GARCH (1.1) model does not allow for assessment of asymmetric shock in the conditional variance. Engle (2001) argues that market declines forecast higher volatility than comparable market increases do. Autoregressive conditional heteroskedasticity (ARCH) models are specifically designed to model and forecast conditional variance. The variance of the dependent variable is modelled as a function of past values of the dependent variable and independent, or exogenous variables.

b) Models Specification

Basic Arch Specification: This entails three distinct specifications- one for the conditional mean equation, one for the conditional variance and one for the conditional error distribution.

The GARCH (1.1) model specification:

$$Yt = Xt0 + \varepsilon t \quad \text{.....equation (1)}$$

$$\delta t2 = \omega t + a\varepsilon 2t\text{-}i + \beta\delta 2t\text{-}1 \quad \text{.....} \quad \text{equation (2)}$$

Equation (1) is the mean equation which is written as a function of exogenous variables with an error term. Since 8t is the one-period ahead forecast variance based on past information, it is called on conditional variance. The conditional variance equation specified in equation (2) is a function of three terms:

i. A constant term: ω
ii. News about volatility from the previous period, measured as the lag of the squared residual from the mean equation: $\varepsilon 2t\text{-}i$ (the ARCH term).
iii. Last period's forecast variance: $\delta 2t\text{-}1$ (the GARCH term).

The (1.1) in GARCH (1.1) refers to the presence of a first-order autoregressive GARCH term (the first term in parentheses) and a first-order moving average ARCH term (the second term in parentheses).

The distribution of series in this study are stated as non-linear (see table 1), the paper employed a stepwise approach, where the standard linear GARCH (1.1) is applied to capture randomness in terms of volatility clustering. The paper estimates this model using monthly date from the Nigerian stock exchange (NSE) from 1985-2011. The standard GARCH (1.1) model defines information set Ωt of monthly price index to be (rp rt-q..,…. R1), which is:

$$rt = \mu + \varepsilon t$$

$$\text{Where: } \varepsilon t = \delta t\, Zt, \text{ and } Zt\ 1.1.d\ (0, 1) \text{ .....} \quad \text{.. (1)}$$

$$\delta 2 = \omega + \delta\varepsilon 2t\text{-}1 + \beta\delta 2t\text{-}1\text{.....} \quad \text{. (2)}$$

is measurable concerning Ωt, which is the monthly price index. $\omega > 0$, $\alpha > 0$, $\beta \geq 0$, and $\alpha + \beta < 1$, such that the model is covariance- stationary, that is, first two moments of the unconditional distribution of the return series is time-invariant.

IV. Results and Discussion

We present the results of our empirical analysis. Monthly data from the CBN statistical bulletin were obtained. Table 1 reports the monthly mean returns, Standard deviation, Skewness, Kurtosis, and Jacque-Bera statistics for the entire sample from 1985-2011. An examination of characteristics displayed in the table shows that the time series is highly volatile judging by the upward trend of the standard deviation computed. The data also exhibit asymmetrical characteristic, evidenced by fat tails, since the Kurtosis lie between 0 and 4, and in most cases exceeds 3 which is the normal value. Evidence of negative Skewness in some years, 1987, 1991, 1995, 1997, 2001, 2002, 2008, 2010, 2011. Other years have positive Skewness as proved by the study. The Jacque-Bera normality tests refute the normality of returns series throughout the periods of study. Hence the market exhibit strong autocorrelation and heteroskedasticity which is an indication of ARCH effects in the series. Persistence parameter for ASI $\alpha + \beta < 1$ shows that the GARCH is weakly stationary in other words, the mean is reverting, that is, no matter how much time it takes, volatility process does return to its mean. This demonstrates that past volatility does not explain current volatility, thus, the series exhibit a random walk process even though the volatility not highly explosive since the wald test $\alpha + \beta$ is less than one throughout the iteration.

This result, irrespective of its difference in a time lag, the volume of data and analytical approach, the result approve as correct the finding of Samuels and Yacout (1981), who employed non-parametric test on

weekly price changes, Olowe (1999) used sample autocorrelations on monthly stock prices, the parametric test of Kukah, Amoo, and Raji (2006), and Okpara (2006), employed the run test and the correlogram/partial autocorrelation function on market return to investors.

Table 1: Descriptive Statistics For Nominal Stock Prices In Nigeria (1985 - 2011)

VARIABLE	1985	1986	1987	1988	1989	1990	1991	1992
Mean	117.283	149.81(	176.91(	210.80:	273.86(	423.65:	671.61	931.0167
Median	116.700	149.15(	178.90(	208.75(	264.20(	431.40(	669.90	875.2500
Standard Deviation	4.65673	9.51208	17.883.	15.850:	26.098:	63.088:	83.727	116.9601
Skewness	0.93303	0.1278:	-0.1144	0.1659(	0.7177:	0.0066:	-0.259	0.450855
Kurtosis	3.19082	1.9261:	1.1804(	1.5237'	2.3992:	1.4592:	1.8957	1.591983
Jarque-Bera	1.75930	0.6092'	1.6816(	1.1446'	1.2106:	1.1870:	0.7444	1.397796
Probability	0.41492	0.7373:	0.4313:	0.5642(	0.5458:	0.5523(	0.6891	0.497133

VARIABLE	1993	1994	1995	1996	1997	1998	1999	2000
Mean	1229.025	1913.225	3815.117	5955.142	7638.592	5961.875	5264.192	6701.175
Median	1187.200	1916.600	3950.400	5859.050	7690.650	5854.550	5291.050	6683.700
Standard deviation	131.0577	154.4547	1148.862	651.8877	875.9848	293.5700	304.3034	778.106
Skewness	1.411915	0.260024	-0.125592	0.215286	-0.205598	0.573276	0.871851	0.28065
Kurtosis	3.871910	2.559352	1.322787	1.670799	1.583678	1.817277	3.524562	1.783007
Jarque-Bera	4.367124	0.232311	1.438069	0.976084	1.087526	1.356707	1.657829	0.898076
Probability	0.112640	0.890337	0.487222	0.613827	0.580560	0.507452	0.436523	0.638248

VARIABLE	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mean	10185.08	11631.87	15559.89	24738.65	22876.72	28101.58	48773.31	50424.71	23091.55	24735.02	23358.61
Median	10301.60	11554.70	14325.90	23809.40	22448.55	27098.30	50215.40	53650.41	21939.38	24906.35	24224.10
Standard	825.2689	636.6326	2501.964	2131.409	1563.053	4366.830	5924.436	11607.71	2854.859	1264.023	2483.831
Skewness	-0.394006	-0.232777	0.835207	0.803457	0.482077	0.120087	-0.617296	-0.478172	1.178488	-0.545592	-0.114061
Kurtosis	1.'777707	2.037601	2.089403	2.214968	2.150245	1.207526	2.746030	1.928637	3.435323	1.909389	1.425923
Jarque-Bera	1.057482	0.571477	1.810070	1.599224	0.825838	1.635323	0.794358	1.031206	2.872419	1.190057	1.264879
Probability	0.589347	0.751459	0.404528	0.449503	0.661716	0.441463	0.672214	0.597140	0.237828	0.55147	0.531294

Garc 1.1: Volatility Coefficients For Return Series In Nigeria 1985-2011

MODEL	ARCH (1) (α)	GARCH (1) (β)	Wald α + β =1	ARCH (1) S. E	GARCH (l) S. E	Constant (ω) S. E	Constant (ω) Coefficient
1985	-0.089794	0.453434	0.363640	88.26376	562.7998	7014595	8953.913
1986	0.778548	-0.424924	0.353624	218.6557	291.1253	268077	1463.17
1987	0.243824	0.114047	0.357871	18.12019	65.40660	1841195	20535.22
1988	0.999048	-0.649485	0.349563	156.1162	161.7540	3880892	29035.79
1989	0.917783	-0.556419	0.359364	87.41596	88.44171	3316776	49157.75
1990	1271350	-0.510329	0.761021	107.7281	108.0729	7590227	47571.63
1991	0.996213	-0.606817	0.389396	71.75627	79.32382	15208405	278478.50
1992	1.027817	-0.676905	0.350912	67.16299	56.32632	28325404	571565.60
1993	1.705446	-1.522897	0.182549	61.41688	161.1630	2.18E+08	992060.7
1994	0.981883	-0.629840	0.352043	136.6063	184.4843	2.83E+08	2392434
1995	1.082651	-0.733248	0.349403	12.01195	7.525037	1.01E+08	10231917
1996	1.119459	-0.776488	0.342962	78.80864	81.40518	1.53E+09	23304617
1997	1.391017	-1.125328	0.265689	41.64561	17.68128	2.19E+09	38383466
1998	-0.100442	0.444839	0.344497	41.70405	145.6334	4.64E+09	23154921
1999	0.217033	0.130686	0.347719	42.92792	274.0507	7.83E+09	15067789
2000	0.834213	-0.460701	0.373512	76.97345	55.04424	21.60E+09	29549482
2001	0.749550	-0.397630	0.35192	146.1227	137.1219	7.18E+09	67834043
2002	-0.090444	0.446627	0.356183	49.56997	119.3448	1.33E+10	88186701
2003	0.934925	-0.564957	0.369968	41.54342	34.92298	4.77E+09	1.61E+08
2004	0.5927237	-0.254302	0.3384217	31.77094	54.62152	3.75E+10	4.01E+08
2005	0.929083	-0.569897	0.359186	90.67400	110.1302	6.01E+10	3.42E+08
2006	0.939776	-0.579942	0.359834	43.48525	29.82792	1.85E+10	5.25E+08
2007	0.791837	-0.431033	0.360804	48.39355	59.19201	7.31E+10	1.57E+09
2008	1.401078	-1.336196	0.064882	13.51903	12.52613	1.87E+10	1.73E+09
2009	0.569021	-0.320967	0.338054	40.81266	26.46616	1.99E+10	3.51E+08
2010	1.001098	-0.533519	0.054882	12.51903	11.43513	1.78E+10	1.63E+09
2011	0.541067	-0.230956	0.337044	32.66084	53.52152	3.76E+10	4.02E+08

V. Conclusion/Recommendation

a) Conclusion

In this paper, we have estimated a nonlinear GARCH model for monthly stock prices volatility in Nigeria. Data for the estimation of GARCH (1.1) model was obtained from the Central Bank of Nigeria statistical bulletin on Nigeria all-share index. The preliminary investigation into the nature of the data reveals that the data is characterized by a non-normal distribution with comparatively high standard deviation; one would expect high conditional stock market volatility.

Results show evidence of time-varying volatility a clustering which is an indication that the market is weakly stationary. We, therefore, accept the weakness from the efficient market hypothesis, in other words, the market exhibits a random walk process.

b) Recommendations

We recommend that:

i. Financial managers, investors, and other market operators can obtain greater insight into the management of their portfolios with the aid of this result.
ii. Investors should obtain more excellent perception and understanding of the stock market to improve their portfolio performance.
iii. Investors should not put absolute trust in any privileged information to bit the market and think of making an abnormal profit, which is a futile effort .

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