RISK-RETURN ANALYSIS OF ASSETS IN THE NIGERIA FINANCIAL MARKETS: A GUIDE TO INVESTORS' CHOICE.

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ABSTRACT

This paper determines and compare the difference in the risk and return on Common stocks, Bonds and Treasury bills and infer on which is likely to be preferred by investors in the Nigeria financial markets. Utilizing daily time series Nigerian data on the prices of the assets for the period Jan 2012 to May 2017, the study employed the monthly rate of return, annualized return, annualized variance, sharpe ratio, average return, Jensen Alpa ratio & Treynor performance ratio evaluation techniues. Risk-Return performance matrix patterned after Eagle and Kroner VECH representation of BGARCH model and partially adjusted CAPM model of linear formation were estimated & analyzed to compare the performance of the different financial assets. The results revealed that stock exhibits the highest rate of monthly average return of about 11.4% followed by bonds with the rate of return of 0.17, while treasury bills display the lowest rate of return of 0.09. This suggest that, judging from the monthly average rate of return performance, a rational investor will prefer stock and possibly bond to treasury bills in his or her investment portfolio. Bonds has the highest annualized return, lowest annualized volatility/risk and the highest sharpe ratio. In any given year, bonds earn more return on investment than stocks or treasury bills and the lowest annualized volatility of 0.001% portents the tendency of very low level of riskiness faced by investors in bonds, while the highest Sharpe ratio of 8.01 for bond explicitly indicates that the return on bond covers its attendant or associated risk about 8.01 times. Given these, the study posits that Bond is the preferred asset by investors in the Nigerian financial markets during the period of this investigation and recommend that investors should diversify efficiently by holding portfolio of either Bonds and Stocks or Bonds and Treasury bills in the Nigerian financial markets

Key Words: Risk-Return Analysis, Financial Markets, Investors' Choice, Common Stocks, corporate bonds, Treasury Bills

INTRODUCTION

Financial markets are part of the financial systems paraphernalia for ensuring efficient allocation of resources within and across national boundaries. This is accomplished through the issue of different kinds of financial instruments, which provide avenues for investments in financial assets. The role of financial instruments is to create opportunity for firms wishing to raise money to do so, by presenting to potential investors the means of sharing in the future fortunes of the issuing entity, if the venture is successful. On the other hand, minimize the pain of loss by sharing the risk among many willing investors. In the financial market, there are different kinds of financial instruments both in the capital and money market, each with its expected risk and returns. Therefore, the choice of which securities one should invest in is very important to an investor and depends on the investors objectives on such investments, his expected returns and his attitude towards risk. Investors' attitude in this context refers to the behavior of investors in the financial market occasioned by their response to risk and returns on various financial assets. Financial market refers to market

that characterizes the transactions of both short and long term financial assets, operated by financial institutions under prescribed regulations. In most markets, these financial assets are purchased and sold for money, they are claims on investments. A vibrant financial market is one in which there is strong healthy competition by the various segments of the market. The depth of its activities breeds creativity in both the design and marketing of capital market products, and creates opportunities for investors to choose from a basket of investment options beyond the basic choice between treasury bills and stock (Cooper and Fraser, 1990). Money market is the market for the exchange of short term financial assets while Capital market is the market for the exchange of long term financial assets. Ross (1989) opines that every day in the money and capital markets, investors of funds must make decisions on where and when to invest their surplus scarce financial resources, considering such factors as risk, and expected return on securities available in the financial market place.

In answer to the question: why do we invest? Jones (1998) asserted that "we invest to make money—improve our monetary wealth, both current and future". This suggest that investment is aimed at maintaining, improving or increasing the stock of monetary resources. As such, investors invest their surplus funds in order to constantly add value to the invested sum. They do so by choosing from a wide range of securities in an attempt to maximize the anticipated returns from the chosen investment. Fischer and Jordan (1995) posit that an investment is a commitment of funds made in the expectation of some positive rate of return in a risky environment. If the investment is properly undertaken, the return will be commensurate with the risk the investor assumes. Certain criteria are considered by both

individual and institutional investors when deciding on which financial asset to invest in. Notable among these, is the risk and return expected on one asset relative to alternative assets. Facing the question of preference of one asset over another, investors' criteria for deciding on which type of marketable security to hold rests on such factors as risk and returns on security as the basic criteria for evaluating and selecting the type of marketable security to hold. This however forms the basis of portfolio choice between money market (treasury bills) and capital market (common stocks, Bonds) instruments. Invariably, the economic agent must make a trade-off between risk and returns when choosing the types of securities to hold (Weston and Brigham, 1975). According to the theory of portfolio choice, an increase in an asset's expected return relative to that of an alternative asset, holding everything else constant, raised the quantity demanded of the asset. Put differently, the quantity demanded of an asset is positively related to its expected risk and return relative to alternative assets (Mishkin,1997). Thus, a typical investor, as a rational economic agent, engages in investment in financial market instruments (common stocks, bonds, treasury bills) in order to reap all available returns on investments and in most cases, combines them into a portfolio which maximizes returns and minimizes risk more than investment in just one class of assets. An asset, for our purpose is a piece of financial security such as Equity (Common Stock), bonds & treasury bill that is a store of value. Financial assets are instruments of financial claims or securities that increase, improve or maintain the wealth of an individual, firms or government. They are traded in the financial market. Corporate bond or Bond is conceptualized as a financial instrument of long term indebtedness issued by the borrower to the

creditor (bond holder). It attracts interest as its return. Common stock is a financial claim that indicates ownership of the equity capital of a company. It attracts dividend as its return while Treasury bills is a Central Bank of Nigeria issued instrument on behalf of Government, traded in the money market with the intention of contracting or expanding the stock of money in the economy. Return on asset refers to the income, or yield that accrues to an investor according to the value of investment. It is technically known as dividend or interest. Return relates to the earnings, income or cash inflow from carrying-out the investment activity while risk refers to the uncertainty of the flow of these returns.

The major interest of any investor while investing in a financial asset or instrument is the expected return and the associated risk on investment. The return and risk on investment is the cardinal determinant of the choice of asset. Several assets are available in the capital and money markets in Nigeria, but the knowledge about their returns and the attendant risk which should guide their choice by investors are not mostly reported empirically. This constitutes a research burden to portfolio managers and researchers in finance. Based on the risk-return aversion; Returns are expected to reflect the degree of risk on a financial instrument, in which case, security with higher degree of risk, are expected to have higher returns. The question as to whether common stocks generate higher returns or risk than bonds and treasury bills or vice-versa is another problem that requires investigation. The basic questions in this study are: What is the nature of the rate of returns on common stocks, bonds & treasury bills? What is the extent of the risk and return differential as a basis of assets choice by investors.? What asset(s) will investors prefer on the basis of risk-return performance?

Research findings on Returns has indicated varying results in Nigeria and across countries. For instance, Adam and Tweneboah (2008); Osisanwo and Atanda (2012); Kpanie, Vivian and Sare (2014) indicated that return on Bonds, return on Treasury bills and return on Equities and Stock prices are negatively related in Ghana as well as Nigeria. However, contrary to these results, Maku and Atanda (2010); Adaramolo (2011); and Ogiji (2013) reported that Stock market prices and return on bonds, return on treasury bills and return on equities are positively related in Nigerian economy. Unlike the earlier studies by theses authors, this study attempts to apply the risk-return analysis on common stocks, bonds & treasury bills in the Nigeria money and capital markets as a basis of evaluating security performance and the decision of investors to prefer specific asset over another and/ or their combination in portfolio as an investment strategy to diversify risk while maximizing returns.

The logic point of entry is to compare the risk and return as performance measuring parameters between common stocks, Bonds & treasury bills so as to make optimal investment decision with regards to the choice of assets. Based on available and reviewed empirical evidence relating to comparative studies on assets returns in Nigeria financial markets, it is observed that there exist relatively few studies on these. Hence, this study attempts to fill this gap in literature and contribute to the existing body of knowledge. In order to fill this gap, this study will attempt to investigate the extent to which each of these assets performs in terms of their risks and returns. Their comparison with one another will help investors make informed investment decision with regards to which assets to invest in and /or to combine in his or her portfolio.

The Objectives.

The aim of this study is to determine and compare the risk and return on common stocks, bonds, treasury bills and infer on which is likely to be the preference of investors. The study intends to achieve the following specific objectives:

1. To determine the rate of return on common stocks, bonds & treasury bills in the Nigeria money and capital markets.

2. To examine and compare the risk and returns on common stocks, bond& treasury bills as a basis of determining the choice of assets by investors.

3. To investigate whether investors will prefer one asset to the other, based on risk-return performance.

The findings of this study will be relevant in creating an informed investment decision between common stocks, Bond & treasury bills investors in the Nigeria capital and money market. The most paramount beneficiaries are; Investors/financial analysts because the outcome will be a tool for investment analysis in the hands of investors and portfolio managers who are mostly concern with risk and returns on investment(s). To the researchers, the result will provide more insight and clearer understanding of the guide to asset choice in anticipation of increasing empirical evidence in this regard. The rest of this paper is set as follows; section two treats the review of existing literature. Method of the study, data organization and model specifications are undertaken in section three. Section four presents our findings, while section five houses the summary and conclusions from the findings.

Theories of Investors Behaviour and Empirical Literature Review

Certain general behavioural patterns are decipherable from investors in their conduct of investment activities. Notable among these is the return maximization and risk minimization behaviour. According to the return maximization hypothesis, a typical investor, whether individual or institutional, as a rational economic agent, engages in financial investment in order to reap all valuable returns from his or her investments. Conventionally, the investor would do this through the window of assuming the associated risk of engaging in the investment activities. This would mean engaging in all activities that enhance the asset return creating ability. It could also imply minimizing risk in all their investment operations.

Usually, risk and return realities constrain the attainment of maximum investment potential of investors. As in Ibenta (2005), in pursuit of return maximization, and using the mean-variance analysis, investors can choose assets and construct portfolios to optimize or maximize expected returns based on a given level of risk. We can infer that risk is a requisite for higher reward since risk is rewarded through return. Based on these, investors are expected to adjust their risk towards the desired level of return. For instance, investors would demand additional expected return, if they are asked to accept additional risk; hence all securities are expected to yield returns commensurate with their riskiness (Sharpe, 1964). A major insight provided by theory is that investments risk and return characteristics should be evaluated before asset choice or portfolio selection.

Theories of Investors Behaviour

Prominent Finance Theories that help explain investors' behaviour in relation to the risk-return axiom are the Capital Asset Pricing Theory, Modern Portfolio Theory, Risk-Return theory and Efficient Market Theory (EMT). Below are posits of the various theories.

Capital Asset Pricing Theory

The Capital Asset Pricing Model (CAPM) was proposed as a model of risk and Return analysis by William sharpe in a paper in 1964. It has become the most important model of the relationship between risk and return. For his contribution to the theory, William sharpe was awarded the Noble prize in Economics in 1990. The Capital Asset Pricing Model (CAPM) holds that investors demand additional expected return (more risk premium) if they are asked to accept additional risk; hence expected return equals the rate on a riskless asset plus a risk premium. It is basically a simple linear relationship. The higher the value of beta, the higher would be the risk of the security and therefore the larger would be the expected return by the investors. In other words, all securities are expected to yield returns commensurate with their riskiness as measured by beta. (Sharpe, 1964).

This relationship is valid not only for individual securities, but is also for all portfolios whether efficient or inefficient. According to Riskglossary (2006), "We call CAPM a 'capital asset pricing model' because, given a beta and an expected return for an asset, investors will bid its current price up or down, adjusting that expected return so that it satisfies the formula. Therefore, the rate of return on investment is the major determinants of an investors choice of assets.

The Markowitz portfolio theory

The intuition behind the maximization of expected returns and portfolio risk is explained by the Markowitz (1952) portfolio theory. The conceptual framework of the theory is that, the utility of the investor is mainly a function of the first two moments (mean and variance) of returns and further takes into consideration the diversification effects of investor preferences and expectation of the risk of all assets under consideration. Fama and French (1989) posited that the Markowitz mean-variance assumes financial or stock returns to be normality. In a real world situation, this could not be the case.

In reality, returns may not depict a normal behavior, and empirical evidence suggests that financial returns are not normally distributed. In spite of these weaknesses of the model, it is widely used in both academic and real world applications. For instance, Huang and Yang (2010), considered the measures of skewness and kurtosis and proposed a general Markowitz portfolio investment model. Another consideration is that, the Markowitz theory has been tested extensively on various developed markets, but fewer studies of the theory have been reported on the frontier markets in sub-Saharan Africa.

Mensah, Avuglah and Dedu (2013), investigated wealth allocation among nonfinancial and financial assets on the GSE and used the classical Markowitz theory of portfolio optimization to determine the degree of profitability on either a buy or hold strategy. The study established the proportion of investment for both nonfinancial and financial assets for a risk averse investor.

Modern Portfolio Theory (MPT)

The Modern Portfolio Theory (MPT) is a hypothesis put forth by Harry Markowitz in his paper 'Portfolio Selection', (published in 1952 by the Journal of Finance). This is an investment theory based on the idea that risk-averse investors can construct portfolio to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. (Ibenta,2005). This theory is otherwise known as mean-variance analysis. The theory explains how risk-averse investors can construct portfolios to optimize or maximize

expected returns based on a given level of market risk, emphasizing that risk is an inherent part of higher reward. A major insight provided by Modern Portfolio theory (MPT) is that investments risk and return characteristics should not be viewed alone, but should be evaluated by how the investment affects the overall portfolio's risk and return. The basic assumption of Modern Portfolio Theory (MPT) is that investors are risk-averse, meaning they prefer a less risky portfolio to a riskier one for a given level of return. If an individual investor wants a higher expected return, he must accept a higher risk. It is an old saying that one should not put all one's eggs in one basket. This implies that an investor will take on more risk if he/she is expecting more reward. Therefore, investors choice of an asset, is based on the risk-return trade-off.

Risk-Return Theory

This theory was postulated by Harry Markowitz with Kenneth A. Blay, McGraw Hill (2014). The theory of risk-return, is a theory which tries to explain the relationship between expected returns from an investment and the risk associated with the investment. It states that the higher the risk, the higher the potentials or expected return from an investment. The common misconception with this theory is that people tend to equate higher risk with higher return. The actual emphasis of this theory is that, higher risk implies the possibility of a higher return, but with no guarantee. This is because higher risk means potential for higher returns as well as higher losses (Pandey, 2004).

EMPIRICAL LITERATURE REVIEWS.

Asiegu(1999) evaluated the selection of security in the Nigerian capital market based on reward-to-volatility criterion as found in capital asset pricing model. The study revealed that individual securities in the market exhibit positive results, a factor which encourages investments in the market. Also, some of the securities display very high level of volatility, thus suggesting instability in prices. They recommended proper evaluation of securities in order to make informed decisions.

In another study, Anuolam and Eke (1999) investigated the efficiency of the Nigeran Capital Market. The study adopted the ADF unit root test, the ARMA Test, VAR-based granger causality test, the cointegration analysis and the Vector Error correction test. They not only reported that the Nigerian capital market is inefficient but also demonstrated that individual securities show fluctuating average rate of Return between high and low of the average market returns. The study reported that the risks of the securities also fluctuate as they could be higher or lower than that of the portfolio. They recommended that investors should always evaluate the risk disposition before undertaking any investment decision.

Financial history shows that common stock investments have been riskier than investments in treasury bills. On the other hand, the riskier investments have offered high average returns, Bodie, Kane & Marcus (1999). Investors, of course, can and do construct their portfolio using safe money market securities like treasury bills and capital market securities such as common stock and bonds. Investments professional consider asset allocation choice, the most important part of portfolio construction, Bodie, Kane & Marcus (1999).

Olaleye (2000) examined portfolio management practice and performance of property portfolio in Lagos. He evaluated the performance of property in terms of mean return measure, the standard deviation measure, the sharpe index and the differential return measure. The study showed that portfolio of different areas within the same urban

centers varies. The study has helped to define some critical issues relating to portfolio management and property performance.

Ebiringa and Okorafor (2007), studied the risk-return index of selected market leaders and underdogs and compare these indices with the benchmarked market performance index: they found that stock investment decision in the market is not efficient as the market leaders perceived as efficient by investors failed the efficiency test. The authors recommended that investors in the Nigeria capital market should be guided by the risk-return analysis of stocks.

Adam and Tweneboah (2008) examined the role of macroeconomics variables on stock prices movements in Ghana, using Johansen's multivariate, cointegration test and innovation accounting techniques. The result indicated that return on bonds, return on treasury bills and return on equities are negatively related to stock prices movements in Ghana.

Erika and Igbinomwanhia (2008) Examined Equity investors rates of return on common stocks in Nigeria. Data were obtained for ten years from the twenty most capitalized firms in the capital market. They found that the rates of return in common stock in the form of dividend for the firms studied varies significantly. For the entire market, the result showed that the rate of return on common stock as dividend was 4.323%. The dividend payout ratio for the market was 57.546%. On the relationship between Fixed Assets and dividend per share, it was not ascertain whether or not fixed assets significantly determine dividend per share, because results from the empirical analysis showed that while for ten companies, fixed assets tend to determine dividend per share, results for the other ten showed otherwise.

Chandra (2008) also employed three broad approaches for the selection of stocks (equity shares): technical analysis, fundamental analysis and random selection. Technical analysis looks at price behavior and volume of data to determine whether the share will move up or down or remain trendless. Fundamental analysis focuses on fundamental factors like the earnings level, growth prospects and risk exposure to establish the intrinsic value of share. The recommendation to buy, hold or sell is based on a comparison of the intrinsic value and the prevailing market price. The random selection approach is based on premise that the market is efficient and securities are properly priced. These evidences indicate a strong relationship between rate of return on a financial security and the demand (choice) or investment in such financial asset. Chandra (2008) proposes that investors should carefully evaluate the yield to maturity in selecting fixed income earning security such as treasury bills. The yield to maturity for a fixed income avenue represents the rate of return earned by the investors if he invests in the fixed income security and holds it till its maturity.

Ade and Dallah (2010) examine the volatility of daily stocks returns of Nigerian insurance stocks using twenty-six insurance companies daily data from December 15, 2000 to june 9 of 2008 as training data set from June 10 2008 to September 9 2008 out- of sample data set. The result of ARCH (1), GARCH (1,1) TARCH (1,1) and EGARCH (1,1) shows that EGARCH is more suitable in modeling stock price returns as it outperforms the other models in terms of model estimation evaluation and out-of-sample volatility forecasting.

Kuchanur A. B. (2010) Studied A Comparison between investment in Financial assets and investment in physical assets made by individual investors by tracing the size and pattern, asset preference, drivers and length of investment. It

was revealed that the majority of individual investors have an investment size between $R_s37,501$ & $R_s75,000$. It was traced that 26.67% of individual investors have investment lenghth between 6 to 10 years in fianacial assets and similar percentages of investors have investment length between 16 to 20 years in physical assets. The financial perceptions cover amount of investment, regular and steady income, capital appreciation, tax benefits, etc whereas non-financial perceptions include low intensity of risk, statutory protection, length of investment, service delivery, etc. It is clear from the preceding discussion that the individual investors prefer for investments in financial as well as physical assets for various reasons and they expect that such assets must fulfill their expectations in the years to come.

Research Gap.

Unlike the earlier studies by the authors, most of these works are foreign based which may not fit the peculiar situation of Nigeria. In the Nigeria context, there is virtually less empirical comparative study on financial assets return and risk that has actually centered on these financial asset returns and risks in the Nigeria financial market. This is a research gap that this study is set to fill. The various studies did not cover the periods from Jan 2012 to May 2017. As such, this study utilized more recent data make up to evaluate the rate return, risk-return performance of common stocks, bonds and treasury bills in the Nigeria financial market with the aim of guiding investors future investment decisions.

More so, the tools used for evaluating the various assets performance is evidently different from that of previous studies. In this study the average rate of return analysis is used alongside with the annualized return, annualized volatility of the

various securities and their Average return, sharpe ratio, Jensen Alpher performance ratio and Treynor ratios. This is a more robust analysis than those carried out in past studies reviewed. Based on available and reviewed empirical evidence relating to comparative studies on assets returns in Nigerian financial market, it is observed that there exist relatively few studies on these. Hence there is a need for a study of this nature that will bridge the gap noticed in the literatures and contribute to the existing body of knowledge.

In order to fill this gap, this paper apply rate of return and risk-return analysis on common stocks, bonds and treasury bills in Nigeria capital and money market as a basis of assessing security performance and to guide the decision of investors. The logical point of entry is to compare the rate of return, risk-return performance between common stock (equity), bonds & treasury bills. We also attempt to investigate the extent to which the comparison will help investors make informed investment decision in the Nigerian capital and money market (financial market).

METHOD OF THE STUDY

The researchers provide a distinct methodological framework required to conduct an investigation on the research gap unfolded by the questions raised. In order to systematically apply the scientific method in the investigation of the problem. The research adopted the quasi- experimental design. Hence, in our construct, we have identified unique stages, which are required to carry out our empirical experiment. In the foremost stage, raw data on financial assets prices are collected on a daily stream and transformed into monthly frequency. Due to the prevalence of out layers or structural breaks in the series of these variables, we questioned their stationarity using unit root test. After the test; the data were used to compute the

assets returns and variance and estimate the model using average returns and variance. Finally, in the last stage we progress further to compare the performance of the various assets. This will justify the presumed investors choice of one asset over the other. In brief, the study provides a measure to assess the performance of financial assets and the possible behavior of investors in terms of investment preference in the Nigerian capital and money market. The designed algorithm to achieve this overriding problem, includes the methods for computing annualized return and volatility, Sharpe, Treynor and Jensen performance ratios, the BEKK and cross-sectional absolute deviation methods. All these specifications are estimated using data collected on the prices of stocks, bonds and treasury bills. However, the raw data had been transformed to first difference before they were fitted into the models.

The study population is based on all the companies that are continuously quoted in the Nigerian stock exchange (NSE) during the period of 2012 to 2017. Specifically, as at November 11, 2016 about 180 companies were listed in the Exchange with total capitalization of N10.6 trillion. Our constituent population is made up of only actives securities, inactive or dead securities are excluded from the population. Thus, the benchmark for the population size is 180 companies. This were the active securities within the period covered by this study.

The researchers employ a blend of random sampling method and convenience sampling technique to select three variables namely stocks, bonds, and treasury bills with limited time dimension ranging from Jan 2012 to May 2017 on daily frequency. Therefore, a company that does not have data on variables of interest or at least one of the variables of interest is excluded from the sample group. In view of this, about 59 companies are selected for the study. The sample period ranges from 2012 to 2017. The justification for this period is that the selected companies were continuously quoted for the aforementioned period.

The study utilizes daily data transformed into monthly series for the computation of stocks, bonds, treasury bill returns and variance. This computation emanated from the Nigeria Stock Exchange Equity prices, bond prices, daily Treasury bill rate for the period Jan 2012 to May 2017. Put differently, monthly data on stock prices, bond price and treasury bill prices are collected from the Nigerian Stock Exchange (NSE) and the Central Security Clearing System over a period of 2012 to 2017. This gives rise to 66 unbreakable monthly observations. The researchers employed secondary data for this study, because the variables under investigation are quantitative in nature.

Operationally, Common stocks is financial claim on the future income or earnings of a business that indicates ownership of the equity capital of the company. It attracts dividend as its return and it value is the function of the market price. Corporate bond is a financial instrument of long term indebtedness issued by the borrower to the creditor (bond holder). It attracts interest as its return. Treasury bills is a short term financial instrument issued at a discount by the Central Bank of Nigeria with the intention of increasing Federal Government Liquidity position or reducing the stock of money in circulation

Model Specification

Following the arguments and the theoretical underpinnings and empirical review earlier made in this paper, we can hypothesize in the null form

that: There is no significant difference in the nature of the rate of return on common stock, corporate Bond & treasury bills in the Nigeria financial market. Also, the risk-return differential on common stock, corporate Bond & treasury bills do not form the basis of determining the choice of assets by investors. Finally, investors choice of financial assets-common stock, corporate Bond & treasury bills are not based on risk-return performance analysis.

Based on the postulation made by Asiegbu (1999), CAPM model is adopted with some adjustment to suit our purpose. In other word, the adoption of CAPM model here was based on the specification made by Asiegbu (1999).

Rate of return on common stocks (Rcs) at time t is derived by:

$$R_{cs} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \text{..........................(3.1)}$$

Rate of return on Bond (R_b) at time t is derived by:

$$R_b = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \text{...........................(3.2)}$$

Rate of return on Treasury bills (R_{TBN}) nominal rate at time t is derived by:

$$R_{TBN} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \text{..........................(3.3)}$$

Rate of return on Treasury bills minimum rediscount rate (R_{TBP}) at time t is derived by:

$$R_{TBP} = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \text{...........................(3.4)}$$

Average rate of return is derived by:

$$R_{cs} = \frac{\sum R_{cs}}{n} \quad \text{.......................................(3.5)}$$

$$Ave\,R_{TBN} = \frac{\sum R_{TBN}}{n} \quad \text{.......................(3.6)}$$

$$Ave\,R_{TBP} = \frac{\sum R_{TBP}}{n} \quad \text{.........................(3.7)}$$

The variance of the rate of return is derived by:

Nominal variance $= \dfrac{\sum (R_{cs} - R_{TBN})^2}{n-1}$ ...(3.8)

Real variance $= \dfrac{\sum (R_{cs} - RP)^2}{n-1}$ ....(3.9)

Where:

P_t =   Closing market price of Nigerian stock exchange All-share index and Treasury bills rate, bond rate at year t.

P_{-t-1} =   The same price relative at the end of year t-1

R_{cs} =   Rate of return on common stocks.

R_{TBN} =   Rate of return on Treasury bills at nominal rate.

R_{TBP} =   Rate of return on Treasury bills at minimum rediscount rate.

N =   Number of years covered by the study.

The study follows the approach of Eagle and Kroner (1995) to develop VECH representation of BGARCH model. This is defined as follows:

$$\Sigma_t = \Omega_t \sigma_t \text{..................................(3.10)}$$

$$\begin{vmatrix} \sigma_{11,t} \\ \sigma_{21,t} \\ \sigma_{22,t} \end{vmatrix} = \begin{vmatrix} c_1 \\ c_2 \\ c_3 \end{vmatrix} + \begin{pmatrix} a_{11} & 0 & 0 \\ 0 & a_{22} & 0 \\ 0 & 0 & a_{33} \end{pmatrix} \begin{vmatrix} e^2_{1t-} \\ e_{1t-1}e_{2t-1} \\ e^2_{2t-} \end{vmatrix} + \begin{pmatrix} b_{11} & 0 & 0 \\ 0 & b_{22} & 0 \\ 0 & 0 & b_{33} \end{pmatrix} \begin{vmatrix} \sigma_{11,t-1} \\ \sigma_{21,t-i} \\ \sigma_{22,t-i} \end{vmatrix}$$

Where Ω_t is contemporaneous time invariant component and σ_t time variant conditional volatility and e^2_{1t-} lag squared innovations.
Annualized return and volatility is defined as:

$$AR = \left(\frac{sr_f}{sr_l}\right)^{0.185} \quad \text{.........(3.12)}$$

$$AV = SD_{SR} * 0.0007337757^{0.5}$$

Where AR and AV are annualized return and variance respectively, and SD_{SR} is the standard deviation of return.

Sharpe ratio is given as:

$$sharpe - ratio = \frac{\bar{r} - rf}{sd} \quad \text{.....................(3.13)}$$

Jensen ratio is defined as:

$$jensen - alpha = \left(r - \{(rf + beta)(rm - rf)\}\right) \quad (3.14)$$

Treynor ratio is

$$treynor - ratio = \frac{\bar{r} - rf}{beta} \quad \text{....................(3.15)}$$

Where $\bar{r}$ is average return, rf risk free rate and rm return on market

Data Estimation Technique

The variables under study are the rate of return as

well as the return on common stock (equity), Bonds and Treasury bills, in Nigeria and the nominal and real variance among these financial securities and their portfolios. We will start by evaluating the behavior of the data series using descriptive statistic, normality and unit root test as well as line graph.

Unit Root Test

The stationary of series used in the study will be determine with the estimation of unit root. Augmented Dickey Fuller (ADF) unit root test will be estimated from the following forms of equations. Based on the following regression equation:

$$\Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + \gamma_i \Delta Y_{t-i} + \varepsilon_t$$

Hypothesis:

$H0 :> 0$ (there is unit root in the series).

$H1 :< 0$ (the series are stationary)

The hypothesis is tested on the basis of t-statistic of the coefficient

Decision rule: Reject H_0 if test statistic is less than critical values, otherwise do not reject. (Haris and Sollis, 2004), Eliott et al. (1996).

Comparison of Security Performance

After the unit root test, we compute the monthly rate of returns on each security. The following techniques will be used to evaluate the performance of the different financial assets: the annualized return and the variance of the various securities and their Average return, sharpe ratio, Jensen Alpher and trynor ratios

i) Annualized Return (AR)

ii) Annualized Variance (AV)

iii) Sharpe Ratio (AR/AV): This measures the rate at which the return generated by an asset covers its risk.

iv) Average return : is a function of profit margin and asset turnover.

v) Jensen Alpher: Average Return divided by Beta; Beta is the measure of an assets volatility or riskiness in relation to the market. A higher beta indicates greater volatility, and a lower beta indicates low volatility.

vi) Treynor performance ratios: is a risk-adjusted measurement of a return, based on systematic risk. It is simply a measurement of actual return.

Average Return of a portfolio – Average return of risk-free Rate
Beta of the portfolio

The maximum estimation technique is employed to compute the parameters in the BGARCH-VECH representation model, and the OLS estimation is adopted for the cross-sectional absolute deviation regression equations.

Decision Rules:

i) Annualized Return (AR): The higher the Annualized Return, the better the performance of the asset.

ii) Annualized Variance (AV): A low Annualized Variance depicts low risk and suggest better asset performance.

iii) Sharp Ratio (AR/AV): The more the Return that cover the variance, the better the performance of the asset or portfolio.

iv) Average Return: Higher average Return suggest better asset performance while lower Average Return indicate poor asset performance.

v) Jensen Alpher: The more the Average Return that covers the riskiness of an asset, the better the performance of such asset and vice-versa

vi) Treynor performance ratio: the higher the Treynor ratio, the better the performance of the portfolio under analysis. When the value of the Treynor ratio is high, it is an

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indication that an investor has generated high returns on each of the market risks he has taken.

Empirical Results and Findings

The focus of the section is to present the outputs of our investigation on comparative analysis of asset performance based on risk-return in Nigerian financial markets. To achieve these, we calculated the monthly rate of return, annualized return and volatility, and then estimated diagonal BEKK specification and cross-sectional absolute deviation equation. However, the descriptive statistics on the interested variables are presented first as followed.

Descriptive Statistics, Normality and Stationary Tests

The mean values as well as skewness and kurtosis scores of the return series on stock, bond and treasury bill prices are calculated. Also, we conducted normality and stationary tests on these variables. These test results are summarized in table 4.1.

Table 4.1-Summarized Descriptive Statistics, Normality and Stationary Tests

Descriptor	BR	SR	TBR
Mean	0.139132	0.24731	0.004209
Std. Dev.	0.017136	0.603452	0.108954
Skewness	0.064029	2.744375	1.085687
Kurtosis	2.131059	10.70336	10.30316
Jarque-Bera	2.09(0.35)	242.30(0.00)	157.22(0.00)
ADF	3.29(0.00)	8.69(0.00)	4.8(0.00)

Source: Author's Result Computation

The descriptive statistics in table 4.1 cover a sample size of January 2002 to May 2017, approximately 66 observations. As clearly indicated in the table, the mean value of bond, stock and Treasury bill assets are about 0.14, 0.25 and 0.004 respectively. While the corresponding total risk or standard deviations are 0.02, 0.60 and 0.11. It is very evident here that stock has the highest mean or average value and the highest risk

too, confirming the convention-the higher the return, the higher the risk. Bond has a better return than treasure bill. However, the three securities have the same "syndrome" of increasing tendency in return over the sampling period. We can also see that by approximating the standard deviation of bond and Treasury bill to one digit, they have zero standard deviation, which means the bond and treasure bill are approximately risk-free securities. Bond has zero skewness, which means it is not skewed but symmetric. The skewness values of stock and Treasury bill are 2.74 and 1.09 respectively. Meaning that stocks and treasury bills are positively skewed with long tail rightward, but bond is bird shaped. Kurtosis values are 2.13, 10.70 and 10.30 respectively for bond, stock and Treasury bill. Therefore, bond is plytokurtic, while stock and Treasure bill are leptokurtic. The result of the distribution pattern is given by the Jarque-Bera statistics. Bond, stock and Treasury bill have Jarque-Bera statistics of 2.09, 242.30 and 157.22 respectively. Moreover, the associated probabilities are 0.35, 0.00 and 0.00. This suggests that bond price return is normally distributed but the return on stock and treasury bill prices are not. The ADF statistics are large in respect of each variable of interest and the corresponding probabilities are about zero, thereby rejecting the hypothesis of unit root is valid in the context of this test. This means that the data on all the assets are stationary at levels. Hence, bond, stock and treasure bill price returns are mean reversible. This reversibility evidence can be examined in the line graph below.

### Figure 4.1- Bond, Stock, and TB Return Distribution Pattern
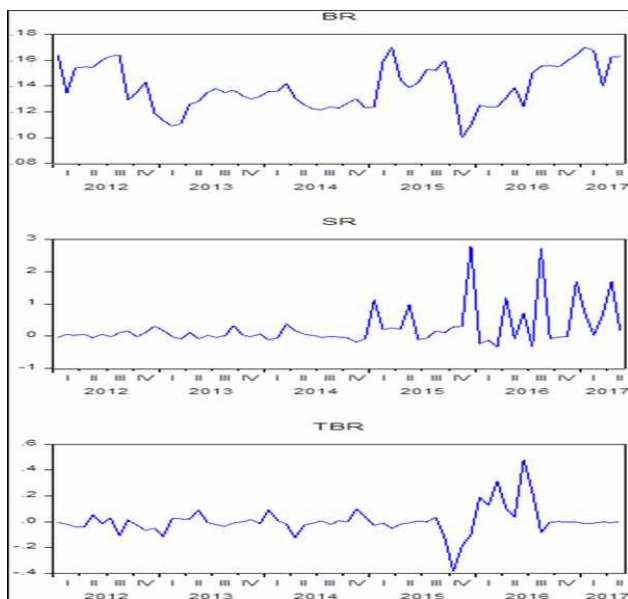
In the figure above, there are three-line graphs-bond return, stock return and Treasury bill return line graphs. Stock returns were apparently stable from January 2012 to December 2013, and decline consistently throughout 2014. Since January 2015 until May 2017, stock return has appeared highly fluctuating. Bond return fell in January 2012, and then clustered in-between 1 and 17 percent, but got to the peak in December 2016, while Treasury bill and stock got to the peak in the middle of 2016. Treasury bill performed very poorly in 2015, when negative returns were recorded; but bond has never given negative return during the sampling period. Throughout 2017, Treasury bill return appeared stable, in the same vain, bond showed element of stability in the last part of 2017. In addition, there is evidence that stock return is moving toward zero percent in the nearest future. This calls for the urgent attention of the capital market regulatory authority. We can now see the three variables in a combined line graph presented below.

Figure4.2- Bond, Stock, and TB Return in a Combined Line Graph
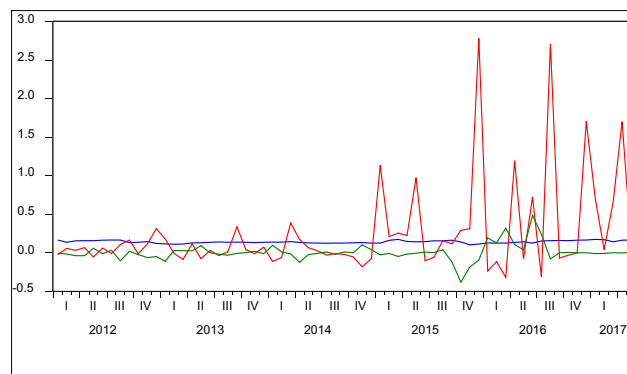
In the combined graph above the blue colored line is the bond return, the red colored line and the grain line is
the stock and Treasury bill return respectively. We can see that the bond return is somewhat stable. So also, Treasury bill return is stable except in the months of 2016, when there are features of swigging. On the contrary, stock return clustered exceedingly especially in the half part of the sample. This shows, suggest and support that bond and Treasury bill are fixed income security, while stock is a variable income security. We also use bar chart to demonstrate the distribution pattern of the variables. This is shown in figure 4.3.

Figure 4.3-Bar Chart Distribution of Bond, Stock and Treasury Bill Return
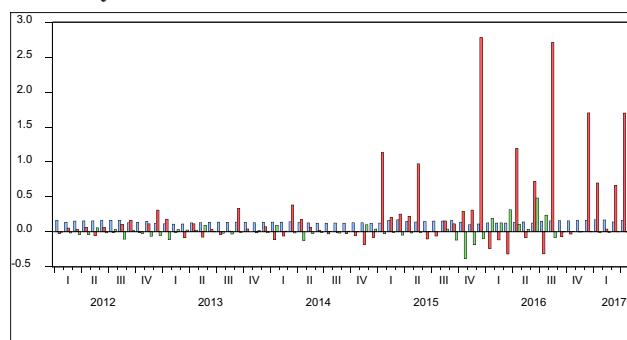
As also shown in the bar chart above, bond return is relatively fixed overtime. With the exception of the period- last month of 2015 and beginning period of 2016, Treasury bill return is fixed, but stock return varies significantly, and so it is truly a variable income security. We can now examine the monthly rate of return on these assets. In this regard, the difference in their performance can be unfolded as.

4.2: Monthly Rate of Return Performance Evaluation

4.2 Rate of Return Performance of the Assets

Table4.2- Monthly Rate of Return Performance Result

PANEL A-BOND RETURN

Regressor	Coefficient	St-error	T-stat	P-value
MTT	0.000167	0.000112	1.49101	0.1409
C	0.133611	0.00426	31.36454	0
PANEL B-STOCK RETURN				
Regressor	Coefficient	St-error	T-stat	P-value
MTT	0.011406	0.003755	3.03708	0.0035
C	-0.12908	0.14256	-0.90542	0.3687
PANEL C-TREASURY BILL RETURN				
Regressor	Coefficient	St-error	T-stat	P-value
MTT	0.000994	0.000715	1.38935	0.1696
C	-0.02858	0.027147	-1.052759	0.2965

Note-that MTT is the monthly time trend, coefficient indicates rate of monthly return, panel A, panel B and Panel C represent the bond return, stock return and treasury bill return regression equations, p-value is only significant in panel Bsource: Author's Computation

As shown in panel A, the coefficient of monthly time trend (MTT) with respect to bond price return is 0.000167 suggesting that bond return increases at the rate of 0.17 percent every month. In panel B, the rate of monthly return is 0.011406. This implies that stock return increases at the rate of 11.41 percent every month. Finally, Panel C indicates that Treasury bill return increases at the rate of 0.000994 or approximately 1 percent every month. Therefore, stock has the highest rate of monthly average return, followed by Treasury bill.

Asset Risk-Return Performance Metrics and Indicators

We computed some metrics such as annualized return, annualized variance/volatility and indicators such as Sharpe ratio, Jensen Alpha and Treynor performance ratio to draw a comparison between stock, bond and Treasury bill Risk-Return Performance o the assets. The values of these indicators are shown in table 4.3.

Table 4.3 Showing the Metrics and Risk-Return Performance Indicators of Bond, Stock and Treasury bill

Indicator/Metric	Stock	Bond	Treasury-Bill
ANNUALIZED RETURN	0.322828729	1.028788	1.005583
SD	0.603452217	0.108954	0.017136
ANNUALIZED VOLATILITY	0.016346491	0.000464	0.002951
AVERAGE	0.247310327	0.139132	0.004209
AVERAGE RETURN -RF	0.243101608	0.137257	
SHARPE RATIO	0.402851462	8.009888	
BETA	-1.096776	-0.5538	
JENSEN ALPHA	0.240542012	0.136219	
TRYNOR RATIO	-0.2216511	-0.24785	

Source: Author's Computation

The table reveals that the annualized returns of stock, bond and Treasury bill are 0.32, 1.03 and 1.01 respectively. This suggests that Bond has the highest annualized return, which is followed by Treasury bill. The annualized volatility of stock is 2 percent approximately, while bond and Treasury bill have annualized volatility of 0 percent each. This obviously confirms that bond and Treasury bill are risk free securities, while stock is a risky security. In other words, bond and Treasury bill do not have annual volatility but on the contrary, stock has. Therefore, a risk lover investor could go for stock to take advantage of its swigs and make excessive return at the time of bull.

The more the Return that cover the variance (risk), the better the performance of the asset or portfolio. Sharpe ratio measures the extent to which the return on an asset covers the associated risk of investing in that asset. The Sharpe ratio of 0.40, and 8.01 for stock, and bond respectively explicitly indicates that the return on stock covers its attendant risk about 0.4 times while the return on bond covers the associated risk about 8.01 times. So by Sharpe performance indicator, bond performs better than stock because for every level of return investors would be able to assume much more units of risk.

The Jensen alpha is estimated to be 0.24, and 0.13 for stock and bond respectively. These positive values imply that much return is earned to compensate forS the risk taken over the years by

investors. However, since stock has a higher alpha value, it means, it performs better than bond based on Jensen performance indicator.

The Treynor ratio or reward to volatility ratio are -0.22, and -0.25 respectively for stock and bond. The negative Treynor ratio means that investors have generated less return for each of the non-diversifiable risk taken by them. Since stock has the highest Treynor ratio, it means that stock perform better than bond.

In summary, bond performs better than stock because it has the highest annualized return, lowest annualized volatility and the highest Sharpe ratio. This suggest that with the highest annualized return, investors in this asset (Bond) stand the chance of earning higher return on their investments on yearly basis. The lowest annualized volatility means that the riskiness on investment in Bond annually is lower than that of Stock & Treasury bills respectively. Exhibiting the highest Sharpe ratio implies that the return generated by investment in Bond could cover its associated risk about eight (8) times when compared to stocks which does not display the potential of covering it risk even one (1) time

Implication of Findings

In this study, the researchers attempt to address three critical issues: namely-To determine the rate of return on common stocks, bonds, treasury bills in the Nigeria money and capital markets. To investigate the risk-return performance of assets across markets on common stocks, bonds, treasury bills in the Nigeria money and capital markets. To examine and compare the rate of returns as well as the risk-return performance of common stocks, bond, treasury bill (comparing the performance of asset returns and risk across

markets) as a basis of determining the choice of assets by investors and finally, to determine whether investors will prefer one asset to the other, based on risk-return performance.

Following the estimation results, it is very evident from the descriptive statistic result that stock has the highest mean or average value and the highest risk too, confirming the convention-the higher the return, the higher the risk. Bond has a better return than treasure bill. However, the three securities have the same "syndrome" of increasing tendency in return over the sample period. By approximating the standard deviation of bond and Treasury bill to one digit, they have zero standard deviation, which means that bond and treasure bill are approximately risk-free securities.

The combined line graph and the bar chart distribution suggest that bond and Treasury bill are fixed income earning securities, while stock is a variable income earning security. This is because bond return seems to be relatively fixed overtime with the exception of the last month of 2015 and beginning period of 2016. Treasury bill return is fixed, but stock return varies significantly, so it is truly a variable income earning security.

As shown in the results of the monthly time trend (MTT) or monthly rate of returns with respect to bond, it suggests that bond return increases at the rate of 0.17 percent every month, while stock return increases at the rate of 11.41 percent every month and finally, there is indication that Treasury bill return increases at the rate of 0.000994 or approximately 1 percent every month. Therefore, stock has the highest rate of monthly average return, followed by Treasury bill. The rate of return result suggest that Stocks perform better with a rate of return of 11.4, followed by bonds with the

rate of return of 0.17, while treasury bills display the lowest rate of return of 0.09. This suggest that, a rational investor will prefer stock and possibly bond to treasury bills in his or her investment portfolio. Judging from the rate of return performance.

In another instance, the performance of the assets was examined based on risk-return such as annualized return, annualized volatility, Sharpe ratio, Jensen Alpha and Treynor Measure. The highest annualized Return (1.03) as displayed by Bond which is closely followed by that of treasury bill (1.01) and lastly, the annualized return of stock (0.32), suggest that on yearly basis, bond performs better than treasury bills and both shows better performance in relation to stock. This implies that, Bond and treasury bills could be preferred securities by investors.

The annualized volatility of 0.016 for stocks, 0.001 for Bonds and 0.003 for treasury bills portents the tendency of high level of riskiness faced by investors in stocks,
followed by investors in treasury bills while investors in bonds face the lowest level of risk. Given that investors are risk-averse; most investors will prefer assets with a low risk to that with a higher risk. As such, investors will prefer Bond and possibly treasury bills while stock may be the least preferred asset for investment on the basis of annualized risk. The Jensen alpha ratio of stock and bonds also supports our earlier position that bond is preferred to stock based on the level of risk associated with investment in these assets.

The result that the average return on stocks (0.24) is greater than the average return on Bonds (0.14) suggest that, the profit margin and asset turnover on stock are better than that of bonds. This points

to the fact that stock may be a more preferred asset to investors than bonds on the basis of average return.

The sharpe ratio of 0.40 for stocks and 8.01 for Bonds implies that, the return generated by investments in bonds covers its associated/attendant risk about 8 times while the return generated by investment in stocks covers its risk only about 0.4 times. These show that bonds should be the preferred asset based on the rate at which its generates return to covers its risk.

The Treynor performance ratio, which is a risk adjusted measure of return based on asymmetric risk shows that, bonds rewards risk taken to invest in bond better than the extent to which stocks rewards its associated risk. This is evidence by their Treynor ratio of -0.25 for Bonds and -0.22 for stocks. This implies that, it will be more rewarding to take the risk of investing in Bonds than to invest in stocks.

It is found that Stock return has the highest annualized volatility (risk) but the lowest annualized return. While, bond and Treasury bill returns have the highest annualized return, and approximately zero annualized volatility(risk). Bond has the highest Sharpe ratio, but stock has the highest Jensen Alpha. Both bond and stock have very low Treynor performance measure. This means they cannot significantly compensate for undiversifiable risk. However, since bond has the highest annualized return and very low volatility (risk), it is confirmed to be the best asset to invest in among the three assets. However, investors could invest in Bond and choose either treasury bill or stock. However, Bond is preferred if the investors are risk-averse otherwise stocks should be preferred if they are risk-plungers. Investors

could also diversify efficiently by holding a portfolio of either Bond and Stocks or Bond and treasury bills.

From the foregoing, bond performs better than stock and treasury bill because it has the highest annualized return, lowest annualized volatility (risk) and the highest Sharpe ratio. The empirical results suggest that with the highest annualized return, investors in this asset (Bond) stand the chance of earning higher return on their investments on yearly basis at low risk. The lowest annualized volatility means that the riskiness on investment in Bond annually is lower than that of Stock and Treasury bills respectively. Exhibiting the highest Sharp ratio implies that the return generated by investment in Bond could cover its associated risk about eight (8) times when compared to stocks which does not display the potential of covering it risk even one (1) time. These position bond as the preferred asset by investors in the Nigeria financial market.

CONCLUDING REMARKS

In view of the findings, the following conclusions are made to justify the aim of this study.

1)Bonds and Treasury bill are less volatile and their expected returns are relatively fixed, while stocks are more volatile and their expected returns vary over time. Stock has the highest monthly rate of return followed by Treasury bill. The pattern of distribution of bond price/return is normal, but stock and Treasury bill return do not follow a normal distribution process.

2)) Base on risk-return analysis, bond perform better than stock and treasury bill because it has the highest annualized return, lowest annualized volatility (risk) and the highest Sharpe ratio.

3)These position bond as the preferred asset by

investors in the Nigeria financial market.

In view of the conclusions above, the study recommendation that investors should diversify efficiently by holding a portfolio of either bond and stocks or bond and treasury bills. Investors should invest in bond, and choose either treasury bill or stock. Bond if the investors are risk averse, otherwise stock. The findings of this study provide investors in the financial market with the template for evaluating asset performance and the basis for choosing one asset over the other as well as the model for constructing or selecting efficient asset or portfolio.

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