World Journal of Finance and Investment Research E-ISSN 2550-7125 P-ISSN 2682-5902
Vol 8. No. 1 2024 www.iiardjournals.org (Online Version)

Efficient Market Hypothesis and Stock Prices: A Time Variant Analysis from Nigeria

LENYIE, Leesi
Department of Finance, Rivers State University,
Port Harcourt, Nigeria

DOI: 10.56201/wjfir.v8.no1.2024.pg105.126

Abstract
This study examined the effect of Efficient Market Hypothesis on stock prices in the Nigeria stock market. Time series data were sourced from Central Bank of Nigeria Statistical Bulletin from 1990-2021. Stock prices was modeled as the function of changes in money supply, changes in expected inflation rate and changes in monetary policy rate. Ordinary Least Square (OLS), Augmented Dickey Fuller Test, Johansen Co-integration test equations, parsimonious vector error correction model and pair-wise causality tests were used to conduct the investigations and analysis. From model five, the study found that money supply and monetary policy rate have positive but no significant effect on stock prices while expected inflation rate have negative and no significant effect on the stock price of traded equities in Nigeria stock market. From the findings, we conclude Efficient Market Hypothesis have moderate effect on stock prices in Nigeria stock market. We recommend the need for investors in the stock market and the regulators to formulate strategies of managing systemic and unsystemic risk and the implementation should not just be formulated but strategic and tactical measures should be put in place to absorb, retain and transfer systemic risk.

Keywords: *Efficient Market Hypothesis, Stock Prices, Changes in money supply, Changes in expected inflation rate, Changes in monetary policy rate*

INTRODUCTION

The efficient market hypothesis (EMH) links information flow and asset prices. One stock market assumption that has a long history of development is the EMH. Gyamfi, Kyei, and Gill (2016) dated the evolution of this theory to Cardano's 1564 work on the equal-opportunity gambling principle, to Brown's 1828 study on rapid oscillatory motion, and to Regnault's 1863 study on stock price deviation and time relation. When shares on the open market open, the efficient market is considered to exist; share prices as acquired denotes the best intelligence's assessment of them (Gibson, 1889, referenced in Ejem, Ogbonna & Okpara) (2020). Other research that led to the development of the EMH include those by Einstein (1905), Fama (1965), Friedman (1953), Granger and Morgenstern (1963), Harry (1959), Keynes (1923), Mandelbrot (1963), Sharpe (1964), Tussig (1921; Akani & Lucky (2014) and von Smoluchowski (1906), as listed in Ejem, et al (2020), Ehiedu and Toria, (2022).The model was successful as it consistently outperformed the

CAPM. Nevertheless, researchers discovered that the Three-factor model, similar to the CAPM, had difficulty explaining several other patterns of returns. This led to the development of the Five-factor (Fama, French 2015; Leesi & UmasoM, 2023) and the Six-factor model (Fama, French 2018) which augment the Three-factor model with the profitability (RMW), investment (CMA) and momentum (WML) factors.

The principle of risk-return tradeoff is one of the basic tenets of finance. It is based on the hypothesis that potential returns rise as risk increases. This positive relationship is assumed by the traditional asset pricing theories such as the capital asset pricing model (CAPM) of Sharpe (1964) and Lintner (1965). Baillie and DeGennaro (1990) stated that most asset pricing models hypothesize a relationship between a stock portfolio's expected returns and volatility. The hypothesis guides investment decisions and evaluation of performance of investment portfolios hence important for the investors. In support of this hypothesis, French, Schwert and Stambaugh (1987) documented that unexpected stock market returns are negatively related to the unexpected change in the volatility of stock returns. They argued that evidence of a positive relationship between expected risk premia and volatility can therefore be inferred from their finding of this negative relationship.

Market efficiency height depends on the knowledge conditions that exist in the market environment. Because of this, the data set was separated into three forms (levels), namely the weak, semi-strong, and strong forms, according to Fama (1970), as cited in Ejem et al. (2020). Strong-form efficient markets must have the following characteristics: a large number of knowledgeable investors actively analyzing and trading stocks; information is widely accessible to all investors; events, like labour strikes or accidents, tend to occur at random; and a quick and accurate response from investors to new information. Weak-form or semi-strong form may exist when one or more of these conditions are not present in the market. A market is considered to be efficient according to the weak-form EMH if current prices accurately reflect all information found in earlier stock prices. According to this representation, previous prices are insufficient as a stock price forecasting tool. Since the semi-strong form of the EMH states that current market prices reflect all information that is publicly available, it is therefore impossible to generate anomalous returns by relying simply on historical prices (Ejem, et al, 2020). Factors that determine stock market return remain a controversial among scholars in behavioral finance. Therefore this study examined the effect of Efficient Market Hypothesis on stock market return in Nigeria.

LITERATURE REVIEW

Efficient Market Hypothesis

Efficient Market Hypothesis was developed in late 1960 by the Nobel Prize Awarded Professor Fama (1970). The theory states that prices of financial assets in a liquid market are random and are fully reflected by all available information; the prices are the intrinsic value, not under nor overvalued. According to EMH, efficient markets can be distinguished in three different forms depending on available information: "weak", "semi strong" and "strong (Fama, 1970; Akani & Lucky, 2014).). The weak form of efficiency emphasizes that the current prices reflect all historical information, meaning that no investor can successfully study historical returns in order to gain future returns. Therefore, technical analysis, technique of identifying previous trends in price movements, is not an efficient tool of generating profits because there are no patterns in a random walk time series (Fama, 1970).

The semi-weak form states that current asset prices reflect all available public information, in addition to historical prices, the semi-weak form includes company announcements, quarterly and annual reports as well as publications and non-financial news such as macro-economic data. It is not possible to generate excess returns based on what is known to the public, as prices rapidly adjust to all new public information. Neither technical nor fundamental analysis, i.e. analysis and forecasts of a corporation's financial record, is a consistent tool to achieve excess returns (Fama, 1970). The strong form is the most extensive of EMH as prices reflect all information, including both public and insider information (private). Insider trading is regulated by national laws and is illegal and therefore not possible, except for countries without legal barriers (Fama, 1970).

Efficient-market hypothesis (EMH) asserted that financial market is "informationally efficient". There are three major forms of the hypothesis: "weak", "semi-strong", and "strong". Weak EMH claims that prices on traded assets (for example, stock bonds, or property) already reflect all past publicly available information. Semi-strong EMH states that prices reflect all publicly available information and that prices instantly change to reflect new public information. Strong EMH additionally claims that prices instantly reflect even hidden or "insider" information. Efficient market theory implies that market will react quickly to new information. Thus, it is important to know when the accounting report first became publicly known. The accounting report is informative only if it provides data not previously known by the market.

Theoretical Review

Arbitrage Pricing Theory (APT)

An important body of research in financial economics has been the behaviour of assets prices, and especially the forces that determine the prices of risky assets. There are also a number of competing theories of asset pricing. These include the original capital asset pricing models (thereafter CAPM) of Sharpe (1964), Lintner (1965) and Black (1972), the Inter-temporal models of Merton (1973a), Long (1974) Rubinstein (1976), Breeden (1979), and Cox, Ingersoll & Ross (1985), and the arbitrage pricing theory (hereafter APT) of Ross (1976). The theory of asset pricing is concerned with explaining the price of financial assets in an uncertain world. Qian (2011) stated that the uncertainty is described by probability distributions, which can be understood as beliefs of economic agents. According to him, the theory of asset pricing studies both the valuation of risk and the structure of these beliefs themselves, which are disciplined by market arbitragers.

According to Granville (2001) it would take the development of organized markets for derivative products for other major advances to be made: there was first, the Black-Scholes (1973) and Merton (1973b) valuation formula of European options; then the recognition of Harrison & Pliska (1981) that the absence of arbitrage was intimately linked to the existence of the martingale probability measure. And a major discovery was finally made by David Heath, Robert Jarrow and Andrew Merton in 1972, since it deals with the stochastic properties of the term structure of interest rate. Heath, Jarrow and Merton's fundamental discovery is the following: arbitrage-free markets imply that, if a winner process drives the forward interest rate, the drift term of the stochastic differential equation cannot be independent; on the contrary, it will be a deterministic function of the volatility.

The earliest theory to receive widespread support as an alternative to the CAPM was the Arbitrage Pricing Theory (APT), developed in the mid-1970s by Stephen Ross (1976, 1977). Mathematically, and intuitively more challenging than the CAPM, the APT begins with the notion that financial markets are frictionless. Investors can buy or sell short any of a large number of assets that trade in this market. Short-selling is a transaction in which an investor sells borrowed assets that must be returned to the lender of the asset at a later date. In the simplest case, short sales are made in an attempt to profit from an expected decline in a given asset's value.

However, asset pricing theory seeks to describe the relationship between risk and expected return. It is refer to asset pricing models to mean the expected return investors require given the risk associated with an investment. In a well-functioning capital markets,' an investor would be rewarded for accepting the various risks associated with investing in an asset. It is express an asset pricing model in general terms based on risk factors as follows:

$$E(R_i) = f\ (F_1, F_2, F_3, \dots F_N) \qquad (3)$$

Where $E(R_i)$ is the expected return for asset i,

F_N is the risk factor k,

N is the number of risk factors.

In other words, the expected return on an asset is the function of N risk factors. The trick is to determine what the risk factors are and to specify the precise relationship between expected return and the risk factors.

APT posits that asset returns are driven by a group of different factors but specifies neither the identity nor the number of these factors (that is, APT has been silent about which events and factors are likely to influence all assets prices). As opined by Megginson, Smart & Gitman (2007; Lucky, Akani & Anyamaobi, 2015; Leesi, 2023)., APT leaves the identification of these factors as an empirical matter for researchers to sort out; and the nature of these factors is likely to change over time and between economies (Bhat 2008). Furthermore, APT does not offer any guidance about what factors should be important, or even how many factors should be included in equation (3). The risk factors represent sources of systematic risk that cannot be diversified away.

In the world of APT, each asset can be affected by each risk factor. That is, each firm has its own set of "factor betas", and each risk factor is associated with a risk premium. For example, if fluctuations in the price of Premium Motor Spirit (PMS) represent a source of systematic risk, then stocks that are sensitive to that factor will have to pay investors higher returns as compensation. This relationship can be summarized as follows:

$$R_i - R_f = \beta_{i1}(R_1 - R_f) + \beta_{i2}\,(R_2 - R_f) + \beta_{i3}\,(R_3 - R_f) + \cdots + \beta_{in}\,(R_n - R_f) \qquad (4)$$

The left-hand side of this equation represents the risk premium on a particular asset. The betas reflect that particular asset's sensitivity to each of the factors, and the terms in brackets stand for the risk premium associated with each factor. APT does not ask which portfolios are efficient. Instead, it starts by assuming that equity's return depends partly on pervasive macroeconomic influences or factors and partly on noise (Brealey, Myers & Allen 2006). The APT model tries to capture some of the non-market influences that cause securities to move together. APT gives a characterization of expected returns on assets based only on the weak assumptions that there are no arbitrage opportunities, returns follow a factor structure and there are homogenous expectations (Gilles & Leroy, 1990). Multi-factor models allow an asset to have not just one, but many measures of systematic risk. Each measure captures the sensitivity of the asset to the corresponding pervasive factor. If the factor model holds exactly and assets do not have specific risk, then the law of one price implies that the expected return of any asset is just a linear function of the other assets' expected return. If this were not the case, arbitrageurs would be able to create a long-short trading strategy that would have no initial cost, but would give positive profits for sure. This arbitrage relies on a fundamental principle, the law of one price, which, according to Drake & Fabozzi (2004) stated that a given asset must have the same price regardless of the means by which one goes about creating that asset. Moreover, testing the APT model does not require identification of the true market portfolio.

Equation (4) which is defined as the asset pricing model can be fine-tuned by thinking about the minimum expected return an investor would want from investing. Securities issued by the Nigeria Central Bank offer a known return if held over some period of time. The expected return offered on such securities is the risk-free rate because we believe the securities to have no default risk. By investing in an asset other than such securities, investors will demand a premium over the risk-free rate. That is, the expected return that an investor will require is:

$E(R_i) = R_f +$ Risk premium;

Where R_f is the risk-free rate.

The risk premium or additional return expected over the risk-free rate, depends on the risk factors associated with investing in the asset. Thus, we can rewrite the general form of the asset pricing model given in equation (4) as:

$$E(R_i) = R_f + f(F_1, F_2, F_3, \dots F_N) \quad (5)$$

This risk factor can be divided into two categories. The first category is risk factors that cannot be reduced with diversification. That is, no matter what the investor does, the investor cannot eliminate these risk factors. These risk factors are also known as systematic risk factors or non-diversifiable risk factors. The second category is risk factors that can be eliminated through diversification, which are unique to the asset and known as unsystematic risk factors or diversifiable risk factors.

In conclusion, arbitrage pricing theory is a well-known method of estimating the price of an asset. The theory assumes an asset's return is dependent on various macroeconomic, market and security-specific factors. Arbitrage pricing theory is an alternative to the capital asset pricing model. Stephen Ross developed the theory in 1976.

The Arbitrage Pricing Theory formula is:

$$E(r_j) = r_f + b_{j1}RP_1 + b_{j2}RP_2 + b_{j3}RP_3 + b_{j4}RP_4 + \cdots + b_{jn}RP_n \quad (6)$$

Where:

$E(r_j)$ = the asset's expected rate of return

r_f = the risk-free rate

b_f =the sensitivity of the asset's return to the particular factor

RP= the risk premium associated with the particular factor

The general idea behind Arbitrage Pricing Theory is that two things can explain the expected return on a financial asset: (1) macroeconomic/security-specific influences and (2) the asset's sensitivity to those influences. This relationship takes the form of the linear regression formula above. There are an infinite number of security specific influences for any given security including inflation, production measures, investor confidence, exchange rates, market indices or changes in interest rates. It is up to the analyst to decide which influences are relevant to the asset being analyzed. Once the analyst derives the asset's expected rate of return from the Arbitrage Pricing Theory model, he or she can determine what the "correct" price of the asset should be by plugging the rate into a discounted cash flow model. Note that Arbitrage Pricing Theory can be applied to portfolios as well as individual securities.

After all, a portfolio can have exposures and sensitivities to certain kinds of risk factors as well. The Arbitrage Pricing Theory was a revolutionary model because it allows the user to adapt the model to the security being analysed. And as with other pricing models, it helps the user decide whether a security is undervalued or overvalued and so he or she can profit from this information. Arbitrage Pricing Theory is also very useful for building portfolios because it allows managers to test whether their portfolios are exposed to certain factors. Arbitrage Pricing Theory may be more customizable than Capital Asset Pricing Model, but it is also more difficult to apply because determining which factors influence a stock or portfolio takes a considerable amount of research. It can be virtually impossible to detect every influential factor much less determine how sensitive the security is to a particular factor. But getting close enough is often good enough; in fact studies find that four or five factors will usually explain most of a security's return: surprises in inflation, Gross National Product, investor confidence and shifts in the yield curve.

The assumption behind the arbitrage pricing theory model is that securities prices/returns are generated by a small number of common factors, but our challenge is to identify each of the factors affecting a particular stock; the expected return for each of these factors; and the sensitivity of the stock to each of these factors. And arbitrage pricing theory did not give us any formal theoretical guidance on choosing the appropriate group of macroeconomic factors to be included in the model, rather left the identification of these factors to us as empirical matter.

The primary advantages of using macroeconomic factors as stated by Azeez & Yonoezawa, (2003) and DeFusco, *et al*. (2004) are: (1) the factors and their prices in principle can be given economic interpretations, while with factor analysis approach it is unknown what factors are being priced; and (2) rather than only using asset-prices to explain asset-prices, observed macroeconomic factors introduce additional information, linking asset-price behaviour to macroeconomic events.

APT Model Formulation

The APT models, according to Facardi and Fabozzi (2004), can be divided into two different categories in function of how factors are treated. In the one, factors are portfolios or exogenous variables such as macroeconomic factors; in the other, factors are either modeled or not. They opined that if factors are not given, they must be determined with statistical learning techniques. Given the variance-covariance matrix, if factors are portfolios one can determine factors using e technique of principal component analysis (PCA).

The APT model postulates that an asset's expected return is influenced by a variety of risk factors, as opposed to market risk in the case of the CAPM. That is, the APT model asserts that e return on an asset is linearly related to k "factors". The APT does not specify what these factors are, but it is assumed that the relationship between asset returns and the factors is linear. Specifically, the APT model asserts that the rate of return on asset i is given by the following relationship:

$$R_i = E(R_i) + \beta_{i1}F_1 + \beta_{i2}F_2 \dots \beta_{ik}F_k + e_i \quad (7)$$

Where R_i is the rate of return on asset i

$E(R_i)$ is the expected return on asset i

F_k is the k^{th} factor that is common to the returns of all assets $(k = 1, \dots, k)$

e_i = the unsystematic for asset i.

For equilibrium to exist, the following conditions must be satisfied: using no additional funds (wealth) and without increasing risk, it should not be possible, on average, to create a portfolio to increase return. In essence, this condition states that there is no so-called money machine available in the market. Ross derived the following relationship, which is referred to as the APT model:

Ross derived the following relationship, which is referred to as the APT model:

$$E(R_i) = R_f + \beta_i, F_1\left[E(R_{F1}) - R_f\right] + \beta_i, F_2\left[E(R_{F2}) - R_f\right] + \dots + \beta_i, F_N\left[E(R_{FN}) - R_f\right] \quad (8)$$

Where, $[E(R_{Fj}) - R_f]$, is the excess return of the j^{th} systematic risk factor over the risk-free rate and can be thought of as the price (or risk premium) for the j^{th} systematic risk factor.

The APT model asserts that investors want to be compensated for all the risk factors that systematically affect the return of an asset. The compensation is the sum of the products of each risk factor's systematic risk (β_i, F_k), and the risk premium assigned to it by the financial market$[E(R_{Fj}) - R_f]$. The investor is not compensated for accepting unsystematic risk.

Ross showed that in the absence of arbitrage, the following relationship holds:

$$E(R_i) = R_f + \sum_{i=1}^{k} \beta_{ik}\left[E(F_k) - R_f\right] \quad (9)$$

This is referred to as the APT. The expression $E(F_k) - R_f$ is the excess return of the k[th] systematic factor over the risk-free rate, and as such it can be thought of as the “price” (or risk premium) for the k[th] systematic risk factor. Huberman (1982) opined that, “strictly speaking, this is not fully correct. In particular, the equality holds in the mean-variance sense, when the number of assets approaches infinity”. That is, the APT states that in the absence of asymptotic arbitrage opportunities

$$\lim \frac{1}{N_{n\to\infty}} \sum_{k=1}^{k}\left[E(r_i) - R_f - \sum_{k=1}^{k} \beta_{ik}\, E(F_k) - R_f\right] = 0 \quad (10)$$

The pre-specified model, assume that market risk can be captured best using multiple macroeconomic factors and estimating betas relative to each. Unlike the factor likelihood, pre-specified do attempt to identify the macroeconomic factors that drive market risk. The APT requires only four assumptions:

(1) Returns can be described by a factor model.
(2) There are no arbitrage opportunities.
(3) There are a large number of securities, so that it is possible to form portfolios that diversify the firm-specific risk of individual stocks. This assumption allows us to pretend that firm-specific risk does not exist.
(4) The financial markets are frictionless. Ross (1976, 1977), Roll (1977), and Roll & Ross (1980) developed the arbitrage pricing model (APM) in order to show that multiple factors (multiple beta models) can explain stock prices/returns. If APM holds, then a risky asset can be described as satisfying the following relation:

$$E(r_i) = r_f + b_{i1}RP_1 + b_{i2}RP_2 + \cdots + b_{in}RP_n \quad (11)$$
$$r_f = E(r_f) + b_{i1}F_1 + b_{i2}F_2 + \cdots + b_{in}F_n + \in_i \quad (12)$$

Where

$E(r_i)$ is the risky asset’s expected return

RP_k is the premium of the factor

r_f is the free risk

F_k is the macroeconomic factor

b_{ik} is the sensitivity of the asset to factor k, also called factor loading, and;

$\in_i$ is the risky asset’s idiosyncratic random shock with mean zero (the error term, assumed to be uncorrelated with the factor). This is also the (uncertain) security-specific return. Notice that if the macro factor has a value of 0 (zero) in any particular period (i.e. no macro surprises), the return on the security will equal its previously expected value, $E(r_i)$, plus the effect of firm-specific events only. The nonsystematic components of returns, the e_i's, are assumed to be uncorrelated among themselves and uncorrelated with the factor F.

All of the models described begin by thinking about market risk in economic terms and then developing models that might best explain this market risk. All of them, however, extract their risk parameters by looking at historical data. The costs of moving from the factor likelihood APM to a macroeconomic multi-factor model can be traced directly to the errors that can be made in identifying the factors (Damodaran, 2003, Davies & Lucky, 2018; Leesi, 2023). The economic factor in the model can change over time as will the risk premium associated with each one. Using the wrong factor(s) or missing a significant factor in a multi-factor model can lead to inferior estimates of cost of equity. Morel (2001) opined that by using this arbitrage reasoning it can be shown that in an efficient market, the expected return is linear combination of each factor's beta. Thus, the APM predicts that "general news" will affect the rate of return on all stocks but by different amounts. In this way the APM is more general than the CAPM, because it allows larger number of factors to affect the rate of return (Cuthbertson, 2004).

Many divergent views trail the issues' of stock price determination and the factors responsible. The proponents of efficient market hypothesis are of the view that stock prices would be determined primarily by fundamental factors such as earnings per share, dividend per share, payout ratio, size of the firm and dividend yield, management and diversification (Srinivasan, 2012). However, sequel of information asymmetry, stock market information may not be available to all stakeholders at the same time. Equity risk premium is the return provided by an individual stock on the overall stock market in excess of the risk-free rate. This excess return compensates investors for taking on the relatively higher risk of the equity market. The size of the risk premium will vary as the risk in a particular stock, or in the stock as a whole, changes, that is, high-risk investments are compensated with a higher premium.

When you invest in equities, the risk in underlying economy is manifested in volatility in the earnings and cash flows reported by individual firms in that economy. Information about these changes is transmitted to markets in multiple ways, and it is clear that there have been significant changes in both the quantity and quality of information available to investors over the last two decades. During the market boom in the late 1990s, there were some who argued that the lower equity risk premium that we observed in that period were reflective of the fact that investors had access to more information about their investments, leading to higher confidence and lower risk premiums in 2000.

Empirical Review

Fama and French (2015) compared the performance of the Five-factor model to the three-factor. Fama and French use factor spanning regressions to test for factor redundancy. Model performance is primarily evaluated with the GRS F-test and performance statistics based on Jensen's alpha. The sample covers July 1963 to December 2013. To test how sensitive the results are to different factor definitions, the factors are constructed using three different sorting schemes: 2x2, 2x3 and 2x2x2x2. The test portfolio sets are created using two different sorting schemes: 5x5 for the size-B/M, size-profitability, size-investment and 2x4x4 for the size-B/M-profitability, size-B/M-investment and size-profitability-investment portfolio sets. The results show that the value factor becomes redundant once the profitability and investment factor are added. Fama and French (2015) argue that the value factor, due to market capitalization being sensitive to forecasts of earnings and investment, may be a "noisy proxy" for expected returns. Model performance does not seem to be affected by the factor construction method and they therefore choose to continue using the 2x3 factor construction scheme as it is commonly used in the literature. Overall, the Five-factor model outperforms the Three-factor model regardless of the factor construction method. The Five-factor model's primary problem is that it has trouble explaining the returns of small sized stocks, especially small sized stocks with high investment and low profitability.

Njiforti and Akaolisa (2010) investigated whether the Nigerian stock market has experience a speculative bubble using unit root test, cointegration and GARCH on a time series data for banks from 2008 to 2009. The result reveals speculative bubbles in most of the banks and insurance companies (i.e., the price-dividend ratio, share prices and dividend were non-stationary). Fama and French (2017) used a similar methodology to their 2015 study on a U.S. sample, Fama and French evaluate the performance of the Five-factor model in four regions in the developed markets: North America, Europe, Japan and Asia Pacific. The main difference is that they use a shorter sample period which covers July 1990 to December 2015. The performance of the Five-factor model is compared to the performance of the Three-factor model and a Five-factor model that excludes the investment factor. The results show that the size and investment factors are redundant in Europe and Japan. The size factor is the only redundant factor in Asia Pacific. In general, the Five-factor model outperforms the Three-factor model in all regions except Japan. In Japan, all three models produce insignificant GRS statistics for all sets of portfolios. In Europe, the main problem for the Five-factor model is explaining the returns of the size-investment sorted portfolio set. This is most likely due to the size and investment factor being redundant in that region. Similar to their study in 2015, Fama and French conclude that the primary problem of the Five-factor model is that it is not capable of explaining the returns of small stocks that have similar returns to those with low profitability and high investment.

Fama and French (2018) analyzed different versions of the Six-factor model's performance, which adds momentum to the Five-factor model. In addition, an alternative definition of the profitability factor is tested, using cash profitability instead of operating profitability. Furthermore, Fama and French test a new performance metric proposed by Barillas and Shanken (2016). This performance metric is the max squared Sharpe ratio of the intercepts from LHS factor return regressions and is mainly used to compare nested and non-nested models. The max squared Sharpe ratio is closely related to the GRS F-test, however, the GRS statistic is not suited for the comparison of non-nested models as it causes an upward bias for models that include more factors. Non-nested models are models that use distinct factors, meaning that the models do not use the same factor definitions. The sample contains data from the U.S. stock market between July 1963 to June 2016. The factor spanning regressions indicate that the momentum factor adds explanatory power to the Five-factor model. Cash profitability is found to outperform operating profitability when analyzed using the Barillas and Shanken metric. A Six-factor model which combines the market and size factor with the small stock spread factors (meaning factors created only using small sized companies) HMLS, RMWS, CMAS, and WMLS outperforms the other models with regards to the max squared Sharpe ratio statistic proposed by Barillas and Shanken. However, Fama and French conclude that this does not justify a permanent switch to these new factor definitions as the base Six-factor model also performs well, overall, the Barillas and Shanken statistic correlates with the GRS statistic, which is not surprising as they are closely related.

Cakici, Fabozzi and Tan (2013) examined size, value and momentum effects are examined in 18 emerging markets divided into three regions: Asia, Eastern Europe and Latin America. The authors use monthly stock data between January 1990 to December 2011. Factor and portfolio summary statistics as well as factor spanning regressions are used to analyze the factor effects in the emerging markets, global markets and the U.S. In addition, two sets of portfolios (5x5) sorted on size-B/M and size-momentum is analyzed using the CAPM, Three-factor model and Carhart model. The performance of the asset pricing models are also compared using factors created with local, global and U.S. data, which tests for market integration. The GRS F-test, Jensen's alpha based performance metrics as well as a GMM-based test-statistic are used to evaluate and rank the performance of the different models. GMM (Generalized Method of Moments) is used to test for non-normal and serially auto-correlated error terms. The purpose of the GMM statistic is to control the significance level of the GRS statistic. The authors find a statistically significant value effect in all three regions in the emerging markets, with the big sized value premia being slightly larger than the small sized value premia. The reverse is found in the U.S. and global developed markets, where the small sized value premia is larger than the big sized value premia. The momentum effect is found to be significant in all regions except Eastern Europe. The momentum premia are found to be larger in small sized stocks compared to big sized stocks. This pattern of momentum premia regarding size is consistent with results found in the developed markets. Performance evaluation shows that the use of global and U.S. constructed factors decreases the explanatory power of local returns (i.e returns in different regions of the emerging markets). These results indicate that the emerging markets are not fully integrated with the developed or global markets. The Carhart model, which includes the momentum factor, is found to be comparatively successful in explaining the returns of the size-momentum sorted portfolios, especially in Asia. However, overall the momentum factor does not seem to add explanatory power. The GMM results indicate that the significance level of the GRS statistic is robust for local factors and a majority of the results using U.S. and global factors.

Ehiedu, (2022), Audu, Osamwonyi, and Enofe (2022) looked into the connection between stock market crashes and capital market efficiency using data from January 2005 to December 2015. The research demonstrated that the semi-strong form of EMH was unable to account for the price variations of stock market assets between July 2008 and January 2009. Furthermore, the findings generally showed that market crashes around major stock markets had a significant impact on particular markets, regardless of their degree of development. This implies that the time leading up to and including the 2008 market crash, the stock markets around the world were not operating efficiently. It is advised that market fundamentals reclaim their prioritization in the examination of stock market behaviour. The Adaptive Market Hypothesis (AMH) and Bounded rationality theories were examined by Yousuf and Makina (2022), Obi and Ehiedu, (2020), in relation to the Johannesburg Stock Exchange (JSE), to ascertain the impact of behavioural risk factors on the effectiveness of the stock market. The Efficient Market Hypothesis has a hole, as shown by behavioural theories. The study determined the Adaptive Market Hypothesis' applicability on the JSE using quartile regression. Market returns in the past have been shown to be highly predictive

of returns in the future, deviating from a random walk. Higher quartiles saw an increase in the lagged return, which varied according to changes in the market environment (i.e. pre-financial crisis, financial crisis and post-financial crisis). As a result, the predictability of returns varies as market conditions change. The Johannesburg Stock Exchange in South Africa is the sole subject of this essay, and more specifically, the movement of the all-share index. The results ought to be transferable to both developing and advanced economies. A negative correlation between business confidence and returns is discovered, indicating a delay in the incorporation of sentiment into prices. Contrarily, it is discovered that returns have a positive relationship with consumer confidence. In conclusion, it is established that both fundamental and behavioural factors have an impact on investors.
Ejem, Ogbonna, and Okpara's (2020), Ehiedu, Onuorah and Chigbo (2022) analysis of the Nigerian Stock Exchange and the Efficient Market Hypothesis using daily data from January 2, 2014 to May 20, 2019 (1333 observations) and annual data from 1985 to 2018 (34 observations) obtained from the Nigeria Stock Market fact books. For the assessment of weak form hypotheses on the daily and annual all share index in the Nigerian Stock Market, the study used three analytical techniques: the unit root test, GARCH Model, and the Autocorrelation cum partial autocorrelation method. The evaluations' findings showed a significant correlation between price series and their lag values, indicating that the stock price series on the Nigerian stock market do not follow a random walk process confirming that the weak form of the Nigeria Stock Exchange is not efficient. In light of this, the researchers suggest that the supervisory and regulatory authorities should strengthen the Nigerian Stock Market by easing its regulations pertaining to information management rules for transparency, such as market barriers and strict listing requirements, publication of accounts, notices of annual general meetings, and the like.

Kelikume, Olaniyi, and Iyohab (2020), Ehiedu, Odita and Kifordu (2020) looked into how the EMH holds true for fifteen (15) of the continent's top stock exchanges. In Africa, there are currently more than stock exchanges, with a wide range of differences in market size, trading volume, the number of listed companies, access to funds, access to information, market standardization, etc. The article did not test the weak-form efficient market hypothesis in a linear manner as is typically done, instead using a method called the runs test for serial dependency. The tool used in this paper's wavelet unit root analysis decomposed stochastic processes into their wavelet components with a range of frequency bands. The study discovered that the EMH and stock market investment in Africa are both affected by institutional constraints. According to the study's findings, it is relevant to use historical stock prices to forecast current earnings at stock markets in Africa, refuting the EMH.

An analysis of the Nigerian stock market's weak-form efficiency was conducted by Adebanjo, Awonusi, and Eseyin (2018), Ehiedu (2014). Employing The runs test and distribution patterns are used to determine whether stock prices are random, the partial autocorrelation (PACF) test is used to determine whether stock prices are independent, and the one-sample Kolmogorov Smirnov test is used to determine whether there is an observable trend in the movement pattern of stock prices. Following the analysis, it was discovered that stock price movements on the stock market were independent. Stock market price changes weren't just arbitrary fluctuations. The movement pattern of stock prices on the stock market also showed a discernible trend. The results of the partial auto correlation test indicated that stock price movements are independent. The results of the runs test once more demonstrate that the movements of stock prices were not entirely random, as do the distribution patterns. The Kolmogorov-Smirnov (K-S) goodness of fit test, and autocorrelation test were used by Hawaldar, Rohit, and Pinto (2017) to test the Bahrain Bourse for the weak-form efficient market hypothesis. While the results of the K-S test indicated that the general movement of stock prices does not follow a random walk, those of the runs test showed that the share prices of seven companies do not, and those of the autocorrelation tests showed that share prices exhibit low to moderate correlation, varying from negative to positive values. Due to the inconsistent findings from the numerous research, Bahrain Bourse's weak efficiency level was difficult to ascertain, according to Hawaldar, Rohit, and Pinto (2017) using seven parametric techniques, including the Granger Causality Test, the ADF and P-P Unit Root Tests, the Autocorrelation Test, the Variance Ratio Test, and the Normality/Random Test. Ogbulu (2016) looked into the efficiency of the Nigerian Stock Exchange (NSE) throughout a range of data estimate periods that use the NSE all share indexes series from 1999 to 2013 and the ARCH-GARCH test and Regression analysis. The results revealed that the NSE is weak to unproductive all in all daily, weekly, monthly, and quarterly values are considered, irrespective of the assessment frequency and the parametric test employed in the experiments.

METHODOLOGY

This study is designed to examine Fama and French 3-factor model and stock prices in Nigeria. The research design adopt in this study is the ex-post facto research method which is largely quasi-experimental. The data used in this study will be collected from secondary sources. The instrument utilized for the collection of secondary data is documentation. Documentary data will be collected via the Nigerian Stock Exchange bulletin (NSE), Security and Exchange Commission (SEC) bulletin Central Bank of Nigeria (CBN) Statistical bulletin and financial statement of traded firms. The study utilizes the secondary source because it provides a basis for purposeful research work and also gives a direction for the research work.

Data Analysis Procedure

Statistical evaluation of the global utility of the analytical model, so as to determine the reliability of the results obtained is carried out using the coefficient of correlation (r) of the regression, the coefficient of determination (r^2), the student T-test and F-test.

Stationarity (Unit Root) Tests

The study investigates the stationarity properties of the time series data using the Augmented Dickey Fuller (ADF) test. According to Nelson and Plosser (1982) and Chowdhury (1994) there exists a unit root in most macroeconomic time series. While dealing with time series, it is necessary to analyze whether the series are stationary or not. Since regression of non-stationary series on other non-stationary series leads to what is known as spurious or nonsense regression causing inconsistency of parameter estimate. The Null hypothesis of a unit root is rejected against the one sided alternative if the t-statistic is less than the critical value. Otherwise, the test

Stationarity denotes the non-existence of unit root. We shall therefore subject all the variables to unit root test using the augmented Dickey Fuller (ADF) test specified in Gujarati (2004) as follows.

$$\Delta y_t = \beta_1 + \beta_2 + \delta y_{t-1} + \alpha i \sum_{i-1}^{m} \Delta y_{t-1} + Et \qquad (13)$$

Where:

Δy_t = change time t

Δy_{t-1} = the lagged value of the dependent variables

Σ_t = White noise error term

If in the above δ =0, then we conclude that there is a unit root. Otherwise there is no unit root, meaning that it is stationary. The choice of lag will be determined by Akaike information criteria.

Co-integration Test (The Johansen' Test)

It has already been warned that the regression of a non-stationary time series on another non stationary time series may lead to a spurious regression. The important contribution of the concept of unit root and co-integration is to find out if the regression residual are stationary. Thus, a test for co-integration enables us to avoid spurious regression situation. The study employed the Johansen Multivariate Co-Integration Test to ascertain if there is the existence of a long run equilibrium relationship among time series variables. If the residual is found to be stationary at level, we conclude that the variables are co-integrated and as such has long-run relationship exists among them.

$$SPR_t = w_O + \sum_{i=1}^{i} \vartheta_t CAMP_{t-i} + \mu_{1t} \qquad (14)$$

Granger Causality Test

Granger causality test according to Granger (1969) is used to examine direction of causality between two variables. Therefore, in this study, we will carry out granger causality between an independent variables monetary policy and the dependent variables private sector funding in Nigeria from 1990 – 2021.The pair-wise granger causality test is mathematically expressed as:

$$Y_t \pi_o + \sum_{i=1}^{n} x_1^{\ y} \ Y_{t-1} \sum_{i=1}^{n} \pi_1^{\ x} x_{t-1} + u_1 \qquad (15)$$

and

$$x_t dp_o + \sum_{i=1}^{n} dp_1^y \, Yt-1 \sum_{i=1}^{n} dp1^x x_{y-1} + V_1 \qquad (16)$$

Where x_t and y_t are the variables to be tested white u_t and v_t are the white noise disturbance terms. The null hypothesis $\pi_1^y = dp_1^y = 0$, for all I's is tested against the alternative hypothesis $\pi_1^x \neq 0$ and $dp_1^y \neq 0$. if the co-efficient of π_1^x are statistically significant but that of $dp1y$ are not, then x causes y. If the reverse is true then y causes x. however, where both co-efficient of π_1^x and dp_1^y are significant then causality is bi – directional.

Error Correction Model Technique

The presence of co-integrating relationship forms the basis of the use of Error Correction Model. E-views econometric software used for data analysis, implement Vector Auto-regression (VAR)-based co-integration tests using the methodology developed by Johansen (1991,1995). The non-standard critical values are taken from Osterward Lenun (1992).

Specification of Models

Based on the objective of the study, we formulate the following regression models:

SP = $\beta_0 + \beta_1 X_1(MS) + \beta_2 X_2(EIFR) + \beta_3 X_3(MPR) + u_3$ (3.7)

Where

SP = Stock market prices measured by changes in all share price index

MS = Changes in money supply

EIFR = Changes in expected inflation rate

MPR = Changes in monetary policy rate

μi = Error term

RESULTS AND DISCUSSION

Table 1: Testing for Unit Root (Stationarity Test)

Variable	ADF Stat	MacKinnon 1%	5%	10%	Order int	ADF Stat	MacKinnon 1%	5%	10%	10%
	ADF at Level					ADF at Difference				
SMV	-4.576516	-3.639407	-2.951125	-2.614300		-5.415901	-3.699871	-2.976263	-2.627420	
MS	-0.838723	-3.639407	-2.951125	-2.614300		-8.275117	-3.653730	-2.957110	-2.617434	
MPR	-2.106970	-3.639407	-2.951125	-2.614300		-8.780687	-3.661661	-2.960411	-2.619160	
EIFR	-1.925444	-3.653730	-2.957110	-2.617434		-5.396391	-3.646342	-2.954021	-2.615817	

Source: Computed from E-View 9.0

Stationarity test or unit root test is one of the conditions to be satisfied in time series data analysis to ensure accuracy and to avoid spurious regression. A time series is said to be stationary when it's mean and variance do not vary systematically over time (Gujarati 2004). A Unit root test was carried out to check for stationarity. In order to avoid problems of autocorrelation as may arise from using Dickey-Fuller test, the researcher used Augmented Dickey- Fuller Unit root test. From the table above, we conclude that the variables are stationary at first difference and integrated in the order of 1(I).

Table 2: Johansen Co-Integration Test Results: Maximum Eigen

Series: SMV MS MPR EIFR

Unrestricted Cointegration Rank Test (Trac)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.659324	69.74214	47.85613	0.0001
At most 1 *	0.424734	34.20694	29.79707	0.0146
At most 2 *	0.245070	15.96047	15.49471	0.0425
At most 3 *	0.183330	6.683172	3.841466	0.0097

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.659324	35.53520	27.58434	0.0039
At most 1	0.424734	18.24647	21.13162	0.1209
At most 2	0.245070	9.277301	14.26460	0.2638
At most 3 *	0.183330	6.683172	3.841466	0.0097

Source: Computed from E-View 9.0

From the lag selection criteria, the most appropriate lag was lag 2 due to inadequate number of observations. Two equations were used, but with similar model. This was so to avoid the problem of multicollinearity of variables. The two dimensions were put in a separate equation. In the entire model, the Trace statistics indicate that the variables are cointergrated. The Maximum Eigen value shows cointergration. Null Hypothesis: There is no cointegration among variables (Hypothesis zero) Alternative hypothesis. From the table above, we conclude that there are 3 cointegrating equation in the model, this implies that there are linear combination between efficient market hypotheses and stock prices in the Nigeria stock market.

Table 3: Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
MS does not Granger Cause SMV	33	2.85096	0.0747
SMV does not Granger Cause MS		0.10093	0.9043
MPR does not Granger Cause SMV	33	4.82457	0.0158

SMV does not Granger Cause MPR		0.47420	0.6273
EIFR does not Granger Cause SMV	33	2.45095	0.1045
SMV does not Granger Cause EIFR		1.15471	0.3297

Source: Computed from E-View 9.0

Pair wise causality tests were run on the model with an optimal lag of 2. The researcher's interest here is to establish the direction of causality between the dependent variables the percentage of efficient market hypotheses and stock prices. However, from the tables above, the study conclude that there is no causal relationship among the variables except uni-directional causality from monetary policy rate to stock prices in the Nigeria stock market

Table 4: Parsimonious Error Correction Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MS)	0.061955	0.085863	0.721563	0.4763
D(MPR)	0.053657	0.044088	1.217051	0.2334
D(EIFR)	-0.056774	0.191155	-0.297006	0.7686
C	-0.043980	0.204018	-0.215569	0.8308
ECM(-1)	-0.948354	0.182964	-5.183279	0.0000
R-squared	0.508422	Mean dependent var		0.028029
Adjusted R-squared	0.440618	S.D. dependent var		1.240948
S.E. of regression	0.928127	Akaike info criterion		2.823758
Sum squared resid	24.98120	Schwarz criterion		3.048222
Log likelihood	-43.00388	Hannan-Quinn criter.		2.900306
F-statistic	7.498429	Durbin-Watson stat		2.055046
Prob(F-statistic)	0.000282			

Source: Computed from E-View 9.0

The Error correction term is positive which is confirm our expectation, that is to say it has a negative sign, implying that the error obtain has high possibilities of moving much further away from the equilibrium path as time goes on and on. Also the ECM (-1) coefficient shows that 94.8 percent of the error produced in the previous period are corrected in the current period. The error term however is statistically significant ECM (-1) is speed of adjustment towards equilibrium or error correction term. From the model, the independent variables can explain 44 percent variation on the dependent variable while the beta coefficient of the variables shows that money supply and monetary policy rate have positive effect changes in expected inflation rate have negative effect on stock prices in Nigeria stock market.

Discussion of Findings

The estimated model found that efficient market hypothesis model 44 percent variation in assets prices in the Nigeria stock exchange; this implies that 56 percent are explained by factors not captured in the model. The beta coefficient of the variables shows that money supply and monetary policy rate have positive effect changes in expected inflation rate have negative effect on stock prices in Nigeria stock market. We expected a positive effect of the variables on the dependent variable based on theories and empirical studies. Empirically, the findings is in line with the findings of Udo (2010), Zivot (2008) that the GARCH models do not forecast very well. Udo

(2000) and Zivot (2008), Engel (2016), Anders (2006) that previous research on the effects of error distribution assumptions on the variance forecasting performance of Asymmetric GARCH family models is scarce, Yeh and Lee (2000) that volatility responds more to positive shocks than negative shock in the China market, which led investors in China's stock market to be more interested in good news than bad news, Uyaeboet al. (2011) that the indices in both markets have the character of clustering, asymmetry, fat Thailand leverage effect returns, Hou(2013), Abbas, Khan and Shah (2013) found some evidence of transmission of volatility between countries which are on unfriendly terms when investigating the presence of volatility transmission, Humavindu&Floros (2006) that the two markets exhibit very low correlations, while there is no evidence of linear relationship between the markets. Furthermore, their analysis shows evidence of no spillover effects. Their results suggested that NSX is an attractive risk diversification tool for regional portfolio diversification in Southern Africa, Emenike (2014) found unidirectional volatility transmission from the foreign exchange market to the stock market was also detected, suggesting that information flow in the foreign exchange market impact the stock market and vice versa and Emenike and Aleke (2012) showed evidence of volatility clustering and volatility persistence in Nigeria.

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined the effect of efficient market hypotheses on stock prices of quoted firms in Nigeria. The study used time series data from 1990-2021. The variables were tested using the Augmented Dickey Fuller unit root test and the test found that the variables were stationary at first difference. The cointegrattion test indicated that there is long run combination of the variables while the granger causality test proved that there unidirectional causality in model the model. The study found that efficient market hypotheses can explain 44 percent variation on the dependent variable while the beta coefficient of the variables shows that money supply and monetary policy rate have positive effect changes in expected inflation rate have negative effect on stock prices in Nigeria stock market. The study conclude that money supply and monetary policy rate have positive but no significant effect on stock prices while expected inflation rate have negative and no significant effect on the stock price of traded equities in Nigeria stock market.

Recommendations

i. There is need for investors in the stock market and the regulators to formulate strategies of managing systemic and unsystemic risk and the implementation should not just be formulated but strategic and tactical measures should be put in place to absorb, retain and transfer systemic risk.
ii. Systemic risk management should be considered as part of strategic plans which need to be reviewed on a more frequent basis and macroeconomics policies should directed towards stabilizing Nigerian exchange rate to avoid depreciating naira exchange rate against key currencies that exposes the firms to exchange rate risk.

iii. Investors and other investment companies should embrace a multifactor model as stock returns are affected numerous factors such as expectation about future levels stock prices and expectations about future interest rate and expectation about future level of inflation.

iv. Nigeria exchange rate per US dollar should be well structured and defined. Policies to leverage the depreciation naira exchange rate should be formulated and there is need to strengthen Nigeria bilateral, unilateral and multilateral trade and investment relationship for better naira exchange rate that will enhance stock prices.

REFERENCES

Abakah, E. J. A., Alagidede, P., Mensah, L. & Ohene-Asare, K. (2018). Non-linear approach to Random Walk Test in selected African countries. *International Journal of Managerial Finance,14(3), 362-376.*

Adam, K., Marcet, A. & Beutel, J. (2017). Stock price booms and expected capital gains. *American Economic Review, 107(8), 2352- 2408.*

Adebanjo, J.F., Awonusi, F. & Eseyin, O. (2018). The weak form market efficiency and the Nigerian stock exchange. *Afro Asian Journal of Social Science, 9(4), 1-17.*

Adigwe, P., Ugbomhe, U. & Alajekwu, U. (2017). Test of weak form stock market efficiency in selected African stock markets (2013-2015). *Saudi Journal of Business and Management Sciences, 2(2), 60-69.*

Akani, H. W., & Lucky, A. L., (2014). Money supply and aggregate stock prices in Nigeria: An analysis of co-integration and causality test. *Research Journali's Journal of Finance, 2 (10), 1 – 24.*

Audu, A. G., Osamwonyi, O. I. & Enofe, E. E. (2022). Efficient market hypothesis in market crashes: The 2008 global market meltdown. Amity Journal of Management Research, 5(1), 636-650.

Awiagah, R. & Choi, S. S. B. (2018). Predictable or Random?– A Test of the weak-form efficient market hypothesis on the Ghana stock exchange. *Journal of Finance and Economics, 6(6), 213-222.*

Ayadi, S. & Bouri, A. (2019). Intervening parties' behaviours and its impact on the financial market functioning. *International Research Journal of Finance and Economics, 31, 101–115.*

Bhalla, V.K. (2017). Investment management: Security analysis and portfolio management. New Delhi: S. Chad and Company Ltd.

Boamah, N. A., Watts, E. & Loudon, G. (2017). Regionally integrated asset pricing on the African stock markets: Evidence from the Fama French and Carhart models. *Journal of Economics and Business, 92, 29-44.*

Davies, S. D., & Lucky, A. L., (2018). Corporate characteristics and influence on share based payment of financial service firms in Nigeria. *Asian Finance & Banking Review, 2 (1), 18-29.*

Dimpfl, T. & Jank, S. (2016). Can internet search queries help to predict stock market volatility? *European Financial Management, 22(2), 171-192.*

Downey, L. & Scott, G. (2020). Efficient Market hypothesis. www.investopia.org. Retrieved on 09/04/2020.

Edmans, A.(2019). Blockholder trading, market efficiency and managerial myopia. *The Journal of Finance, 64(.6), 2481–2513.*

Ehiedu V.C. (2014). An Investigation into the Internal Control System in the Banking Industry (A Study of Some Selected Banks in Asaba. *European Journal of Business Management. IIST. UK*

Ehiedu Victor C, Odita A.O. and Kifordu A.A. (2020). Financial deepening estimators and economic growth nexus: evidence from a small open economy. *Webology. 17(1), 1-12.*

Ehiedu, V.C, and Toria, G. (2022). Audit indicators and financial performance of manufacturing firms in Nigeria. *Linguistics and Culture Review, 6(SI), 14-41*

Ehiedu, Victor C (2022). Corporate finance alternative and shareholders' value creation in Nigeria. International Journal of Academic Accounting, Finance and Management Research, (IJAAFMR). *International Journals of Academic Research World (IJARW). 6(6), 26-33*

Ejem, C. A., Ogbonna, U. G. & Okpara, G. C. (2020). Efficient market hypotheses controversy and Nigerian stock exchange relations. *American International Journal of Economics and Finance Research, 2(1), 1-13.*

Fama, E. (1965).The behaviour of stock market prices. *Journal of Business, 38, January edition, 34-49.*

Fama, E. F. & Blume, M. E. (1966). Filter rules and stock-market trading. *The Journal of Business, 39(1), 226-241.*

Fama, E. F. (1976). Reply to efficient capital markets: Comments. *Journal of Finance, 31(1), 143-145*

Fama, E.F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance, 25(1), 83-417.*

Gagan. D.S & Mahendru. M. (2019). Efficiency hypothesis of the stock markets: A case of Indian securities. *International Journal of Business and Management. Available at SSRN: http://ssrn.com/abstract=1827522. Retrieved 01/3/2020.*

Gao, P. (2018). Keynesian beauty contest, accounting disclosure and market efficiency. *Journal of Accounting Research, 46(4), 785–807.*

George, E.O. & Oseni, J.E. (2018). The influence of information asymmetry on equity pricing: A theoretical perspective. *American Journal of Scientific Research, 65, 42-50.*

Gyamfi, N. E., Kyei, K. A. & Gill, R. (2016). African stock markets and return predictability. *Journal of Economics and Behavioral Studies, 8(5), 91-99.*

Hawaldar, I. T., Rohit, B. & Pinto, P. (2017). Testing of weak form of efficient market hypothesis: Evidence from the Bahrain Bourse.*Investment Management and Financial Innovations, 14(2), 376-385.*

Katabi, M. M. & Raphael, G. (2018). An empirical analysis of weak-form efficiency of Dar es Salaam stock exchange. *African Journal of Economic Review, 6(2), 115-134.*

Kelikume, I. (2016). New evidence from the efficient market hypothesis for the Nigerian stock index using the wavelet unit root test approach. *The Journal of Developing Areas, 50(5), 185-197.*

Kelikume, I., Olaniyi, E., Iyohab, F. A. (2020). Efficient market hypothesis in the presence of market imperfections: Evidence from selected stock markets in Africa. *International Journal of Management, Economics and Social Sciences (IJMESS), 9(1), 37-57.*

Lawal, A. I., Somoye, R. O. & Babajide, A. A. (2017). Are African stock markets efficient? Evidence from wavelet unit root test for random walk. *Economics Bulletin,37(4), 2665-2679.*

Leesi, L. (2023). Financial deepening on the liquidity of nigerian stock market: a multi-dimensional study. *International Journal of Economics and Financial Management (IJEFM), 8(3), 99-117.*

Leesi, L. (2023). Monetary policy transmission channels on the performance of Nigerian stock market. *International Journal of Economics and Financial Management (I JEFM), 118-139*

Leesi, L., & Umasom, P. (2023). Stock market anomalies and efficient market hypothesis: empirical analysis of Monday effect of selected securities from Nigeria. *International Journal of Banking And Finance Research, 9(2), 22-33.*

Lucky, A. L., Akani, H. W., & Anyamaobi, C., (2015). Prudential determinants of stock prices of commercial banks in Nigeria: An application of fundamentalists and macroeconomic view. 1980 – 2014. *IIARD International Journal of Banking and Finance Research, 1 (7), 1 – 27.*

Malkiel, B. G. (2017). The Efficient Market Hypothesis and Financial Crisis. Rethinking Finance: Perspective on the crisis (Proceedings of conference on Economic Lessons from the financial crisis).

Manasseh, O.C, Asogwa, F.O & Agu, D.O (2012). The causality effect of stock market development, financial sector reforms and economic growth in Nigeria; The Applicationof Vector Autoregressive (VAR) and Vector Error Correction Model (VECM). A Paper presented at the Global Development Finance Conference. Crystal Towers, Century City, Cape Town, South Africa.

McAleer, M., Suen, J. & Wong, W. K. (2016). Profiteering from the dotcom bubble, subprime crisis and Asian financial crisis. *The Japanese Economic Review, 67(3), 257-279.*

Obi, C.K. and Ehiedu V.C. (2020). Testing the Efficacy of Wadner's Law on Public Public Expenditure in Nigeria. SciPapScientific Papers of the University of Pardubice,

Okpara, G. C. (2017). Stock market prices and the random walk hypothesis: Further evidence from Nigeria. *Journal of Economics and International Finance, 2(3), 49-57.*

Osaze, E. B. (2017). Capital markets – African and Global. Published by the Book House Company, 55- 63.

Osinubi, T. S. (2017). Does stock market promote economic growth in Nigeria? http://sta.uwi.edu/conferences/financeconference. Rtrieved 3/2/2020.

Schubert, W., Gavurová, B., Kováč , V. & Už ík, M. (2018). Comparison of selected market indicators during the dot-com bubble. *Management from an Emerging Market Perspective, 93.*

Series D. Ogbulu, O.M. (2016). Weak-form market efficiency, estimation interval and the Nigerian Stock Exchange: *Empirical evidence. International Journal of Economic and Business, 5(1), 84-116.*

Vitali, F. & Mollah, S. (2017). Stock market efficiency in Africa: Evidence from random walk hypothesis. *South Western Finance, 1-54.*

Yang, Y. H., Shao, Y. H., Shao, H. L. & Stanley, H. E. (2019). Revisiting the weak-form efficiency of the EUR/CHF exchange rate market: Evidence from episodes of different Swiss franc regimes. Physica A: *Statistical Mechanics and Its Applications, 523, 734-74.*

Yousuf, Z. & Makina, D. (2022). The behavioural finance paradigm and the adaptive market hypothesis: evidence from the JSE. *International Journal of Finance & Banking Studies, 11(2), 34-48.*

Zaman, S. (2019). Weak form market efficiency test of Bangladesh Stock Exchange: An empirical evidence from Dhaka Stock Exchange and Chittagong Stock Exchange. *Journal of Economics, Business and Accountancy Ventura, 21(3), 285-291.*