World Journal of Finance and Investment Research E-ISSN 2550-7125 P-ISSN 2682-5902
Vol 8. No. 5 2024 www.iiardjournals.org Online Version

Exploring Stock Return Predictability and Adaptive Market Hypothesis: Evidence from Nigerian Exchange Group (NGX)

Ejem, Chukwu Agwu[1], Wogu, Chinwendu Amblessed[2]
Department of Banking and Finance, Abia State University, Uturu, Nigeria
*Corresponding Author's email: chukwu.ejem@abiastateuniversity.edu.ng
DOI: 10.56201/wjfir.v8.no5.2024.pg44.55

Abstract

The Efficient Market Hypothesis has been a central topic in financial discussions, offering significant insights into stock market behaviour. According to Efficient Market Hypothesis, market returns are unpredictable because markets are informationally efficient. However, this concept has been challenged by empirical evidence, leading to the development of the Adaptive Market Hypothesis. The Adaptive Market Hypothesis contends that arbitrage opportunities do exist and that market efficiency fluctuates with changing conditions. This study examined the Nigerian Exchange Group to determine if returns are predictable by using Automatic Variance Ratio and predictive regression. The analysis utilized daily closing prices of selected stocks listed on the Nigerian Exchange Group (NGX) from January 2016 to August 2024. The findings indicated that the market was inefficient during the study period, with returns being predictable based on economic fundamentals such as interest rates, inflation rates, dividend yields, financial crises, and government policies, all with statistical significance. However, due to the study's relatively short duration compared to earlier research, cyclic patterns of efficiency were not observed. The study recommends that investors, regulators, and scholars should not rely solely on the assumption that markets are always efficient. Such a belief can led to neglect of fundamental and intrinsic stock values. The Adaptive Market Hypothesis offers a more nuanced view, suggesting that market efficiency can vary over time, allowing periods where investors might outperform the market and achieve returns exceeding the average.

Keywords: *Return Predictability, Efficient market and Adaptive Market Hypotheses*

1.1 Introduction

The predictability of stock returns has been a subject of intense debate and research in financial economics, as it challenges the foundational principles of the Efficient Market Hypothesis (EMH). The EMH, initially formulated by Fama (1970), posits that financial markets are "informationally efficient," meaning that asset prices fully reflect all available information. According to this hypothesis, it is impossible to consistently achieve returns that outperform the overall market through stock selection or market timing, as all known information is already incorporated into stock prices. However, numerous empirical studies have documented patterns in stock returns that suggest predictability, such as momentum, mean reversion, and other market anomalies (Campbell

& Shiller, 1988; Fama & French, 1988; Jegadeesh & Titman, 1993). These findings pose a challenge to the EMH and have led to the exploration of alternative theories, including the Adaptive Market Hypothesis (AMH) proposed by Andrew Lo (2004).

The AMH provides a more flexible and evolutionary perspective on market efficiency, suggesting that it is not a static condition but rather evolves over time in response to changing market conditions, investor behaviour, and technological advancements (Lo, 2004). Unlike the EMH, which assumes a constant state of market efficiency, the AMH posits that market efficiency can vary over time, influenced by the adaptive behaviours of investors and the dynamic nature of markets. This hypothesis integrates insights from behavioural finance, evolutionary biology, and psychology to explain why markets might exhibit periods of inefficiency, allowing for the potential predictability of stock returns (Lo, 2012). The AMH also acknowledges that different market environments, such as bull and bear markets, can lead to varying degrees of market efficiency and predictability, which are contingent upon factors like competition, market participant behaviour, and the availability of arbitrage opportunities.

Empirical evidence supporting the AMH has emerged from various studies examining market efficiency over different time periods and across different markets. For example, Neely, Weller, and Ulrich (2009) provide evidence from the foreign exchange market that supports the notion that market efficiency evolves over time, aligning with the AMH. Similarly, Kim, Shamsuddin, and Lim (2011) show that stock return predictability in U.S. markets fluctuates over the past century, further supporting the idea that market efficiency is adaptive rather than static. These studies suggest that the degree of predictability in stock returns is not constant but changes in response to market conditions, investor learning, and technological advancements.

Despite the growing body of literature on stock return predictability and the AMH, several gaps remain. Firstly, there is a lack of consensus on the effectiveness of various predictive indicators and models, particularly in different market conditions and time periods (Goyal & Welch, 2008). Additionally, while the AMH provides a robust framework for understanding market dynamics, there is a need for more comprehensive empirical studies that integrate stock return predictability with the adaptive mechanisms proposed by the AMH. Understanding these dynamics is crucial not only for investors seeking to develop more effective trading strategies but also for policymakers aiming to enhance market stability and efficiency.

This study aims to address these gaps by examining the extent to which stock returns can be predicted using various economic, financial, and behavioural indicators and exploring how the AMH explains the evolving patterns of market efficiency and return predictability over time. By providing a nuanced understanding of these concepts, this research contributes to the ongoing debate on market efficiency and offers insights into the factors influencing the predictability of stock returns.

1.2 Statement of the Problem

The study of stock return predictability and the Adaptive Market Hypothesis (AMH) presents a significant challenge to traditional financial theories, particularly the Efficient Market Hypothesis (EMH), which asserts that stock prices fully reflect all available information, rendering return predictions based on historical data ineffective. However, accumulating empirical evidence suggests that stock returns can indeed be predicted to some extent using various economic, financial, and technical indicators, as well as behavioural factors. This contradiction raises important questions about the nature and extent of market efficiency and the factors influencing it over time.

Despite substantial research on stock return predictability, there is no consensus on the predictive power of different indicators or models, nor on the conditions under which they are most effective. Additionally, while the AMH offers a dynamic perspective on market efficiency, positing that market conditions, investor behaviour, and technological changes can lead to varying levels of predictability, this hypothesis remains under-explored in empirical studies. The current literature lacks a comprehensive analysis that integrates stock return predictability with the adaptive mechanisms proposed by the AMH.

The problem, therefore, is twofold: (1) To what extent can stock returns be predicted using available economic, financial, and behavioural indicators, and what factors affect their predictive power? (2) How does the AMH explain the changing patterns of market efficiency and return predictability over time? Addressing these questions is crucial for understanding the dynamics of financial markets, improving investment strategies, and refining economic theories related to market behaviour and efficiency.

2. Literature Review

Preamble

The predictability of stock returns is a central theme in financial economics, as it directly challenges the Efficient Market Hypothesis (EMH) proposed by Fama (1970). According to EMH, stock prices fully reflect all available information, rendering attempts to predict future returns based on historical data futile. However, empirical studies have consistently found evidence contradicting this hypothesis, suggesting that stock returns can indeed be forecasted to some extent. In contrast, the Adaptive Market Hypothesis (AMH), proposed by Andrew Lo (2004), offers a more flexible framework, positing that market efficiency is not static but evolves over time due to changing market conditions and investor behaviours. This literature review synthesizes the existing research on stock return predictability and the AMH to provide a comprehensive understanding of these concepts.

2.1 Stock Return Predictability

Empirical Evidence on Stock Return Predictability

Numerous studies have documented patterns in stock returns that suggest predictability. For example, Campbell and Shiller (1988) demonstrate that valuation ratios, such as the dividend-price ratio, can predict long-term stock returns. Similarly, Fama and French (1988) find that dividend yields have predictive power over stock returns, particularly over longer horizons. More recent studies have expanded the set of predictive variables to include economic indicators such as interest rates, inflation, and output growth (Lettau & Ludvigson, 2001).

Market Anomalies and Behavioural Biases

Market anomalies, such as momentum and mean reversion, also suggest that stock returns can be predicted to some extent. Jegadeesh and Titman (1993) find that stocks with high returns over the past 3 to 12 months tend to outperform in the future, indicating momentum. Conversely, De Bondt and Thaler (1985) document a tendency for stocks that have performed poorly in the past to outperform in the future, a phenomenon known as mean reversion. These anomalies challenge the EMH and suggest that behavioural biases, such as overreaction and underreaction, may lead to predictable patterns in stock returns.

Advances in computational methods have facilitated the use of sophisticated models for predicting stock returns. Goyal and Welch (2008) evaluate the predictive performance of several economic variables using both traditional econometric models and more advanced techniques like machine learning. Their findings suggest that while some models exhibit out-of-sample predictive power, the results are highly sensitive to the choice of model and time period.

2.2 Theoretical Review

Adaptive Market Hypothesis (AMH)

Lo (2004) proposes the Adaptive Market Hypothesis as an alternative to the EMH, integrating elements of evolutionary biology with financial economics. According to AMH, market efficiency is not an absolute state but a dynamic process that evolves in response to changing market conditions, technological advances, and investor learning. This hypothesis reconciles the conflicting evidence on market efficiency by suggesting that markets can be efficient at times and inefficient at others, depending on the level of competition, number of market participants, and available profit opportunities.

Empirical Evidence Supporting AMH

Several empirical studies provide support for AMH by demonstrating that the degree of market efficiency varies over time. For instance, Neely, Weller, and Ulrich (2009) find that the

profitability of technical trading rules declines over time as markets adapt. Similarly, Kim, Shamsuddin, and Lim (2011) show that emerging markets, which are less efficient, become more efficient as they develop and integrate into the global financial system. These findings are consistent with the notion that market efficiency is not static but evolves over time as markets adapt to new information and conditions.

Behavioural Implications of AMH

AMH also incorporates insights from behavioural finance, acknowledging that investor behaviour, driven by psychological biases and emotions, can lead to temporary inefficiencies. Lo (2012) argues that understanding these behavioural aspects is crucial for comprehending how markets adapt and evolve. Empirical studies, such as those by Barberis, Shleifer, and Vishny (1998), show that behavioural biases, such as overconfidence and loss aversion, can lead to predictable patterns in stock returns, aligning with the principles of AMH.

In sum, this study on stock return predictability and the Adaptive Market Hypothesis provides a nuanced understanding of market efficiency. While the traditional EMH posits that stock prices fully reflect all available information, empirical evidence suggests otherwise, highlighting the potential for predictability. The AMH offers a more flexible framework, suggesting that market efficiency is an evolving concept influenced by changing market conditions, investor behaviour, and technological advances. Future research could benefit from integrating insights from behavioural finance, machine learning, and evolutionary biology to further explore the dynamics of market efficiency and stock return predictability.

3. Material and Methods

The study used daily closing prices of a sample of stocks listed on the Nigerian Exchange Group (NGX) from January 2016 to August 2024. This study used the Automatic Variance Ratio (AVR) which is autocorrelation based for test of market efficiency on the All-Shares Index of the Nigerian Exchange Group (NGX) under the assumption of heteroskedastic and wild bootstrap. The variance ratio exploits the fact that the variance of an investment in a random walk is linear in the sampling interval. That is, if a series follows a random walk process, the variance of the q-differences would be q times the variance of its first differences. Therefore, if we obtain nq + 1 nominal index observation $Y_0, Y_1, Y_2, \ldots \ldots Y_q$ at equally spaced intervals (q is any integer greater than one). The ratio of $1/q$ of the variance $Y_t - Y_{t-q}$ to the variance of $Y_t - Y_{t-1}$ would be equal to one.
Variance ratio is given as:

$$VR(Q)\ \frac{\sigma_C^2(q)}{\sigma_a^2(q)} \qquad (01)$$

Were:

$$\sigma_c^2(q) = \frac{1}{m}\sum_{t-q}^{nq}(Y_t - Y_{t-q} - q\hat{\mu})^2 \qquad (02)$$

Where m = $q(nq - q + 1)\left(1 - {}^{q}/_{nq}\right)$, and

$$c_c^2(q) = \frac{1}{nq-1}\sum_{t=1}^{nq}(Y_t - Y_{t-1} - \hat{\mu})^2 \qquad (03)$$

Where $\hat{\mu} = \frac{1}{nq}(Y_{nq} - Y_0)$.

The heteroscedasticity-consistent asymptotic variance of the variance ratio $\emptyset\ *(q)$:

$$\emptyset\ *(q) = \sum_{j=1}^{q-1}\left[\frac{2(q-1)}{q}\right]^2 \hat{\delta}(j), \qquad (04)$$

Where,

$$\hat{\delta}(j) = \sum_{t=j+1}^{nq} \frac{(Y_t - Y_{t-1} - \hat{\mu})^2(Y_{t-j} - Y_{t-j-1} - \hat{\mu})^2}{\left[\sum_{k=1}^{nq}(Y_t - Y_{t-1} - \hat{\mu})^2\right]^2} \quad .(05)$$

The heteroscedasticity consistent standard normal test-statistics $z*(q)$, is then given as

$$Z*(q) = \frac{VR(q) - 1}{[\emptyset\ *(q)]^{1/2}} \ \underline{a}\ N(0,1) \qquad (06)$$

The model to examine how return reacts to change in economy conditions, financial crisis is given below.

$$\boldsymbol{r_t = b + b_1(divy) + b_2(ir) + b_3(inf) + b_4(govpol) + b_5(fincrisis) + b_6(mkrisk) + \mu}$$

Where

$\boldsymbol{r_t}$	=	market return
b	=	constant
$divy$	=	dividend yield
ir	=	interest rate
inf	=	inflation rate
$govpol$	=	government policies
$fincrisis$	=	financial crisis
$mkrisk$	=	market risk (proxy by standard deviation)
Inf	=	inflation rate

μ = error term

The variables were subjected to stationarity test to ensure the result is not spurious using Augmented Dicky Fuller (ADF test. The Automatic Various ratios is used compared to others like runs test and autocorrelations-based test like BDS test and Ljung-Box test tests because it allows for lag truncation and takes into consideration heteroskedastic assumption. This methodology was also used by Kim et.al. (2011).

4. Results and Discussion of findings

4.1 Test of Market Efficiency

The hypothesis for the test of market efficiency is as follows:

H_0: AVR(k) = 1 for k = 2, 4, 8, 16

H_1: AVR(k) ≠ 1 for k = 2, 4, 8, 16

The test is carried out with equal lag truncation of 2 to 16. The expectation is that at all points, the ratio should be equal to 1, and otherwise the market is not efficient. At 5% confidence level, the value of Z statistics for heteroscedasticity should lie between -1.96 and 1.96. Outside this will indicate the significance of the test.

Table 1: Automatic Variance Ratio

Joint Tests	Value	Df	Probability
Max |z| (at period 14)	10.99132	312	0.0000

Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.021080	0.006995	3.013473	0.0000
6	1.099736	0.015423	6.466591	0.0000
10	1.171930	0.019233	8.939472	0.0000
14	1.237386	0.021598	10.99132	0.0000

From the table above the joint tests for efficiency from 2008 to 2024 shows overall Z value and p value of 10.99 and 0.0000 which means there is statistical significance. The variance ratio for lag 2, 4, 8, and 16 are 1.021, 1.099, 1.1719 and 1.237. This implies that the first-order autocorrelation for monthly index is 2.1%, 9.9%, 17.1% and 23.7% respectively. The ratios increase with increase in lag and the corresponding Z-statistics of 3.013, 6.467, 8.939 and 10.991. The test statistics for the overall result is outside the acceptance of null hypothesis region with statistical significance of 0.0000. Based on these, the variance grows more than proportionally; hence, the random walk for monthly time series of the Nigerian is rejected at the 5% significance level. The same condition

applies to all other truncations with AVR above 1 and test statistics outside the expected interval. The p value of 0.0000 also confirms the significance of the test.

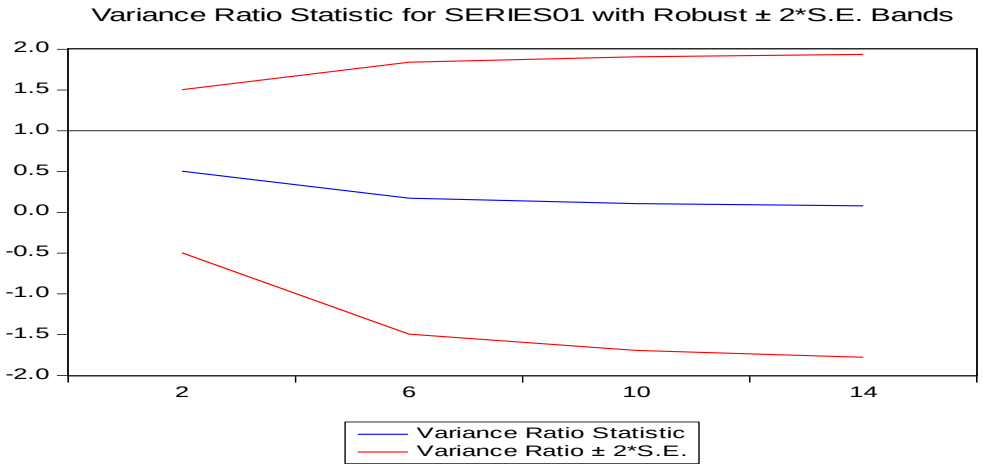

Fig 1

4.2 Predictive Regression

To carry out the regression test, the properties of the data are first examined for stationarity and multi-co-linearity to ensure that the result is not spurious. The research thereby uses the Augmented Dicky Fuller (ADF) to test for stationarity.

The hypothesis for the test is as follows:

Ho: there is a unit root in return, inflation rate, dividend yield and interest rate

Hi: the data are stationary.

The decision rule is that if the calculated ADF is larger than the critical value, we accept the Ho. However, if the calculated value is more negative than the critical value, we reject the Ho and accept the H1.

The result of the test for the various variables is the tables below, at first order; all the data are stationary, since their values are more negative than the critical values at 5%. See appendix.

From the below, the value of r is 0.71 and adjusted r-squared of 0.61 which means there is a positive relationship between the combined effects of the variables. However, there is a negative relationship between financial crisis (FINCRISIS) and return, as inflation rate increases, return increases, and decreases with increase in interest rate, dividend yield has positive relationship, the dummy for government policy predicts returns positively with statistical significance while the measure of market risk (MRKRISK) has a negative relationship. The overall test is significant at 5% test level with a P value of 0.0004. The result also shows a Durbin-Watson stat of 2.18 which is less than the value of the upper level, therefore, suggesting absence of autocorrelations.

Table 2

Dependent Variable: RET				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.941097	3.332542	0.582467	0.5675
FINCRISIS	-0.193093	0.164402	-1.174517	0.2555
DIVY	0.163047	0.157289	1.036612	0.3136
GOVPOLICY	4.010656	0.828870	4.838701	0.0001
INFRATE	0.029295	0.019073	1.535927	0.1419
INTRATE	-0.378039	0.299407	-1.262626	0.2228
MRKRISK	-0.086149	0.100057	-0.861001	0.4006
R-squared	0.712868	Mean dependent var		1.976074
Adjusted R-squared	0.617157	S.D. dependent var		2.446007
S.E. of regression	1.513449	Akaike info criterion		3.898156
Sum squared resid	41.22951	Schwarz criterion		4.239441
Log likelihood	-41.72694	Hannan-Quinn criter.		3.992814
F-statistic	7.448157	Durbin-Watson stat		2.188478
Prob(F-statistic)	0.000402			

The analysis of the stock index for market efficiency shows that for all the lag truncations the values are above unit. In fact, it increases the above unit with the increase in the truncations. This differs from the result of Fama and French (1988) where they reported that stock returns are mean reverting over a long period of time.

It is expected that at 5% confidence level, the value of Z statistics for heteroskedastic should lie between -1.96 and 1.96, outside; this shows the significance of the test. The joint test showing AVR of 1.268 suggests a positive serial correlation, hence, the shorter interval returns trend within the duration of the longer interval. i.e. a change in one direction causes a change in the same direction. Since the value of Z statistics lies outside the interval, the random walk for monthly time series of the Nigerian Exchange group is rejected at 5% confidence level with statistical significance. Earlier studies like (Kalu, 2008; Appiah-Kusi & Menya, 2003; Akpan, 1995) have also found the NGX inefficient using runs test and autocorrelation. In fact, studies that found the NSE efficient were carried out at firm level, (Okpara, 2010; Olowe, 1999).

This finding suggests that arbitrage opportunities exist in the market as suggested in the Adaptive Market hypothesis. i.e. since market is inefficient one can gain in excess of the average market returns and that returns could be predicted. However, evidence of cyclic efficiency and inefficiency were not observed as claimed by AMH. This could be due to shortage of data on the NSE. Earlier studies like Kim et.al (2011) used a century long data; even Ito and Sugiyama (2009), Yen and Lee (2008), Park and Irwin (2007) also used a longer duration.

The test for the examination of the degree of market efficiency using regression shows that r-squared and adjusted r is 71% and 61%. This means that the variables used could explain only 61% of the returns. The remaining is probably due to the absence of other predictors like price earnings ratio and book-to-market ratios which could not be included due to their absence on the Nigerian data-base. Again, since financial crisis predicts return negatively, a possible reason attributable to this is that crisis usually results to panic, overreaction and overconfidence. These lead investors into panic withdrawers from the market. Foreign investors also pull out their funds and this often affects the activities, possibly causing of inefficiencies around the periods which is evidence supported by behavioural finances and AMH.

A unit of inflation contributes 0.027 which is insignificant indicating that higher inflation increases return on the NSE. This pattern was also observed in the inflation return plot in table 4, which is contrary to that of Kim et al (2011).

Again, dividend yield and government policies proxy by SAP contributed positively and it is significant. But, the measure of risk contributed negatively and is insignificant. The F value of 7.44, and P value of 0.0004 shows that the result is generally significant. The above result again shows that the stock returns are predictable depending on economic fundamentals, and policies based on their past trends. This creates possibility for technical and fundamental analysis which the adaptive market tends to agree with. Possible causes of inefficiency as witnessed on the NGX are political, economic crises, information asymmetry and barriers to market entry and regulations.

5. Conclusion and Recommendations

The study examined the predictability of stock return and Adaptive Market Hypothesis. Using Automatic Variance Ratio and Predictive Regression and discovers that the Nigerian Stock Exchange is not efficient across lag truncations, which supports earlier studies of Kalu (2008), Akpia-Kusi (2003) and Akpan (1995). However, in contrast, the works of Okpara (2010) and Olowe (1995) show no evidence of arbitrage opportunities in the market. Economic fundamentals and government policies have effects on returns in the market. While some of the findings conform to those suggested by Adaptive Market Hypothesis, evidence of changing efficiency and inefficiency were not observed. This could be due to the fact that earlier studies that found the evidence of cyclic efficiencies like Kim et. al (2011), Ito and Sugiyama (2009), Neely et. al (2007) and Yen and Lee (2008) used a longer duration and were hence exposed to varying economic and political conductions and crisis.

Based on the findings of this research, it is therefore concluded that the Adaptive Market Hypothesis rather explains market conditions than the Efficient Market Hypothesis, which argued that, efficiency change across time, profit opportunities exist and competitions drives away the opportunities

Based on the findings of this study, the following recommendations are therefore made:

a) To the investors, regulations and academicians it is recommended that they do not completely depend on the general belief that markets are always efficient. This usually

leads to negligence or non-payment of attention to the fundamental and intrinsic value of stocks. The concept of an adaptive market better explains the nature of market. There could be period of efficiency and inefficiencies, with period where investors could outsmart the market and gain in excess of average market returns.

b) While other investors could outsmart the market, the ideal condition is to offer all investors equal opportunities. Therefore, market operators like NSE and SEC should address some of the weaknesses that could lead to inefficiencies such as information asymmetry, insiders trading, lack of investors' confidence, illiquid nature of the market and encouraging investors into the market by properly monitoring and training of staff to make sure and make sure prices reflect their true values and also consider reducing the charges on transactions.

References

Akpan, O. (1995). "Thin and Thick Capital Markets". *Nigerian Journal of Social and Economic Research , 1(37).*

Appiah-Kusi, J. and Menya, K. (2003). Return predictability in African stock markets. *Review of Financial Economics , 12.*

Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), 307-343.

Campbell, J. Y., & Shiller, R. J. (1988). Stock prices, earnings, and expected dividends. *The Journal of Finance*, 43(3), 661-676.

De Bondt, W. F. M., & Thaler, R. H. (1985). Does the stock market overreact? *The Journal of Finance*, 40(3), 793-805.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, 25(2), 383-417.

Fama, E. F., & French, K. R. (1988). Dividend yields and expected stock returns. *Journal of Financial Economics*, 22(1), 3-25.

Fama, E. F., & French, K. R. (1988). Dividend yields and expected stock returns. *Journal of Financial Economics*, 22(1), 3-25.

Goyal, A., & Welch, I. (2008). A comprehensive look at the empirical performance of equity premium prediction. *The Review of Financial Studies*, 21(4), 1455-1508.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance*, 48(1), 65-91.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of Finance*, 48(1), 65-91.

Kalu, E. (2008). Retrieved December 10, 2011, from Munich Personal RePEc Archive: mpra.ub.uni-muenchen.de/229011

Kim, H.J., Lim, K.P. and Shamsuddin, A. (2011). Stock return predictability and adaptive market hypothesis: Evidendce from century-long US data. *Journal of Empirical Finance , 18.*

Kim, J. H., Shamsuddin, A., & Lim, K.-P. (2011). Stock return predictability and the adaptive markets hypothesis: Evidence from century-long U.S. data. *Journal of Empirical Finance*, 18(5), 868-879.

Lettau, M., & Ludvigson, S. C. (2001). Consumption, aggregate wealth, and expected stock returns. *The Journal of Finance*, 56(3), 815-849.

Lo, A. W. (2004). The adaptive markets hypothesis: Market efficiency from an evolutionary perspective. *The Journal of Portfolio Management*, 30(5), 15-29.

Lo, A. W. (2012). *Adaptive markets: Financial evolution at the speed of thought*. Princeton University Press.

Neely, C. J., Weller, P. A., & Ulrich, J. M. (2009). The adaptive markets hypothesis: Evidence from the foreign exchange market. *Journal of Financial and Quantitative Analysis*, 44(2), 467-488.

Okpara, G.C., (2010). Stock Market Prices and Random Walk Hypothesis: Further Evidence from Nigeria. *Journal of Economic and International Finance. Vol 2(3)*

Olowe, R. (1999). Weak form efficiency of the Nigerian Stock Exchange Market: Further Evidence. *African Development Review , 11(1)*.

Yen, G. and Lee, C.F. (2008). Efficient market hypothesis: past, present and future. *Reiew of Pacific Basin Financial Markets and Policies , 11*.