Econometric Investigation of the Random Walk Hypothesis in the Nigerian Stock Market

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Abstract  
Growth is a key objective of developing nations, including Nigeria. However, inefficiency of stock markets can pose real dangers to the economic growth of any nation through misallocation of scarce investible resources. This study investigated the weak-form of the Nigerian stock market in the context of the efficient market hypothesis. The stock market prices were modeled to test for weak-form efficiency- the search for serial correlation, which might indicate whether or not current stock market prices depend on previous prices. Using monthly time series data of the Nigerian stock market price index from 1985-2010, a regression analysis, involving the runs test, correlegram, correlation matrix and the least squares estimation techniques was also employed. The results revealed that investors can use past data to predict the future prices of the market which symbolizes inefficiency. However, the results seem to suggest that there is a strong need to put in place policy measures that would guarantee competitive participation and avoid the “buy and hold” attitude of securities by investors which have delayed the rapid development of Nigeria’s economy.

Key words: Econometric investigation, Random walk, Runs test, Stock market
1. Introduction

The most important role of the Nigerian Capital Market is the mobilization and efficient allocation of capital for investment purposes. The market puts in place structures for the mobilization of savings from numerous surplus economic units for the purpose of the productive process and thus enhances economic growth and development. However, owing to certain factors affecting the market, the performance of the capital market has always been questioned. Some of the suspected factors include stringent listing conditions, especially in the first and second tier markets, lack of awareness by the investing public, which leads to low activity and insufficient funds in the market, arising from the buy-and-hold attitude of majority of the investors. Other factors are poor economic conditions and dividend payment. These further, lead to loss of confidence by investors in the institutions operating and divesting funds to some other areas outside the capital market, where appropriate returns are envisaged. In doing this, the investors normally shy away from investment in the capital market resulting in the reductions of securities traded in the market. Since the amount of securities traded could determine the amount of funds mobilized, a reduction in securities traded thus lead to insufficient funds in the market. This affects the economic growth and development in the country since companies cannot raise sufficient funds for expansion, modernization and optimum utilization of their operational capacities.

2. Rationale and Objectives of the study

The level of efficiency of the Nigerian stock market has not been ascertained. Some authors affirmed that the market is efficient in the weak-form, while others, on the other hand disagreed, stressing that the market is inefficient. This controversy about the weak-form efficiency of the Nigerian stock market was due to both the fact that most studies used very short time periods of study and the methods of testing. However, the present study is designed to investigate the weak-form efficiency in the Nigerian stock market in the context of both the random walk theory and the efficient market hypothesis. In order to correct the deficiency of previous studies on this subject matter, the study cover a period of 25 years, using monthly data. It also employed both parametric and non-parametric tests.

3. Literature Review

The paper is anchored mainly on the Efficient Market Hypothesis (EMH) and the Random Walk Theory. Generally, the issue of the stock market efficiency is categorized into two major areas: operational efficiency and informational efficiency (Bumol, 1965; Fama, 1970; Jensen,
1978; Copland and Weston, 1983; Thygerson, 1993; among others). A stock market that is operationally efficient may not be informationally efficient and vice versa. And an inefficient stock market means a stock market that is either operationally or informationally inefficient. What it also means is that in whichever way the stock market becomes efficient (either operationally or informational), the economy is better for it. The issue of capital market efficiency is significant for its implications both for investors and regulatory authorities. In an informationally efficient capital market, the role of the regulatory authorities is delimited by correct pricing of stocks. The efficient dissemination of information ensures that capital is optimally allocated to projects that yield the highest expected return with necessary adjustment for risk and uncertainty. With an efficient pricing mechanism, an economy’s savings and investment are allocated efficiently. Hence, an efficient capital market provides no opportunities to involve in gainful trading activities on a continuous basis. But, on the contrary, if a capital market is not efficient, the regulatory bodies can take necessary steps to ensure that stocks are correctly priced, leading to stock market efficiency. Samuel and Oka (2010), Hamid, Suleman, Shah (2010) Fama (1970), Khoury (1983), Olowe (1996, 1997), Wen, Li, and Liang (2010) view capital market efficiency from the roles the capital markets are expected to play in an economy, which can be classified into three:

i) **Allocation Efficiency**: The role of a capital market here is to optimally allocate scarce savings to productive investments in a way that benefits everyone. Thus, share prices are determined in a way that equates the marginal rates of return to all lenders (savers) and borrowers.

ii) **Operational Efficiency**: A market is said to be operationally efficient if intermediaries which provide the service of channeling funds from savers to investors do so at the minimum cost that provides them a fair return for their services.

iii) **Pricing Efficiency**: This is a market condition where prices are used as signals for capital allocation. Forces of demand and supply set the prices. A market that is price efficient implies efficiency in the processing of information. The prices of capital assets anytime are based on the correct evaluation of all information available at that time. Thus, in finance literature, the focus is more on pricing efficiency, although pricing efficiency implies, in a limited sense operational and allocative efficiency. Fama (1970) defines capital market efficiency as a market where security prices quickly and fully reflect all available information. If a market is efficient, any/all devices intended to out-perform the market will be rendered useless. No scheme devised by any individual should result in
consistently higher returns than those realized on a buy and hold strategy. In an efficient market, the same rate of return for a given level of risk should be realized by all investors. The behaviour of any participant or group should not influence the price of a security in the market.

The Random – Walk Theory

Empirical support for the view that share prices do not behave in a systematic manner but are more akin to a random walk was initially put forward by Kendall (1950) and has since been supported by many other studies of share price behaviour (Foley, 1991). Fama (1978) provides a comprehensive review of the early development of both the theory and empirical work. A random walk simply means that successive price changes are independent of each other.

According to Mbat (2001), Srivastava and Thenmozhi (2011) random–walk theory which is the brainchild of academics based on extensive research states that the future price of stocks are completely independent of past trends. In other words, there is a statistically independent relationship between future prices of stocks and their past prices. This is the main characteristic, which is fundamental for market efficiency. Notable among those who support the efficient market theory are Van Horne and Parker. It should however be noted that efficient market theory is a weaker form of random–walk theory. This is because random walk theory asserts that there is a statistically independent relationship between past records of price movements and future price movements, the efficient market theorist have found the existence of a weak statistical dependency between the two.

Efficient Market Hypothesis (Emh)

The efficient market hypothesis supplies a theoretical framework, which leads to support the random-walk character of share prices. But what exactly, is an “efficient” market? An efficient market is one where at any one-time, prices take into account all available information. Market participants are assumed to act in an intelligent, self-motivated manner and to assess and act upon available information about share prices when formulating their buy or sell decisions. If some available information about a specific share is not acted upon, then an opportunity will arise for, at least some market participants to use that information to their advantage by buying or selling the share. Thus, as market individuals or organizations act upon this information, the price of the share will adjust accordingly until there are further profit opportunities. This has been referred to as “information arbitrage” efficiency (Tobin, 1958).
Empirical Literature Review

In early literature, tests on weak form efficiency were based on the random-walk theory. The researches proved that the weak-form efficiency was hinged on two premises:

i. that share price movements are random.

ii. There exists no relationship between past price movement and new share price changes.

Osei (2002) studied the asset pricing characteristics of the Ghana stock market as well as the response of the market to annual company empowerment. The study, which covered a 17-week event window, looked at the performance of 16 out of the 21 stocks listed in the market. And by measuring the abnormal returns (AR) including the cumulative abnormal returns of the market, it showed that the Ghana stock market is inefficient in response to earnings announcements.

Ronald and Grandbois (1999) studied the efficiency of the Securities Exchange of Barbados over the period 1987 to 1997, using the Augmented Dickey–Fuller and Philips and Perron test, and in both cases found the exchange inefficient. Again Husain and Kevin (1999) tested the weak form efficiency of the Pakistani equity market, using both the Runs test and the serial correlation tests. They found out that the Pakistani equity market is inefficient. Ahmed (1998) studied the equity market performance in Bangladesh for the period 1981 to 1997 tested for the Risk–return trade-off, the Return investments and other Researchers which really tested the efficiency of the market, but concluded that the market has characteristics of a well-functioning market. The weak form efficiency hypothesis has also been tested variously by Fama (1965) for the USA, Dryden (1970) for the UK, Solnik (1973) for 8 European markets, Conrad and Jutter (1973) for Germany, Laurence (1986) for Malaysia and Singapore, Malaikah (1990) for Saudi Arabia and Kuwait, among others. Mixed results are discernible from their studies. The developed markets, like the U.S.A. and some European countries, are found to be weak-form efficient while in general terms, those from the developing or emerging markets do not satisfy the weak-form hypothesis.

The results of researches on the Nigerian Stock Market pose a barge of conflicting signals. Yacout (1980) tested the correlation weekly price of 21 companies, quoted on the Nigerian Stock Exchange (NSE) between July 1977 and July 1979. The result showed that the prices follow a random walk thus confirming the efficiency of the market. Also Ayadi (1984) tested the price behaviour of 30 securities quoted on the Nigerian Stock Exchange (NSE) from 1977-1980 using the Monday closing prices of these shares after adjusting for cash dividends and scripts issues. It was found that the share price movements followed a random walk. In other words, the past prices of shares are of no value in predicting future prices, thus confirming the efficiency of the
market. Also Osisioma (1989) tested 30 securities of the Nigerian Stock Exchange (NSE) over a 6year period (1981-1985). The study had sought to find out the randomness in the movement in security prices and whether the price changes conformed to a stable distribution. The results did not confirm a stable distribution in the price movements, which suggested efficiency.

Anyanwu (1998) examines the efficiency of the Nigerian Stock Market from the border angle of the market’s relationship to the economic growth of the nation. He used indices of stock market development – liquidity, capitalization, market size, among other – to construct an aggregate index of stock market development and related it to the long-run economic growth index, emphasizing the GDP growth rate. The study found a positive association between the two indexes and so concluded that the stock market is efficient to the extent that it affects the economic development of the nation.

Ofobike (1992) showed how accounting infrastructure aids the share pricing and resource allocation mechanism in the Nigerian economy through the Nigerian Stock Exchange (NSE). Ofobike (1992) discussed the relationship which accountancy has with the efficiency and resource allocation process in the economy through the generation of relevant information. This is supported by the works of Ball and Brown (1968) and Beaver (1968), which documented a statistical association between accounting numbers, especially earnings, with the prices of shares. But Ofobike did not go further to examine empirically the efficiency question of the Nigerian Stock Exchange (NSE).

Some practitioners and writers have expressed their views that the Nigerian Stock Market is inefficient. These include Alice and Anao (1986), Akingbohunde (1990), Odife (1990), Osaze (1991), and Mobolirin (1993). These assertions border on personal opinions, for they were not supported by any empirical research.

Akpan (1995), while studying the efficiency of the Nigerian Stock Exchange (NSE), used time series data of stock market price indices covering the period 1989 to 1992. Akpan (1995) described the efficiency of the market in parts, in terms of thickness and size of the market. He considered the informational efficiency of the market, including the risk implications and found that the Nigerian Stock Exchange (NSE) is inefficient. Firstly the author worries about the use of seven sub index (or industrial price indices) data instead of the average share prices for the various industries in the period under study. On account of this, it seems that there may be informational losses on actual stock price movements. Again stock returns do not only mean stock price but also include dividends received. The method used does not capture the impact of dividends paid in the period of research.
It is evident from the review of literature on the efficient market theory that the studies by different scholars did not all produce results that were mutually consistent. Some supported the random walk hypothesis while others refuted it. The different studies on the efficiency of the Nigerian stock market showed conflicting results. Some researchers are of the opinion that the Nigerian stock market is efficient while others take the view that the market as inefficient. The following researchers confirmed the efficiency of the Nigerian stock market: Yacout (1980) who tested the weekly price correlation of 21 companies between 1977 and 1979. Also Ayadi (1984) tested the efficiency of the Nigerian stock market using 30 securities quoted on the stock exchange and found that the market is efficient. In addition, Anyanwu (1998) studied the efficiency of the Nigerian stock market and the contribution of the market to economic development and concluded that the market was efficient.

On the other hand, Akpan (1995) used time series data of the Nigerian stock market from 1989 to 1992 and found that the market is inefficient. Also writers like Osaze (1991), Mobolirin (1993), Odife (1990), Akingbohunde (1990), are of the opinion that the Nigerian stock market is inefficient. Ako (1977) studied the efficiency of the Nigerian stock market from a sample of 45 quoted companies and also found that the market was inefficient. However, in this study efforts were made to overcome the various weaknesses of the studies discussed above. This is to establish the true position of the Nigerian stock market with respect to the level of its efficiency.

4. Methodology

Based on the efficient market theory, stock prices should indicate random walk over time. This implies that no systematic price movements or monopoly profits would be expected, as large number of buyers and sellers seek to make profit by frequent trading on even the smallest piece of information. Thus, properly anticipated prices will fluctuate randomly (Fama, 1970). The movement of series over time can be considered under the following scenarios:

Let $\Delta S_{MP_t} =$ price of stock at a given time period $t$ (current price)
$\Delta S_{MP_{t-1}} =$ Price of stock at previous time period

The objective of the study is to establish whether there is a relationship between price of period $(t)$ ($S_{MP_t}$) and price at previous time period $(t-1)$ ($S_{MP_{t-1}}$). Thus, the random walk model stock price, where $S_{MP_{t-1}}$ should be independent and identically distributed that is randomly. Therefore, where $S_{MP_t}$ depends on $S_{MP_{t-1}}$, then there is serial correlation. On the other hand where $S_{MP_t}$ does not depend on $S_{MP_{t-1}}$, the price variables are random and therefore independent. The functional relationship may then be represented as:
Stationarity in a time series data is a desirable property for an estimate AR model. This is because a model whose co-efficient are non-stationary will have non-declining effects on the current values of the dependent variable as time progress which is counter-productive, empirically defective and could lead to spurious regressions. In this case, the Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root test are employed to handle the problem of data stationarity.

$$Y_t = B + \alpha Y_{t-1} + U_t$$ ...........................................................................(3)

Where B and $\alpha$ are parameter of the model and $U_t$ is a white noise disturbance term.

If and only if, $-1 < \alpha < 1$, then $\alpha = 1$, then $Y_t$ is a non-stationary series.

$$\Delta Y = B + RY_{t-1} + U_t$$ ...........................................................................(4)

Where $R = (\alpha - 1)$ and the null hypothesis can be tested as

$H_0$: $R = 0$

$$\Delta Y = B + RY_{t-1} + \sum_{i=1}^{p} \Delta Y_{t-i} + U_t$$ ...........................................................................(5)

### 5. Major Findings and Discussion

<table>
<thead>
<tr>
<th>Table 1: Descriptive Statistics of Variable</th>
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</thead>
<tbody>
<tr>
<td>RETURNS</td>
</tr>
<tr>
<td>MEAN</td>
</tr>
<tr>
<td>MEADIAN</td>
</tr>
<tr>
<td>MAXIMUM</td>
</tr>
<tr>
<td>MINIMUM</td>
</tr>
<tr>
<td>STD. DEV.</td>
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<tr>
<td>SKEWNESS</td>
</tr>
<tr>
<td>KURTOSIS</td>
</tr>
<tr>
<td>JARQUE-BERA</td>
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</tbody>
</table>

Source: Authors’ computation (2012)

Table 1 above shows the summary of the descriptive statistics of the variable for the sample period. The low mean and standard deviation suggest that the distribution is abnormal, The Jacque bera statistics which test for the normality in the distribution, did not conform to the

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theoretical expectation. Furthermore, the skewness and kurtosis value do not appear to be closed to the theoretical value of zero for skewness and three for kurtosis.

Table 2: Unit Root Test Summary Results

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>ADF TEST</th>
<th>PP TEST</th>
<th>ORDER INTEGRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURNS</td>
<td>-5.547391</td>
<td>-9.032468</td>
<td>1(1)</td>
</tr>
</tbody>
</table>

Critical Values: (ADF): 1%-3.4549; 5%-2.8717; 10%-2.5722
(Phillips-Perron): 1%-3.5541; 5%-2.7217; 10%-2.6402
Source: Authors’ computation (2012)

Table 2 shows the results of both the Augmented Dickey-Fuller (Dickey and Fuller, 1979) and the Phillips-perron test (Perron,1990). The result reveals that the original series is not stationary, but the first differenced series is stationary However, based on the level series it revealed the presence of autocorrelation, and hence did not support the efficient market hypothesis.

Non-parametric Stock Market Efficiency Tests

There are a large number of other direct tests of EMH. In addition, indirect tests are also used as evidence for or against the EMH. Keane (1983) provides some basic explanations of what makes markets inefficient. One of his ideas is called “Gambler’s Fallacy”. This may be described as the belief that what “goes up must come down”. This phenomenon exhibits itself among investors the prices of stock risen for a period of time and so is deemed to be “due for a fall”. Generally speaking, by knowing the relationship of the current price to recent price movements, one can better estimate the likely direction of future price movements, i.e. historical data such as price movement can be used to predict future prices. This provides credibility for the argument that the market is predictable and inefficient. Therefore, the issue is to see whether the stock market is predictable or not by detecting serial dependence of stock returns. In this paper, two popular tests of market efficiency, which can test serial dependence of stock returns, are applied. That is the run test and autocorrelation function (ACF) test.

The results of these two tests will be supplemented by the evidence from tests of predictability, anomaly, and volatility reported by the authors to draw a conclusion about EMH in the Nigerian stock market.

Runs Test

The runs test, also called Geary test, is a non-parametric statistical test whereby the number of sequences of consecutive positive and negative returns is tabulated and compared against its sampling distribution under the random walk hypothesis (Campbell et al. 1997; Gujarati 2003). A run is defined as the repeated occurrence of the same value or category of a variable. It is indexed
by two parameters, which are the type of the run and the length. Stock price runs can be positive, negative, or have no change. The length is how often a run type occurs in succession. Under the null hypothesis that successive outcomes are independent, the total expected number of runs is distributed as normal with the following mean:

\[ \mu = \frac{N(N + 1) - \sum_{i=1}^{3} n_i^2}{N} \]  

(1)

and the following standard deviation:

\[ \sigma_{\mu} = \left[ \frac{\sum_{i=1}^{3} \sum_{i=1}^{3} n_i^2 + N(N + 1) - 2N(\sum_{i=1}^{3} n_i^3 - N^3)}{N^2(N - 1)} \right]^{1/2} \]  

(2)

where \( n_i \) is the number of runs of type \( i \). The test for serial dependence is carried out by comparing the actual number of runs, \( a_r \) in the price series, to the expected number \( \mu \). The null proposition is:

\[ H_0 : E(\text{runs}) = \mu. \]  

(3)

In this section, runs in the monthly SET index for the total period are presented in table 4.3 below.

<table>
<thead>
<tr>
<th>Table 3: Summary Result of the Run Test Using Spss 16.0</th>
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</thead>
<tbody>
<tr>
<td>Runs Test</td>
</tr>
<tr>
<td>SP</td>
</tr>
<tr>
<td>Test Value(^a)</td>
</tr>
<tr>
<td>Cases &lt; Test Value</td>
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<tr>
<td>Cases &gt;= Test Value</td>
</tr>
<tr>
<td>Total Cases</td>
</tr>
<tr>
<td>Number of Runs</td>
</tr>
<tr>
<td>Z</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
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</tbody>
</table>

Source: SPSS
Computation, 2012

The above is a runs test using monthly data that show a high degree of autocorrelation among the variables. In addition, the test value is significant and we can conclude that, for the period, the null hypothesis is rejected and there is therefore an evidence of autocorrelation.
Many studies on market efficiency have employed run tests in a similar framework for verification of the weak-form efficiency of the U.S. and other countries’ stock markets. These include the studies by Fama (1965), Sharma and Kennedy (1977), Cooper (1982), Chiat and Finn (1983), Wong and Kwong (1984), Yalawar (1988), Ko and Lee (1991), Butler and Malaikah (1992), and Thomas (1995). These studies typically found that, in most markets (except Hong Kong, India, Kuwait and Saudi Arabia), the null hypothesis is not rejected. Thailand, as elsewhere in developing countries, experiences relative underdevelopment of the capital market especially the stock market. This can be attributed to inadequate market and legal infrastructure. Therefore, the results of the run tests indicate that Nigerian stock market is not efficient in the weak-form.

**AUTOCORRELATION FUNCTION (ACF)**

The autocorrelation function (ACF) test is examined to identify the degree of autocorrelation in a time series. It measures the correlation between the current and lagged observations of the time series of stock prices.

However, if the series has unit root, then the autocorrelation function slowly decreases starting from the value of one and the partial correlation function has only first value which differs from zero. If one time series has two unit roots, ACF act the same way as for the one unit root series, but the Partial autocorrelation function (PACF) has only first two nonzero values.

**Table 4: Correlogram and the Values of Acf and Pacf**

<table>
<thead>
<tr>
<th>Date: 08/02/12  Time: 02:42  Sample: 1985 2010  Included observations: 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autocorrelation Partial Correlation AC PAC Q-Stat Prob</td>
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</tbody>
</table>
Source: Eviews Computation, 2012

Based on the results of the correlogram presented on table 4.4, both the ACF and PACF statistics are significant even at 1% level of significance. Thus, we can conclude that the Nigerian stock market prices index represent stationary time series. This means that the Nigerian stock market is not efficient in the weak form.

Table 5: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>SMPTT</th>
<th>SMPT1</th>
<th>SMPT2</th>
<th>SMPT3</th>
<th>SMPT4</th>
<th>SMPT5</th>
<th>SMPT6</th>
<th>SMPT7</th>
<th>SMPT8</th>
<th>SMPT9</th>
<th>SMPT10</th>
<th>SMPT11</th>
</tr>
</thead>
<tbody>
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<td>SMPT</td>
<td>1</td>
<td>0.996195</td>
<td>0.997078</td>
<td>0.995258</td>
<td>0.969441</td>
<td>0.990899</td>
<td>0.978797</td>
<td>0.975792</td>
<td>0.9716305</td>
<td>0.9354122</td>
<td>0.882010</td>
<td>0.855848</td>
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<tr>
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<td>0.9354122</td>
<td>0.882010</td>
<td>0.9354122</td>
<td>0.882010</td>
<td>0.9354122</td>
<td>0.882010</td>
<td>0.9354122</td>
<td>0.882010</td>
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<tr>
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<td>0.882010</td>
<td>0.9354122</td>
<td>0.882010</td>
<td>0.9354122</td>
<td>0.882010</td>
<td>0.9354122</td>
<td>0.882010</td>
</tr>
<tr>
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<td>0.882010</td>
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<td>SMPT8</td>
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<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>1</td>
<td>0.9716305</td>
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<td>0.882010</td>
<td>0.9354122</td>
</tr>
<tr>
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<td>0.975792</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>1</td>
<td>0.9716305</td>
<td>0.9354122</td>
<td>0.882010</td>
</tr>
<tr>
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<td>0.9716305</td>
<td>0.975792</td>
<td>0.9716305</td>
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<td>0.9716305</td>
<td>0.9716305</td>
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<td>0.9354122</td>
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<tr>
<td>SMPT11</td>
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<td>0.9716305</td>
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<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>0.9716305</td>
<td>1</td>
<td>0.9716305</td>
</tr>
</tbody>
</table>

Source: Eviews Computation, 2012

The results presented in table 4.4 revealed that there exist a strong correlation between the variables, moving as high as 80% of correlation as showed in the correlation matrix presented in table 4.4.

Table 6: Testing Weak-Form Efficiency Of The Nigerian Stock Exchange

Dependent Variable: D(RETURNS)
Method: Least Squares

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(RETURNS)(-1)</td>
<td>0.186394</td>
<td>0.061427</td>
<td>3.03439</td>
<td>0.0027</td>
</tr>
<tr>
<td>D(RETURNS)(-2)</td>
<td>0.13117</td>
<td>0.062086</td>
<td>2.112705</td>
<td>0.0356</td>
</tr>
<tr>
<td>D(RETURNS)(-3)</td>
<td>0.114079</td>
<td>0.062746</td>
<td>1.818115</td>
<td>0.0702</td>
</tr>
<tr>
<td>D(RETURNS)(-4)</td>
<td>-0.175802</td>
<td>0.06278</td>
<td>-2.800297</td>
<td>0.0055</td>
</tr>
<tr>
<td>D(RETURNS)(-5)</td>
<td>0.274953</td>
<td>0.063817</td>
<td>4.308459</td>
<td>0.0004</td>
</tr>
<tr>
<td>D(RETURNS)(-6)</td>
<td>0.018922</td>
<td>0.066546</td>
<td>-0.284347</td>
<td>0.7764</td>
</tr>
<tr>
<td>D(RETURNS)(-7)</td>
<td>-0.036191</td>
<td>0.066514</td>
<td>-0.544115</td>
<td>0.5868</td>
</tr>
</tbody>
</table>
The results in table 4.5 revealed that most of the returns are significant, indicating a serial correlation between past returns and present returns. The D.W statistics of 1.340840 shows the presence of autocorrelation; also the DW statistics figure is higher than the figure of the R-square which showed that the regression result is in accordance with theoretical expectation. Also, the overall F-statistics is significant. But both the R-square and the adjusted R-square are low. However, this is not important, since our main concern is to examine for serial correlation.

Data were analyzed, using both non-parametric and parametric tests, the non-parametric tests are runs test, correlogram and correlation matrix estimation technique to find out if present stock prices are correlated with past stock prices in order to ascertain the level of the efficiency of the Nigerian stock market. Also, the least square estimation method was used to test for the significance. The result shows that most of the predictors are significant at 5 per cent as indicated by the P-value in table 4.5 above. This means that the future market price can be predicted, using past information. It also revealed the presence of seasonality in the market. Also, the result of the correlation matrix revealed that there is strong correlation between present stock prices and past stock prices.

However, the result of both the non-parametric and parametric tests revealed the presence of serial correlation regarding past and current stock prices in the Nigerian stock market. The stock prices tend to display a systematic movement, rather than random movement over time. This trend indicates imperfection in the market with great price volatility, which could allow a certain class of investors, with superior information, to reap abnormal returns from the market.
6. Conclusions and Recommendations

The theoretical and empirical studies of the efficient market hypothesis have made an important contribution to the understanding of the stock market. However, in the Nigerian context, the present state of understanding of the issue, especially in the emerging financial markets, is far from being conclusive. The results of the present study show that there is an autocorrelation on Nigerian stock market returns. The results of all the tests reject the null hypothesis. From the foregoing, we concluded that the Nigerian stock market is inefficient.

The inefficiency of Nigerian stock market follows the violation of the necessary conditions for an efficient market with a developed financial system and also implies financial and institutional imperfections. This leads to the conclusion that Thai financial policies and regulations, such as those concerning liberalisation, deregulation and privatisation have generated a perceived inconsistency, and a tendency to produce instability. The implications are that the benefits of a well functioning stock market are not being enjoyed in the economy. Indeed, the weak-form inefficiency of the stock market, demonstrated in this study is most likely to have been caused by a combination of the lack of its development and the implication of policy choices. It is necessary to gain more insights into the operation and characteristics of the stock market in terms of its efficiency and the valuation processes to make an informed assessment of the empirical characteristics of the Nigerian financial market.

In the study, we have attempted to provide theoretical and empirical analyses of the efficiency of the Nigerian stock market. Our result indicates that the Nigerian stock market is inefficient in price determination, which provides the opportunity for a given class of investors to reap abnormal returns. Some factors were identified, as being responsible for the imperfection in the market. It is hoped that these should provide a basis for sound policy actions. We know, from the theory of choice that decision-makers stick to the best option out of available alternatives in order to attain optimal benefits in the same way the availability of information plays a key role for investors to make optimal decisions on their choice of securities in the stock market. This matter is important because in the absence of adequate information, securities in the market may either be overpriced or under priced. No wonder, Kitchen (1993) notes that risk estimates may be hazy because of lack of information. Based on the findings of this study, the following policy recommendations are suggested towards resolving some of the underlying problems of the Nigerian stock market: Full automation of the market, mass enlightenment and stable macroeconomic environment must be provided.
References


