Journal of Financial Management and Analysis, **26(1):2013**:39-64

TESTING CALENDAR EFFECT ON NIGERIAN STOCK MARKET RETURNS : METHODOLOGICAL APPROACH

OSAZEE FRANK OGIEVA, M.Sc., ACA
Faculty Member
Department of Business Administration

Professor I.O. OSAMWONYI, Ph.D.
Professor and Head
Department of Banking and Finance

ESEOGHENE JOSEPH IDOLOR, Ph.D., ACE
Faculty Member
Department of Banking and Finance
University of Benin
Benin City, Nigeria
Email: greatidolor@yahoo.com

Abstract

In this study we test for the existence of calendar effect in Nigerian stock market returns. The data utilised comprised of the daily All Shares Price Index returns for a period of 1339 sampled days ranging from 19th April 2005 to 30th September 2010. In testing for calendar effect in the Nigerian bourse (stock exchange) for the period of study, we utilised relevant descriptive statistics such as mean, standard deviation, skewness, kurtosis and Jaque-Bera (JB) test to enable us understand and compare the unique statistical properties of the stock returns utilised. We also subjected the daily stock returns to stationarity tests using Agumented Dicker-Fuller (ADF) and the Philip-Perron (PP) Unit root test, while the data analysis was performed using the multiple ordinary least square regression (OLS) techniques in testing for the day of the week and month of the year effect. Our findings revealed that Monday Thursday and Friday are associated with negative market returns (R) while Tuesday and Wednesday are associated with positive market returns (R) and that equity traders can make abnormal gains by trading on Tuesday in Nigerian stock market since Tuesday was positive and statistically significant. On the other hand, our monthly calendar test results shows that February, March, April, May and December were consistently associated with negative market returns (R) while January, August, September, October and November were associated with positive market returns (R). In the case of June and July there was mixed signs (findings).

Keywords: Calendar effects, Day of the week effect, Month of the year effect, Stock market anomalies

JEL Classification: C51; C82; E44; G14; O55

Introduction

Calendar effects have remained an area of growing interest for researchers in the last three decades as the presence of the phenomena has been evidenced even in the most developed capital markets of the world (Ali and Akbar[1]). The effects of these security price anomalies have been regarded as strong evidence against efficient market hypothesis in the field of finance and economics. Anomalies which are significant deviations from market efficiency have been reported in a number of countries, including U.K., U.S.A., Canada, Japan, Finland and Australia (French[2]; Jaffe and Westerfield[3]; Board and Sutclifle[4]; Connoly[5]; Solnik and Bousquet[6] ; Barone Connolly[7]; Agrawal and Tandon[8]).

In the traditional finance framework where

The authors own full responsibility for the contents of the paper.

agents are assumed to be "rational" and where there are no financial market frictions, a security's price equals its "fundamental value". This is the discounted sum of expected future cash flows, where in forming expectations, investors correctly process all available information, and where the discount rate is consistent with a normatively acceptable preference specification. The hypothesis that actual prices reflect fundamental values is the Efficient Markets Hypothesis (EMH). Put simply, under this hypothesis, "prices are right", in that they are set by agents who understand Bayes law and have sensible preferences. In an efficient market, there is "no free lunch" as no investment strategy can earn excess risk-adjusted average returns, or average returns greater than are warranted for its risk (Barberis and Thaler[9]). Rationality here means two things. First, when they receive new information, agents (investors) update their beliefs correctly in the manner described by Bayes Law. Second, given their beliefs, agents make choices that are normatively acceptable, in the sense that they are consistent with savage's notion of Subjective Expected Utility (SEU).

For instance, the idea of weak-form-efficiency requires that there are no consistent patterns in the stock prices and consequently returns. While early tests of random walk did not detect any strong evidence of the existence of any return pattern, more recent studies have demonstrated market inefficiency by identifying systematic variations in stock returns. Some of the more important systematic variations or anomalies as they are often referred to are value line's investment recommendations, the small firm effect and extraordinary returns related to the time of calendar effect. Such systematic changes, variations or patterns in stock returns are referred to as the monthly effect, the weekly effect, the daily effects or broadly categorized as calendar effects (Radcliffe[10]). The existence of seasonality or variations in domestic and international markets suggests market inefficiency in that investors should be able to earn abnormal rates of returns incommensurate with the degree of risk that they are exposed to.

Prelude

However, a review of the empirical literature on calendar effect reveals that the most important calendar anomalies studied are the day of the week effect (significantly different returns on some day of the week, usually higher Friday returns and lower Monday returns), the month of the year effect (relatively higher January returns), the trading month effect (returns higher over the first forth night of the month and the holiday effect (returns higher on the day before vacations).

Day of the week and monthly effect patterns in returns (if they do exist) might enable investors to take advantage of relatively regular shifts in the market by designing trading strategies which can take advantage of such predictable patterns. Because of transaction cost, those trading strategies may not be able to generate the much desired profits, but they still may provide illuminating insights to investors. For a rational financial decision maker, returns constitute only one side of the decision making process. The other aspect that must be taken into account when one makes investment decisions is risk or volatility of returns. If investors can specify a certain pattern in volatility, then it would be easier to make investment decisions based on both return and risk. This would give investors another possible tool to design profitable strategies (Kiymaz and Berument[11]). The study of volatility in this regard, aims at showing the level of price discovery of financial assets as a function of volatility and pricing of derivative securities. For instance, Engel[12] opines that investors who dislike risk may adjust their portfolios by reducing their investments in these assets whose volatility are expected to increase. Investors may also adjust their portfolios by taking into account, day of the week variations

in volatility. Finding certain pattern in volatility might benefit investors in several ways, including the use of predicted volatility patterns in hedging and speculative purposes and the use of predicted volatility in valuation of certain assets.

Although, many of the studies on calendar effect have provided strong empirical evidence supporting its significant effect on stock market returns and the general economy of a country, there seems to be a few dissenters who have opined that the empirical findings on calendar effects are not significant enough. Theory has clearly made some progress in the subject. We now understand the possible importance of some days of the week and month of the year, on capital markets of developed countries. However, very little is known about the empirical relevance of the findings to a third world or developing country like Nigeria. Though empirical work has unearthed some stylized facts on the subject, but these evidence is largely based on foreign and highly advanced European and Asian economies; and it is not at all clear how these facts relates to different economic models of other developing countries in the African continent (Idolor[13]).

Without testing the robustness of these findings outside the environment in which they were uncovered, it is hard to determine whether these empirical regularities are merely spurious correlations let alone whether they support one theory or another (Rajan and Zingales[14]). This paper attempts to start filling this gap in our knowledge. Against this background, the purpose of this study is to wade into this controversy and reinvestigate using the multiple ordinary least square regression (OLS) techniques in testing for the day of the week and month of the year effect (calendar effect) on Nigerian stock market returns.

Fama[15] introduced the random walk theory which is the basis of the efficient Market hypothesis. Based on his theory, stock prices cannot be precisely predicted. If stock price is to be predicted for the next day, the best prediction will be the market price prevailing today adjusted with a drift term. In other words, there cannot be any trends, either seasonal or calendar, in stock prices. If there are any seasonal or calendar effects present in the market that will allow players to make abnormal profits, this negates the weak from of market efficiency that states that stock prices are independent of past information.

However, evidence collected over time suggests that stock returns do not remain constant and that the market can be outperformed using calendar or seasonal dummies. This has enticed many researchers such as Balaban and Bulu[16], Gao and Kling[17], Berg[18], Marquerine[19], and Priestley[20] to explore the presence of these anomalies in stock prices. In this aspect of the paper, an attempt will be made to review some previous works done by other researchers as regards calendar effect on stock price with particular emphasis on the daily, weekly, monthly and end of the year effect.

The Day of the Week Effect

Day of the week is an important calendar anomaly. It describes Monday as a bad day because on the average the market is bearish on the first day of the week, while Friday is a good day because the market is bullish on the last day of the week. In an analytical survey of the Japanese and Australian markets, Jaffe and Westerfield[21], looked for a weekend effect and reported that the lowest return values occur on Thursdays and they accorded this to the time difference between the operating periods of different stock exchange markets. In an investigation conducted by Hussain[22], it was discovered that there was no weekday effect in the Pakistani equity market by considering a period from January 1989 to December 1993. Similarly Nishat and Mustapha[23], found no

significant day of the week effect on stock returns and on conditional variance by considering a period from December 1991 to December 2001 for stock returns on the Karachi stock exchange index. Ali and Akbar[24] agreed with the above in their research study when they concluded that there were no weekly effects in stock returns in Pakistani stock market using a period of fifteen years ranging from November 1991 to October 1996. Their research went further to show that the Pakistani equity market is inefficient in the short run and there was existence of daily effects where the fourth and fifth days of a week showed abnormal returns using autoregressive modeling. Foster and Viswanathan[25] found that for actively traded firms, trading volumes, adverse selection cost, and return volatility are higher in the first half hours of the trading day. In the same vein Chang, Pinegar and Schachter[26] observed that the volatility pattern is U-shaped across weekdays in selected commodities futures markets and found that return variance is the highest while volume is the lowest on Monday supporting Foster and Viswanathan[27] model. Thomas[28], in his study about trend and calendar effects in stock returns of 207 stocks from Swedish stock market for a period of 1987 to 1996 found that the day-of-the-week affects returns significantly.

Based on the study conducted by Dimitrios and Katerina[29] on the day-of-the-week effect anomaly in the French stock Exchange, the highest volatility is also observed on Monday. Bildik[30] examined stock market returns and trading activity in the emerging market of Istanbul Stock Exchange using daily closing values of the ISE-100 index from 1988 to 1999, and found that Monday showed the lowest return and had the highest volatility across the week.

For the African market, a study by Paul and Theodore[31] examined the day-of-the week and month of the year effect using daily closing prices of major share index on Ghana Stock Exchange for the period of 1994 to 2004. Ordinary Least Square (OLS) model showed that all test statistics are very significant at 5% for Monday and 1% for Wednesday and Friday. Mean daily returns during the estimation period on Mondays are also lower than other days of the week (0.1% on Monday as opposed to 0.18% and 0.19% on Wednesday and Friday respectively). Similar result was found for the Chinese stock market and the Indian Stock market studied by Gao and Kling. The result was also similar to that of Jaffe and Westerfield[32] in the case of Australia and Japan. Chen and Liang, investigated the daily anomalies in the five ASEAN equity markets of Malaysia, Singapore, Thailand, Indonesia and Philippines before, during and after the Asian financial crisis and found that Monday effects was still significant in the Malaysian market, but no daily seasonal anomaly during the crisis period for the Malaysian market which also showed similar results after the crisis period. For the Malaysian market, there are few studies done in relation to market anomaly (e.g. Hakan and Halil[33]; Kok and Wong[34]; Mansor[35]).

Kok and Wong, using ordinary least Square (OLS) method found that day of the week effect did exist in Malaysia with a negative Monday effect and positive Wednesday and Friday effect for the pre-crisis period of 1996. However, during the crisis period (1996-1998), daily seasonal anomaly disappeared completely in all five ASEAN markets while for the post-crisis period; Malaysia showed only a positive Tuesday effect. Hakan and Halil on the other hand found the highest and lowest returns on Wednesday and Monday respectively. The day-of-the week effect, examined by Mansor using the daily closing prices of the Kuala Lumpur Stock Exchange Composite Index (KLCI) from January 1980 to December 1996 found that the day of the week effect was present in the Malaysian market. Yet, the pattern of the effect had changed over the time from negative Tuesday, positive Thursday to negative Monday and positive Friday. Ho and Cheung[36]

investigated whether there was an effect, similar to the weekend effect, in the volatility of returns for a number of Asian markets over the period of 1975 until 1989. They found that the highest volatility occurred on Monday while the lowest average return occurred on Tuesday. Anuar and Shamser[37] used the daily returns of the New Strait Times Industrial Index for the period of July 1975 until December 1985 to investigate the existence of the day-of-the week effect. By employing the multiplicative random walk method, they substantiated the presence of the day-of-the-week effect.

However in recent times, Wei and Zee[38] found higher volatilities on Fridays and lower volume in both Mondays and Fridays in their study of the currency futures markets, providing partial support to the Foster and Viswanathan arguments. Rogalski[39] concluded that the weekend effect showed itself only between December and February, but Monday returns took positive values in January which means that there was no weekend effect in January. Harris[40], constructed models for individual firms using hourly data to examine cumulative returns patterns within a day. Smirlock and Starks[41] used hourly values of the Dow Jones industrial average and found that the weekend effect showed itself in different periods. They concluded that over the early part of their sample period, negative returns characterize each hour of trading on Monday while the return from Friday close to Monday was positive. In the last sub- period of their classification in their analysis period, Monday average hourly returns in the afternoon were all positive and the weekend effect was due to negative average returns from Friday close to Monday open. French and Roll pointed out that asset prices are more volatile during trading hours than non-trading hours and variances for the days following an exchange holidays are larger than for other days. They hypothesize that more public information arrives during normal business hours and that informed traders are more likely to trade when the exchanges are open. Harvey and Huang[42] observed higher volatility in interest rates and foreign exchange futures market during the first few trading hours exchange futures market during the first few trading hours on Thursdays and Fridays, they interpreted their result as evidence of more public information arriving on Thursdays and Fridays.

Jarret and Kyper[43] provides evidence in support of the end of the week anomaly using closing stock prices for forty nine (49) randomly selected firms listed in the U.S.A. Pearce[44] also provided evidence in support of the weekly effect. Gao and Kling found in the Chinese stock market that Fridays are more profitable than other days of the week in the short term. Coutts[45] concluded for the U.K. that though calendar anomalies were persistent but they were not exploitable due to financial market frictions like the round trip transaction costs. After analyzing standard and poor's composite index, Cross[46] and French[47] found that Monday closing price indices are lower than Friday closing values and as a result, Monday returns generally have negative values. Keim and Stambaugh[48] pointed out that even when the New York stock exchange market operated on Saturday, it resulted in negative Monday returns. Their analysis on standard and poor's composite index from 1928 to 1982 also indicated consistently negative Monday returns. They also found a positive correlation between Friday and Monday returns for thirty individual stocks of the Dow Jones industrial index. In another study done by Board and Sutcliffe, the weekend effect was found in the British stock market returns. In their analysis, they considered the effects of the so-called "reverse weekend effect" for the Monday that was the first day of an account.

Connolly discovered that after 1975, the weekend effect disappeared in the U.S.A. Solnik and Bousquet presented evidence on the day of the week effect on the Paris bourse. A strong

and persistent negative return was found on Tuesday. The tests were conducted using daily stock index from January 1978 to December 1987. They found no satisfactory explanation for the negative Tuesday returns on the Paris bourse. Barone analyzed the stock index between January 1975 and August 1989. He found an average January return of 0.33 percent that is significantly different from zero. A significant negative return for Tuesdays at one percent confidence level was another conclusion of the study. Furthermore a study done by Ozmen[49] showed that the highest returns between January 1988 and February 1992 were obtained on Fridays and the lowest on Thursdays. Another study done by Karan[50] supported the idea of high Friday's returns during the October 1990 to December 1993 period. However in this study, it was found that Tuesdays had moderately significant negative returns. Muradoglu and Oktay[51] analyzed the daily Instanbul stock exchange returns within the period January 1988 to December 1992 and showed that randomness in the Turkish stock market returns gets statistically insignificant with time. Although the study was unable to find a consistent day of the week effect on stock returns, it found significantly negative Tuesday returns within the period 1990 to 1992 and positive Friday returns within the same period. They concluded that the cause of the weekend effect could be the announcement of news about the firms at weekends (see Fishe, Gosnell and Lasser[52]; Myers, Brealey and Marcus[53]).

Miller[54] attributes the negative returns over weekends to a shift in the broker – investor balance in decisions to buy and sell. Miller argued that during the week, investors, too busy to do their own research tends to follow the recommendations of their brokers, recommendations that are skewed to the buy side. However on weekends, investors free from their own work as well as from brokers, do their own research and tend to reach decisions to sell. The result is a net excess supply at Monday's openings. However, evidence that support millers hypothesis has shown that brokers do tend to make buy recommendations, by evidence that odd-lots transactions tend to be net sales and by data showing that odd-lot volume is particularly high and institutional volume is particularly low on Mondays (Shaheen[55]). These individual investors tend to sell on Mondays when the lack of institutional trading reduces liquidity. Ziemba[56] provides evidence that the same phenomenon exists in Japanese stock prices.

Another explanation for the weekend effect is that stock prices close "too high" on Fridays or "too low" on Mondays. One variance attributes unusually high Friday's closing prices to settlement delays. The delay between the trade date and the settlement date creates an interest free loan until settlement. Friday buyers get two extra days of free credit, creating an incentive to buy on Fridays and pushing Friday prices up. The decline over the weekend reflects the elimination of this incentive (Nishat). This hypothesis is supported by the intra- week behavior of volume and returns. Friday is the day with the greatest volume and with the most positive stock returns. In an investigative study of the day of the week effect for the Karachi stock market, Shaheen, employing the daily data from July 1997 to May 2006 observed that the highest volatility occurred on Monday and lowest for Fridays using standard deviation of returns as a volatility measure, Monday had the highest volatility on returns. He therefore concluded that the co-efficient of the conditional standard deviation of the returns equation is positive indicating that investors would certainly be compensated for investment into riskier assets.

Other studies have examined the time series stock price behaviors in terms of volatility by using generalized autoregressive conditional heteroskedasticity (GARCH) models. Campbell and Hentschel[58], found that an increase in

volatility raises the required rate of returns on common shares and hence covers stock prices. Others that have alluded to this fact are Hamao, Masulis and Ng[59] and Nelson[60]. In a study done in the Athens stock exchange, Alexakis and Xanthakes[61] used an aggregate index that includes all stocks on the Greek stock exchange and found positive and highest returns for Fridays, while Tuesday showed negative returns during the period from January 1985 to Febuary 1994. Mills, Siriopoulos, Markelos and Harizanis[62], examine not only basket indices but also constituents stocks of the Athenian stock exchange general index from 1986 to 1997. They find significant evidence for higher returns on Fridays and lower returns on Tuesdays and Wednesdays.

Finally Coutts, kaplanidis and Roberts[63] investigate the existence of security price anomalies for four indexes (banking, insurance, general and leasing) over the period 1986 to 1996. They found out that the Friday returns are always positive and highest. Specifically their study supported the existence of this anomaly for the general and bank indexes, but not for the insurance and leasing indexes. Kenourgios and Samitas[64] also investigated the day of the week effect in the Athens Stock Exchange using a conditional variance framework. They therefore reported that day of the week in both the return and the volatility equation is present for the emerging Athens stock exchange over the period 1995 to 2000. Similar studies were also performed for some developed equity markets. Karolyi[65] included the volatility of foreign stock returns to explain the conditional variance of home country stock returns for the case of the U.S.A. and Canada. Berument and Kiymaz[66] use the standard and poor's index and reports that there are differences in stock market volatility across the days of the week, with the highest volatility observed on Fridays. Berument and Kiymaz, found that the day of the week effect is present in both returns and volatility for Canada, Germany, Japan, U.K. and the U.S.A.

The Month of the Year Effect

The month of the year's effect most commonly referred to as January effect is the most prominent of all monthly calendar anomalies (Ali and Akbar). Evidence generated from the most developed capital markets of the world depicts the presence of January effect. Gultekin and Gultekin[67]. Using value weighted indices for a total of seventeen countries found the presence of January effect for thirteen countries. Ali[68] studied the relationship between stock prices and trading volume in the context of Karachi stock markets daily data for a very short time period, that is, nine months data. He confirmed the significance of non- information trade in explaining the fluctuations in stock prices. Jaffe and Westerfield found for the U.S. market that on average, returns in January are higher than other months of the year. Anderson, Gerlach and DiTraglia[69] also confirmed the January effect and found that returns in January are higher than other months in an experimental setting. No wonder then that Hansen and Lunde[70], concluded for stock indices from Denmark, France, Germany, Hongkong, Italy, Japan, Norway, Sweden, U.K. and U.S.A., that calendar effects were significant in most series and that it was primarily the end of the year effects that exhibited the largest anomalies. They also opined that in recent years, it seemed that the calendar effects had diminished except in small capitalization stock indices.

In a month of the year study of stock return seasonalities in low-income African emerging markets using monthly market indices for the Ghanaian stock market (1991-1996), Nigerian stock market (1984-1995), and Zimbabwean stock market (1987-1995), Ayadi[71] finds that the results of both the Kruskal-Wallis and Friedman tests suggests the absence of seasonality in stock returns on the Nigerian and Zimbabwean stock markets while the Friedman test confirms the presence of seasonality in stock returns for Ghana. Furthermore, the Wilcoxon-Mann-

Whitney test and the dummy-variable regression analysis show the presence of the "January effect" for Ghana but not for Nigeria and Zimbabwe.

Van der Sar[72] using daily data on a value weighted index of all shares in the Netherlands ranging from the period 1981 to 1998 found abnormally high returns and higher volatility on Monday. Alegidede and Panagiotidis[73], found an April effect for Ghana stock prices contrary to the usual January effect. Olowe[74] tested the weak form efficient market hypothesis (EMH) on the monthly stock prices of fifty-nine Nigerian companies by using the auto correlation test. Results showed that security returns were independent, demonstrating the fact that the Nigerian stock market seemed to be efficient in the weak form. Okpara[75] conducted a survey into the Nigerian stock market with data ranging from 1984 to 2006 using the run test and the correlogram/partial autocorrelation function as alternate forms of the research instrument. He found out that the average monthly returns were all independent suggesting that the Nigerian stock market is efficient in the weak form and that the opportunity to make excess returns does not exist in the Nigerian stock market.

Ojah and Karemera[76] using both the multiple variance ratio test as well as the autoregressive fractionally integrated moving-average test, found evidence that the random walk hypothesis (RWH hereafter) was not rejected for the emerging markets of Argentina, Brazil, Chileand Mexico. Wortington and Higgs[77] had opposite results. By using unit root tests, multivariance test statistics and runs tests, they found that the stock markets of Argentina, Brazil, Columbia, Mexico, Peru and Venezuela are not weak form efficient.

Abraham, Seyyed and Alsakran[78] examined the weak form efficiency of the stock markets of Bahrain, Kuwait and Saudi Arabia by using both the variance ratio test and runs test: these tests showed that the random walk hypothesis is rejected when the index levels are used. Correcting this index by the Beveridge and Nelson[79] decomposition, they found that these markets are weak form efficient. Marashdeh and Shrestha[80] by using Augmented-Dickey Fuller and Phillip-Perron tests showed that the United Arab Emirates Securities Market is weak form efficient. In some cases weak form efficiency of stock markets may be achieved by specific steps taken by national institutions.

For instance, Islam and Khaled[81], found evidence that the Dhaka Stock Market returns behaved differently before and after the 1996 stock market crash. Predictability of stock returns seemed to characterize the period after the 1996 crash, while after these events; returns have followed a random walk. In other words this market seems to be weak form efficient. These changes are probably due to several rules introduced by the Bangladeshi Security Commission in order to increase the transparency in the stock market. Efficient Market Hypothesis (EMH) was also explored by Jefferis and Smith[82] through a test of evolving efficiency for six African stock markets (that is Egypt, Kenya, Morocco, Mauritius, Nigeria and South Africa) and weekly closing price indices for the time period covering January 1990 through June 2001. Their results indicated that only the South African stock market was efficient during the full period considered while Egypt, Morocco, and Nigeria became weak form efficient towards the end of the period.

In a more recent study, using index returns adjusted for thin trading as a nonlinear autoregressive process with conditional heteroscedasticity, Appiah-Kusi and Menyah[83] used the EGARCH-M model to investigate the weak-form pricing efficiency of eleven African stock markets. Their findings reject evidence in prior studies that the Nigerian stock market is weak-form efficient. They confirm ex-ante results that the markets in Egypt, Kenya, and Zimbabwe

are efficient while that of South Africa is not weak-form efficient. Their findings indicate that stock markets in Mauritius and Morocco may be efficient while the stock markets in Mauritius and Morocco, Botswana, Ghana, Ivory Coast, and Swaziland are not consistent with weak-form efficiency. The application of the EGARCH model enabled them to capture how conditional volatility affects the pricing process without imposing undue restrictions on the parameters of the conditional variance equation. It is obvious that the question of efficiency of the African financial markets is still unresolved as conflicting research findings prevail, which seems to strongly suggest the existence of the month of the year effect.

The End of the Year Effect

The tax loss hypothesis is presented as the most prominent explanation for the presence of end of the year effect and it is argued that small stocks being relatively more risky are used to gain tax advantage by offsetting capital losses from these small stocks against income. Window dressing by institutional investors has been labeled as another explanation for the end of year effect. Here the proposition is that institutional investors sell "Losers" to show a better picture at the end of the year. However in January, they again, buy these or similar stocks to meet their portfolio requirements. This abnormally increases the demand for such stocks in the market and thus results in greater prices (Ali and Akbar). Pandey[84] confirmed the occurrence of January effect and hence the existence of seasonality in stock returns in India, and therefore concluded that since the capital market in India was inefficient, investors used to time their capital investment in Indian stock market to improve returns. However the magnitude of the January effect depends upon the country and the composition of the index Maquerine[85].

Though the end of the year effect is more pronounced for small firms stock and consequently for equally weighted indices, it is also present in value weighted indices Marquering. Baillie and DeGenero[86] found no evidence of a relationship between Portfolio mean returns and variances. These findings are further supported by Chan, Karolyi and Stulz[87] who reported a significant foreign influence on the time varying risk premium for U.S. Stocks but found no significant relationship between the conditional expected excess returns on the standard and poor's index and its conditional variance. Corhay and Rad[88] and Theodossiou and Lee[89] found no significant relationship between stock market volatility and expected returns for major European stock markets. Admati and Pfleiderer[90] and Foster and Viswanathan developed models to explain time dependent pattern in security trading caused by the arrival of private information. Both studies demonstrated how information is incorporated into pricing and how various groups of investors Influence prices. Specifically, both take into account the roles of liquidity and informed traders in explaining variation in volume and volatility. Accordingly, traders would try to minimize their trading costs and therefore trade when the trading costs are lower. Foster and Viswanathan therefore suggested that liquidity traders avoid trading with informed traders when private information is intense. The resulting volume will be low and this would imply that low volume comes with high volatility. Admati and Pfleiderer speculate that trading volume would be high when price volatility is high.

Methodology Used

As a frame of reference, the following hypotheses are posed:

Ho_1: The Day of the Week effect does not occur in the Nigerian stock market

Ho_2: The Month of the Year effect does not occur in the Nigerian stock market

Ho_3: There is no best Day and Month to transact stocks so as to make abnormal gain in the Nigerian stock market.

These hypotheses, serve as the link between theory, speculation and facts. The purpose of the present study is to investigate the presence of calendar effect in the Nigerian stock market with interest in day of the week effect and monthly effect in stock market returns. The population of the study consists of all firms quoted in the Nigerian Stock Exchange. The characteristic of the population that is of interest to the researcher is the stock returns of the quoted firms, which will be related to selected days and monthly trading date dummy. The best index for measuring all quoted company stock returns in the Nigerian stock exchange (NSE) is the all share price index. In obtaining the all share returns data, we calculated using the log-difference of the index. This is shown below;

$$r_t = \ln\left(\frac{p_t}{p_{t-1}}\right)*100 \quad \text{.....(1)}$$

Where P was the closing price and r was the all share returns. This method for computation of stock returns is very common in the financial literature.

The nature of the study necessitated the use of secondary data covering a period ranging from April 19, 2005 to September 30, 2010. There was all together (1339) sampled days in the observation for testing day of the week effect while in the case of monthly effect the data covered a period (65 average monthly stock returns) of April 2005 to September 2010. The data collected exclude non-trading days and public holidays and was sourced from Securities and Exchange Commission (SEC) and Nigerian Stock Exchange (NSE) official daily trading documents.

Model Specification

In the light of our hypotheses and in order to empirically analyze calendar effect in stock returns in the Nigerian stock market we formulate two models. In the first model we test for the presence of day of the week effect in stock returns as represented in Equation 2 while model two which is expressed in Equation 3 test for the existence of monthly effect. In other to avoid "dummy variable trap" in both models, the intercept was excluded in Equations 2 and 3 (see Gujarati[91]). The OLS regression form of the two models is expressed as follows;

Model 1: Testing Day of the Week Effect

$$R = \beta_1 Dmon + \beta_2 Dtue + \beta_3 Dwed + \beta_4 Dthus + \beta_5 Dfri + \sum_{i=1}^{n} R_{t-i} + \varepsilon_t \quad (2)$$

Where Dmon, Dtue, Dwed, Dthus and Dfri are the dummy variables for Monday, Tuesday, Wednesday, Thursday, and Friday respectively. Moreover, we included the lag values of the returns variable to the equation to eliminate the possibility of having autocorrelated errors and heteroscedasticity problem. This was deduced from the works of Hakan and Halil and Nik and Nik[92]. The dummy variables data are structured in such a way that if Monday (Dmon) is "1" other days will be "0" while if Tuesday (Dtue) is "1" other days will be "0" and so forth. The statistical significance of any day coefficients (â) will imply the existence of a specific day of the week effect in the Nigerian stock market returns (R). the error term is represented as $å_t$.

Model 2: Testing for Monthly Effect

$$R = \alpha_1 Djan + \alpha_2 Dfeb + \alpha_3 Dmah + \alpha_4 Dapr + \alpha_5 Dmay +$$

$$\alpha_6 Djun + \alpha_7 Djul + \alpha_8 Daug + \alpha_9 Dsep + \alpha_{10} Doct +$$

$$\alpha_{11} Dnov + \alpha_{12} Ddec + \sum_{i=1}^{n} R_{t-i} + \varepsilon_t \quad \text{.... (3)}$$

Where Djan, Dfeb, Dmar, Dapr, Dmay, Djun, Djul, Daug, Dsep, Doct, Dnov and Ddec are the dummy variables for January, February, March, April, May, June, July, August, September, October, November and December. We also included lag of returns in the monthly effect model. The monthly effect dummy variables data also follow similar pattern. In this case if January (Djan) is "1" other months will be "0" while if in February (Dfeb) we assign "1" then other months will be "0" and so forth. The statistically significance of any month coefficient (á) will imply the existence of a specific month effect in the Nigerian bourse (stock market) returns. The error term is represented as $å_t$

Data Estimation Techniques

The study like other similar research on calendar effect uses the ordinary least square (OLS) regression techniques in testing for day of the week effect and monthly effect in Nigerian stock market returns. Before estimating the models we subjected stock returns daily time series to stationary tests using Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) Unit root test. We also carried out descriptive statistics (Mean, Standard Deviation, Skewness, Kurtosis and JB test) to enable us understand and compare the unique statistical properties of daily stock returns in different days and month.

Research Findings

In the study we investigate the possibilities for the existence of day of the week and monthly calendar effect in Nigeria capital market returns. The data for the study comprised of the daily all share prices index returns (R), which was computed using percentage charges in daily all share prices index. The data covered a period of 1339 sampled days (i.e., from April 19, 2005 to September 30, 2010). The selection of this period was based on the availability of data. The large sampled daily all share price index returns data adopted in this study provide reasonable basis for accepting the generalization that would be drawn from this study. In testing for the presence of calendar effect in Nigerian capital market returns in the period of study, we conducted descriptive statistics, unit root test and dummy multiple ordinary least square (OLS) regression. The results obtained are presented and analyzed below.

Data Description

Table 1, Figures 1 and 2 provides a full description of the statistical properties and graphical representation of the Nigerian all share price index returns (R) for the period of 1,339 days. It can be observed that the mean returns of the all share price index returns for the 1339 days was -0.000039. The standard deviation was 0.012828 while the skewness and Kurtosis were 0.056302 and 12.93269 respectively. This implies that the all share price index returns over the focus period was positively skewed while the kurtosis revealed the presence of peakedness in all share returns that is more than normal distribution. This in other word means that the Nigerian capital market is characterized by very frequent large changes. The Jarque-Bera (JB) value of 5505.018 with its associated probability of 0.000 provides empirical evidence to reject the assumption of normality.

TABLE 1
DESCRIPTIVE STATISTICS OF RETURNS

Statistics	Value
Mean	-0.000039
Standard deviation	0.012828
Skewness	0.056302
Kurtosis	12.93269
Maximum	0.105190
Minimum	-0.099960
Jarque-Bera	(JB)55505.018(0.0)
N	1339

FIGURE 1
HISTOGRAM VALUES OF R

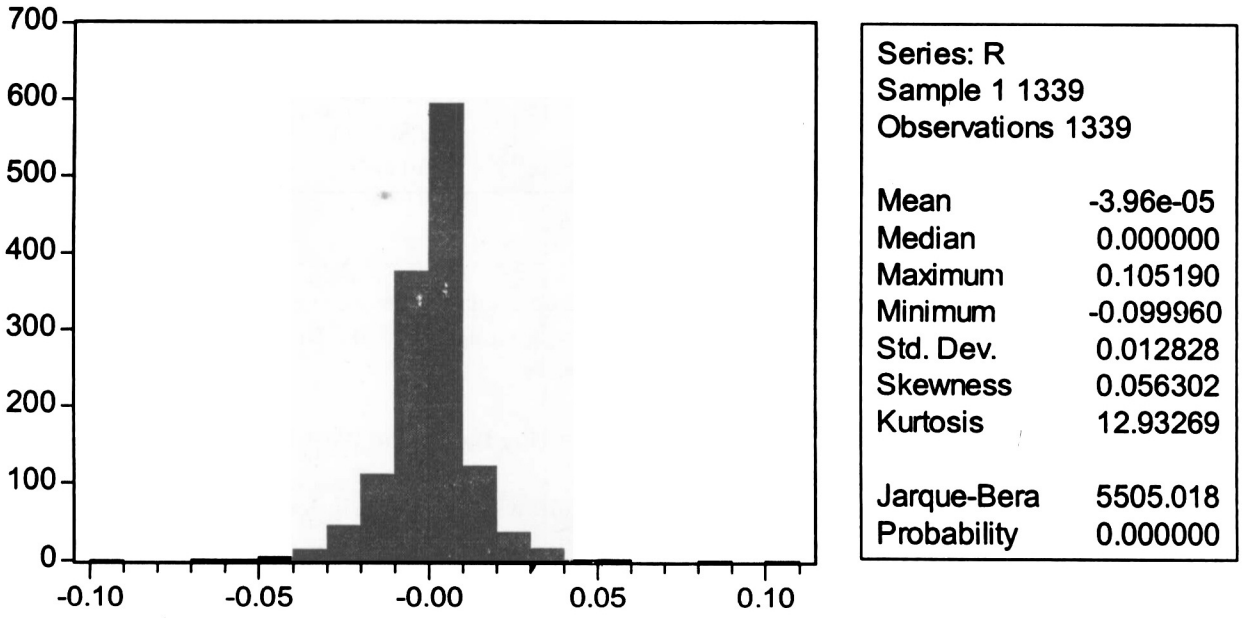
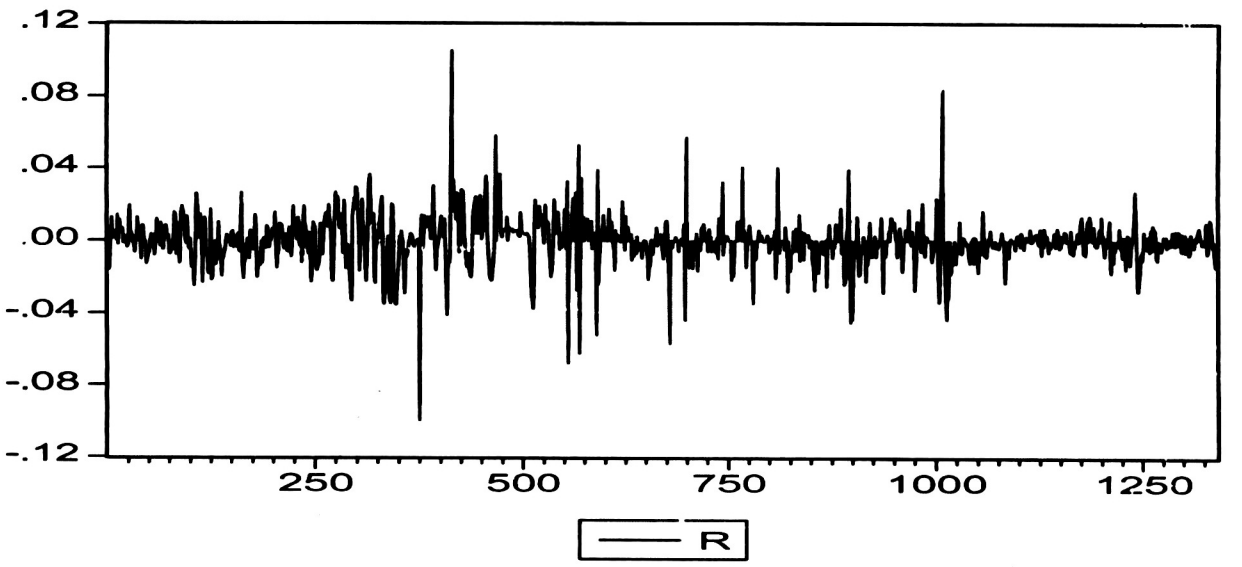


FIGURE 2
NIGERIA ALL SHARE PRICE INDEX RETURNS OVER THE 1339 SAMPLED DAYS



Unit Root Test

In testing for the stationary of the all share price index returns (R), the three popular unit root test which are Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) were adopted. The results from these three tests are shown in **Table 2**.

TABLE 2
UNIT ROOT TEST FOR ALL SHARE PRICE INDEX RETURN (R)

At level	Statistic		Critical Values	
		1%	5%	10%
ADF Test	-24.94153	-3.433027	-2.863493	-2.567859
PP Test	-25.0575	-3.433027	-2.863493	-2.567859
KPSS Test	0.547633	0.739	0.463	0.347

Notes : *and** are 1% and 5% level of significance respectively

The unit root test result as revealed in the ADF, PP and KPSS tests shown in **Table 2** indicates that the all share price index returns (R) at levels is stationary at 1% (using ADF= -24.94153 and PP= -25.0575) and at 5% (using KPSS= 0.547633). This was the case since all their statistical value in absolute term was greater than their 1% or 5% critical values. This finding also shows that the Nigerian all share prices return index (R) is integrated of order one i.e., I (0) and there would be no reason to use its first difference as a better proxy.

Testing Day of the Week Calendar Effect

Following the description of all share price index returns (R) and test for stationary we present the dummy OLS multiple regression result at levels of

TABLE 3
DAY OF THE WEEK EFFECT REGRESSION RESULTS

Indicator	Result 1 (R)	Result 2 (R)	Result 3 (R)
C	—	—	—
Monday	0.0053	-0.0000062	0.0003
	(0.66)	(-0.008)	(0.43)
Tuesday	0.00108	0.0012	0.001
	(1.38)	(1.68)**	(1.34)
Wednesday	-0.0003	0.000065	-0.003
	(-0.38)	(0.091)	(-0.41)
Thursday	-0.0011	-0.00076	-0.0009
	(-1.41)	(-1.037)	(-1.097)
Friday	-0.0042	-0.0006	-0.0004
	(-0.54)	(-0.86)	(-0.52)
R_{t-1}	—	0.338	—
		(12.35)*	
R_{t-2}	—	0.0739	—
		(2.704)*	
AR(1)	0.365	—	—
	(14.33)*		
R^2	0.14	0.14	0.003
$À^2$	0.13	0.13	-0.0003
AIC	-6.0	-6.0	-5.9
DW	2.1	1.9	1.3
N	1338	1337	1339

all share returns (R). The result provides empirical evidence on the trading days within a week (Monday, Tuesday, Wednesday, Thursday and Friday) that have a significant influence in Nigerian all share price index returns (R). In order to avoid the dummy variable trap in the results we estimated the model without intercept. The results are presented in **Table 3**.

As shown in **Table 3**, results 1 show that none of the days of week had statistically significant influence on Nigerian all share returns. In results 3,

TABLE 4
MONTH OF THE YEAR EFFECT REGRESSION RESULTS

Month/ Indicator	RESULT1 (R)	RESULT2 (R)	RESULT3 (R)
C	——	——	——
January	0.002	0.002	0.001
	(1.42)	(1.11)	(1.24)
February	-0.002	-0.003	-0.002
	(-1.89)**	(-1.40)	(-1.61)
March	-0.001	-0.001	-0.0004
	(-0.85)	(-0.65)	(-0.36)
April	-0.001	-0.001	-0.0004
	(-0.81)	(-0.58)	(-0.36)
May	-0.004	-0.004	-0.0007
	(-3.05)*	(-2.18)*	(-0.56)
June	0.0009	0.001	-0.002
	(0.85)	(0.69)	(-2.03)*
July	0.00007	-0.0005	0.0006
	(-0.07)	(-0.32)	(0.55)
August	0.001	0.0015	0.00008
	(0.92)	(0.97)	(0.08)
September	0.006	0.0005	0.00039
	(0.51)	(0.32)	(0.35)
October	0.002	0.0013	0.0009
	(1.61)	(0.76)	(0.76)
November	0.002	0.002	0.001
	(1.46)	(1.33)	(1.05)
December	-0.0008	-0.0008	-0.0004
	(-0.60)	(-0.42)	(-0.32)
R_{t-1}	—	—	0.330
			(12.1)*
R_{t-2}	—	—	0.07
			(2.42)*
AR(1)	—	0.356	—
		(13.8)*	—
R^2	0.02	0.14	0.14
R^2	0.01	0.13	0.13
AIC	-5.9	-6.0	-6.0
DW	1.3	2.0	1.9
N	1339	1338	1337

APPENDIX A

Dependent Variable: R

Method: Least Squares
Date: 01/11/12 Time: 13:59
Sample (adjusted): 2 1339
Included observations: 1338 after adjustments
Convergence achieved after 5 iterations

MONDAY	0.000528	0.000801	0.659609	0.5096
TUESDAY	0.001074	0.00078	1.376562	0.1689
WEDNESDAY	-0.000294	0.000777	-0.378306	0.7053
THURSDAY	-0.001114	0.000788	-1.413802	0.1577
FRIDAY	-0.000424	0.000788	-0.537435	0.5911
AR(1)	0.365786	0.025518	14.3345	0
R-squared	0.135889	Mean dependent var		-3.96E-05
Adjusted R-squared	0.132646	S.D. dependent var		0.012833
S.E. of regression	0.011951	Akaike info criterion		-6.01147
Sum squared resid	0.190256	Schwarz criterion		-5.98816
Log likelihood	4027.675	Durbin-Watson stat		2.051546
Inverted AR Roots	0.37			

APPENDIX B

Dependent Variable: R

Method: Least Squares
Date: 01/11/12 Time: 14:01
Sample (adjusted): 3 1339
Included observations: 1337 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONDAY	-6.16E-06	0.000746	-0.008257	0.9934
TUESDAY	0.001213	0.000722	1.678792	0.0934
WEDNESDAY	6.52E-05	0.00072	0.09057	0.9278
THURSDAY	-0.000757	0.00073	-1.037065	0.2999
FRIDAY	-0.000627	0.000732	-0.856366	0.3919
R(-1)	0.337689	0.027338	12.35237	0
R(-2)	0.073949	0.027349	2.70387	0.0069
R-squared	0.139987	Mean dependent var		-2.75E-05
Adjusted R-squared	0.136107	S.D. dependent var		0.01283
S.E. of regression	0.011925	Akaike info criterion		-6.015182
Sum squared resid	0.189125	Schwarz criterion		-5.987966
Log likelihood	4028.149	Durbin-Watson stat		1.996619

APPENDIX C

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.785717	Probability	0.456005
Obs*R-squared	1.580214	Probability	0.453796
Test Equation:			
Dependent Variable: RESID			
Method: Least Squares			
Date: 01/11/12 Time: 14:02			
Presample missing value lagged residuals set to zero.			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MONDAY	-0.00053	0.001025	-0.516929	0.6053
TUESDAY	-9.50E-05	0.000727	-0.130598	0.8961
WEDNESDAY	0.000245	0.000813	0.300899	0.7635
THURSDAY	0.000271	0.000807	0.33582	0.7371
FRIDAY	0.00012	0.000739	0.162343	0.8711
R(-1)	0.431147	0.599886	0.718715	0.4724
R(-2)	-0.293185	0.324873	-0.902461	0.367
RESID(-1)	-0.430173	0.600596	-0.716243	0.474
RESID(-2)	0.15803	0.136451	1.158142	0.247

R-squared	0.001182	Mean dependent var	7.01E-20
Adjusted R-squared	-0.004835	S.D. dependent var	0.011898
S.E. of regression	0.011927	Akaike info criterion	-6.013372
Sum squared resid	0.188902	Schwarz criterion	-5.978381
Log likelihood	4028.939	Durbin-Watson stat	2.003722

we observed the problem of autocorrelation (Durbin-Watson statistics, DW=1.3) and the adjusted coefficient of determination (Adj R-Squared = -0.0003) was negative. The empirical deficiencies in results 3 necessitated the need for results 2 and 1, which are autocorrelation correction methods. In results 1, autocorrelation was corrected using an autoregressive scheme (AR(1)) and the DW became 2.1 but the results also shows that none of the days of the week (Monday, Tuesday, Wednesday, Thursday and Friday) was statistically significant in causing abnormality in all share price returns in Nigerian capital market under the period of study. Although there was improvement in the adjusted coefficient of determination (Adj R-Squared = 0.13). In the case of results 2, autocorrelation was corrected using the two lags periods of the dependent variable(all share price returns) as explanatory variables and the DW became 1.9 and the results identify Tuesday as been statistically significant in causing abnormality in all share price returns in the Nigerian capital market under the period of study. This in other words implies that the Nigeria capital market is associated with Tuesday as the day of week effect. There was also improvement in the adjusted coefficient of determination (Adj R-Squared = 0.13) for results 2 when compared to result 3. In selecting from the three models for conducting our sign analysis, the Akaike Information Criterion (AIC) was used since it control for different numbers of parameters while comparing the goodness-of-fits for these models. In the AIC values of the three results (1, 2 and 3) and the significance of Tuesday in results 2, we decided to use results 2 for performing sign

analysis. An examination of the coefficients signs in results 2 shows that Monday, Thursday and Friday are associated with negative market returns (R) while Tuesday and Wednesday are associated with positive market returns (R). Tuesday is also statistically significant meaning that equity traders can make abnormal gains by trading on Tuesday in the Nigerian capital market. (see **Appendix A, B and C)**

Testing Month of the Year Calendar Effect

Moving on to check whether there is any monthly calendar effect in the Nigerian capital market, **Table 4** shows three (3) multiple dummy regression results. In Results 1 we identify February and May calendar effect but these are not statistically valid due to the presence of autocorrelation in result 1 and the poor performance of the adjusted coefficient of determination (Adj R-Squared = 0.02) in the same result. In other to correct results 1 we obtained results 2 and 3, which are autocorrelation correction methods. In results 2, autocorrelation was corrected using an autoregressive scheme AR(1)) and the DW became 2.0 and the results shows that the month of May was negatively and statistically significant in causing abnormality in all share price returns in Nigerian capital market under the period of study. There was improvement in the adjusted coefficient of determination (Adj R-Squared = 0.13). In the case of result 3, autocorrelation was corrected using the two lags periods of the dependent variable (all share price returns) as explanatory variables and the DW became 1.9 and the results identify the month of June as being negative and statistically

APPENDIX D

Dependent Variable: R

Method: Least Squares
Date: 01/11/12 Time: 14:05
Sample: 1 1339
Included observations: 1339

Variable	Coefficient	Std. Error	t-Statistic	Prob.
JANUARY	0.001832	0.00129	1.419913	0.1559
FEBRUARY	-0.00243	0.001283	-1.893443	0.0585
MARCH	-0.001073	0.001258	-0.85254	0.3941
APRIL	-0.001021	0.001258	-0.811799	0.4171
MAY	-0.003565	0.001171	-3.045644	0.0024
JUNE	0.000958	0.001124	0.851633	0.3946
JULY	-7.38E-05	0.001111	-0.066387	0.9471
AUGUST	0.001021	0.001107	0.921977	0.3567
SEPTEMBER	0.000589	0.001151	0.51163	0.609
OCTOBER	0.002034	0.001264	1.608665	0.1079
NOVEMBER	0.001853	0.001277	1.4585	0.1449
DECEMBER	-0.000794	0.001317	-0.602701	0.5468

R-squared	0.017161	Mean dependent var	-3.96E-05
Adjusted R-squared	0.009014	S.D. dependent var	0.012828
S.E. of regression	0.01277	Akaike info criterion	-5.87452
Sum squared resid	0.216397	Schwarz criterion	-5.827921
Log likelihood	3944.991	Durbin-Watson stat	1.291037

APPENDIX E

Dependent Variable: R				
Method: Least Squares				
Date: 01/11/12 Time: 14:07				
Sample (adjusted): 3 1339				
Included observations: 1337 after adjustments				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
JANUARY	0.001489	0.001205	1.236001	0.2167
FEBRUARY	-0.001934	0.001199	-1.612488	0.1071
MARCH	-0.000428	0.001176	-0.364268	0.7157
APRIL	-0.000661	0.001176	-0.561979	0.5742
MAY	-0.002237	0.001098	-2.037882	0.0418
JUNE	0.000579	0.00105	0.550921	0.5818
JULY	-8.78E-05	0.001038	-0.084612	0.9326
AUGUST	0.000816	0.001034	0.789045	0.4302
SEPTEMBER	0.00039	0.001085	0.359737	0.7191
OCTOBER	0.0009	0.001184	0.760077	0.4473
NOVEMBER	0.001255	0.001193	1.051881	0.293
DECEMBER	-0.000392	0.00123	-0.318926	0.7498
R(-1)	0.330395	0.027418	12.05041	0
R(-2)	0.066215	0.027373	2.419033	0.0157
R-squared	0.144395	Mean dependent var		-2.75E-05
Adjusted R-squared	0.135968	S.D. dependent var		0.01283
S.E. of regression	0.011926	Akaike info criterion		-6.009849
Sum squared resid	0.188156	Schwarz criterion		-5.955418
Log likelihood	4031.584	Durbin-Watson stat		1.997251

significant in causing abnormality in all share price returns in Nigerian capital market under the period of study. There was also an improvement in the adjusted coefficient of determination (Adj R-Squared = 0.13) for results 3 when compared to result 1. In selecting from the three models for conducting our sign analysis, the Akaike Information Criterion (AIC) was used since it control for different numbers of parameters while comparing the goodness-of-fits for these models.

The AIC values of results 2 and 3 were approximately the same, so we decided to use both results 2 and 3 for performing our monthly calendar effect sign analysis. An examination of the coefficients signs in results 2 and 3 shows that February, March, April, May and December were consistently associated with negative market returns (R) while January, August, September, October and November were associated with positive market returns (R) in both results. In the case of June and July there was mixed signs finding between results 2 and 3. Results 3, shows that the month of June was negative and statistically significant in association with stock returns in the Nigerian capital market. Results 2 and 3 both identified the month of May to be negative and statistically significant in association with stock returns. A final evaluation of results 2 and 3 showed that the Nigerian stock market returns is negative and statistically significant in association with the month of May but the month of June had mixed

APPENDIX F

Dependent Variable: R				
Method: Least Squares				
Date: 01/11/12 Time: 14:08				
Sample (adjusted): 2 1339				
Included observations: 1338 after adjustments				
Convergence achieved after 5 iterations				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
JANUARY	0.002003	0.001799	1.113187	0.2658
FEBRUARY	-0.002517	0.001792	-1.40469	0.1603
MARCH	-0.001145	0.001758	-0.651015	0.5151
APRIL	-0.001006	0.001747	-0.575643	0.565
MAY	-0.003557	0.001633	-2.177534	0.0296
JUNE	0.001089	0.001573	0.691849	0.4892
JULY	-0.000498	0.001557	-0.31989	0.7491
AUGUST	0.001511	0.001552	0.973864	0.3303
SEPTEMBER	0.00052	0.001623	0.320529	0.7486
OCTOBER	0.001338	0.001767	0.756981	0.4492
NOVEMBER	0.002373	0.001782	1.33166	0.1832
DECEMBER	-0.000767	0.001833	-0.418588	0.6756
AR(1)	0.355563	0.025751	13.80749	0
R-squared	0.140764	Mean dependent var		-3.96E-05
Adjusted R-squared	0.132982	S.D. dependent var		0.012833
S.E. of regression	0.011949	Akaike info criterion		-6.006667
Sum squared resid	0.189182	Schwarz criterion		-5.956154
Log likelihood	4031.46	Durbin-Watson stat		2.046418
Inverted AR Roots	0.36			

signs. This means that equity traders can make abnormal losses by trading in the month of May while the month of June can offer mixed results (Gain or losses) in the Nigerian stock market. (see **Appendix D, E, F and G**).

Conclusions

Market investors are always looking for ways to maximize returns on their investment by exploiting loopholes in the stock market. On the other hand, market watchers and regulators are always on the look-out for such lapses in order to ensure a relatively efficient market. Thus, studies on day of the week and month of the year effects (which indicate the efficiency level of the market) is always imperative. In this study, we have found a Day of the week and month of the year effect in the Nigerian stock market returns. As observed earlier, this may constitute an advantage to investors but a definite point of worry for the authorities.

However, one weakness of the study is that it does not consider individual share price rather it considers market index. So investment strategy on the basis of the finding of this study in case of individual share may not provide expected result. But if the size of the portfolio is large enough, and it closely represents or approximates the market portfolio, then investment strategy on basis of the

APPENDIX G

Null Hypothesis: R has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=22)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-24.94153	0
Test critical values:	1% level	-3.435027	
	5% level	-2.863493	
	10% level	-2.567859	

*MacKinnon (1996) one-sided p-values

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(R)
Method: Least Squares
Date: 01/11/12 Time: 14:13
Sample (adjusted): 2 1339
Included observations: 1338 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
R(-1)	-0.635875	0.025495	-24.94153	0
C	-2.92E-05	0.000327	-0.089208	0.9289

R-squared	0.317699	Mean dependent var	-1.09E-05
Adjusted R-squared	0.317188	S.D. dependent var	0.01447
S.E. of regression	0.011957	Akaike info criterion	-6.013492
Sum squared resid	0.19101	Schwarz criterion	-6.00572
Log likelihood	4025.026	F-statistic	622.0798
Durbin-Watson stat	2.049524	Prob(F-statistic)	0

findings of this study is expected to provide some abnormal return to the investors.

As the presence of the day of the week and month of the year anomalies indicates the existence of inefficiency in the market, it informs the regulators and policy makers that appropriate measures should be taken to bring informational and operational efficiency into the market. It is our sincere opinion that a combination of factors like inadequate financial information, thin and discontinuous trading, reliance on price momentum as a basis for trading and manipulation by the market makers creates the conditions that lead to the positive Daily and monthly effect. Thus regulators of the Nigerian bourse (stock market) should take appropriate steps to remove such anomalies to bring about higher efficiency in the market.

Policy Implications

In all, our results showed that Monday, Thursday and Friday are associated with negative market returns (R) while Tuesday and Wednesday are associated with positive market returns (R) and that equity trader can make abnormal gains by trading

on Tuesday in the Nigerian stock market since Tuesday was positive and statistically significant. One possible explanation for such day of the week effect anomaly may be that most of the positive economic news comes at the weekend and on Mondays and investors show affirmative and hopeful investment behaviour which result in a positive return on Tuesdays. This sharply contrasts the evidence provided by Alexakis and Xanthakes and Markelos and Harizanis that Tuesday is associated with constant negative returns in the Athenian stock returns while Friday is associated with positive and highest returns during the period of January 1985 to February 1994.

On the other hand, our monthly calendar test results shows that February, March, April, May and December were consistently associated with negative market returns (R) while January, August, September, October and November were associated with positive market returns (R). In the case of June and July there was mixed signs finding. The results also show that the Nigeria stock market returns is negative and statistically significant in association with the month of May while June had mixed signs. This means that equity traders can make abnormal losses by trading in the month of May while the month of June can offer mixed results (gains or losses) in the Nigerian stock market. This sharply contrast the evidence provided by Olowe and Okpara that average monthly returns are all independent in the Nigerian stock market suggesting that the market is efficient in the weak form and that the opportunity to make excess returns does not exist in the Nigerian stock market.

Since this study provides evidence of the day of the week and month of the year effect in the Nigerian stock market returns, stock returns are seen not to be entirely random. In order words, the market is not efficient and therefore, can be used by investors, in addition to other stock market analysis tools, to maximise their expected return by exploiting calendar anomalies in their portfolios as well as to forecast stock market trends, which can help them in their decision making process.

The findings made in the study gave impetus for the following recommendations which are useful to both the regulators and investors in the Nigerian capital market.

- Investors should formulate their investment strategies and timing on the basis of this result and thus possibly earn some abnormal return by predicting future prices. Investors should not transact stocks on Monday, Thursday and Friday since they are all associated with negative market returns. Wednesday proved to be associated with positive market returns though making abnormal gain by trading on stocks in this day is not always guaranteed. However particular and special investment on stocks should be made on Tuesday which proves to be both statistically significant and associated with positive market returns. By following this trading strategy, investors are expected to earn some abnormal return.

- Investors should not transact stocks in the month of February, March, April, May, July and December because they were consistently associated with negative market returns. The month of May proved to be statistically significant and consistently associated with negative market returns which means that equity traders can make abnormal loss by trading in the month of May. Positive market returns proves to be associated with January, August, September, October and November, though making abnormal gain by trading on stocks in these months is not always guaranteed. However particular and special investment on stocks should be made in the month of June (with some caution) which offers mixed results (Gains or losses). Such transaction on stocks should be carried out cautiously as the month of June proves to be statistically significant both positively and negatively in the results.

- The presence of the day of the week and Month of the year anomaly indicates inefficiency of the market; it informs the regulators and policy makers that appropriate measures should be taken to bring informational and operational efficiency into the market. In the first place, the speed of information dissemination should be fostered in the stock market. This can be done by highlighting the upcoming announcements more actively and maybe setting up reminders for interested investors. This will reduce the arbitrary use of information in the market.
- Short-selling should be intensified in order to ensure efficient information dissemination of negative news and reduce the tendencies to use this news for the wrong purposes.
- It will be beneficial if the depth and breadth of the market is expanded. The attraction of more potential investors by lowering the transaction fees could be considered for the further development of the markets. Moreover, a deep market would increase efficiency and ensure that anomalies in the market are minimized.

REFERENCES

1. Ali, S. and M. Akbar (2009). Calendar Effects in Pakistani Stock Market. **International Review of Business Research Papers**, 5, 389-404.
2. French, K.R & R. Roll (1986). Stock Return Variances: The Arrival of Information and the Reaction of Traders; **Journal of Financial Economics**, 17, 5 – 26.
3. Jaffe, J & R. Westerfield (1980). Patterns in Japanese Common Stock Returns: Day of the Week and Turn of the Year Effects; **Journal of Financial and Quantitative Analysis**, 20, 261-272.
4. Board, J.L.G & C.M.S. Sutcliffe (1988). The Weekend Effect in U.K. Stock Market Returns, **Journal of Business and Financial Accounting**, 15, 199-213.
5. Connolly R. (1989). An Examination of the Robustness of the Weekend Effect; **Journal of Financial and Quantitative analysis**, 24, 133-169.
6. Solnik, B. & L. Bousquet (1990). Day of the Week Effect on Paris Bourse; **Journal of Banking and finance**, 14, 461-468.
7. Barone, E. (1990). The Italian Stock Market: Efficiency and Calendar Anomalies; **Journal of Banking and Finance**, 14, 483-509.
8. Agrawal, A. & K. Tandon (1994). Anomalies or Illusion? Evidence from Stock Markets in Eighteen countries; **Journal of International Money and Finance**, 29, 263-277.
9. Barberis, N. and R. Thaler (2002). A Survey of Behavioural Finance. **Working Papers, National Bureau of Economic Research (NBER)**.
10. Radcliffe, R. (1989). **Investment: Concepts Analysis and Strategy**. New York: McGraw Hill.
11. Kiymaz, H & H. Berument (2003) The Day of the Week effect and Stock Market Volatility; Evidence from Developed Countries; **Market Review of Financial Economics**,12, 360-380.
12. Engel, R. (1993).Statistics Models for Financial Volatility; **Financial Analysis Journal**, 4,72-78.
13. Idolor, E.J. (2010). Approaches to Establishing an Appropriate Capital Structure: A Survey of General Literature with some guide to Indigenous Nigerian Firms. **The Nigerian Academic Forum**, 18, 45-55.
14. Rajan, R.G. and L. Zingales (1995). What Do We Know About Capital Structure? Some Evidence From International Data. **The Journal of Finance**, 50, 1421-1460.
15. (i) Fama, E. (1965).Behavior of Stock Market Prices; **Journal of Business**, 38, 34-105.

(ii) Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work; **Journal of Finance**, 25, 383-417.

16. Balaban, E & M. Bulu (1996). Is There a Semi- Monthly Effect in the Turkish Stock Market? **Discussion Paper, The Central Bank of the Republic of Turkey**.
17. Gao, L & G. Kling (2005). Calendar Effects in Chinese Stock Market; **Journal of Economics and Finance**, 6, 75-78.
18. Berg, L. (2003). Deterministic Seasonal Volatility in a Small and Integrated Stock Market: The Case of Sweden; **Finnish Economic papers**, 16, 61-71.
19. Maquerine, W. (2002). Seasonal Predictability of Stock Market Returns; **Tijdschrift voor economic en management**, 47, 557-576.
20. Priestley, R. (1997). Seasonality, Stock Returns and the Macro-economy; **The Economic Journal**, 107, Pp.1742-1147.
21. Jaffe, J. & R. Westerfield (1985). The Weekend Effect in Common Stock Returns: The International Evidence; **Journal of Finance**, 40, 433-454.
22. Hussain, F. (1999). The Day of the Week Effect in the Pakistani Equity Market: An investigation; **The Lahore Journal of Economics**, 5, 93-98.
23. Nishat, M. & K. Mustapha (2002). Anomalies in Karachi Stock Market: Day of the Week Effect; **The Bangladesh Development Studies**, 28, 55-64.
24. Ali, S & M. Akbar (2008). Calendar Effects in Pakistani Stock Market; **Journal of Finance**, 6, 1-22.
25. Foster, F.D & S. Viswanathan (1993). Variations in Trading Volume, Return Volatility, and Trading Costs: Evidence from Recent Price Formation Models; **Journal of Finance**, 48, 187-211.
26. Chang, E. M. Pinegar & B. Schacter (1997). Interday Variations in Volume, Variance, and Participation of Large Speculators; **Journal of Banking and Finance**, 21, 797-810.
27. Foster, F.D & S. Viswanathan (1990). A Theory of the Inter-day Variations in Volume, Variances and Trading Costs in Securities Market; **Review of Financial Studies**, 3, 593-524.
28. Thomas, H. (2002). Trends and Calendar Effects in Stock Returns; **Australian Technical Analysts Association Journal**, 6, 222-234.
29. Dimitrios, R & A, Katerina (2003). Market Anomalies; **European Financial Management Association Conference**, Proceedings, 87-92, Efficiency of the Gulf Stock Markets; **The Financial Review**, 37, 469-480.
30. Bildik, R. (1999). Calendar Effect in Instanbul Stock Market; **Journal of Financial Economics**,75, 283-317.
31. Paul, A. & P. Theodore (2006). Modeling and Forecasting Volatility of Returns on the Ghana Stock Exchange Using GARCH Models; **Journal of emerging market in finance**, 4, 115-132.
32. Chen Y. & Liang, B. (2004). Timing Ability in the Focus Market of Asian country; **Journal of Finance**, 59, 2871-2901,
33. Hakan, B. & K. Halil (2001). The Day of the Week Effect on Stock Market Volatility. **Journal of Economics and Finance**, 25, 181-190.
34. Kok, K. L. & Y.C. Wong. (2004). Seasonal Anomalies of Stocks in ASEAN Equity Markets. **Sunway College Journal**, 1, 1-11.
35. Mansor H. (1997). New Evidence on Day of-the Week Effect in the Malaysian Stock Market; **Capital**

Market Review, 5, 23-33.

36. Ho, R.Y. & Y. Cheung (1994). Seasonal Pattern in Volatility in Asian Stock Markets; **Applied Financial Economics**, 4, 61-67.

37. Anuar M. N & Shamser M. (1993). **The Efficiency of the Kuala Lumpur Stock Exchange: A Collection of Empirical Findings; Malaysia**, Penerbitan University, Pertanian.

38. Wei P. & S. Zee (1998). Inter day Variations in Price Volatility, Volume and Open Interest in the Market for Foreign Currency Futures; **Journal of Research in Finance**, 1, 6-27.

39. Rogalski, R.J. (1984). Another Investigation of the Weekend Effect in Stock Returns Disenssion; **Journal of Finance**, 36, 15-29.32.

40. Harris, L. (1956). A Transaction Data Study of Weekly and Intra-daily Patterns in Stock Returns; **Journal of Financial Economics**, 16, 99-117.

41. Smirlock, M. & L. Starks (1986). Day of the Week and intraday effects in Stock Returns; **Journal of Financial Economics**, 17, 197-210.

42. Harvey, C & R. Huang (1991). Volatility in Foreign Exchange Futures Market; **Review of Financial Studies**, 4, 543-570.

43. Jarret, E.J & E. Kyper (2005). Daily Return, Capital Market Efficiency and Predicting Stock Market Returns; **Management Research News**, 28, 34-47.

44. Pearce, D.K. (1995). The Robustness of Calendar Anomalies in Daily Stock Returns; **Journal of Economics and Finance**, 7, 69-80.

45. Coutts, A.J (1997). Discussion of Microstructure and Seasonality in the UK Equity Market; **Journal of Business Finance and Accounting**, 24, 1205-1215.

46. Cross, F. (1973). The Behaviors of Stock Prices on Fridays and Mondays; **Journal of Financial Analysis**, 29, 583-588.

47. French, D.W. (1984). The Weekend Effect on the Distribution of Stock Prices; **Journal of Financial Economics**, 13, 547-559.

48. Keim, D.B. & F. Stambaugh (1984).Another investigation of Weekend Effects in Stock Returns; **Journal of Finance**, 39, 819- 840.

49. Ozmen, T. (1992). Instanbul Stock Exchange Market and Anomalies; **Capital Market Board Report**, Ankara.

50. Karan, M.B. (1994). The Weekend Effect in the Instanbul Stock Exchange Market; **Yaklasim Journal**, 20, 99-109.

51. Muradoglu, G & F.T. Oktay (1993). Calendar Anomalies at Istanbul Stock Exchange; Hacettepe University, **Faculty of Business Administration Journal**, 11, 14-17.

52. Fisher, R. P. H. T.F. Gosnell & D.J. Lasser (1993). Good News, Bad News: Volume and the Monday Effect; **Journal of Business Finance and Accounting**, 20, 881-892.

53. Myers, C.M. R.A. Brealey & A. J. Marcus (2009). **Fundamentals of Corporate Finance**; 6th Edition, New Delhi: Tata, McGraw- Hill.

54. Miller, E. (1988). Why a weekend Effect? **Journal of Portfolio Management**, 14, 42-48.

55. Shaheen, R. (2008). Stock Returns and the Day of the Week Effect: Karachi Stock Exchange; **Journal of Management Sciences**, 8, 1-12.

56. Ziemba, W. (1993) Comment on why a Weekend Effect? **Journal of Portfolio Management**, 6, 93-99.

57. Nishat, M. (1999). The Impact of Institutional Development on Stock Prices in Pakistan; **Doctoral Dissertation, Auckland Business School, University of Auckland**.

58. Campbell, J.Y & L.Hentschel (1992). No News is Good News: An Asymmetric Model of Changing Volatility in Stock Returns; **Journal of Financial Economics**, 31, 281-318.

59. Hamao, Y.R. Masulis & V. Ng (1990). Correlation in Price Changes Across International Stock Markets; **Review of Financial Studies**, 3, 281-307.

60. Nelson, D.B. (1991) Conditional Heteroskedasticity in Asset Returns: A New Approach; **Econometric Journal**, 59, 347-270.

61. Alexakis, P. & M. Xanthakis (1995). Day of the Week on the Greek Stock Market; **Journal of Applied Financial Economics**, 5, 43-50.

62. Mills, T.C. C. Siriopoulos R.N. Markelos & D. Harizanis (2000). Seasonality in the Athens Stock Exchange; **Journal of Applied financial Economics**, 10, 137-142.

63. Coutts, J. A C. kaplanidis & J. Roberts (2000). Security Price Anomalies in an Emerging Market: The Case of the Athens Stock Exchange; **Journal of Applied Financial Economics**, 10, 497-514.

64. Kenourgios, D & A. Samitas (2008). The Day of the Week Effect Patterns on Stock Market Return and Volatility: Evidence for the Athens Stock Exchange; **Journal of Finance and Economics**, 15, 78-89.

65. Karolyi, A.G. (1995). A Multivariate Garch Model of International Transmission of Stock Returns and Volatility; The Case of the United States and Canada; **Journal of Business and Economic Statistics**, 13, 11-25.

66. Berument, H. & H. Kiymaz (2001). The Day of the Week Effect on Stock Market Volatility; **Journal of Economics and Finance**, 25, 203-214.

67. Gultekin, M.N & B.N. Gultekin (1983). Stock Market Seasonality: International Evidence; **Journal of Financial Economics**, 12, 469-481.

68. Ali, S. (1997). Stock Price and Trading Volume: Evidence from Karachi Stock Exchange; **Journal of Finance**, 10, 17-30.

69. Anderson, L.R. J.L. Gerlarch & F.J.DiTraglia (2005). Yes, Wall Street, There is January Effect: Evidence from Laboratory Auctions; **Working Papers, College of William and Mary**, Department of Economics.

70. Hansen, R & A. Lunde (2003). Testing the Significance of Calendar Effects; **Working Paper, Centre for Analytical Finance, University of Aarhus**, Aarhus Business school.

71. Ayadi, O.F. (1998). Stock Return Seasonality's in Low – Income African Emerging Markets; **Journal of Managerial Finance**, 24, 22-32.

72. Van Der Sar, N. (2003). Calendar Effects on the Amsterdam Stock Exchange; **De Economist Journal**, 151, 271-292.

73. Alagidede, P. & T. Panagiotidis (2006). Calendar Anomalies in the Ghana Stock Exchange; **Working Papers, Loughborough University**, Department of Economics.

74. Olowe, R.A. (2002). Weak Form Efficiency of the Nigerian Stock Market: Further Evidence; **African Development Review**, 11, 64-68.

75. Okpara, G.C. (2010). Stock Market Prices and the Random Walk Hypothesis: Further Evidence from Nigeria; **Journal of Economics and International Finance**, 2, 49-57.

76. Ojah, K. & D. Karemera (1999). Random Walks and Market Efficiency Tests of Latin American Emerging Equity Markets: A Revisit; **The Financial Review**, 34, 57-72.

77. Worthington, A.C. & Higgs, H. (2003). Weak-Form Market Efficiency in Asian Emerging and Developed Equity Markets: Comparative Tests of Random Walk Behaviors; **University of Wollongong, Working Paper**, 3, 1-12.

78. Abraham, A. F. J. Seyyed & S.A. Alsakran (2002). Testing the Random Walk Behavior and Efficiency of the Gulf Stock Markets. **The Financial Review**, 37, 469-480.

79. Beveridge, S. & C.R. Nelson (1981). A New approach to Decomposition of Economic Time Series into Permanent and Transitory Components with Particular Attention to Measurement of the Business Cycle; **Journal of Monetary Economics**, 6, 151-174.

80. Marashdeh, H. & Shrestha, M.B. (2008). Efficiency in Emerging Markets – Evidence from the Emirates Securities Market; **European Journal of Economics, Finance and Administrative Sciences**, 12, 143-150.

81. Islam, A. & M. Khaled (2005). Tests of Weak-Form Efficiency of the Dhaka Stock Exchange; **Journal of Business Finance & Accounting**, 32, 1613-1624.

82. Jefferis, K & Smith, G. (2005). The Changing Efficiency of African Stock Markets; **South African Journal of Economics**, 73, 54-67.

83. Appiah-Kusi, J. & Menyah, K. (2003). Return Predictability in African Stock Markets; **Review of Financial Economics**, 12, 247-250.

84. Pandey, I.M. (2002). Seasonality of Monthly Stock Returns: The Indian Evidence; **Journal of Applied Finance**, 8, 55-67.

85. Baillie, R.T & R.P. DeGennaro (1990). Stock Returns and Volatility; **Journal of Financial and Quantitative Analysis**, 25, 203-214.

86. Chan, K.C. G.A. Karolyi & R.M Stulz (1992). Global Financial Markets and the Risk Premium on U.S. Equity; **Journal of Financial Economics**, 32, 137-167.

87. Corhay, A. & A.T. Rad (1994). Statistical Properties of Daily Returns: Evidence from European Stock Market; **Journal of Business Finance and Accounting**, 21, 271- 282.

88. Theodossiou, P. and Lee, U. (1993). Mean and Volatility Spillovers Across Major National Stock Markets: Further Empirical Evidence. **Journal of Financial Research**, 16, 337-350.

89. Admati, A. & P. Pfleiderer (1988). A Theory of Intraday Patterns Volume and Price Variability; **Review of Financial Studies**, 1, 3 - 40.

90. Gujarati, D.N. (2004). **Basic Econometrics**; 4th Edition, New Delhi: Tata McGraw-Hill.

91. Nik, M.N.M and M.N.A.R. Nik (2010). Efficient Market Hypothesis and Market Anomaly: Evidence from Day of the Week Effect of Malaysian Exchange; **International Journal of Economics and Finance**, 2, 1-14.