

**AN EMPIRICAL INVESTIGATION OF THE EXISTENCE OF THE
RAMADHAN EFFECT AT THE NAIROBI SECURITIES
EXCHANGE**

**By
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DECLARATION

This research paper is my original work and has not been presented for examination in this or any other university.

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This research paper has been submitted for examination with my approval as the university supervisor.

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DEDICATION

I dedicate this paper to my Wife Lydia and to our three children, Caleb, Praise and Blessing.

ABSTRACT

The objective of this study was to find out if the Ramadhan Effect exists in the Nairobi Securities Exchange. Ramadhan is the ninth month of the Islamic lunar calendar, a calendar that contains twelve months each starting with the sighting of a new moon. The Islamic lunar year is approximately 11 days shorter than the Gregorian solar year. So, over time, Ramadhan does not coincide systematically with the Gregorian calendar. During the month of Ramadhan Muslims dedicate themselves to prayers and fasting from dawn to dusk. The lifestyle changes during the month of Ramadhan would make one to suspect that there is a resultant economic impact. The study covered a period of 13 years, between 1st Jan 2001 and Dec 31 2013. We initially sought to do a 15 year period but this was narrowed down to a 13 year period due to the non-availability of data for the years 1999 and 2000. To determine whether there is a Ramadhan effect, we measured the monthly returns for the calendar months in the period 2001-2013. The mean returns of the Non Ramadhan months were compared with that of the month of Ramadhan. A statistical test was used to determine the significance of the difference of the two sets of returns so as to conclude about the presence or absence of the Ramadhan Effect. The monthly returns were calculated using the market index movements between the beginning and end of calendar months. The months of January was excluded because of the possibility of the January effect affecting the outcome of the findings and since the Ramadhan months don't always coincide with the usual calendar month, for consistence and simplicity in calculation, the calendar months where Ramadhan begins and ends in the middle were excluded from the analysis. This left us with nine calendar monthly returns to compare with the Ramadhan Month. However, in the years 2008 and 2011 the Ramadhan month and calendar months start and end dates coincided so in these two years we have 10 non-Ramadhan months to compare with the Ramadhan month. Monthly returns were examined using the regression methodology developed by Connolly (1989) and used by Kimonda (2006). The regression model was used to regress annual returns against monthly returns. A t test is used to test the statistical significance of the difference of the two means so as to conclude about the presence or absence of the Ramadhan Effect. Results of the analysis showed that returns during the months of Ramadhan tended to be lower than those of the other months. A statistical test of significance however revealed that the difference in the returns was not significant. A repeat of the examination using event study approach yielded similar results.

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LIST OF ABBREVIATIONS

NSE	Nairobi Stock Exchange
EMH	Efficient Market Hypothesis
NASI	Nairobi Stock Exchange All Share Index
IPO	Initial Public Offering
KENGEN	Kenya Electricity Generating Company
NASDAQ	National Association of Security Dealers Automated Quotation
NYSE	New York Stock Exchange
AMEX	American Stock Exchange

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The primary role of the capital market is allocation of ownership of the economy's capital stock. In general terms, the ideal is a market in which prices provide accurate signals for resource allocation. A market in which prices always “fully reflect” available information is called “efficient” (Fama (1970)). The information can be financial news, research or political, economic and social events (Hirshleifer (2001)). The concept of market efficiency has generated a lot of interest from the investor and research communities over the years. In fact, this concept has been subject to more empirical testing than practically any other area in the theory of corporate finance (Lumby & Jones (2003)). This illustrates how important this concept is in financial Economics

Fama (1970) described the theoretical analysis of market efficiency that is famously referred to as Efficient Market Hypotheses. Numerous empirical studies have since been carried out on this subject. Efficient market hypothesis holds that a market is efficient if the market price of financial instruments rapidly and correctly reflects all the relevant information as it becomes available (Lumby & Jones (2003)). Thus in a truly efficient stock market, there are no overvalued or undervalued shares- all stocks reflect their true economic value, prices are random, so no investment pattern can be discerned (Leuthold 1998). Stock prices take a ‘random walk’ resulting in the failure of any investment strategy that aims to beat the market consistently. Fama & Blume (1965), alexander

(1964), Jensen and Benington (1970) supported the random walk model-that it was not possible to predict future prices from historical prices. Michael Jensen a leading financial economist argued in 1978 that EMH is 'the best established fact in all social science.

Fama offered a popular distinction on the forms of markets efficiency that depend on what kind of information is reflected in the securities: He categorized the forms of efficiency into Weak form, semi-strong form and strong form efficiency. In Weak form efficient market, Shares reflect all information that can be obtained from studying past price movements. In a Semi-strong efficient market, Shares reflect all relevant publicly disclosed information, while in a strong form efficient market, share prices reflect all information, whether public or private.

In the early 1980s however, researchers began identifying patterns that were inconsistent with Efficient Market Hypothesis. These patterns are systematic variations in returns that show seasonal or calendar trends with are normally referred to as calendar anomalies or seasonalities. The most common ones include: Weekend effect, Turn of the month Effect, size and January Effects. This existence of calendar or time anomalies is a contradiction to the weak form of the Efficient Market Hypothesis (EMH)which states that the market prices cannot be predicted using this historic information.

In Kenya, dealings in shares and stocks started in the 1920's. However the market was not formal as there were no rules and regulations to govern stock broking activities. Trading took place on a 'gentleman's agreement with clients being obligated to honor

their contractual commitments of making good delivery, and settling relevant costs. In 1954 the Nairobi Stock Exchange was then constituted as a voluntary association of stockbrokers registered under the Societies Act.

A major development in the history of the NSE happened in 1989 when the capital Markets Authority was formed to regulate capital markets. This is when formal rules began getting implemented in the market. In Nov 2004, the Central Depository and settlement corporation was launched. In September 2006 live trading on the automated trading systems of the Nairobi Stock Exchange was implemented.

In all the organization and quality of information at the NSE has developed gradually over the years. The market is however still relatively small and shallow compared to those found in more developed economies.

1.1.1 Ramadhan Effect

Religions are essentially ubiquitous across human societies. It is thus natural to speculate that they may affect important economic outcomes, such as economic growth— as many have done dating at the very least to Max Weber’s celebrated work of 1905 (Compte and Drott (2013)). Religious practices are a kind of informal institution (North 1991), imposing constraints that structure economic, political and social interactions. Stulz and Williamson (2003) documented empirically that religion has the power to explain the cross-country variation in creditor rights and the level of enforcement. The existing literature also acknowledges that religiosity and social norms can have some bearing on

investment decisions of institutions such as pension plans and corporate decision-making in general (Hilary and Hui, 2009; Hong and Kacperczyk, 2009).

Ramadhan fasting is one of the central tenets of Islam. During the month of Ramadhan Muslims dedicate themselves to prayers and fasting from dawn to dusk. In Kenya, the season is normally well publicized in the media where times of beginning and end of activities for each day are announced. The last day of Ramadhan is normally observed as a public holiday in the country. The devotion to prayer and fasting tends to slow things down as businesses owned by Muslims would normally close early. In countries where Islam is the majority religion, daily work schedules are often turned upside down during Ramadan- most government offices and most national businesses tend to slow down or almost shut down, so that people can basically rest (dailyfinance.com). Symbolically, it is the time of the year to reflect over your lifestyle and abstain from materialistic pleasures.

1.1.2 Relationship between Stock Returns and Returns and Ramadhan

The lifestyle changes during the month of Ramadhan would make one to suspect that there is a resultant economic impact. Compate and Drott (2013) of Harvard university did a study to assess the economic effects of Ramadan fasting. They exploited variations in fasting periods lengths in different regions due to the rotating Islamic calendar to establish causality. The results showed that that longer Ramadan fasting has a negative effect on output growth in Muslim countries, and it increases subjective well-being among Muslims.

Specific studies on Ramadhan Effect on stock market returns show mixed results. A study carried in 14 predominantly Muslim countries over the years 1989-2007 somewhat surprising results. In this study, Bialkowski et al (2012) of the university of Canterbury, and University of New Hampshire New Zealand, report that stock returns during Ramadan are almost nine times higher and less volatile than during the rest of the year. They attributed these findings with a notion that Ramadan positively affects investor psychology, as it promotes feelings of solidarity and social identity among Muslims world-wide, leading to optimistic beliefs that extend to investment decisions. In another study, Seyyed et al. (2005) examines the behavior of the Saudi Arabian stock market in Ramadan during the period of 1985-2000. They find no significant change in mean return but a noticeable decline in volatility.

1.2 Statement of the Problem

Research studies on market efficiency in the Nairobi securities Exchange show existence of seasonalities (Nyabuto (2011) and Mulumbi (2010)). Before the year 2010, most of the studies done in this market seemed to suggest that the NSE had no anomalies present. Kingori (1995), Mokuu (2003), Nyambongi (2005) and Miya (2005) all reported the absence of seasonalities in the NSE. These earlier researchers however cited two common limitations that may have affected their findings: The studies covered a short period of time (5 years or less) and complete data was lacking. Kingori (1995) for instance reports that prior to 1989, dealings in NSE were then less formally organized and data kept by brokers was not considered very reliable. The market has however been developing over time with more formal regulation having come into force after the

enactment of the Capital Markets Authority Act of 1989. It is perhaps due to these developments that researchers have begun documenting findings that are consistent with those of developed markets. In the year 2010, Mulumbi documented the existence of the turn of the month effect. He found out that NSE turn of the month returns were significantly higher than the other days of the trading month in the period 2000-2009. More recently, Nyabuto (2011) reported strong evidence of the existence of January Effect in the same market after studying the years 2001-2011. These evidences of anomalies in the Nairobi Securities Exchange makes us suspect that there could be a Ramadhan effect in existence as well.

Efficient market hypothesis holds that a market is efficient if the market price of financial instruments rapidly and correctly reflects all the relevant information as it becomes available. Therefore if a market is efficient we would not expect to see seasonalities in such a market. The argument by proponents of EMH is that smart actors in the market would have discovered these seasonal changes in patterns and have moved to take advantage of them forcing the market to quickly go back to equilibrium. Such seasonalities would therefore be only short-lived. In other words, in an efficient market, prices cannot be systematically wrong unless you believe that market participants are unable or unwilling to take advantage of profitable trading opportunities.

However, in spite of the above argument, research done in stock markets world over shows rampant evidence on empirical anomalies. These evidences have been documented since the early 1980s when French (1980) published the weekend/Monday effect. French

found out that there was a tendency for returns to be negative on Mondays whereas being positive on other days of the week. In 1981 Banz R. W first published the small Size effect. He revealed that excess returns would have been earned by holding stocks of low capitalization companies during this period 1936-1975. Keim (1983) provided more supporting evidence documenting further that the relationship between returns and size was more pronounced in the month of January. Other researchers who have documented anomalies include Lakonishok and Smidt (1988) who showed that US stocks returns had been significantly higher at the turn of the month and Galai et al (2005) who reported significantly pair wise weekend effects in high moments when comparing the first and last trading days of the week, to name just but a few. The existence of these anomalies is a contradiction to the weak form of the Efficient Market Hypothesis.

The above results of past studies in the Nairobi Securities Exchange and limitations thereof show that there is a strong case for the continued investigation of anomalies in the Kenyan context. Areas which were investigated in the past may need to be re-investigated with a longer time horizon. Features that have not been investigated also need to be investigated. One such area that hasn't been investigated so far is the season of Ramadhan. Muslims take a significant part of their time during the month of Ramadhan on prayer and fasting. Since Muslims form a significant part of the Kenyan population (approximately 11% according to the 2009 population census) it is likely that their participation in the stock market is affected due to their religious activities during the time of Ramadhan, hence the research question; do the activities of this season have a significant impact on the performance of the stocks at the Nairobi Securities Exchange?

1.3 Objective of the Study

The objective of this study was to find out if the season of Ramadhan has any effect on the returns of stocks in the Nairobi Securities Exchange.

1.4 Importance of the Study

The findings of this study are of interest to various stakeholders:

The government of Kenya is interested in the efficient allocation of resources. In Sessional paper No 1 of 1986, the government recognizes the importance of developing and strengthening the stock market for the realization of more long term savings. The government will be interested to know if there are anomalies caused by Ramadhan that affect resource allocation and thereby set up policy measures to correct this.

Managers are interested in any factor that affects share prices of the companies they manage because that reflects on their performance. Having information on this seasonal fluctuation will minimize their either misplaced worries or false positive signals that are caused by external factors.

Investors/Stock traders are always interested in any information that may help them increase the value of their wealth. Discovery of any anomaly will therefore be of interest to them as they will seek to take advantage of it to make profitable trading.

This study will also add to the body of knowledge about anomalies in stock markets particularly breaking new ground in an area related to religious behavior. It is

important to note that in two of the studies on Holiday effects in Kenya (Rasugu (2005), and Osman 2007), the IDD holiday that falls in the Ramadhan month was omitted from the studies because its calendar date varies from year to year.

CHAPTER TWO

LITERATUR REVIEW

2.1 Introduction

This chapter reviews previous literature on the subject of Efficient of markets and market anomalies. It is organized as follows: Section 2.2 discusses theoretical literature. Section 2.3 presents empirical literature while section 2.4 presents a review of local research on this subject. Lastly, section 2.5 gives a summary of the chapter.

2.2 Theoretical Literature

2.2.1 Efficient Market Hypothesis

The efficient market model holds that arrival of new information is rapidly incorporated in the value of the shares. Since the information is random and can be either positive or negative, then prices of shares are said to make a random walk. Fama & Blume (1965), alexander (1964), Jensen and Benington (1970) supported the random walk model-that it was not possible to predict future prices from historical prices. In fact, Michael Jensen one of the leading financial economists argued in 1978 that EMH is ‘the best established fact in all social science.’ However, this theory met a lot of opposition especially from technical analysts who tried to beat the markets by analyzing past price movements. The subject is still hotly disputed.

Fama offered a popular distinction on the forms of markets efficiency that depend on what kind of information is reflected in the securities i.e. Weak form, semi-strong form and strong form efficiency. These forms of efficiency are briefly explained below:

In weak form efficiency, Shares reflect all information that can be obtained from studying past price movements. If the market is weak form efficient, a trader cannot outperform the market by analyzing past movements of the prices of a stock. There is therefore no value in paying Technical analysts for information that would be used for purpose of trading. Technical analysts-analyze trends in the share price to establish a pattern which they then use to trade.

In semi-strong form efficiency, Shares reflect all relevant publicly disclosed information. This is the most talked about form of efficiency. It is impossible for fundamental analysts to beat the market since stocks prices already reflect all publicly available information. Fundamental analysts analyze the fundamentals underlying the industry in which the companies are operating in order to determine undervalued and overvalued stocks.

In strong form-share prices reflect all information whether public or private. As regards to private information however, the use of insider information is regulated and can be illegal in some forms. Anyone therefore who makes supernormal returns by using insider information is essentially profiting using illegal means.

In efficient markets, prices are random, so no investment pattern can be discerned (Leuthold 1998). A planned approach to investment therefore cannot be successful. This

'random walk' of prices commonly spoken about in EMH school of thought result in the failure of any investment strategy that aims to beat the market consistently. In fact, the EMH suggests that given the transaction costs involved in portfolio management, it would be more profitable for an investor to put his/her money into an index fund (Lee, Scheifer & Thaler 1990)

In the real world of investment however, there are obvious arguments against EMH. There are investors who have beaten the market. Warren Buffet, whose investment strategy focused on undervalued stocks made millions and set an example for numerous other followers (Dechow et al, 2000). There are portfolio managers that have better track records than others and there are investment houses with better renowned research analysis than others (Gompers and Metrick, 2001). So how can performance be random when people are clearly profiting from beating the market?

Skeptics of EMH also point to occasional stock market bubbles and burst which seem to suggest that at the height of the boom, many stock prices exceed their intrinsic value. Others suggest that investors are not machines and therefore always rational. Researchers have documented evidence of short-term momentum and long term reversals that are caused by over-confidence and biased self-attribution.

Despite these arguments against EMH, most studies suggest that stock markets are highly efficient in the weak form and reasonably efficient in the semi-strong form (Ehrhardt & Brigham (2010). Despite occasional major shifts in the stock markets, the bottom line of EMH is that for most stocks, based on the available evidence, it is generally safe to assume that the market is efficient. As in cases such as the Siamese twins, there are

occasions when individual stocks can get out of line (Brealy et al (2011)). There are also cases in which prices as a whole cannot be justified by fundamentals. Every now and then, investors seem to be caught in a speculative frenzy and asset prices can reach levels that cannot be justified. Example is the Japanese bubble of 1985 where the Nikkei rose 300% in 4 years only to fall back by half in less than a year and not to recover 20 years later. The NASDAQ index in the USA also rose 580% in the late 1990s only to fall back rapidly between year 2000 and 2002. All these occasional shifts notwithstanding, the efficiency of markets cannot be refuted.

2.2.2 Stock Market Anomalies/Irregularities

Anomalies or irregularities are inconsistencies that conflict with the efficient Market Hypothesis. Since the 1980s, Studies in time efficiency have found seasonality patterns in many markets in the world. The most common of these patterns include the Weekend effect, January and size related anomaly, Holiday effect and the turn of the month effect. The existence of calendar or time anomalies is a contradiction to the weak form of the Efficient Market Hypothesis (EMH) which states that the market prices cannot be predicted using this historic information.

The anomalies seem to suggest are that it is possible to make supernormal returns by trading on the information provided therein (Sharpe (2004)). For instance, the weekend effect suggests that investors who want to buy stocks should avoid doing so late on Friday or early on Monday. Conversely, investors who want to sell stocks should try to sell late on Friday or early on Monday. The size effect suggests that if stocks of small firms are to be purchased, they should be purchased in late December or somewhat

earlier. If stocks of small firms are to be sold, they should be sold in Mid-January or somewhat later. Sharpe however cautions that none of the irregularities are sufficient to cause enormous riches in exploiting them. Even if gains are to be made, transaction costs might devour some if not all those gains. It is possible also that as those anomalies are discovered, some analysts will take advantage of them and over time, this anomalies disappear. Haugen and Jorion (1996) suggested that calendar effects should not be long lasting, as market participants can learn from past experience. Hence, if a monthly effect exists, trading based on exploiting a monthly pattern of returns should yield extraordinary profits (at least for a short time). Yet such trading strategies affect the market in that further profits should not be possible: the calendar effect should break down. Nevertheless, it is interesting to note that Haugen and Jorion (1996) found that the January effect still existed 20 years after it was first discovered by Rozeff and Kinney (1976).

2.2.3 Behavioral Finance

Studies in behavioral finance which looks into the effect of investor psychology on stock prices reveal some predictable patterns in stock markets (Hirshleifer and Shumway 2001). Investors tend to buy undervalued stocks and sell overvalued stocks and in a market of many participants, the results can be anything but efficient. Zeckhauser and Hendricks (1991) argue that for most economists, it is an article of faith that financial markets reach aggregate rational outcomes, despite irrational behaviors of some participants, since sophisticated players stand ready to capitalize on the mistakes of the naive. Yet financial markets have been subject to speculative fads that are hard to

interpret as rational (Hirshleifer, 2001). Shiller (1998) reiterates that recent literature in empirical finance is surveyed in relation to underlying behavioral principles which come primarily from psychology, sociology and anthropology.

The field of modern financial economics assumes that people behave with extreme rationality, but they do not (Barber and Odean). Investors are not machines and therefore always rational. Other behavioral economists suggest that people's deviations from rationality are often systematic. Behavioral finance relaxes the traditional assumptions of financial economics by incorporating these observable, systematic and very human departures from rationality into standard models of financial markets. They highlight two common mistakes investors make: excessive trading and the tendency to disproportionately hold on to losing investments while selling winners. Other researchers have also documented evidence of short-term momentum and long term reversals that are caused by over-confidence and biased self-attribution Ehrhardt & Brigham (2010).

In summary, the theory of behavioral Finance seeks to show how psychological factors come into play to make markets imperfect. The theory is still in its formative stages of development.

2.3 Empirical Literature

Research on security prices did not begin with the development of a theory of price formation which was then subjected to empirical tests (Fama (1970). Rather, the impetus for the development of a theory came from the accumulation of evidence in the middle 1950's and early 1960's that the behavior of common stock and other speculative prices could be well approximated by a random walk. Faced with the evidence, economists felt

compelled to offer some rationalization. What resulted was a theory of efficient markets stated in terms of random walks.

Though his contributions were ignored for sixty years, the first statement and test of the random walk model was that of Bachelier in 1900. But his “fundamental principle” for the behavior of prices was that speculation should be a “fair game”; in particular, the expected profits to the speculator should be zero.

After Bachelier, research on the behavior of security prices lagged until the coming of the computer. In 1953 Kendall examined the behavior of weekly changes in nineteen indices of British industrial share prices and in spot prices for cotton (New York) and wheat (Chicago). After extensive analysis of serial correlations, he suggests, in quite graphic terms: The series looks like a wandering one. But the suggestion by Kendall, that series of speculative prices may be well described by random walks was based on observation. He never attempted to provide much economic rationale for the hypothesis, and, indeed, Kendall felt that economists would generally reject it.

It was not until the work of Samuelson and Mandelbrot in 1965 and 1966 that the role of “fair game” expected return models in the theory of efficient markets and the relationships between these models and the theory of random walks were rigorously studied. And these papers came somewhat after the major empirical work on random walks. In the earlier work, “theoretical” discussions, though usually intuitively appealing, were always lacking in rigor and often either vague or *ad hoc*. In short, until the Mandelbrot-Samuelson models appeared, there existed a large body of empirical results in search of a rigorous theory.

In 1970 Eugene Farma reviewed the existing literature and empirical studies by earlier researchers, introduced the theoretical analysis of market efficiency and proclaimed the Efficient Market Hypotheses.

2.3.1 Weekend Effect

Some of the most anomalous findings in finance are associated with the sample distributions of daily common stocks returns (Jaffe and Westerfield (1984). Cross (1973) and French (1980), Gibbons-Hess (1981) and Keim stambaugh (1983) have documented that average returns on Fridays is abnormally high and the average return on Monday is abnormally low. French (1980) analyzed daily returns of stocks for the period 1953 to 1977 and find that there is a tendency for returns to be negative on Mondays whereas they are positive on other days of the week. He notes that these negative returns are caused only by the weekend effect and not by the general closed market effect since the same results do not obtain when the stock market is closed in the middle of the week.

Kamara (1997) shows that S&P 500 has no significant Monday effect after 1982 yet finds that the Monday effect undiminished from 1962 -1993 for a portfolio of smaller US stocks

Jaffe & Westerfield examined the daily stock market returns for foreign stocks (outside the United States) and found out that the weekend effect was present in each country. In addition, they sought to find out if the seasonalities in the “foreign” markets were independent of those in the US market as well as the effect of time zones and whether the weekend effects in foreign markets offset the weekend effect of stocks of Americans

investing overseas. They found negative Monday returns and high average Friday and Saturday returns, consistent with earlier studies in the US markets.

2.3.2 January and Size Related Anomaly

There is no obvious reason to expect stock returns to be higher in certain months than in others. However, some studies have found significant seasonalities here. Average returns in January were found to be higher than the average returns in the rest of the months. Rozzoff and Kinney (1976) were the first to document evidence of higher mean returns in January as compared to other months. Later studies document that the effect persists in more recent years-Bhardwaj and Brooks (1992) and Haugen and Jorion (1996). Studies have linked much of the January effect to the small firm (Keim (1983).

Banz (1981) and Reinganum (1981) report a significant negative relation between abnormal returns and market value of common equity for samples of NYSE and NYSE-AMEX firms, respectively. Banz analyzed 1936-1975 stock behaviors and reveals that excess returns would have been earned by holding stocks of low capitalization companies. Reinganum (1981) provides supporting evidence and reports that risk adjusted return of smaller firms was greater than 20%.

Keim (1983) of the University of Pennsylvania examined month-by-month, the empirical relation between abnormal returns and market value of NYSE and AMEX common stocks. He found evidence that daily abnormal return distributions in January had large means relative to the remaining eleven months, and that the relation between abnormal returns and size is always negative and more pronounced in January than in any other month - even in years when, on average, large firms earn larger risk-adjusted returns than

small firms. In particular, nearly fifty percent of the average magnitude of the 'size effect' over the period 1963-1979 is due to January abnormal returns.

Gultekin M and Gultekin B (1983) in a bid to examine international evidence on stock seasonalities empirically examined stock market seasonality in major industrialized countries. They found evidence that there were strong seasonalities in the stock market return distributions in most of the capital markets around the world. The seasonality, when it existed, appeared to be caused by the disproportionately large January returns in most countries and April returns in the U.K. With the exception of Australia, these months also coincide with the turn of the tax year.

Boudreaux (1995) studied monthly seasonality effect in Denmark, France, Germany, Norway, Singapore/Malaysia, Spain and Switzerland which by then had not been studied thoroughly. Three of the seven countries' markets had a monthly effect. An inverted monthly effect was found in a Pacific basin market. It was also determined that the January effect, although significant, was not capable of explaining the presence of monthly effect where they exist.

Ray (2012) in Investigating Seasonal Behavior in the Monthly Stock Returns in India Found evidence for a month-of-the-year effect in Indian stock markets confirming the seasonal effect in stock returns in India and also support the ' tax-loss selling' hypothesis and 'January effect'.

2.3.3 Pre-holiday Effect

Abnormal pre-holiday returns in US stocks have been documented by finance practitioners for a long period of time. Merrill (1965) finds disproportionate advances in the Dow Jones Industrial Average on the trading day prior to a holiday for the period from 1897-1965. Ariel (1987) also shows that on the trading day prior to holidays, stocks advance with disproportionate frequency and show high mean returns averaging nine to fourteen times the mean return for the remaining days of the year. Over one third of the total return accruing to the market portfolio over the 1963–1982 periods was earned on the eight trading days before holiday market closings. Examination of hourly pre-holiday stock returns reveals high returns throughout the day.

Wung and Park (1994) provide further evidence of the holiday effect in stock returns and additional insight into the effect. They report abnormally high returns on the trading day before holidays in all three of the major stock markets in the U.S.: the NYSE, AMEX, and NASDAQ. Their study also showed that the holiday effect was found to be present in the U.K. and Japanese stock markets, even though each country has different holidays and institutional arrangements. This study finds that the holiday effects in the U.K. and Japanese stock markets are independent of the holiday effect in the U.S. stock market.

2.3.4 Turn of the Month Effect

The turn-of-the-month effect is a phenomenon whereby the mean daily return of four Trading days – the last trading day of the month and the first three trading days of the following month – is higher than that of the other days of the month. This was first found

by Lakonishok and Smidt (1988) who, in their study, showed that the US market had such turn-of-the-month effect.

Cadsby (1989) obtained similar results for Canada, Cadsby and Ratner (1992) obtained the following results: The turn-of-the-month effect was found in the US, Canada, Switzerland, West Germany, United Kingdom and Australia but not in Japan, Hong Kong, Italy and France. Lakonishok and Smidt (1988) show that US stocks returns are significantly higher at the turn of the month-last and first three trading days of the month.

2.4 Review of Local Research on Stock Market Anomalies

The available local literature on stock market anomalies is summarized below:

Kingori (1995) did an empirical study to test stock seasonality in the NSE. He used changes in prices and dividends to measure monthly and quarterly returns of a sample of companies in the NSE. His findings suggest that there was no seasonality effects in the NSE in the period of time studied. He however points out that the short period covered in the study (5 years) may be a possible cause of this finding. He suggests that a longer period of study-10 years may produce a different result.

Mokua (2003) carried an empirical study of the weekend effects on stocks in the NSE. His findings were that the NSE mean returns are equal over the days of the week thus no weekend effect in the NSE. The length of period under study is again cited as a limitation that may have affected the findings.

Murigi (2003) investigated the impact of National elections on the behavior of stocks. She found that abnormal returns were positive for the period 60 days before an election and became negative thereafter (60 days). The implication is that election events have an impact on stock market returns in Kenya.

Nyambongi (2005) sought to get more evidence of the weather effect from the NSE by looking at the effects of sunshine and cloud weather in the stock prices represented by the daily changes in the NSE 20 share index. He found out that there was no evidence of weather effect in the NSE.

Miya (2007) studied the behavior of stocks around the elections seasons of 1997 and 2002. He found out that stocks reacted strongly to election outcomes and temporarily elevated levels of volatility were observed. He used stock index data changes similar to Nyambongi (2005)

Kimonda (2007) investigated the existence of the reverse weekend effect in the NSE. Stocks were divided into two sub-samples-for small stocks and large ones. She found out that Monday returns are highly significant but their coefficient is not positive thus concluding that there is no weekend effect in the Nairobi Securities exchange.

Kosgei (2008) investigated the existence of the weekend effect at the NSE. The results were similar to Mokuu (2003), that mean stock returns are equal over the days of the week hence the absence of the weekend effect. Also found that the returns on Monday

will influence the performance of the subsequent days of the week but returns on Friday have no effect on the returns of other days of the week. The implication is that the performance of shares on Monday could be used to forecast the performance during other days of the week

Mulumbi (2010) investigated the existence of the turn of the month effect at the NSE. Unlike many earlier researchers, his findings point to existence of seasonalities at the NSE. He found out that turn of the month returns are significantly higher than the other days of the trading month.

Nyamosi (2011) tested the existence of January Effect at the Nairobi Stock Exchange. Once again, the January effect is found to exist providing further evidence that seasonalities do exist at the NSE. The analysis actually showed 'strong evidence' that the January effect was present between 2001 and 2010.

2.5 Summary

This section shows that empirical evidence supports the fact that markets are efficient. However, evidence also shows that anomalies do exist in many markets in the world. Kenya studies in the area of market anomalies show mixed results. A majority of the earlier studies showed lack of seasonalities in the Kenyan market but these studies suffered from some limitations of short periods studied and lack of some of the required data Miya (2007). Recent studies have however indicated evidence of seasonalities. As the Nairobi Securities Exchange has become institutionalized over time, data availability and reliability has been improving and this perhaps shows why research results are now

more consistent with trends in other world markets. It is with this background that we seek to find out if Ramadhan has a seasonality effect on the trading of securities in this market.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter lays out the research methodology that will be employed in doing this study. Section 3.2 presents the research design, section 3.3 the population sample, section 3.4 data and data collection instruments and 3.5 the data analysis methodology.

3.2 Research Design

This is a descriptive research study. Descriptive research is used to describe characteristics of a population or phenomenon being studied. It does not answer questions about how/when/why the characteristics occurred. Rather it addresses the "what" question (What are the characteristics of the population or situation being studied?). In this study, we are interested to know if the 'Ramadhan Effect' exists, without going into the causes of such effect hence a descriptive study is the best approach to the study.

The study covered a period of 13 years, between 1st Jan 2001 and Dec 31 2013. Monthly movements of the NSE 20 share index are used to calculate the monthly holding period returns of the index. Indices are chosen as opposed to individual stocks because Seasonality as well as the monthly effect is more easily detected in market indexes or large stock portfolios than in individual share prices (Officer 1975). This is also consistent with Boudreaux (1995) and Nyamao (2008).

3.3 Population and Sample

3.3.1 Population

A population can be defined as including all people or items with the characteristic one wish to understand. The population in our current study is all the companies listed at the Nairobi Securities exchange for the period between 1st January 1999 and 31st Dec 2013. There are 61 companies were listed as at 31st Dec 2013.

3.3.1 Sample

A Sample is defined as a selection of a subset of individuals from within a statistical population to estimate characteristics of the whole population. The sample chosen therefore needs to be representative of the population. We use the companies that constitute the NSE 20 Share index as our sample in this study. These companies represent 80% of the NSE trading volumes (Miya 2007).

The NSE All Share Index would be a more appropriate measure to use but it was only started in the year 2008 and thus only 5 years of data will be available, which does not cover the entire period of our study.

3.4 Data and Data Collection Instruments

We use secondary data in our study. The main source of data is of daily stock index value records. The dates of yearly Ramadhan calendar for the period of study for all the years of the study are also required since we are comparing returns for the Ramadhan period vs returns during the non-Ramadhan period.

Whereas Stock index values can be easily obtained from the Nairobi Securities exchange offices, data on the exact dates of the end of Ramadhan are not readily available as they vary from year from the calendar announced in advance, depending on the sighting of the moon. The differences are however normally very small. Approximate dates of the Ramadhan calendar obtained from Wikipedia are therefore deemed to be sufficient for the study.

Ramadan is the ninth month of the Islamic lunar calendar, a calendar that contains twelve months each starting with the sighting of a new moon. The Islamic lunar year is approximately 11 days shorter than the Gregorian solar year. So, over time, Ramadan does not coincide systematically the Gregorian calendar.

3.5 Data Analysis

The mean monthly returns for each of the twelve calendar months are examined during the period of the study. The difference in the mean month returns during the Ramadhan month and that of the Non-Ramadhan months is measured. A t test is used to test the statistical significance of the difference of the two means so as to conclude about the presence or absence of the Ramadhan Effect.

The monthly returns of the Ramadhan month is calculated as the movement in market capitalization between the beginning of Ramadhan and the end of Ramadhan. The monthly returns of Non-Ramadhan months are calculated using the market capitalization movements between the beginning and end of calendar months. The months of January and the calendar months where Ramadhan begins and ends are excluded. This gives us nine calendar monthly returns to compare with the Ramadhan Month. In the years 2008

and 2011 the Ramadhan month and calendar months start and end dates coincided so in these two years we have 10 non-Ramadhan months.

3.5.1 Conceptual Model

Stock market returns in this study are computed from the stock indices measurements.

The returns are computed as percent change in the price index. Letting P_t denotes the price index of stock at time t , then:

$$R_t = (P_t - P_{t-1}) * (1 / P_{t-1}) \quad (1)$$

Where:

R_t is the holding period return

P_t is the price of the index at time t .

P_{t-1} is the price of the index at time $t-1$.

3.5.1 Analytical Model

A regression Analysis model is used where Annual returns were regressed against monthly returns. We examine monthly returns using the regression methodology developed by Connolly (1989) and used by Kimonda (2006). The method is based on the following regression model:

$$R_t = \beta_1 \alpha_1 + \beta_2 \alpha_2 + E_t \quad (2)$$

Where:

R_t is the annual return of the NSE index securities

β_i ($i=1$ and 2) are the coefficients for Ramadhan and the rest of the months of the year (except January) returns respectively.

α_i (i=1 and 2) are the returns for Ramadhan and the rest of the months of the year respectively

E=random error term with mean of zero

As explained earlier in this paper, Ramadhan does not coincide systematically with the Gregorian calendar. One Ramadhan month will most of the time run between two calendar months. To make more effective comparisons therefore, where the Ramadhan month runs between two calendar months, we consider only the Ramadhan period and leave out the rest of the days in the affected calendar months from the analysis. We also leave out the month of January because of the likelihood of the January Effect. So effectively, we compare Ramadhan month with nine other months of the year.

3.6 Hypothesis

Ho: $\beta_i=0$

H1= $\beta_i \neq 0$

We examine the significance of β_1 and the sign of the coefficients to determine if β_1 (Ramadhan month returns) is lower than β_2 (Non Ramadhan returns). If β_1 is significantly lower, we reject the null hypothesis that Ramadhan returns are equal to the returns of other months.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

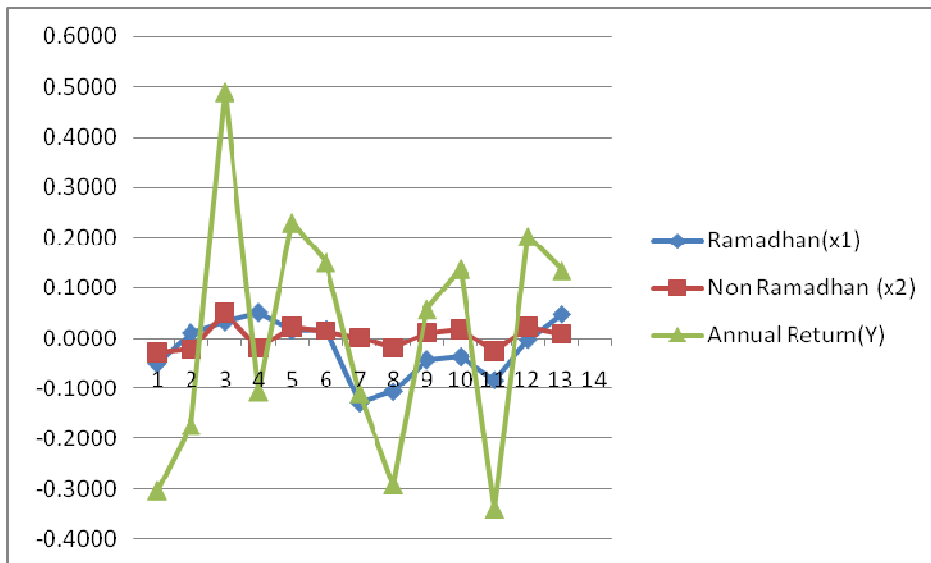
This chapter presents the data analysis and results of the study followed by a discussion of those results. It is organized as follows: Section 4.2 describes the data used in the study providing the full range of statistical measures that describe the population. Section 4.3 presents the estimated/Empirical model with only the statistics that are relevant to the study. Section 4.4 discusses the results and lastly, section 4.5 gives a summary of the chapter.

4.2 Summary Statistics

The monthly returns of are calculated using the market index movements between the beginning and end of calendar months. Three sets of return figures are calculated: The total return for all months under consideration (we call this annual Return); the average monthly returns for the Ramadhan months; and the average monthly returns for the rest of the months of the year except January and the calendar months where the months of Ramadhan begin and end.

The full return results of all the months under study are displayed in Appendix 2. The return figures are graphically presented in Figure 1 below to give a visual picture of the year to year movements:

Figure 1: Graph of Returns for the 2001-2013 Period



Source: Author's computations

The graph of the Non Ramadhan month returns is above that of the Ramadhan one in nine of the thirteen periods under consideration. The differences were more pronounced in the years 2007-2011. Thus the average monthly returns for the Non Ramadhan months tended to be higher than those of Ramadhan in most of the years. The descriptive statistics of the returns figures for each category for all the years under consideration are displayed in Table 1 below.

Table 1: Mean Monthly Returns for Ramadhan and Non Ramadhan months from 2001-2013

Month	Mean monthly returns	Std Deviation	Variance	Standard Error
Ramadhan	-0.0210	0.0589	0.0035	0.0163
Non Ramadhan	0.0034	0.0239	0.0006	0.0066

Source: Author's computations

The mean return of Ramadhan months is lower than that of the Non- Ramadhan months. The variability of the Ramadhan returns is also higher compared to the Non Ramadhan ones as shown by the standard deviations and variances.

4.3 Results of Ramadhan Effect Test on the NSE

To test the for the existence of Ramadhan Effect, The Ramadhan and Non Ramadhan returns data are regressed against the total return using the Microsoft Excel data analysis module. The full regression results are shown in Appendix 3. The relevant results are summarized in Table 2:

Table 2: Regression Statistics of Ramadhan and Non-Ramadhan Months for the Period 2001-2013

Multiple R	0.999641			
R Square	0.999282			
Adjusted R Square	0.999139			
Standard Error	0.007303			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	-0.00254	0.002254	-1.1245	0.287068
Ramadhan (α_1)	1.058723	0.038848	27.25329	1.02E-10
Non Ramadhan(α_2)	9.110988	0.095721	95.18239	4.01E-16

Source: Author's computations

4.3.1 Results of Goodness of Fit Test

Fig. 1 shows two obvious outliers as far as the annual returns figures are concerned-the year 2003 where annual returns were much higher compared to the other years and in 2012 where the annual returns were much lower than the rest of the years. The Coefficient of determination $r^2=0.9996$. This shows that there is a very strong relationship between the annual reruns and independent variables (the average returns of

Ramadhan and non Ramadhan month's) as more than 99.9% of the dependent variable can be explained by the independent variables.

4.3.2 Results of Analysis of Variance (ANOVA)

The Ramadhan coefficient (α_1) was obtained as 1.058723 while the Non Ramadhan coefficient (α_2) was 9.110988. The intercept figure is -0.00254. Significance F of the regression results gives a result of 1.905E-16. This is much lower than the significance level of 0.05 this shows that at least one of the variables determines the independent variable. We went further to determine whether each of the dependent variables is significant. Looking at the p values of both the independent variables, they are both smaller than 0.05 i.e. 1.02E-10 and 4.01E-16 for α_1 and α_2 respectively, showing that both the independent variables are significant in the model.

4.3.3 Estimated Model

From the regression results the estimated model is as follows:

$$R=1.0587\alpha_1+9.111\alpha_2-0.0025$$

It is observed from the equation that the Non Ramadhan coefficient is much higher than the Ramadhan coefficient-it is more than nine times higher. Our main objective is to test whether the mean monthly Ramadhan returns are significantly lower than the Non-Ramadhan returns. To test the significance of the difference of the Ramadhan and Non Ramadhan means, we do a one tail t-Test for Paired Two Sample for Means. We do a one tail test since we are interested to know if the Ramadhan returns are significantly lower than the Non Ramadhan returns as opposed to whether they are merely different. The results are displayed in Table 3.

Table 3: T Test Results for the Mean Returns of Ramadhan and Non-Ramadhan Months for the Period 2001-2013

Df	12
t Stat	-1.6222
P(T<=t) one-tail	0.06535
t Critical one-tail	1.7822

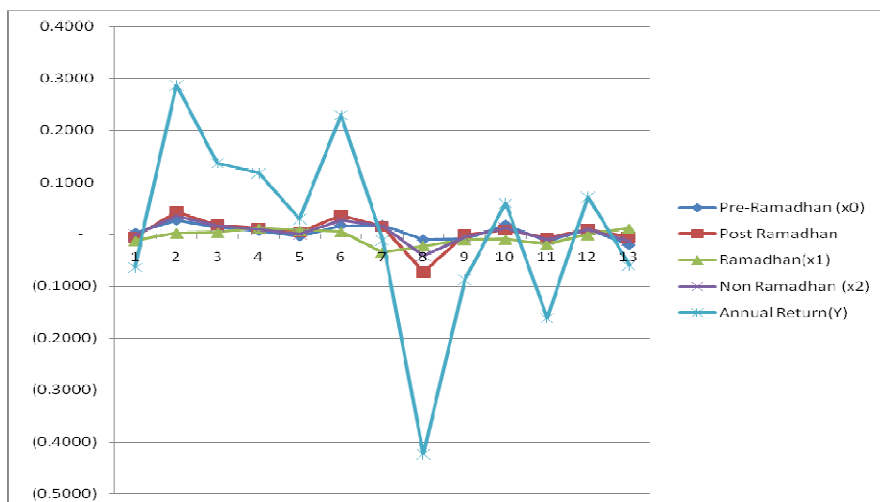
Source: Author's computations

The resultant t value from comparing the two return arrays is -1.6222. The critical t is 1.782. Since the absolute value of T is less than the critical t, we conclude that the Mean returns during the Ramadhan month are not significantly lower than the mean return of the rest of the months with 95% confidence level.

4.3.4. Result of Event Studies of the Ramadhan months Returns

To confirm the accuracy of the above results, the test was repeated using an event study approach. The weekly mean returns of the month before, during and after Ramadhan are examined. The results are plotted in a line graph and are shown in Figure 2 below:

Figure 2: Graph Showing Mean Weekly Returns of the Month Before, During and After Ramadhan for the years 2001-2013



Source: Author's computations

The results show that the Ramadhan returns graph is slightly below both the pre and post Ramadhan return graphs for most of the period, the only exception being the year 2008. This results are similar to the results where the methodology of studying monthly returns was employed. The weekly returns of the pre, during and post Ramadhan months were then regressed against the total returns for the three months and the results are displayed in table 4 below:

Table 4: Regression Analysis Results of Event Studies Weekly Returns of the Pre-, During and Post Ramadhan months

Multiple R					0.9999
R Square					0.9998
Adjusted R Square					0.9997
Standard Error					0.00307
<i>Coefficients</i>					
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	0.001769	0.000969	1.82599	0.097814	
Ramadhan (α_1)	4.109140	0.065948	62.3088	2.76E-14	
Non Ramadhan (α_2)	7.93405	0.048065	165.070	1.64E-18	

Source: Author's computations

The results show that there is goodness of fit and the significance of both the Ramadhan returns and Non Ramadhan returns independent variables with the p values showing the both the variables are significant and the coefficient of determination showing that 99.99% of the dependent variable are determined by the independent variables. A paired t-test for means was carried out to determine whether the two means are significantly different. The results are displayed below: reveals the following results

Table 5: Paired T Test Results for Events study of Ramadhan and Non Ramadhan months Returns 2001-2013

Df	12
t Stat	-1.6684
P(T<=t) one-tail	0.06054
t Critical one-tail	1.7823

Source: Author's computations

The results are again similar to the test on mean monthly returns- the calculated t statistic is less than the critical T leading to the conclusion that difference in the mean returns of the Ramadhan period and the non Ramadhan period was statistically insignificant with 95% confidence level.

4.4 Discussion

A calculation of returns for the Ramadhan and Non Ramadhan periods showed that returns for the Ramadhan period tended to be lower during the period 2001 -2013. A further analysis of the returns showed that the returns in the two sets of periods were not statistically different. This may be attributed to the proportion of the population that is Muslim. The Muslim population was 11% by the 1999 census figures. It would be interesting to see what the result would be if the Muslim population was the majority.

4.5 Summary

The objective of the study was to investigate the existence of the Ramadhan Effect in the Nairobi Securities Exchange. Mean monthly returns for the Non Ramadhan and Ramadhan months are compared. The results of the comparison of the mean monthly returns show that the mean monthly returns for non Ramadhan months were higher

during the period 2001 and 2013 but were statistically insignificant. A repeat of the test using Event study approach showed similar results.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 Introduction

This chapter summarizes the methodology and findings of the study and the conclusions drawn there from. It also highlights the limitations of the study and gives recommendations for further research. Section 4.2 summarizes the objective, research methodology and the results. Section 5.3 presents the conclusion reached in view of the findings. Section 5.4 gives the limitations of the study and section 5.5 gives recommendations for further research.

5.2 Summary of the Study

The objective of this study was to find out if the Ramadhan Effect exists in the Nairobi Securities Exchange. Ramadan is the ninth month of the Islamic lunar calendar, a calendar that contains twelve months each starting with the sighting of a new moon. The Islamic lunar year is approximately 11 days shorter than the Gregorian solar year. So, over time, Ramadan does not coincide systematically the Gregorian calendar. During the month of Ramadhan Muslims dedicate themselves to prayers and fasting from dawn to dusk. The lifestyle changes during the month of Ramadhan would make one to suspect that there is a resultant economic impact. The study covered a period of 13 years, between 1st Jan 2001 and Dec 31 2013. We initially sought to do a 15 year period but

this was narrowed down to a 13 year period due to the non-availability of data for the years 1999 and 2000

To determine whether there is a Ramadhan effect, we measured the monthly returns for the calendar months in the period 2001-2013. The mean returns of the Non Ramadhan months were compared with that of the month of Ramadhan. A statistical test was used to determine the significance of the difference of the two sets of returns so as to conclude about the presence or absence of the Ramadhan Effect. The monthly returns were calculated using the market index movements between the beginning and end of calendar months. The months of January was excluded because of the possibility of the January effect affecting the outcome of the findings and since the Ramadhan months don't always coincide with the usual calendar month, for consistence and simplicity in calculation, the calendar months where Ramadhan begins and ends in the middle were excluded from the analysis. This left us with nine calendar monthly returns to compare with the Ramadhan Month. However, in the years 2008 and 2011 the Ramadhan month and calendar months start and end dates coincided so in these two years we have 10 non-Ramadhan months to compare with the Ramadhan month.

Monthly returns were examined using the regression methodology developed by Connolly (1989) and used by Kimonda (2006). The regression model was used to regress annual returns against monthly returns. A t test is used to test the statistical significance of the difference of the two means so as to conclude about the presence or absence of the Ramadhan Effect.

Results of the analysis showed that returns during the months of Ramadhan tended to be lower than those of the other months. A statistical test of significance however revealed that the difference in the returns was not significant. A repeat of the examination using event study approach yielded similar results.

5.3 Conclusion

Even though returns tended to be lower during the Ramadhan months, the difference was not statistically significant. The lack of statistical significance may be attributed to the relatively low proportion of the Muslim population. We accepted the null hypothesis that Ramadhan returns are the same as the returns of other months. The evidence from this study therefore showed that there was no Ramadhan Effect in existence at the Nairobi Securities Exchange in the period between 2001 and 2013.

5.4 Limitations of the Study

The first limitation was unavailability of data. We undertook to study 15 years but only 13 years of data was available. The study period was designed to be from the beginning of January 1st 1999 but Continuous data was available only from April 2000. The years 1999 and 2000 were therefore dropped from the study due to unavailability of data.

The second limitation has to do with the nature of the Ramadhan calendar which does not coincide with the Gregorian calendar. Parts of the calendar months where Ramadhan began and ended in the middle of the month were omitted from the study. The omissions meant that part of the story is cut out. The remaining nine months of study are however considered sufficient even though a study of the full 12 months would have been more meaningful.

5.5 Recommendations for Further Research

Six of the 13 Ramadhan periods occurred in the 3rd quarter, seven were in the 4th quarter of the year none in the first or second quarters. It would be interesting to know if there is any influence in stock returns of the calendar quarters. This will help us to ascertain whether the differences in returns observed in the period of the study was due to seasonal (quarterly variations) in returns rather than the Ramadhan month.

Another subject that may be of interest is the study of causality. The current study was only a descriptive study that does not tell us the causes of the return differences. A further study may reveal the real specific behavioral changes that may result in a Ramadhan effect.

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APPENDICES

Appendix 1:

List of companies at the NSE Dec 31 2013

Eaagads Ltd Ord 1.25	E.A.Portland Cement Co. Ltd
Kakuzi Ltd Ord.5.00	KenGen Co.
Kapchorua Tea Co. Ltd Ord. 5.00	KenolKobil Ltd
The Limuru Tea Co. Ltd Ord 20.00	Kenya Power & Lighting
Rea Vipingo Plantations Ltd Ord 5.00	Total Kenya Ltd
Sasini Ltd Ord 1.00	Umeme Ltd Ord
Williamson Tea Kenya Ltd Ord 5.00	British-American Investments Co.(Kenya) I
Car & General (K) Ltd Ord 5.00	CIC Insurance Group Ltd
CMC Holdings Ltd Ord 0.50	Jubilee Holdings Ltd
Marshalls (E.A.) Ltd Ord 5.00	Kenya Re Insurance Corporation Ltd
Sameer Africa Ltd Ord 5.00	Liberty Kenya Holdings Ltd
Barclays Bank of Kenya Ltd Ord 0.50	Pan Africa Insurance Holdings Ltd
CFC Stanbic of Kenya Holdings Ltd ord.5.00	Centum Investment Co Ltd Ord 0.50
Diamond Trust Bank Kenya Ltd Ord 4.00	Olympia Capital Holdings Ltd Ord 5.00
Equity Bank Ltd Ord 0.50	Trans-Century Ltd Ord 0.50 AIMS
Housing Finance Co. Kenya Ltd Ord 5.00	A.Baumann & Co Ltd Ord 5.00 AIMS
I&M Holdings Ltd Ord 1.00	B.O.C Kenya Ltd Ord 5.00
Kenya Commercial Bank Ltd Ord 1.00	British American Tobacco Kenya Ltd Ord 1
National Bank of Kenya Ltd Ord 5.00	Carbacid Investments Ltd Ord 1.00
NIC Bank Ltd Ord 5.00	East African Breweries Ltd Ord 2.00
Standard Chartered Bank Kenya Ltd Ord 5.00	Eveready East Africa Ltd Ord.1.00
The Co-operative Bank of Kenya Ltd Ord 1.00	Kenya Orchards Ltd Ord 5.00 AIMS
Express Kenya Ltd Ord 5.00 AIMS	Mumias Sugar Co. Ltd Ord 2.00
Hutchings Biemer Ltd Ord 5.00	Unga Group Ltd Ord 5.00
Kenya Airways Ltd Ord 5.00	Safaricom Ltd Ord 0.05
	E.A.Cables Ltd Ord 0.50

Longhorn Kenya Ltd Ord 1.00 AIMS
Nation Media Group Ltd Ord. 2.50
Scangroup Ltd Ord 1.00
Standard Group Ltd Ord 5.00
TPS Eastern Africa Ltd Ord 1.00

Home Afrika Ltd Ord 1.00
Uchumi Supermarket Ltd Ord 5.00
ARM Cement Ltd Ord 1.00
Bamburi Cement Ltd Ord 5.00
Crown Paints Kenya Ltd Ord 5.00

Appendix 2

Table of monthly returns for the Ramadhan months and average returns for the Non Ramadhan months for each year 2001-2013

	2001	2002	2003	2004	2005	2006	2007
X1	(0.0501)	0.0116	0.0335	0.0516	0.0161	0.0178	(0.1288)
X2	(0.0281)	(0.0206)	0.0508	(0.0176)	0.0237	0.0148	0.0021
R	(0.3034)	(0.1735)	0.4904	(0.1067)	0.2298	0.1509	(0.1100)

	2008	2009	2010	2011	2012	2013	
X1	(0.1062)	(0.0429)	(0.0372)	(0.0834)	(0.0031)	0.0480	
X2	(0.0185)	0.0112	0.0195	(0.0256)	0.0228	0.0098	
R	(0.2915)	0.0575	0.1384	(0.3390)	0.2025	0.1359	

Appendix 3

A table showing the Regression statistics

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.999641							
R Square	0.999282							
Adjusted R Square	0.999139							
Standard Error	0.007303							
Observations	13							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	2	0.742507	0.371254	6960.949	1.91E-16			
Residual	10	0.000533	5.33E-05					
Total	12	0.74304						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.00254	0.002254	-1.1245	0.287068	-0.00756	0.002488	-0.00756	0.002488
Ramadhan(x1)	1.058723	0.038848	27.25329	1.02E-10	0.972166	1.145281	0.972166	1.145281
Non Ramadhan (x2)	9.110988	0.095721	95.18239	4.01E-16	8.897707	9.324268	8.897707	9.324268

Appendix 4

Summary statistics for Ramadhan and Non Ramadhan Months Means

<i>Ramadhan(x1)</i>		<i>Non Ramadhan (x2)</i>	
Mean	(0.0210)	Mean	0.0034
Standard Error	0.0163	Standard Error	0.0066
Median	(0.0031)	Median	0.0098
Standard Deviation	0.0589	Standard Deviation	0.0239
Sample Variance	0.0035	Sample Variance	0.0006
Kurtosis	(0.8509)	Kurtosis	(0.5969)
Skewness	(0.5450)	Skewness	0.2819
Range	0.1804	Range	0.0789
Minimum	(0.1288)	Minimum	(0.0281)
Maximum	0.0516	Maximum	0.0508
Sum	(0.2732)	Sum	0.0443
Count	13.0000	Count	13.0000
Confidence Level(95.0%)	0.0356	Confidence Level(95.0%)	0.0144

Appendix 5

T-Test: Paired Two Sample for Means results for the Ramadhan and Non-Ramadhan months

t-Test: Paired Two Sample for Means

	Ramadhan(x1)	Non Ramadhan (x2)
Mean	(0.021015)	0.003406
Variance	0.003469	0.000571
Observations	13.000000	13.000000
Pearson Correlation	0.388665	
Hypothesized Mean Difference	-	
df	12.000000	
t Stat	(1.622254)	
P(T<=t) one-tail	0.065355	
t Critical one-tail	1.782288	
P(T<=t) two-tail	0.130710	
t Critical two-tail	2.178813	

Appendix 6

List of Monthly opening and closing Indices at the NSE between 2001 and 2013

Opening NSE Index		Closing NSE Index		Opening NSE Index		Closing NSE Index	
2001				2008			
01-Feb	1,897	29-Feb	1,933	01-Feb	4,713	29-Feb	5,072
29-Feb	1,933	31-Mar	1,831	29-Feb	5,072	31-Mar	4,843
31-Mar	1,831	30-Apr	1,768	31-Mar	4,843	30-Apr	5,336
30-Apr	1,768	31-May	1,636	30-Apr	5,336	31-May	5,176
31-May	1,636	30-Jun	1,657	31-May	5,176	30-Jun	5,186
30-Jun	1,657	31-Jul	1,621	30-Jun	5,186	31-Jul	4,868
31-Jul	1,621	31-Aug	1,506	31-Jul	4,868	31-Aug	4,649
31-Aug	1,506	30-Sep	1,401	01-Sep	4,649	30-Sep	4,180
30-Sep	1,401	31-Oct	1,473	30-Sep	4,180	30-Oct	3,387
16-Nov	1,468	15-Dec	1,397	30-Oct	3,387	30-Nov	3,341
				30-Nov	3,341	31-Dec	3,521
2002				2009			
01-Feb	1,343	29-Feb	1,314	01-Feb	3,199	29-Feb	2,475
29-Feb	1,314	31-Mar	1,183	29-Feb	2,475	31-Mar	2,805
31-Mar	1,183	30-Apr	1,129	31-Mar	2,805	30-Apr	2,800
30-Apr	1,129	31-May	1,071	30-Apr	2,800	31-May	2,853
31-May	1,071	30-Jun	1,087	31-May	2,853	30-Jun	3,295
30-Jun	1,087	31-Jul	1,098	30-Jun	3,295	31-Jul	3,273
31-Jul	1,098	31-Aug	1,043	22-Aug	3,179	19-Sep	3,046
31-Aug	1,043	30-Sep	1,043	01-Oct	3,005	30-Oct	3,084
30-Sep	1,043	31-Oct	1,116	30-Oct	3,084	30-Nov	3,190
06-Nov		04-Dec		30-Nov		31-Dec	

	1,149		1,163			3,190		3,247
2003				2010				
01-Feb	1,511	29-Feb	1,558	01-Feb	3,565	29-Feb	3,629	
29-Feb	1,558	31-Mar	1,608	29-Feb	3,629	31-Mar	4,073	
31-Mar	1,608	30-Apr	1,847	31-Mar	4,073	30-Apr	4,233	
30-Apr	1,847	31-May	2,075	30-Apr	4,233	31-May	4,242	
31-May	2,075	30-Jun	1,935	31-May	4,242	30-Jun	4,339	
30-Jun	1,935	31-Jul	2,005	30-Jun	4,339	31-Jul	4,439	
31-Jul	2,005	31-Aug	2,107	11-Aug	4,626	09-Sep	4,457	
31-Aug	2,107	30-Sep	2,380	01-Oct	4,630	30-Oct	4,660	
26-Oct	2,471	24-Nov	2,555	30-Oct	4,660	30-Nov	4,395	
01-Dec	2,731	31-Dec	2,738	30-Nov	4,395	31-Dec	4,433	
2004				2011				
01-Feb	3,158	29-Feb	3,175	01-Feb	4,465	29-Feb	4,240	
29-Feb	3,175	31-Mar	2,771	29-Feb	4,240	31-Mar	3,887	
31-Mar	2,771	30-Apr	2,708	31-Mar	3,887	30-Apr	4,029	
30-Apr	2,708	31-May	2,681	30-Apr	4,029	31-May	4,078	
31-May	2,681	30-Jun	2,640	31-May	4,078	30-Jun	3,968	
30-Jun	2,640	31-Jul	2,708	30-Jun	3,968	31-Jul	3,738	
31-Jul	2,708	31-Aug	2,709	01-Aug	3,738	29-Aug	3,439	
31-Aug	2,709	30-Sep	2,671	01-Sep	3,465	30-Sep	3,284	
15-Oct	2,724	13-Nov	2,868	30-Sep	3,284	30-Oct	3,507	
01-Dec	2,918	31-Dec	2,946	30-Oct	3,507	30-Nov	3,155	
				30-Nov	3,155	31-Dec	3,205	
2005				2012				

01-Feb	3,094	29-Feb	3,213		01-Feb	3,224	29-Feb	3,304
29-Feb	3,213	31-Mar	3,126		29-Feb	3,304	31-Mar	3,367
31-Mar	3,126	30-Apr	3,228		31-Mar	3,367	30-Apr	3,547
30-Apr	3,228	31-May	3,505		30-Apr	3,547	31-May	3,651
31-May	3,505	30-Jun	3,972		31-May	3,651	30-Jun	3,704
30-Jun	3,972	31-Jul	3,982		20-Jul	3,826	18-Aug	3,814
31-Jul	3,982	31-Aug	3,939		01-Sep	3,866	30-Sep	3,972
31-Aug	3,939	30-Sep	3,833		30-Sep	3,972	30-Oct	4,147
04-Oct	3,831	02-Nov	3,893		30-Oct	4,147	30-Nov	4,084
01-Dec	3,974	31-Dec	3,973		30-Nov	4,084	31-Dec	4,133
2006					2013			
01-Feb	4,172	29-Feb	4,057		01-Feb	4,417	29-Feb	4,519
29-Feb	4,057	31-Mar	4,102		29-Feb	4,519	31-Mar	4,861
31-Mar	4,102	30-Apr	4,025		31-Mar	4,861	30-Apr	4,765
30-Apr	4,025	31-May	4,350		30-Apr	4,765	31-May	5,007
31-May	4,350	30-Jun	4,260		31-May	5,007	30-Jun	4,598
30-Jun	4,260	31-Jul	4,259		09-Jul	4,576	07-Aug	4,801
31-Jul	4,259	31-Aug	4,486		01-Sep	4,698	30-Sep	4,793
24-Sep	4,778	22-Oct	4,864		30-Sep	4,793	30-Oct	4,993
01-Nov	5,314	30-Nov	5,615		30-Oct	4,993	30-Nov	5,101
	5,615	31-Dec	5,646		30-Nov	5,101	31-Dec	4,927
2007								
01-Feb	5,774	29-Feb	5,387					
29-Feb	5,387	31-Mar	5,134					

31-Mar	5,134	30-Apr	5,199				
30-Apr	5,199	31-May	5,002				
31-May	5,002	30-Jun	5,147				
30-Jun	5,147	31-Jul	5,340				
31-Jul	5,340	31-Aug	5,372				
13-Sep	5,556	12-Oct	4,885				
01-Nov	4,971	30-Nov	5,235				
30-Nov	5,235	31-Dec	5,445				