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An examination of the share price and trading volume behaviour on the ex-dividend date for securities listed on the Nairobi Securities Exchange

Noreh, Michelle
Strathmore Business School
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**An Examination of the Share Price and Trading Volume Behaviour on the Ex-Dividend
Date for Securities Listed on the Nairobi Securities Exchange**



Master of Commerce

2016

**An Examination of the Share Price and Trading Volume Behaviour on the Ex-Dividend
Date for Securities Listed on the Nairobi Securities Exchange**

Michelle Noreh

**Submitted in partial fulfilment of the requirements for the Degree of Master of
Commerce at Strathmore University**

**School of Management and Commerce
Strathmore University
Nairobi, Kenya**



JUNE 2016

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Name: Michelle Noreh

Signature:

Date:

Approval

This thesis of Michelle Noreh was reviewed and approved by the following:

Dr. Freshia Waweru

Senior Lecturer

School of Management and Commerce

Strathmore University

Dr. David Wang'ombe

Dean - School of Graduate Studies

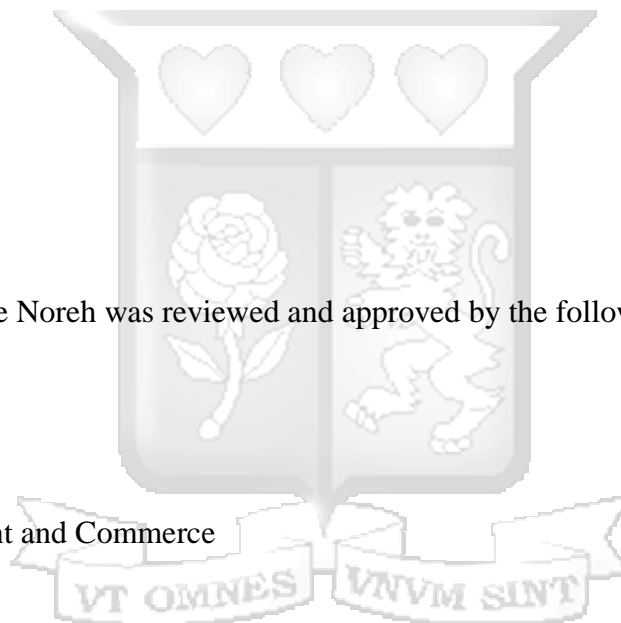
School of Management and Commerce

Strathmore University

Prof. Ruth Kiraka

Dean - School of Graduate Studies

Strathmore University



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ABSTRACT

In a semi-strong form efficient market, the shareholder who sells shares cum-dividend should have the same gain as the one who holds on to the same shares which drop to the ex-dividend price, and receives the dividend. This implies that stock prices should fall by the exact amount of the dividend payment on the ex-dividend day in an efficient market, and suggests that there should be abnormal trading volumes around the ex-dividend day to bring down the share prices by the dividend amount. Empirical studies have, however, had varying findings in different markets. While some empirical studies have found the share price to fall by the dividend amount on the ex-dividend day, the majority find that the ex-dividend price behaviour is a price reduction by less than the dividend amount, which is an anomaly when the efficient market hypothesis is taken into account, since from theory the share price should fall by the amount of dividend, on average. Yet other studies have found that the share prices rise on the ex-dividend day.

An event study was carried out on price and volume behaviour 5 days before and 5 days after the ex-dividend day as well as how long it took the prices to normalize after the ex-dividend day. The study examined the cash dividends by companies listed on the Nairobi Securities Exchange for the period from September 2006 to November 2015 and found that, on average, the share prices fell by only 20% of the dividend amount on the ex-dividend day, and there were abnormal share volumes of -1% traded on this day. It was also found that the prices did not normalize and actually rose on average within the 5 day period after the ex-dividend day,. These findings suggest that the market is not efficient in the semi-strong form and there are likely to be arbitrage opportunities in the Kenyan market, and thus an investor can buy a share cum-dividend, receive the dividend, and sell the share ex-dividend, at a price higher than the expected ex-dividend price.

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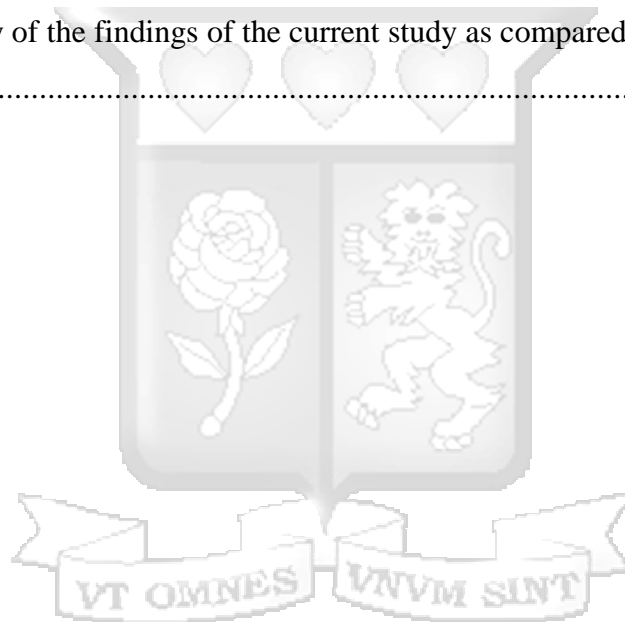
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LIST OF ABBREVIATIONS

CSE - Copenhagen Stock Exchange

EMH – Efficient Market Hypothesis

NSE - Nairobi Securities Exchange

NYSE - New York Stock Exchange

TSX - Toronto Stock Exchange



CHAPTER ONE

INTRODUCTION

1.1 Background

Corporate finance is a major decision-making area for any company according to Leary and Roberts (2014). Muiruri and Bosire (2014) aver that there are two main categories of financing decisions; long term financing, which involves a choice between the use of debt and equity, and short term, where working capital management is considered. Long term financing consists of debt, that is, loans extended by financial institutions to companies, as well as equity, that is capital raised from the owners of organizations (Mwangi and Murigu, 2015). Where equity is chosen as the source of financing, the question of appropriate dividend policy arises.

Baker and Weigand (2015) state that dividend policy is generally concerned with the amount and timing of dividend payments made, as well as the form of the payment. Dividends may be paid in the form of cash, bonus shares or other property (Limungi, 2011). Cash dividends are mostly issued as a fixed amount per share held and may be paid annually as a single amount, or several times a year, in which case there will be one or more sets of interim dividends and a final dividend. Bonus shares, or stock dividends, are an alternative to cash dividends, where additional shares are issued to existing shareholders in proportion to their holding. Then again, some companies may elect not to pay dividends, according to Baker and Kapoor (2015), so that the returns on investment for equity investors are realised in the form of capital gains.

Investors in equity markets have a choice between capital gains and dividends (Al-Makawi, Rafferty and Pillai, 2010). Dividends generally form part of taxable income in most countries, whereas capital gains tend to be tax-exempt, or have lower tax rates than dividend income (Panetsidou, 2015). Given a choice between the two options, Baker and Weigand (2015) posit that it is expected that a majority of investors shall prefer capital gains to dividends in order to avoid taxes. Whether the investor who receives dividends is in the same position as the one who gets capital gains has been a matter of much research according to Hodgkinson and Wells (2009), and has resulted in different schools of thought.

Ma and Ruan (2012) demonstrate that in efficient markets, investors are indifferent between dividends and capital gains. This implies that stock prices should fall by the exact amount of the dividend payment on the ex-dividend day, since dividends are regarded as a distribution of shareholders' wealth (Isaksson and Islam, 2013). Essentially, in an efficient market, the shareholder who sells the share cum-dividend should have the same gain as the one who holds on to the share which drops to the ex-dividend price, and receives the dividend (Alaganar, Jun, Partington and Stevenson, 2008). Empirical studies have been carried out to assess whether this is how the markets actually behave. In a semi-strong form efficient market, it is expected that the share price will drop by the dividend payment on the ex-dividend day.

There have been several studies performed to assess the ex-dividend share price behaviour with varying findings. Some empirical studies including Isaksson and Islam (2013), Milonas, Tan, Travlos and Xiao (2006) and Boyd and Jagannathan (1994) have found that share prices fall by the dividend amount on the ex-dividend day. For instance, Isaksson and Islam (2013) found that on the New York and Shanghai Stock Exchanges, stock prices fall by an amount that is not statistically different from the dividend on the ex-dividend day. Similarly, Milonas, et al (2006) observed identical price behaviour on the Chinese market.

There is a variation in the findings by Akhmedov and Jakob (2010) who note that ex-dividend day studies generally find that stock prices on the ex-dividend day fall by an amount that is on average less than the dividend, and found this to be the case on the Copenhagen Stock Exchange in Denmark. Likewise, Ma and Ruan (2012), Whitworth and Zhang (2010), Hodgkinson and Wells (2009), Rantapuska (2008), Lakonishok and Vermaelen (1986) and Eades, Hess and Kim (1984) found smaller ex-dividend stock price drops in their studies. As a result of this finding, several reasons have been advanced for the ex-dividend price drop being lower than the dividend amount, including the tax-effect hypothesis, the short-term traders' hypothesis, and market microstructure impediments.

Conversely, Panetsidou (2015) observed that share prices in Romania increased on the ex-dividend day implying large profit opportunities for investors in that market. Kato and Loewenstein (1995) similarly found that stock prices in the Japanese market rise on the ex-dividend day, which is contrary to expectations.

With regard to share volumes on the ex-dividend day, higher trading volumes are expected owing to investors taking advantage of any arbitrage opportunities in the market. This has been found to be the case by Chena, Chowb and Shiuc (2013), Panetsidou (2015), Haesner and Schanz (2013) and Akhmedov and Jakob (2010). However, Isaksson and Islam (2013) found that there was no indication of abnormal trading volumes in the Shanghai and New York Stock Exchanges, even though stock prices fell by the dividend amount on the ex-dividend day.

A study done by Limungi (2011) on the NSE 20-share index in Kenya for the period from 2003 to 2010 found varying results as follows. Stock prices on the ex-dividend day fell by less than the dividend for 37% of the observations, dropped by amounts higher than the dividends for 36% of the observations, reduced by amounts equal to the dividend for 3% of the observations, rose on the ex-dividend day for 14% of the observations, and did not change when compared to cum-dividend prices for 10% of the observations. Thus the findings were not decisive.

Concerning the form of efficiency of the Kenyan market, Kiremu, Galo, Wagala and Mutegi (2013) in their study on the reaction to annual earnings announcements in the Nairobi Securities Exchange (NSE) found that abnormal returns were not significant, an implication that the NSE is efficient in the semi-strong form. Likewise, Wafubwa (2014) found that the NSE is of semi-strong efficiency, suggesting it is not possible to earn abnormal returns in this market using publicly available information. On the other hand, Kiweu and Ndegwa (2013) and Ayoma (2013) found that there is an anomaly regarding the semi-strong form efficiency of the NSE and it is possible for investors to profit on bonus share announcements of listed companies. From the foregoing, the evidence on the form of efficiency of the Kenyan market is not conclusive. This research therefore tests semi-strong form efficiency of the NSE by examining ex-dividend price and volume behaviour for cash dividend payments by companies listed on the Nairobi Securities Exchange as well as how long it took the prices to normalize after the ex-dividend day.

1.2 Problem Statement

Ma and Ruan (2012) demonstrate that in efficient markets, investors are indifferent between dividends and capital gains. This implies that stock prices should fall by the exact amount of the dividend payment on the ex-dividend day, since dividends are regarded as a distribution

of shareholders' wealth (Isaksson and Islam, 2013). Essentially, in an efficient market, the shareholder who sells the share cum-dividend should have the same gain as the one who holds on to the share which drops to the ex-dividend price, and receives the dividend (Alaganar, Jun, Partington and Stevenson, 2008). This suggests that stock prices should fall by the amount of the dividend payment on the ex-dividend day in order to eliminate arbitrage opportunities in an efficient market (Panetsidou, 2015).

Empirical studies have had varying findings on the ex-dividend price behaviour in different markets. Isaksson and Islam (2013), Milonas et al (2006) and Boyd and Jagannathan (1994) found that stock prices fall by an amount that is not statistically different from the cash dividend on the ex-dividend day. On the other hand, studies by Akhmedov and Jakob (2010), Whitworth and Zhang (2010), and Ma and Ruan (2012) found that stock prices fall by less than the dividend distributions. In contrast to these, Panetsidou (2015) and Kato and Loewenstein (1995) found that stock prices rise on the ex-dividend day.

With regard to share trading volume on the ex-dividend day, higher trading volumes are expected due to more transactions as investors take advantage of the arbitrage opportunity in the market. This has been found to be the case by Chena, Chowb and Shiuc (2013), Panetsidou (2015), Haesner and Schanz (2013) and Akhmedov and Jakob (2010). However, Isaksson and Islam (2013) found that there was no indication of abnormal trading volumes in the Shanghai and New York Stock Exchanges, even though stock prices fell by the dividend amount on the ex-dividend day.

In Kenya, a study on the NSE 20-share index for the period from 2003 to 2010 by Limungi (2011) found that stock prices on the ex-dividend day decreased by an amount lower than the dividend for 37% of the observations, dropped by amounts higher than the dividends for 36% of the observations, reduced by amounts equal to the dividend for 3% of the observations, increased on the ex-dividend day for 14% of the observations, and did not change when compared to cum-dividend prices for 10% of the observations. The conclusions from this study were subject to limitations due to sample size as the study did not extend to the entire population of securities listed on the exchange (fifty five at the time), yet the twenty companies may not be representative of the entire portfolio of listed companies. The study also did not consider the share volume behaviour of the market. This study examines the ex-dividend day price and volume behaviour of all the 64 companies listed on the NSE.

Concerning the form of efficiency of the Kenyan market, Kiremu et al (2013) and Wafubwa (2014) found that the NSE is of semi-strong efficiency, suggesting it is not possible to earn abnormal returns in this market using the publicly available information. On the other hand, Kiweu and Ndegwa (2013) and Ayoma (2013) found that there is an anomaly regarding the semi-strong form efficiency status of the Nairobi Securities Exchange. Thus, the evidence on the form of efficiency of the Kenyan market is not conclusive. This research therefore tests semi-strong form efficiency of the NSE by examining ex-dividend price and volume behaviour for cash dividends by all the companies listed on the Nairobi Securities Exchange as well as how long it took the prices to normalize after the ex-dividend day.

1.3 Research Objectives

1.3.1 General Objective

The general objective of this study is to assess semi-strong form efficiency of the NSE by examining ex-dividend price and volume behaviour for cash dividends by companies listed on the Nairobi Securities Exchange as well as how long it took the prices to normalize after the ex-dividend day.

1.3.2 Specific Objectives

The specific objectives of this study are:

1. To examine the behaviour of ex-dividend day prices of shares on the Nairobi Securities Exchange.
2. To examine the volumes of shares traded around the ex-dividend date for shares on the Nairobi Securities Exchange.
3. To assess how long the share price takes to normalize after the ex-dividend day for shares on the Nairobi Securities Exchange.

1.4 Research Questions

The questions that this research will provide insight into include:

1. What is the ex-dividend pricing of shares on the Nairobi Securities Exchange?
2. What volumes of shares are traded around the ex-dividend date for companies listed on the Nairobi Securities Exchange?
3. How long does the share price take to normalize after the ex-dividend day for companies listed on the Nairobi Securities Exchange?

1.5 Scope of the Study

The research will include a review of the behaviour of ex-dividend share prices and volumes of companies listed on the Nairobi Securities Exchange that paid cash dividends during the period from 1 September 2006 to 30 November 2015. In September 2006, the Nairobi Securities Exchange implemented live trading on the automated trading system, resulting in greater efficiency in the update of price and volume information (NSE Website, Kotonya, 2013). Also, this period is over a span of nine years to make certain that there are sufficient observations to establish a trend and derive conclusions that can be generalized to the population.

A previous study on ex-dividend stock price behaviour covered the NSE 20-share index up to 2010. This research aims to cover more ground by considering all the shares of companies listed on the Nairobi Securities Exchange and updating the period to 2015.

1.6 Significance of the Study

The purpose of this study is to examine the share price and volume behaviour on the ex-dividend date, which is relevant to investors, companies that pay dividends, researchers and policy-makers.

1.6.1 Investors

For both institutional and individual investors, ex-dividend price and volume behaviour may present an opportunity to make abnormal profits and thus, increase their wealth. A research in this area would provide useful information to guide individual investors and investment managers in knowing when to invest, divest or hold, depending on the dividend payments. If, for instance, research findings indicate that the share prices in the market consistently drop by less than the dividend amount, then investors can profit by purchasing the shares cum-dividend and receiving the dividend and then selling at the ex-dividend price to arrive at a final position higher than the cum-dividend amount.

1.6.2 Companies

In addition, as Boyd and Jagannathan (1994) state, the behaviour of share prices and volumes around the ex-dividend date is one indicator of the relative valuation of dividends as

compared to capital gains by investors. This has implications for the dividend policy of companies. If the market generally discounts the dividend, arriving at an ex-dividend drop that is lower than the dividend amount, then companies may prefer not to declare dividends, and allow the investors to receive returns in the form of capital gains instead.

1.6.3 Researchers and other Academics

This study will augment existing literature and serve as a source of reference material for future researchers in the area of ex-dividend share prices and volumes. The results of this study may be useful to security market researchers as its results will support findings from previous studies or contradict them.

1.6.4 Policy Makers

The ex-dividend price and volume behaviour of shares could be a pointer to the current level of, and trends in the informational efficiency of the Nairobi Securities Exchange. This could possibly demonstrate the need for investor engagement and education so as to lessen the disparity in knowledge among different investor groups.

1.7 Chapter Summary

In a semi-strong form efficient market, the shareholder who sells the share cum-dividend should have the same gain as the one who holds on to the share which drops to the ex-dividend price, and receives the dividend (Alaganar, Jun, Partington and Stevenson, 2008). This implies that stock prices should fall by the exact amount of the dividend payment on the ex-dividend day in an efficient market, and suggests that there should be abnormal trading volumes around the ex-dividend day. Empirical studies have, however, had varying findings in different markets. This study seeks to examine the ex-dividend share price and volume behaviour for the shares of companies listed on the Nairobi Securities Exchange for the period from 2006 to 2015.

The remainder of the study is arranged as follows. The literature review is in Chapter Two; the research methodology in Chapter Three; research findings and analysis in Chapter Four; and the summary, conclusions and recommendations in Chapter Five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on previous studies done on ex-dividend day behaviour. It is useful to know the efficient market hypothesis and its assumptions, as well as the random walk hypothesis and behavioural finance theory. This is followed by the empirical review of the practical experience as seen in the movement in share prices and volumes on and around the ex-dividend date for companies listed on various exchanges around the world.

2.2 Theoretical Framework

The theoretical framework discusses the efficient market hypothesis in section 2.2.1 whose basis is that market prices reflect available information. Thereafter, it moves on to the random walk hypothesis in section 2.2.2, which has the perspective that past security prices cannot be used to predict future prices, since under this theory future prices are independent of past prices. Lastly, the behavioural finance theory is discussed in section 2.2.3 which contradicts the efficient market hypothesis to the extent that the assumption that all investors are rational is relaxed.

2.2.1 Efficient Market Hypothesis

Market efficiency is defined by Fama (1970) as the degree to which security prices fully reflect all relevant, available information. "Fully reflect" means that all available information is utilized in its entirety in determining the price of the security. Fama (1991) brings in a different angle - that security prices reflect available information to the point at which marginal costs of acting on information equal marginal benefits.

Kiremu et al (2013) agree with the three forms of market efficiency detailed by Fama (1970). Weak-form market efficiency is where security prices fully reflect all past or historical information, therefore a trader in the market cannot make abnormal returns using past information (Harper and Said, 2015). Under semi-strong form market efficiency, Maronga, Nyamosi, and Onsando (2015) reiterate Fama's finding that the prices rapidly reflect all publicly known information (such as announcements of earnings, dividends, changes in management or operations, etc.) On the other hand, for strong form efficiency, security prices reflect private information. Private information includes that which some investors have monopolistic access to (Arasu and Sekar, 2007 and Jensen, 1978), and that is relevant for the

formation of prices. The particular area of interest for this study on ex-dividend price and volume behaviour is semi-strong form market efficiency that focuses on publicly available information – that is, dividend amounts, share prices and share volumes.

Fama (1970), Jensen (1978), Fama (1991) and Lehmann (1988) agree that in order to test that prices fully reflect information, it is necessary to specify the price formation process – that is, the actual efficiency of the markets is always verified in conjunction with the equilibrium asset-pricing model. Many studies, in line with the fair game efficient markets model, assume that market equilibrium of prices can be stated in terms of expected returns, which may in turn depend on risk, and the definition of risk differs. At any rate, expected returns are formed on the basis of and reflect the available information set, which ties in with the concept of market efficiency. Langevoort (1992) stated that under EMH, asset prices are at equilibrium as a result of the competitive actions of many rational agents in the market. To this extent, a test of market efficiency depends on the validity of the asset pricing model as well.

Going into further detail on the price formation process, Fama (1970) describes two forms of the expected returns (or the fair game) models under efficient markets theory - the submartingale and the random walk. Under the submartingale, the current price reflects the expected price of next period, using the current information set. For the random walk, on the other hand, Horne and Parker (1967) note that successive price changes are independent and identically distributed. The conditional and marginal probability distributions of a random independent variable are identical and the density functions do not alter over time. As a result, the sequence of past returns is of no consequence in determining the distributions of future returns under the random walk (Renshaw, 1968).

However, LeRoy (1976) argues that though Fama (1970) provided a representation of the price fully reflecting the available information, the form which he chose is not specific to EMH theory but is true of any stochastic process and since it does not restrict the data, is not in actual sense testable. Nonetheless, LeRoy noted that these adjustments are easily incorporated into the theory.

In setting the groundwork, Fama (1970) stated that market conditions consistent with efficiency include no transaction costs in trading securities, freely available information for all market participants, and agreement by all market participants on the implications of current information for the current price and distributions of future prices of securities. Similarly, Fama (1991) postulated that in an efficient market, it is assumed that there are no information or trading costs. These are sufficient but not necessary conditions for market efficiency; what is necessary is that all available information is taken into account in forming asset prices. Consequently, a market may be considered efficient if it meets the condition of sufficient numbers of investors having ready access to available information, which is a relaxation of the condition of free information availability to all.

Fama (1970) thereafter considered the findings from tests of each of the three forms of market efficiency. In considering weak form tests, Shitta (2015) and Fama (1970) find that whatever dependence exists in a series of historical returns cannot be used to make profitable predictions of the future. Only intra-day dependence exists, and attempts to profit on this would be cancelled out by the commissions charged. Generally for financial data, if price changes are uniform and many, the central limit theorem states that they will follow a normal distribution. However, empirical tests have found returns to follow non-normal stable distributions since they have a higher proportion of large observations.

Thereafter, semi-strong form tests of market efficiency are considered. Fama (1991) postulated that there are regularities in the response of stock prices to financing decisions, investment decisions and changes in corporate control that are scientifically useful and hence event studies are of value to the corporate world. Amongst the first event studies conducted was a test on stock splits done by Fama, Fisher, Jensen and Roll (1969) that found abnormal returns around stock splits. The abnormal returns were attributed to the stock splits having been interpreted to mean that the companies had better earnings prospects and as a result would be able to maintain higher levels of dividends in the future. If the companies turned out not to be able to maintain these higher earnings, it was expected that prices would adjust accordingly subsequently. The four researchers found that information in the stock splits on future dividend payments is on average fully reflected in the price of the split share at the time of the split. Fama (1970) came across similar findings in other studies (such as Ball and Brown, 1968) that established earnings announcement information to have been anticipated and thus reflected in share price. In addition, new stock issues were found to have been

reflected in share prices and tended to come after recent favourable events. Charest (1978) and others found that unexpected increases or decreases in dividends are accompanied by corresponding share price rises or drops respectively which is in line with market efficiency, but inconsistent with the work of Modigliani and Miller (1961) on dividend policy irrelevance. Moreover, new issues of common stock are bad news for stock prices whereas redemptions are good news (Fama, 1991). Fama thus concluded that evidence on semi-strong form efficient markets is consistent to the extent that it shows that publicly available information had been incorporated in share prices. On the other hand, Jensen (1978) noted that there have been several cases of departures from efficiency, or anomalies with regard to semi-strong form efficiency from the studies conducted by Charest (1978) on cash dividends, among others. Jensen (1978), however, noted that though there is anomalous evidence regarding market efficiency, this should not result in the abandonment of the theory of market efficiency, but rather deeper enthusiasm in developing a better understanding of the markets and the concepts therein.

Fama (1991) observed that ease of access to daily data allows the speed of price response to be measured precisely in event studies; and reduces the problem of testing market efficiency together with an asset pricing model. Empirically it has been found that stock prices seem to adjust within a day of event announcements although dispersion of returns increases around information events. However, some event studies suggest that stock prices do not respond quickly to specific information, for instance, in mergers, acquiring firm stock prices have been found to adjust slowly, and stock prices after quarterly earnings announcements do not adjust rapidly.

Under the strong form tests of efficient market models, there are several instances of market inefficiency that have been found, attributed to the information advantages of individual agents (Fama, 1970 and Fama, 1991). Niederhoffer and Osborne (1966) found that specialists on NYSE use their monopolistic access to information concerning unfilled limit orders to generate monopoly profits. Similarly, Scholes (1969) established that corporate insiders sometimes have monopolistic access to information about their firms that is not reflected in prices. Generally, it is found that it does not profit the average investor to expend resources searching out little known information since mutual fund managers who are expected to have access to this information, given their resources, do not seem to access special information that allows them to generate abnormal returns. With regard to measurement, if the norm

against which a comparison is made in order to obtain the abnormal profit is based on risk, then the return has to be above the market line. Jensen (1969) found that returns to investors in funds were 1% below the market line. He considered whether mutual funds perform well enough to compensate investors for their charges as compared to investing on the market line, and found that they did not, even when commissions were ignored. Further, when all expenses were ignored, the funds still did not pick any securities that outperformed the average market return. When several funds were compared, none consistently outperformed the market. On the contrary, Fama (1991) noted that returns to professional portfolio managers are trivially different from Sharpe Lintner's market line, which suggests that fund managers have sufficient access to private information to cover their costs.

Jaffe (1974) found that the market does not react quickly to public information about insider trading, and more so in the case of small firms which gives an opportunity for more profit to be made (Seyhun, 1986). In market efficiency tests, Fama (1991) found it advisable to avoid models that put strong restrictions on the cross-section of expected returns. In observing results to security analysts, Fama (1991) found that because generating information had costs, informed investors were compensated for the costs they incurred to ensure that prices adjust to information. Thus, the market is less than efficient but in a rational manner.

As the field of market efficiency developed, there were some changes in the scope of forms of market efficiency. Fama (1991) replaced weak-form efficiency tests with tests for return predictability. Here, returns are predictable not only from past returns as in Fama (1970), but also from dividend yields, earnings price ratios and various term structure variables including inflation, interest rates, consumption trends, default spread, and term spread. The scope of return predictability is increased to consider the cross-sectional predictability of returns, that is, tests of asset-pricing models and the anomalies discovered in the tests e.g. size effect, and seasonals in returns (like the January effect, end-of-month effect, Monday effect, holiday effect, intraday effect, among others). The other two forms of efficiency merely changed in title but not in scope; semi-strong form tests now referred to as event studies, whereas tests for private information substitute strong form tests.

Several studies on tests for return predictability including French and Roll (1986), Lo and MacKinlay (1988), Chen (1991), Keim and Staumbaugh (1986) and Conrad and Kaul (1988) found that a greater proportion of returns are explained when longer term horizons are used,

for instance two to five years as opposed to using a few months (Fama, 1991). A small proportion of short-term returns are predictable from other variables (3%) – but these variables explain a much higher proportion of long-term returns (25% to 40%).

Looking at term structure and return predictability, one of the perspectives considered is that variation in expected returns could be the result of variation in tastes for current versus future consumption rather than a bubble or irrationality of investors (Fama and French, 1989). There are systematic patterns in the variation of expected returns through time that suggest that it is rational. Evidence that the variation through time in expected returns is common to corporate bonds and stocks and is related in plausible ways to business conditions leans toward the conclusion that it is real and rational. (Fama, 1991)

During return seasonalities including anomalies such as Monday, end of month, holiday, beginning of day and end of day anomalies, returns deviate from average daily returns by less than the bid-ask spread thus these anomalies are considered to be due to market microstructure. (Fama, 1991; Lakonishok and Maberly, 1990). Higher small-stock returns and the January bias in favour of small stocks are sensitive to small changes in the way the portfolios are defined, thus are not reliable anomalies.

Fama (1991) noted that earnings price ratios, book to market values, and leverage are variables that explain expected returns. For instance, the higher the risk faced by a company, the higher the earnings price ratio, and thus the higher the expected returns. These variables are related, for example, small stocks have higher earnings price ratios; and small stocks include many firms that are highly levered. Some are better explanatory variables than others, for instance, book to market value ratio is a strong explanatory variable for expected returns (Fama and French, 1991). On the other hand, beta is feeble as an only explanatory variable as posed by Sharpe, Lintner and Black (Fama and French, 1991). There is, however, a strong relation between returns and betas on portfolios formed based on size. There is a positive relation between expected returns and beta across security types (bonds and stocks) but the relation is weaker for stocks.

Still under return predictability, it is noted that single asset-pricing models such as the Sharpe-Lintner-Black model or multifactor models like those developed by Merton (1973) and Ross (1976) may be used in determining asset-pricing. Fama (1991) posits that the

challenge with using multifactor asset-pricing models such as the arbitrage pricing theory is that they leave an unexplained size effect. This means that expected returns are too high for small stocks and too low for large stocks. Another model was developed by Chen, Roll and Ross (1986) using industrial production and the difference between low grade corporate bonds and long term government bonds. The model allows a search for variables that describe the returns and then tests them. Although this model explains the size anomaly, it is sensitive to the assets used in its computation and the manner in which the betas of economic factors are estimated.

Fama (1998) observed that many event studies focus on short windows around a cleanly dated event, but the empirical finding of a random split between under and over reaction of the market to price changes supports market efficiency. An example of an under-reaction is when stock prices continue to respond to an earnings announcement for 3 to 6 months thereafter, showing that the initial reaction was partial. Kiremu et al (2013) are in agreement with Fama (1998) in reference to post event return continuation, that is found to be about as frequent as reversal, which is consistent with market efficiency. The scenario of over and under reactions stocks that were considered losers becoming gainers and vice-versa in the long run. This is in the sense that, if the market had under-reacted to some information, then the market adjusts over the long-run, thus returning to the mean level of performance. Most anomalies disappear when reasonable alternatives are used to measure them.

Market efficiency must be tested jointly with a model for expected returns, yet many models have problems describing average returns. This problem tends to grow with the time period under consideration. Fama (1998) posits that it is better to use cumulative abnormal returns or average abnormal returns rather than buy and hold abnormal returns due to fewer statistical issues posed by the latter including matters such as skewness, normality assumption for shorter periods and false impressions of the speed of price adjustment to an event.

The efficient market hypothesis has been challenged by proponents of behavioural finance. Lo (2004) stated that though behavioural economics and finance have challenged market efficiency, arguing that markets are not rational, but driven by fear and greed, the adaptive markets hypothesis reconciles what behavioralists cite as counterexamples to rationality (that is, the behavioural biases) as consistent with the evolutionary model of people adapting to a changing environment.

2.2.2 Random Walk Theory

Fama (1965) stated that in an efficient market, which is defined as having large numbers of rational profit-maximizers with free access to important current information, a security's price at any time is a good reflection of its intrinsic value. However, since the state of factors affecting the market is not assured, there is the possibility for divergent views about what the intrinsic value actually is, the transactions of many competing participants cause the actual price of a security to wander randomly around its intrinsic value. Horne and Parker (1967) add that a random walk requires that stock price fluctuations are independent over time which means that the current market price of a stock is unrelated to past price patterns. Fama (1965) identifies two approaches to predicting stock prices: the technical approach where prices can be forecasted by studying past patterns (Brock, Lakonishok and LeBaron, 1992); and the fundamental approach where securities have intrinsic values that depend on their earning potential, which, in turn, depends on quality of management, industry outlook, economic performance, among other factors. In this latter approach, the actual value of a share in the market is compared to the intrinsic value to determine whether a stock is over or under valued. Horne and Parker (1967) thus assert that in a market following a random walk, it is implied that technical or chartist trading rules will not result in a greater profit than the buy-and-hold strategy because the prices have "no memory". Under the random walk, it is assumed that the market price of a stock represents the market's best estimate of the intrinsic value of the share based on the available information of expected future earnings. As a result, new information, such as a change in management, may change the market price but past price trends are expected to have no effect. Random walk theory hence implies no systematic overvaluations or undervaluations of stock, since it is expected that these would be eliminated by market participants taking advantage of arbitrage opportunities in the market.

In considering the mechanics of the random walk, Fama (1965) stated that in an efficient market, on average, competition will cause new information affecting intrinsic values to be reflected in actual prices instantaneously. This means that it is likely that initially there will be an over or an under-adjustment to the change in the intrinsic values. Also, there is likely to be a lag in adjustment of actual prices, with the actual prices sometimes adjusting before the intrinsic value – that is when the event causing the change is anticipated by the market, and sometimes following the change. Successive price changes caused by new intrinsic values will be therefore be independent. A market where successive price changes are independent is

by definition a random walk market. In this market, a series of stock price changes has no memory and thus price history cannot be used to predict the future prices in any meaningful way.

Fama (1965) stated that the key assumption of the random walk is independence of prices over time. In line with Fama's argument, Horne and Parker (1967) have considered one test of the random walk theory which consists of determining whether mechanical trading rules used by a chartist can result in a profit greater than that available with a simple buy-and-hold strategy. Empirical research on sequences of price changes has supported that a stock's price is independent of past price changes, though perfect independence is unlikely, as noted when Niederhoffer and Osborne (1966) and Brock, Lakonishok and LeBaron (1992) found dependence in small price changes over time. Thus, the sequence can be considered independent for all practical purposes if the amount of dependence is so small that a technical trader cannot realize consistent profits by relying on past profits. This considers how well the random walk approximates the behaviour of share prices.

A second approach considered by Fama (1965) as appropriate in obtaining evidence whether successive price changes are independent, is applying statistical tools such as serial correlation and analysis of runs for change in sign. Fama has found in his review that this has yielded no evidence of important dependence of current market prices on past prices and thus supported the theory of random walks in the serial correlation tests done by Cootner (1962), Fama (1965) and Kendall (1953), as well as the spectral analysis by Granger and Morgenstern (1963). In addition, the results of the tests of the filter technique that ignore price direction changes smaller than a certain percentage, also tend to support the random walk.

Fama (1965) stated that the random walk theory that says prices are independent over time is opposed to the chartist theory that holds that past prices can be used to predict future prices, but that the evidence in favour of the random walk is consistent and voluminous. Fundamental analysts however can perform better than the buy-and-hold theory. It is a requirement, however, that results must be consistent, and cover the costs of the research into new information available or new insights, and of transactions, by a large enough margin to be worthwhile. Many mutual funds claim to outperform the market through fundamental

analysis, but in fact Fama (1965), Malkiel (1995) and Carhart (1997) found that on average they perform as well as a randomly selected portfolio would before transaction costs are considered, and not as well when the costs are considered.

Horne and Parker (1967) tested that stock price changes around the intrinsic value of a stock were random using daily closing prices from 1960 to 1966 for 30 stocks on the NYSE. The buy-and-hold strategy was compared to the decision rules based on past prices and it was found that the buy-and-hold strategy had consistently greater profits than the trading rules strategy, even when transaction costs were ignored. Transaction costs are higher for decision rules than buy-and-hold strategies since decision rules require action whenever a certain threshold is reached. The profit increases as the threshold for buy and sell signals increases because there are fewer transactions and therefore lower transaction costs. The study supports random walk theory of price behaviour over any trading based on past prices and decision rules.

Renshaw (1968) defines a perfectly random world as one in which prices of all securities adjusted for dividends either fluctuate unpredictably around the same basic logarithmic trend or possess offsetting covariance characteristics such that all risky assets can be judged equally attractive from the perspective of a portfolio manager who is striving to maximize long-run wealth. This is in line with portfolio theory that requires a higher return for higher levels of risk. Renshaw (1968) noted that the optimum investment strategy has been found not to be random, but rather, investing equal amounts of money in all securities and maintaining the same proportions over time by selling those that appreciate more than average, and buying those that appreciate less than average (Macaulay, 1938; Fisher, 1966; Cohen and Fitch, 1966).

However, Fama and French (1986) reject the random walk model because they find that for long-term horizons of 3 to 5 years, up to 40% of variation in prices of securities can be predicted, which means that part of the price of the security can be predicted from past prices. In support of this, Poterba and Summers (1988) find that stock returns exhibit positive correlation in the short run and negative correlation over longer periods.

2.2.3 Behavioural Finance

Thaler (1999) stated that finance theory is based on the assumption that investors and other economic agents are rational in making of decisions and unbiased forecasts of the future, and thus asset prices are set by rational agents. Also, the agents update their beliefs correctly on receipt of new information and make choices that are normatively acceptable (Barberis and Thaler, 2003). But some facts about the stock market, returns, and individual trading behaviour do not make sense in this framework. In reality, most markets have some irrational investors, according to Thaler (1999), but it is possible for the argument of rationality to hold, as long as there are only few irrationals, low transaction costs and long-term horizons for the rational investors to drive prices towards their intrinsic values.

Traditionally, under the Efficient Markets Hypothesis, prices reflect fundamental values, which are the discounted sum of expected future cash flows, and thus no investment strategy can earn average returns greater than are warranted for its risk. However, Barberis and Thaler (2003) argue that some features of asset prices which are deviations from the fundamental value are brought about by the presence of traders who are not fully rational, thus supporting the presence of behavioural finance. Friedman (1953) objects saying rational traders will quickly undo any dislocations caused by irrational traders. Nonetheless, from the viewpoint of Barberis and Thaler (2003), it may be risky and costly to correct mispricing caused by irrational traders, and hence it may remain. The risks may be fundamental – bad news about the company causing the fundamental value to drop; noise-trader risk – mispricing exploited by the arbitrageur worsen in the short run due to the activities of noise-traders (Bondt and Thaler, 1985); or implementation costs such as commissions, as well as the cost of finding and learning about a mispricing. Persistent mispricing is evidence of limited arbitrage. These are known as limits to arbitrage by Shleifer and Vishny (1997) as arbitrageurs are not always able to restore prices to parity. An illustration given of mispricing without a fundamental change is the 3.5% permanent increase on the inclusion of a share in the index S&P 500. Also, just because prices do not reflect fundamental values does not mean that there are riskless, costless arbitrage opportunities. The lack of arbitrage opportunities does not mean that prices are right.

Rational investors are expected to reverse the impact of irrational investors on the market and make the market efficient. On the other hand, Shiller (2003) considers that rational traders may not be able to fully offset the impact of the other investors. In some markets, smart

money tends to amplify the impact of the feedback traders, for instance, by buying ahead of the feedback traders in anticipation of the price increases they will cause. Also, the risk involved may prevent action by the smart traders as they could make losses. To add on that, smart money can always buy the stock, but if the market requires selling and smart money does not have the stock then this may present a difficulty if there are short-sale constraints. Short selling is also unattractive because investors generally derive more pain from losses than satisfaction from gains (Kahneman and Tversky, 1979)

According to Barberis and Thaler (2003), apart from limits to arbitrage, the other aspect of behavioural finance that may cause deviations of prices from fundamental values is psychology, which refers to biases that arise when people form beliefs and how they make decisions given their beliefs as well as their preferences. Beliefs include overconfidence in people's own judgements in making estimates (Alpert and Raiffa, 1982); unrealistic optimism as to abilities and prospects (Weinstein, 1980); the use of representativeness while ignoring the base rate and sample size (Kahneman and Tversky, 1974); conservatism resulting in overweighting of base rates where sample evidence is available (Edwards, 1968); belief perseverance where people hold on to formed opinions for too long (Lord, Ross and Leper, 1979); anchoring, where, when forming estimates, people begin with an arbitrary number and adjust away from it (Kahneman and Tversky, 1974); availability bias where more recent and easily remembered events distort the estimation process (Kahneman and Tversky, 1974).

Preferences, on the other hand, include prospect theory and ambiguity aversion. Prospect theory is about how investors evaluate risky gambles. People focus on gains and losses rather than final wealth positions (Kahneman and Tversky, 1979). People are risk averse for gains and risk-seeking for losses (loss aversion), and the way a problem is framed for a decision-maker. The application in the aggregate stock market is that the stock market has historically earned a high excess rate of return compared to the commercial paper market, there is volatility in the stock returns and the price dividend ratios, and predictability in stock returns using the dividend price ratio to forecast. Investors demand high equity premium because of loss aversion in the stock market.

Thaler (1999) stated five aspects of real world markets that bring out the magnitude of the impact of behavioural finance. Firstly, standard models of asset markets predict that rational investors will trade little as buying and selling would not occur at the same time. Barberis,

Shleifer and Vishny (1998) undertook to generate asset-pricing models that explain short-run under-reaction and long-run overreaction. Secondly, volatility exceeds that expected from new information that would cause changes in intrinsic values of stocks in the market (Shiller, 1981). Thirdly, according to Modigliani and Miller (1961), dividend policy should be irrelevant, yet most large companies pay dividends, and share prices rise when dividends are initiated or increased. Fourthly, the equity premium puzzle persists with higher returns on equity as compared to government and other securities than can be explained by risk alone. This is explained by the myopic loss aversion where investors weigh gains more heavily than losses (Benartzi and Thaler, 1995). Lastly, stock returns are at least partially predictable based on past returns, price to earnings ratio, and so on (Fama, 1991)

Shiller (2003) stated that behavioural finance is finance from a broader social science perspective including psychology and sociology, and juxtaposed with the theory of rational expectations where asset prices incorporate information about fundamental values. Anomalies discovered, such as serial correlation (Fama, 1970), excess volatility, which implies that prices change for no fundamental reason. Evidence against EMH by looking at anomalies – excess volatility (Shiller, 1981), (LeRoy and Porter, 1981) Samuelson – the stock market is micro efficient (per company) but macro inefficient – movements among individual stocks make more sense than movements in the market as a whole. Jung and Shiller (2002) show that for continually traded stocks, the price-dividend ratio is a strong forecaster of the present value of future dividend changes.

Shiller (2003) stated that feedback models are theories that the success of some investors due to price increases drive new investor demand, thus driving the prices further up. Biased self-attribution is where individuals attribute events that confirm the validity of their actions to their own high ability, and those that go contrary to bad luck. Feedback models do not imply strong serial correlation since people react gradually to price changes over months or years, and not just the current day change. There is momentum in the markets (Jegadeesh and Titman, 1993) such that stocks that showed exceptionally high six month returns beat other stocks in the following year by 12%. But this momentum reverses itself over longer time periods.

The efficient market hypothesis is chosen in carrying out this research since it provides a framework in which the market response to new information (in this case, the shares going

ex-dividend) can be measured to ascertain whether the market is efficient or not. Behavioral finance provides an explanation as to why the market may not behave efficiently, whereas the random walk explains movement of prices independent of the actions happening in the market.

2.3 Empirical Review

The empirical review discusses the share price behaviour on the ex-dividend date in section 2.3.1 which addresses objective one. Subsequently, it moves on to the share volume behaviour on the ex-dividend day in section 2.3.2, and lastly, price normalization on the ex-dividend day in section 2.2.3 which contradicts the efficient market hypothesis to the extent that the assumption that all investors are rational is relaxed.

2.3.1 Share Price Behaviour on the Ex-dividend Date

This section considers share price behaviour on the ex-dividend date. It has been found by Akhmedov and Jakob (2010), Dasilas (2009), Lasfer (1995), Kaplanis (1986), among others, that the share prices fall by less than the dividend amount on the ex-dividend day, which is divergent from the expectation. Akhmedov and Jakob (2010) carried out an event study to examine ex-dividend day behaviour on the Copenhagen Stock Exchange (CSE), Denmark. The variables they used were the close to close prices on cum and ex-days, dividend amounts, yields and trading volumes on the CSE from 1995 to 2005. They noted that ex-dividend day studies generally find that stock prices on the ex-dividend day fall by an amount that is on average less than the dividend, and found this to be true in Denmark as well. They computed the price drop ratios, and also compared the average trading volume around the ex-day (3 days before and 3 days after) to the average on normal trading days (30 days before and 30 days after). After this, their findings were that there were low price drop ratios with a mean of 0.32, using the formula $(P_{cum} - P_{ex}) / D$

Where

P_{cum} = Cum-dividend share price

P_{ex} = Ex-dividend share price

D = Dividend share price

They adjusted their findings for the market ratio as follows:

$P_{cum} (1 + \text{market return}) - P_{ex} / D$

This still yielded a small price drop ratio of 0.33 which is outside of the range specified by the tax clientele hypothesis and the tax transaction costs model of 0.57 – 1.26.

They also found large positive abnormal returns of 6% for the close to close samples, using the formula $[(P_{ex} - P_{cum} + D) / P_{cum}] - E(r)$ where $E(r)$ was the index return on the CSE. High abnormal returns and low price drop ratios suggested that short-term traders do not strongly influence prices around the ex-dividend day. The conclusion was that small price drop ratios in Denmark are caused by relatively illiquid markets, combined with a lack of an automated limit order adjustment mechanism. Isaksson and Islam (2013) and Panetsidou (2015) used similar methodology.

According to Hodgkinson and Wells (2009), in the absence of taxes, market microstructure and other effects, the dividend represents a payment of cash and the value of equity should decrease by that amount on average. The seller will be indifferent as to when to sell if the cum-dividend share price for a particular share is equal to the ex-dividend share price of the stock in addition to the dividend.

Similarly, Dasilas (2009) carried out a study on ex-dividend day behaviour on the Athens Stock Exchange for the period from 2000 to 2004. The variables used in the study were dividend yields, opening and closing prices. He used event study methodology and regression analysis to examine ex-dividend stock prices in an environment with no taxes on dividends or capital gains. The ex-dividend day share prices were found to have dropped by an amount lower than the dividend amount on the ex-dividend day with a price drop ratio of 87.7%.

Lasfer (1995) carried out an event study on ex-day behaviour, specifically with respect to tax and short-term trading effects in the United Kingdom given the change in law - the 1988 Income and Corporation Taxes Act - that reduced the differential taxation of dividends and capital gains. The variables he examined included cash distributions of interim and final dividends from 1985 to 1994, share prices, bid-ask prices and market index. He used the market model to compute abnormal returns over the ten day event window, using the event study methodology as well as regression. He also computed the drop-off ratio, raw returns and mean-adjusted returns, the bid-ask spread on the ex-day. He found that the drop off ratio before the tax reform was lower than that after the change, but is consistently below one.

Kaplanis (1986) carried out a study on options, taxes and ex-dividend day behaviour in the United Kingdom to determine the expected share price fall-off ratio. He collected cum-and ex-dividend closing offer prices for options, and the equity prices from 1979 to 1984. He computed the expected fall-off ratio. He found that the expected fall-off price implicit in option prices was 55-60% of the dividend amount and was not significantly different from the actual fall-off, thus the assumption that stock prices fall by the dividend amount would result in downward biased estimates of option values.

Several reasons have been advanced for the ex-dividend price drop being lower than the dividend amount, including the tax-effect hypothesis, the short-term traders' hypothesis, and market microstructure impediments.

Taxation on dividend income has been advanced as one of the reasons for a share price drop that is lower than the dividend amount (Ma and Ruan, 2012) – this is the tax-effect hypothesis or tax clientele hypothesis, or the long-term trading hypothesis. This is because in many countries the tax rate on dividends is higher than that on capital gains. Based on the premise that investors are interested in the after-tax returns on shares, shares on which dividends have been declared will be traded only until the price drops by an amount equal to the dividend net of the tax. Connelly, Gorman, Limpahayom and Weigand (2008) and Elton and Gruber (1970) argue that the investors will only be indifferent between dividends and capital gains if the effective rates of tax on capital gains and income are equal, as the interpretation of the finding of positive ex-day return.

Elton and Gruber (1970) carried out a study on ex-dividend price behaviour on the New York Stock Exchange from April 1966 to March 1967 on 4,148 dividend payments and found a price drop ratio of 85% of the dividend amount. They developed a model to explain the failure to drop by the entire dividend amount that is now referred to as the long-term trading hypothesis or the tax-effect hypothesis.

Connelly et al (2008) carried out a study on the ex-dividend price behaviour in 37 countries for the year 2000. The price drop ratio was arrived at using the proportion of the value of dividends divided by the value of capital gains. The value of dividends and capital gains were computed taking into consideration the corporation tax rate on distributed profits, the imputation rate and the personal tax rate on dividends. Abnormal returns were computed

using a 78 day window to estimate market model parameters and subtracted from the expected return. The study tested whether each country's mean price drop ratio reflects differences between dividend and capital gains tax rates by regressing the mean price drop ratios on the predicted price drop ratios and a set of variables for agency and information asymmetry effects in each country. The variables were ownership concentration, disclosure index with regard to prospectuses, director compensation and the pervasiveness of earnings management. They found that differential taxation is an important determinant of ex-day stock price changes in global markets and that agency and information asymmetry exert significant influence on ex-dividend day stock prices.

According to Elton and Gruber (1970), the price drop ratio depends on the specific tax-clientele that receives the dividend and in accordance, equilibrium price-drop ratio occurs when the investors are indifferent between selling the stock cum-dividend and holding the stock so as to receive the dividend and then selling ex-dividend. For the investor to be indifferent between the two options, stock prices should drop by an amount less than the dividend in an environment where there is tax.

In this argument, if an investor chooses to sell cum-dividend, he or she receives the cum-dividend price and pays tax at the capital gains tax rate on the excess of the cum-dividend price over the price at which the share was purchased (Ma and Ruan, 2012). If the investor, on the other hand, chooses a different option - to hold the stock, receive the dividend and then sell on the ex-dividend day, the investor will receive the dividend and the ex-dividend price, according to Elton and Gruber (1970) but will have to pay tax on the dividend at the dividend tax rate and also pay capital gain tax on the excess of the ex-dividend price over the price at which the share was procured. When the drop in the stock price is less than the dividend paid, it indicates that the market value of the dividend is lower than the actual dividend paid, which is explained by the dividend income tax rates that are higher than the capital gains tax rates. With differential taxation of dividends and capital gains for individual investors, the price drop should reflect this tax differential and need not be the same as the dividend amount (Panetsidou, 2015). When dividends are taxed at a higher rate than capital gains, investors will be unwilling to subject themselves to a higher tax rate by holding a stock through to the ex-dividend day unless they are to be compensated by a smaller ex-day price decline.

In the same vein, according to Limungi (2011), dividends are generally taxed at higher rates than capital gains, hence the investors tend to prefer capital gains rather than dividends and do not engage in dividend-capturing activities – which limits how far the share prices drop on the ex-day. Also, investors who are in higher tax brackets are interested in lower dividend yields, and vice versa. Investors in higher tax brackets try to avoid paying more tax by avoiding investing in the shares of companies that pay high dividends. When dividends are declared, these investors will sell before the book closure date, whereas the investors in lower tax brackets will purchase the shares cum-dividend so as to benefit from the dividend income. The tax clientele hypothesis is expected to hold in Kenya since dividends are taxable income, whereas capital gains on shares are not taxed.

On the other hand, some researchers have found that even where there are neither taxes on dividends nor on capital gains, the share prices still drop by an amount less than the dividend per share. This suggests that there are factors other than differential taxation between dividend income and capital gains that affect the ex-dividend share price drop. Eades, Hess and Kim (1984) found that excess returns on ex-dividend days cannot be completely explained by the tax hypothesis that dividends are taxed more heavily than capital gains in the United States. They thus conclude that there must be an explanation other than differential taxation.

Rantapuska (2008) reiterates the argument of Kalay (1982) that short-term traders are taxed identically on dividends and capital gains, so that any deviation from a dividend amount price drop creates an arbitrage opportunity that shall be exploited as long as transactions costs are covered. If capital gains and dividends have the same tax treatment, it would be possible for an investor to find arbitrage opportunities by buying cum-dividend and selling ex-dividend, given that the stock price will drop by less than the dividend amount and the transaction costs are more than covered by the tax savings from the capital loss. Arbitrage traders attempt to eliminate any difference between the stock price change and the dividend amount that is caused by the tax clienteles (investors in higher tax brackets own low dividend yield stocks and vice versa, forming two tax clienteles), leaving the transaction costs to be the only restriction that keeps the price drop from adjusting at the amount of the dividend.

Kalay (1982) stated that high dividend yields and low transaction costs are a prerequisite for arbitrageurs to enter the market on the ex-dividend day. Arbitrageurs must also have an equal

preference for dividends and capital gains. He incorporates transaction costs in a model of ex-day trading that predicts an equilibrium ex-day ratio of unity, plus or minus a proportion attributable to transaction costs. This is because arbitrageurs will enter the market and drive the ratio close to one; to the point where profit opportunities no longer exist. There are strong grounds for expecting the degree of short-term trading activity to be non-normally distributed.

Rantapuska (2008) carried out a study on ex-dividend day trading in the Finnish market for the period from 1995 to 2002. He computed the ex-day premiums as well as gross and net trading volumes, and regressed the former on the latter, and found that transaction costs and dividend yield jointly determine the volume of short-term trading activity. Ex-day returns were also computed and the trade found to be profitable.

Similarly, Ma and Ruan (2012) refer to Bali (2003) who examines the effect of price discreteness and bid-ask spreads on the ex-dividend day share price by including arbitrageurs who are taxed similarly on dividends and capital gains as the market makers and found evidence in support of the short-term traders' hypothesis. Eades et al (1984) and Lakonishok and Vermaelen (1986) had similar findings.

Eades et al (1984) carried out a study on interpreting security returns during the ex-dividend period from 1962 to 1980 on the New York Stock Exchange. They used cum and ex-day prices as well as the dividend amount to compute abnormal returns. They found that the ex-day pricing behaviour is consistent with the tax hypothesis that dividends are taxed higher than capital gains, but was not completely explained by it.

Papers in this area have attributed the lower ex-dividend share price drop to market microstructure impediments where differential taxation and transaction costs have not fully explained the ex-dividend price drop. Market microstructure impediments include factors such as price discreteness and bid-ask bounds.

Akhmedov and Jakob (2010) describe the microstructure model by Bali and Hite (1998) as an alternative to the tax clientele and short-term trading models. Their tick-size model implies that the price-drop ratio is caused by discrete pricing that is imposed by a mandatory tick size enforced by the exchange on which the shares trade. They suggest that the ex-day price of a

stock changes by the price increment equal to or just smaller than the size of the dividend payment. Thus the price will change to the tick just below the dividend amount. For example, with a minimum bid-ask spread of 1/16 (\$0.0625) a dividend of \$0.10 would lead to \$0.0625 drop in price that leads to a price-drop ratio of 0.625. The decimalization in 2001 and the transition of the 1/8 to 1/16 tick in the US markets offered a great opportunity to test Bali and Hite's argument. The reduction of the tick size, along with decimalization, was expected to lead to a price drop on the ex-dividend day that is closer to one.

French, Varson and Moon (2005) present a different possible explanation for the ex-day anomaly in their study on capital structure and ex-dividend day return. Their analysis relied on the valuation of corporate securities using option-pricing theory where the payment of a cash dividend causes the value of the firm to fall by an amount equal to the dividend. According to their theory, the debt claim absorbs a portion of the decrease, so that the remainder (the fall in the value of equity) is less than the dividend.

Pham, Walter and Yahyae (2008) conducted a study on ex-dividend day behaviour in the absence of taxes and price discreteness in the Oman market for the period from 1997 to 2005. They computed the ex-day premium using a 5 day window and they found a price drop less than the dividend amount and attributed it to the bid-ask spread since the cum-dividend share sells at the bid price while the ex-dividend share sells at the ask price.

Similarly, Yahyae (2014) performed a study on ex-dividend day behaviour of cash dividends on Omani stocks for the period from 1997 to 2012. He obtained the cum and ex day open and close prices and open and close bid and ask quotes, and used these variables to compute the ex-day premium using an overnight price drop and found a price drop smaller than the dividend amount. He attributed it to an illiquid market as well as lack of an automated limit order adjustment mechanism.

Hodgkinson and Wells (2009), in considering the findings of a drop-off ratio of less than one in Hong Kong by Frank and Jagannathan (1998), concluded that market microstructure may provide an explanation in that market makers are more likely to hold the shares when they go ex-dividend as they will be best placed to re-invest the dividend. It may be burdensome for the individual investor to receive the dividend due to the cumbersome process of collecting it, thus he or she may choose not to receive it. On the other hand, market makers may be better

placed to collect the dividend and buy just before the ex-dividend day. Consequently, on the last cum-dividend day, most trades will occur at the ask price, which will lead to a lower ex-dividend price drop than the dividend amount.

Isaksson (2013) and Jason and Ma (2004) looked into microstructure impediments from a different perspective in order to explain the ex-day anomaly. They argued that an automated cum-dividend day to ex-dividend day limit order adjustment mechanism seems to control ex-dividend day behaviour based on data taken from the US. Jason and Ma (2004) used data from the NYSE to develop their research regarding this issue and concluded that no matter the tick size, bid prices fell more as compared to ask prices, regardless of whether they measured the drop from cum-dividend day open to ex-dividend day open or from cum-dividend day close to ex-dividend day close. Moreover the report suggested that while price discreteness was eliminated, the actual ex-dividend drop anomaly increased. Jason and Ma (2005) conducted another research, examining trading in the Toronto Stock Exchange (TSX) in which limit orders are not automatically adjusted from cum-dividend day to ex-dividend day. They reported much smaller price drop ratios in TSX and concluded that the lack of an order adjustment mechanism together with a fairly low trading volume leads to incomplete price adjustments on ex-dividend days. Dubofsky (1992) advances an explanation based on NYSE rules that require open orders to buy to be marked down on the ex-date by an amount that is more than the dividend, while open orders to sell are not reduced.

There, however, have been contrary findings by Graham, Michaely and Roberts (2003), and Jakob and Ma (2004) who analysed the relation between tick sizes and drop in price ratios on the NYSE. They found that price-drop ratios decreased after stock market decimalization, which is quite unexpected based on the theoretical background.

Some empirical studies have found that share prices fall by the dividend amount on the ex-dividend day. Isaksson and Islam (2013) carried out a study on the ex-dividend day price behaviour of blue-chip stocks in the international markets, specifically, the Shanghai, New York, Tokyo and London Stock Exchanges for the period from 2005 to 2009. The variables they considered were daily stock prices, daily trading volumes, cash dividend amounts, cum and ex-dividend dates and annual market capital of each company. They computed the raw and market adjusted price drop as well as the relative trading volume, which is the trading volume for the ex-dividend day over the average trading volume of the company estimated

over a period of 30 to 5 days relative to the ex-dividend day. They found that in the Shanghai and New York Stock Exchanges, stock prices fall by an amount that is not statistically different from the dividend on the ex-dividend day, however, there is no indication of abnormal trading volumes or abnormal returns.

Hodgkinson and Wells (2009) carried out a study on the ex-interest behaviour of gilt prices in the United Kingdom from 1996 to 2008. The variables they used included the cum-interest and ex-interest gilt prices as well as the corresponding coupon amounts. They carried out a regression analysis and calculated the drop off statistic excluding the expected change in price of gilt from the cum to the ex-interest state. They then used a cluster procedure to ensure consistent estimates of standard errors under arbitrary serial correlation. Having thus ensured robust standard errors, they then tested for heteroscedasticity using Wooldridge and Wald statistics. Hodgkinson and Wells found the drop-off ratio in the UK market to be insignificantly different from one for the unadjusted sample. Heteroscedasticity, was, however, found to be a problem for the panel data. In relation to returns, they used Bank of England yield data and found that there are lower returns on the ex-interest day than on other days.

Similarly, Milonas et al (2006) carried out research on the ex-dividend price behaviour of shares of companies listed in the Chinese market from 1996 to 1998. The variables they used were the cash dividends and the cum and ex-dates from the annual reports of listed Chinese companies, as well as the daily share prices and market indices. They computed the raw price ratio, the raw price drop ratio, the market-adjusted price ratio and the market-adjusted price drop ratio for two categories of data – the taxable and non-taxable shares. The share prices were found to drop by the dividend amount on the ex-dividend day for the non-taxable shares. For the taxable shares, the drop approaches the tax adjusted dividend as the tax rate moves from 20% to 0%.

Likewise, Boyd and Jagannathan (1994) performed a study on the ex-dividend price behaviour of common stocks in the United States for the period from 1962 to 1987. They computed the price drop ratio from the variable of the cum and ex-dividend share prices and found that on average the ex-dividend percentage price drop moves almost exactly in line with the dividend yield.

Panetsidou (2015) carried out a study on ex-dividend day behaviour in Romania for the years 2000 to 2012, and specifically on whether the short-term trading hypothesis and the clientele effect exist in this market. He used the standard event methodology to assess the price and trading volume behaviour, looking specifically at the raw and market adjusted price drop ratio including abnormal returns and using multiple regression analysis. He observed that share prices in Romania increased, rather than dropping, on the ex-dividend day, implying large profit opportunities for investors in that market.

Equally, Kato and Loewenstein (1995) performed an assessment of the ex-dividend day behaviour of stock prices in the Japanese market and found that the share prices rose on the ex-dividend day, which is contrary to expectations. Kato and Loewenstein (1995) carried out a study on ex-dividend day stock price behaviour in Japan for the period from 1981 to 1991. The variables studied included daily closing prices, daily trading volumes, semi-annual earnings for individual securities, index data (Nikkei and Tokyo Stock Exchange Price Index), dividend amounts, ex-dividend dates and information on rights issues and splits. They calculated the price drop to dividend ratio on the ex-day (that is, $(P_{cum} - P_{ex}) / D$). This was however potentially subject to heteroskedasticity and fails to consider general market movements on the ex-day, and thus in addition, they computed the difference between the rates of return around ex-dividend and on other days. The expected returns are the observed returns + $D / P_{cum} * [(dividend\ tax\ rate - capital\ gains\ tax\ rate) / (1 - capital\ gains\ tax\ rate)]$. They employed a standard event methodology and used the market model to calculate excess returns on ex-dividend days. The excess returns are regressed against the explanatory variables. They found that share prices increased on the ex-dividend day by a ratio of 0.5063.

2.3.2 Share Volumes on the Ex-dividend Day

In line with Lakonishok and Vermaelen (1986), Panetsidou (2015) noted that an examination of volume behaviour around ex-dividend days more fully explains the ex-dividend day behaviour of shares than an examination of the price movements only. It distinguishes between the effect of taxation and transaction costs on ex-day prices.

Chena, Chowb and Shiuc (2013) examined ex-dividend events on the Taiwan Stock Exchange from 1992 to 2006, looking specifically at the trading volumes, daily prices, the dividend amounts, transaction costs, and the tax rates on dividends and capital gains as their variables. They found that the excess volume around the ex-dividend day is positively

correlated with the degree of tax heterogeneity and gains from dividend capturing activities, and negatively related to arbitrage risks and transaction costs. Also, high tax bracket investors sell cum-dividend and buy the shares back ex-dividend, whereas low tax bracket investors trade in the opposite direction.

Equally, Panetsidou (2015) carried out a study on ex-dividend day behaviour in Romania for the years 2000 to 2012, and specifically on whether the short-term trading hypothesis and the clientele effect exist in this market. He used the standard event methodology to assess the trading volume behaviour, looking specifically at the mean abnormal trading volume following Lakonishok and Vermaelen (1986) where they used a time frame of 110 days to 10 days. The cumulative abnormal volume was also computed. He observed that there were abnormal trading volumes 30% higher than the average on the cum and ex-dividend days.

Similarly, Haesner and Schanz (2013) carried out a study on ex-dividend stock prices and trading behaviour on the Frankfurt Stock Exchange from 1994 to 2009. The variables they examined included daily trading volumes, dividend amounts, cum-dividend stock price, ex-dividend stock price, standard deviation of each security in relation to the market's return, and transaction costs. In their methodology, they computed the daily abnormal volume as the difference between a stock's daily trading volume and the average trading volume over the estimation period. The cumulative abnormal volume was arrived at as the sum of the daily abnormal volumes in the ten days surrounding the ex-dividend day – 5 days before and 5 after. They also estimated the ex-dividend price drop ratio, removing outliers at the 1% level, and the abnormal return on comparison with the market average. They found that trading volumes were significantly higher around ex-dividend days, with 34.2% for the full imputation system, 43% for the half income system and 60% for the flat tax system, and positively related to dividend yield. The level of trading did not change with the 2001 tax reform which reduced tax heterogeneity among investors.

Likewise, Akhmedov and Jakob (2010) carried out a study to examine ex-dividend day behaviour on the Copenhagen Stock Exchange (CSE), Denmark. The variables they used were the close to close prices on cum and ex-days, dividend amounts, yields and trading volumes on the CSE from 1995 to 2005. They compared the both the ex-day and the cum-day average trading volume around the ex-day (3 days before and 3 days after) to the average on normal trading days (30 days before and 30 days after). They found significant abnormal

trading volume on and around the ex-dividend day. Regression analysis showed a positive and significant relationship between trading volume and price drop ratio, but the liquidity of the market was generally found to be low. Opening limit order book orders were found to impact ex-day price behaviour since the volume of orders in the opening order book was large relative to the total trading volume on the ex-day.

Equally, Kato and Loewenstein (1995) carried out a study on ex-dividend day stock price and volume behaviour in Japan for the period from 1981 to 1991. The variables studied included daily closing prices, daily trading volumes, semi-annual earnings for individual securities, index data (Nikkei and Tokyo Stock Exchange Price Index), dividend amounts, ex-dividend dates and information on rights issues and splits. Volume data was analysed using the mean-adjusted model – comparing volume on ex-day with normal volume levels on other days. They found that excess volumes before the tax reform of 1988 (introducing capital gains tax and limiting intercorporate trading around year ends) were large and highly significant, but after the reform were insignificantly different from zero.

Bowers and Fehrs (1995) examined ex-dividend day effects in the United States over the period from 1976 to 1987 using as their variables daily price data, dividend data and trading volumes. They computed excess returns using the cumulative abnormal volume formula, where abnormal volume was arrived at using the market model, but log transformations were necessary since daily and cumulative residuals were found to be positively skewed. Abnormal volumes were found to persist from the announcement date to the ex-dividend date.

Similarly, Dasilas (2009) carried out a study on ex-dividend day behaviour on the Greek stock market for the period from 2000 to 2004. The variables used in the study were dividend yields, opening and closing prices and trading volume data. He used event study methodology and regression analysis to examine abnormal trading volumes around the ex-dividend day in an environment with no taxes on dividends or capital gains. His event window was 40 days and the average or normal trading volumes were based on 240 days around the ex-day. There were abnormal trading volumes as a result of buying pressure on the last cum-dividend day and selling pressure on the ex-dividend day. This evidence is in line with short-term trading as described by Lakonishok and Vermaelen (1986), which is consistent with the presence of dividend capturing activities around the ex-dividend day.

In addition to the foregoing, Lakonishok and Vermaelen (1986) conducted an examination of tax-induced trading around ex-dividend days which specifically investigated trading volume around ex-dividend days. It was found that trading volume increases significantly for taxable distributions around the ex-dividend day. This is more pronounced for high yield, actively traded stocks. Non-taxable distributions, on the other hand, had negative abnormal trading volumes.

Also, Ma and Ruan (2012) carried out an event study on ex-dividend day volume behaviour using the daily trading volumes over the period from 1994 to 2006. They computed the standardized abnormal volume over a period of 10 days before and 10 days after the ex-dividend day. The average daily volume for comparison was obtained using a 60 day period before and 10 days after the ex-dividend day. They found that there were abnormal trading volumes of 12% above average on the ex-dividend day for all exchange-traded funds.

However, Isaksson and Islam (2013) found that there was no indication of abnormal trading volumes in their study on the Shanghai and New York Stock Exchanges, even though stock prices did fall by the dividend amount on the ex-dividend day. They examined abnormal return and relative trading volume using daily trading volumes to find out the relevance of arbitrage opportunity which might exist on the ex-dividend day due to the difference between the stock price drop and the dividend amount.

2.3.3 Price Normalization after the Ex-dividend Day

Several researchers did not consider how long it took the price to normalize after the ex-dividend day (or to drop by the entire dividend amount) including Akhmedov and Jakob (2010), Dasilas (2009), Lasfer (1995), Kaplanis (1986), Siddiqi (1997) and thus this study adds value by introducing a new angle to the existing ex-dividend literature.

2.4 Conceptual Framework

In the conceptual framework, the independent variable was the dividend payment whereas the dependent variables were the share price and share volume around the ex-dividend day. The conceptual framework is based on the efficient market hypothesis which explains the relationship between dividends and the ex-dividend share prices and volumes. The dividends

are expected to cause a decrease in the share prices and a rise in share trading volumes based on literature. In an efficient market, it is expected that the share price will decrease by the dividend amount on the ex-dividend day. Thus the study compared the price on the ex-dividend day less the price on the previous day with the dividend amount, which is the amount by which the price is expected to decrease.

On the other hand, higher trading volumes are expected in an efficient market due to investors taking advantage of the arbitrage opportunity in the market and this has been found to be the case by Chena, Chowb and Shiuc (2013), Panetsidou (2015), Haesner and Schanz (2013) and Akhmedov and Jakob (2010). Share trading volumes were measured by comparing the share volume on the ex-dividend day with the average trading volume 5 days before and 5 days after the ex-dividend day.

Relating to the third objective, in an efficient market, the expected price drop on the ex-dividend day is the dividend amount. However, based on past research, a majority of studies have found the share price to decrease by an amount lower than the dividend on the ex-dividend day. This objective seeks to determine whether this drop is spread over several days, implying that the market is not efficient, but eventually achieves the efficient position. The normalization of the price is measured by assessing the share prices after the ex-dividend day in the 5 days period after the ex-dividend day.

2.5 Operationalization of Variables

In this section, the measurements used to operationalize the independent and dependent variables are discussed.

2.5.1 Dependent Variables

The ex-dividend price movement is measured using the ex-dividend price drop ratio, which is arrived at as the difference between the cum dividend share price less the ex-dividend share price, divided by the dividend amount (Isaksson and Islam, 2013). This is adjusted for taxes in line with Elton and Gruber (1970), transaction costs in line with Kalay (1982) and compared with the NSE price limit as a check for microstructure impediments as highlighted by Bali and Hite (1998). On the other hand, the ex-dividend movement in share volumes is arrived at by comparing the average share volumes on the ex-dividend day with those on the day average of 5 days before and 5 after in line with Isaksson and Islam (2013).

2.5.2 Independent Variable

The dividend payment consists of the Kenya Shilling amounts of the interim and the final cash dividends paid by Kenyan companies listed on the Nairobi Securities Exchange during the period from 2006 to 2015.

The expected relationship is that the dividend amount (the independent variable) will cause a reduction in the share price (dependent variable) equal to itself on the ex-dividend day in a perfect market. In an imperfect market, factors such as transaction costs and taxes will cause the share price reduction to be less than the dividend amount on the ex-dividend day. For the share volume, there is expected to be a rise in the volumes of shares traded around the ex-dividend day as investors in the higher tax bracket sell off their shares in order to avoid taxes on the dividends.

2.6 Gaps in Research

Studies on ex-dividend price behaviour have had different findings in diverse markets. It was found that share prices fall by the dividend amount on the ex-dividend day by Isaksson and Islam (2013) and Milonas et al (2006). On the other hand, after comparing actual ex-dividend date prices to the theoretical ex-dividend day prices, Akhmedov and Jakob (2010), Whitworth and Zhang (2010), Boyd and Jagannathan (1994) and Chottiner and Young (1971) found that share prices fall by less than the dividend distributions. On the other hand, Panetsidou (2015) and Kato and Loewenstein (1995) found that share prices rise on the ex-dividend day.

Looking at it from a Kenyan perspective, a study done by Limungi (2011) on the NSE 20-share index in Kenya for the period from 2003 to 2010 found varying results as follows. Stock prices on the ex-dividend day fell by less than the dividend paid for 37% of the observations, dropped by amounts higher than the dividends paid for 36% of the observations, reduced by amounts equal to the dividend for 3% of the observations, rose on the ex-dividend day for 14% of the observations, and did not change when compared to cum-dividend prices for 10% of the observations. The conclusions from this study highlight a gap in research as the study was subject to limitations due to sample size as the study did not extend to the entire population of securities listed on the exchange (fifty five at the time), and the twenty companies may not be representative of the entire portfolio of listed companies.

Thus a study on the entire market shall be carried out relating not only to price movements but also to the volume movements as well, in addition to extending the period to 2015.

2.7 Chapter Summary

Many empirical studies have found that the ex-dividend price behaviour is not a price reduction by the dividend amount as would be expected from theory. Different researchers have attributed this to a variety of factors including differential taxation of dividends and capital gains, the short-term traders' hypothesis and market microstructure factors like tick size and bid-ask spread. This study aims to examine the ex-dividend share price and volume behaviour on the Nairobi Securities Exchange.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

The purpose of this study is to test semi-strong form efficiency of the Kenyan stock market by examining the ex-dividend day price and volume behaviour of shares for cash dividend payments, as well as how long share prices took to normalize after the ex-dividend day. This chapter outlines the procedures and methods used in carrying out the study, including the research design in section 3.2, proposed population and sample in section 3.3, data collection methods in section 3.4 and data analysis methods in section 3.5. The data obtained was used to measure the movements in the share prices and volumes on and around the ex-dividend dates and assess whether these are indicative of market efficiency or arbitrage opportunities.

3.2 Research Design

This research is an event study of price and volume behaviour 5 days before and 5 days after the ex-dividend day for cash dividend payments. Kramer (2001) stated that researchers use event studies to analyse the information content of corporate events, commonly by making use of changes in share prices in order to shed light on various questions including the impact on market efficiency.

Cross-sectional analysis as used by Bowers and Fehrs (1995) was used to determine the relationships amongst the variables under study. The research used data from all listed companies on the NSE that paid cash dividends over the last nine years (2006 to 2015). The period of analysis begun from 2006 because in that year the Nairobi Securities Exchange implemented live trading on the automated trading system, resulting in greater efficiency in the update of price and volume information (NSE Website, Kotonya, 2013).

3.3 Population and Sample

The target population of the study was composed of all the companies listed on the Nairobi Securities Exchange for which cash dividends were paid during the period from September 2006 to November 2015. There were 64 companies listed as at 30 November 2015, and a total of 66 companies were in operation between 2006 and 2015, as shown in appendix 2. The units of analysis were the cash dividend payments by the companies, including both interim and final dividends paid during this period, which were 495 in number.

3.4 Data Collection

Secondary data was obtained from the daily trading reports of the Nairobi Securities Exchange. This data comprised the company announcements, including approved dividend amount per share, and the ex-dividend date for the companies listed on the Nairobi Securities Exchange for the period from September 2006 to November 2015. Using these dates to limit the data, the daily closing share prices, including both cum-dividend and ex-dividend prices in addition to daily trading volumes five days before and five days after each ex-dividend date, as well as the daily index data were obtained. The data collected related to both interim and final cash dividends during the period under study. For this research, data from listed companies was used since market prices of the shares are observable in the cum-dividend and ex-dividend periods.

3.5 Data Analysis

The data analysis is split into three categories. Section 3.5.1 contains the analysis of price data on the ex-dividend day, section 3.5.2 contains the analysis of volume data around the ex-dividend day, and section 3.5.3 contains the analysis of price data around the ex-dividend day to test for the normalization of share prices.

3.5.1 Price Data on the Ex-dividend Day

The data on daily closing share prices was used to measure the change in share price by taking the last cum-dividend day share price less the first ex-dividend day share price (Haesner and Schanz, 2013). This change was then divided by the dividend per share to determine the price movement as a proportion of the dividend amount. This was done for both interim and final cash dividends. The ex-dividend day price drop is computed as:

$$\frac{(\text{Cum-dividend day share price} - \text{Ex-dividend day share price})}{\text{Dividend amount}}$$

Elton and Gruber (1970) developed a model with equilibrium price drop ratio that occurred when the investor was indifferent between trading on cum-dividend or ex-dividend days. This is because, in an efficient market, the shareholder who sells the share cum-dividend should have the same gain as the investor who holds on to the share which drops to the ex-dividend price and thereafter also receives the dividend. For this to hold, it is implied that stock prices

should fall by the exact amount of the dividend payment on the ex-dividend day (Alaganar, Jun, Partington and Stevenson, 2008).

Therefore,

$$P_{\text{cum}} - P_{\text{ex}} = D$$

Where

P_{cum} = Cum-dividend share price

P_{ex} = Ex-dividend share price

D = Dividend share price

The ex-dividend day price drop statistic is computed as $(P_{\text{cum}} - P_{\text{ex}}) / D$ which is in line with Haesner and Schanz (2013), Panetsidou (2015) and Ma and Ruan (2012), among others. Any instances of interim and final dividend payment were considered separately for each case, not amalgamated.

The findings were then adjusted for market movements to obtain the market-adjusted price drop ratio as follows, in line with Panetsidou (2015), Isaksson and Islam (2013), Naranjo (2000), Michaely (1991) and Kalay (1982).

Market-adjusted ex-dividend price drop:

$$= \frac{P_{\text{cum}} - \frac{P_{\text{ex}}}{(1 + \text{market return})}}{D}$$

The market-adjusted ratio was compared with the dividend amount to ascertain by what proportion of the dividend the share price had moved. The market movement is taken into account since if the market performed well, for instance then the price drop on the ex-dividend day would be less than the dividend. The output of the price data analysis is then presented in terms of the categories: share prices increased on the ex-dividend day, share prices decreased on the ex-dividend day, and share prices remained constant on the ex-day.

3.5.2 Volume Data

The trading share volumes collected were analysed as an event study of 10 days before and 10 after the ex-dividend day. Similar to Haesner and Schanz (2013), the daily abnormal volume was computed as the difference between each share's daily trading volume and the

average daily trading volume over the estimation period of ten days around the ex-dividend day, 5 days before and 5 after. This 10 day period has been used by several researchers in the area of stock markets (Haesner and Schanz, 2013 and Seiler, 2000).

$$\text{Abnormal volume ratio} = \frac{\text{Daily Trading Volume} - \text{Average Trading Volume}}{\text{Average Trading Volume}}$$

3.5.3 Price Data around the Ex-dividend Day

Based on past research, a majority of studies have found the share price to decrease by an amount lower than the dividend on the ex-dividend day. Thus, as a third objective, it was considered how long it took the share prices to drop by the dividend amount after the ex-dividend day, or if they did not drop by the entire dividend amount, whether they tended in this direction. This was done by computing the price drop ratio for each of the 5 days before and the 5 days after the ex-dividend day.

The expected price drop ratio is a value of 1 on the ex-dividend day but this objective seeks to determine whether this drop is spread over several days, implying that the market is not efficient, but eventually achieves the efficient position.

3.6 Ethical Considerations

Ethical standards have been taken into consideration in this research and it is not foreseen that any of the information utilised would infringe on the rights and welfare of participants. This study complied with the set requirements in order to ensure accuracy of scientific knowledge and the research outcomes as well as protect intellectual property rights by acknowledging all sources of information or ideas. The study is intended for the good of investors, companies, the academic world, and policy makers, and no harm is expected to result from the performance of this study.

CHAPTER FOUR

RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

The general objective of this study is to test the semi-strong form of market efficiency of the Nairobi Securities Exchange using cash dividends by examining the ex-dividend day price and volume behaviour of shares, as well as how long it took the prices to normalize after the ex-dividend day. In this chapter, the data analysis and a report on the results of the study are presented. The findings are presented based on the specific objectives of the study. Section 4.2 deals with general information, section 4.3 covers the results from the data analysis on testing market efficiency using the ex-dividend day prices of shares on the NSE (objective 1), and section 4.4 covers the results from the volumes of shares traded around the ex-dividend date, which was the second objective of the study, whereas section 4.5 deals with price stabilisation or normalization after the ex-dividend day.

4.2 General Information

The data collected for the study included the NSE daily index data, dividend per share, the daily closing share prices, including both cum-dividend and ex-dividend prices, as well as daily trading volumes five days before and five days after each ex-dividend date. The entire population of the companies that paid dividends during the period was tested.

The number of firms that paid dividends during the period was 63 (that is, 95% of the companies on the NSE during the nine year period under review) and the number of dividend payments was 495. If the ex-dividend price was found to drop by the dividend amount on the ex-dividend day, then the market would be likely to be efficient in the semi-strong form, and there would be no arbitrage opportunities in the market. On the other hand, if the market price decreased by less than the dividend amount, or increased on the ex-dividend day, then the market would likely not be efficient in the semi-strong form, and this would suggest that arbitrage opportunities are available for investors to take advantage of in the market.

4.3 Ex-dividend Day Share Price Behaviour

The first objective of this study sought to examine ex-dividend day share price behaviour on the Nairobi Securities Exchange for the period from 2006 to 2015 for cash dividend payments. This was to determine whether the prices decreased on the ex-dividend day by the dividend amount, as is expected in a semi-strong form efficient market, or alternatively,

whether the share prices behaved in a different manner and the prices decreased by a lower amount than the dividend, increased or remained constant on the ex-dividend day.

For each of the cash dividend payments, the daily closing prices for the last cum-dividend day and the first ex-dividend day were obtained as well as the dividend amount. A check was done for any gaps in the data, and that which was found to be missing was thereafter obtained. Also, the data was cleaned up, removing the instances of bonus issues, rights issues, stock splits and other corporate events that took place on or close to the ex-dividend date. There were 51 instances of corporate events eliminated and 444 dividend payments remained for analysis. Thereafter, the analysis was run for the nine year period from September 2006 to November 2015 and the price-drop ratio, as well as the market-adjusted price-drop ratio, generated for each dividend payment. In six cases, it was found that there was a special dividend announced with the same ex-dividend date as the final dividend. In these cases, the special and the final dividend were amalgamated and treated as a single dividend payment.

Table 4.1 provides descriptive statistics for the price-related variables and shows that there were low ex-dividend price drop ratios.

Table 4.1: Ex-day descriptive statistics for share price movements

	Maximum	Minimum	Mean	Standard Deviation	Median	Mode
Price-drop ratio (PDR)	8.00	(8.33)	0.08	1.52	0.00	0.00
Market-adjusted PDR	9.67	(6.31)	-0.20	1.52	0.11	0.12

The mean ex-dividend price drop ratio is 0.08 with a median and mode of 0. When the price drop ratio was adjusted for the market movement using the NSE 20-share index (that is, the ratio of the index on the day before the stock went ex-dividend to the index on the ex-dividend day), it was found that on average, share prices fell by 20% of the dividend amount on the ex-dividend day. Thus the market movement partially explained the ex-dividend share price movement, causing it to increase by an additional 12 basis points.

The minimum price drop ratio in Table 4.1 is 8.33, which is interpreted as a price increase that is eight-and-a-third times the dividend amount, which corporate actions could not explain, since clean-up of data was done before the analysis was carried out.

Going into further detail, an analysis of the share prices on the ex-dividend day may be presented as in Table 4.2 – categorised into share prices that dropped on the ex-dividend day, share prices that increased on the ex-dividend day, and share prices that remained constant.

Table 4.2: An analysis of the price movement categories on the ex-dividend day

	Number of observations	Percentage
Share price increased	142	32%
Share price decreased	170	38%
Share price remained constant	<u>132</u>	<u>30%</u>
	<u>444</u>	<u>100%</u>

From Table 4.2, of the 444 observations of share price movements on the ex-dividend day, 38% (or 170 observations) were decreases in share price on the ex-dividend day. This was the largest proportion of the movement and therefore the cause of the overall average price movement on the ex-dividend day to be a price decrease of 8% before adjustment for market movements, as shown in Table 4.1.

When the price decrease was further analysed in Table 4.3, it was found that 13 of the 170 observations (or 8%) dropped by the dividend amount on the ex-dividend day – which is what would be expected in a semi-strong efficient market on the ex-dividend day. However, the majority of 65% of the shares dropped by less than the dividend amount on the ex-dividend day on the NSE during the nine year period.

Table 4.3: An analysis of the price decreases on the ex-dividend day

	Number of observations	Percentage
Share price decreased by dividend amount	13	8%
Share price decreased by less than dividend amount	112	66%
Share price decreased by more than dividend amount	<u>45</u>	<u>26%</u>
	<u>170</u>	<u>100%</u>

The second most common category shown in Table 4.2 was the shares for which the price increased on the ex-dividend day, which formed 32% of the total observations, and the last category was 30 of the observations for which the share prices remained constant. It was interesting to note that the observations were almost evenly split between those whose share prices dropped on the ex-dividend day, those whose share prices increased, and those that remained constant.

When the price drop ratio and its market adjusted form were considered for each of the 3 categories, that is, for share price increases on the ex-dividend day, share price decreases and share prices that remained constant, the findings were as in Table 4.4.

Table 4.4: Highlights of price drop ratio per the price movement categories on the ex-dividend day

	Number of observations	Percentage	Price-drop ratio (PDR)	Market-adjusted PDR
Share price increased	142	32%	(108%)	(75%)
Share price decreased	170	38%	111%	108%
Share price remained constant	132	30%	0%	7%
	444	100%		

From Table 4.4, for the 32% of the observations for which the share price increased, the average price movement was an increase of 108%, whereas the market adjusted price movement was a rise of 75%. On the other hand, for the 170 observations where the share price decreased, the price drop ratio was 111%, while the market adjusted price drop was 108%.

Thereafter, the research considered whether there was a difference in price behaviour on the ex-dividend day when the dividend payments are categorized by whether they were interim or final dividends. The findings relating to the price movements when interim dividend payments were made are in Table 4.5.

Table 4.5: An analysis of the prices for interim dividend payments on the ex-dividend day

	Number of observations	Percentage	Price-drop ratio (PDR)	Market-adjusted PDR
Share price increased	40	32%	(145%)	(80%)
Share price decreased	48	38%	153%	154%
Share price remained constant	37	30%	0%	(3%)
	125	100%		

Of the total observations which were 444 in number, 125 (which formed 28% of the total payments) related to interim dividend payments, whereas the remainder related to final dividend payments. 38% or 48 observations of the 125 interim dividend payments related to share price decreases on the ex-dividend day and this formed the largest proportion. This is in line with the overall finding in Table 4.2 where the largest proportion (38%) related to share price decreases on the ex-day. These were followed by 32% of the shares for which the share price increased on the ex-dividend day (in agreement with 32% price increases in Table 4.2)

and 30% of the observations for which the share prices remained constant (in harmony with 30% constant prices in Table 4.2).

The findings on interim dividend payments are compared to the findings on final dividend payments in Table 4.6. Companies for which there was only one dividend payment during the year were considered to have a final dividend payment in the year. Also, for companies which had a special dividend declared with the same ex-dividend date as the final dividend, the two were considered to be the final dividends.

Table 4.6: An analysis of the prices for final dividend payments on the ex-dividend day

	Number of observations	Percentage	Price-drop ratio (PDR)	Market-adjusted PDR
Share price increased	102	32%	(93%)	(73%)
Share price decreased	122	38%	95%	90%
Share price remained constant	95	30%	0%	0%
	319	100%		

Of the total observations which were 444 in number, 319 (or 72% of the total) related to final dividend payments, whereas the remainder related to interim dividend payments. 38% or 122 of the 319 final dividend payments related to share price decreases on the ex-dividend day, and this formed the largest proportion. This is in line with the overall finding in Table 4.2 where the largest proportion of 38% related to share price decreases on the ex-day. These were followed by 32% of the shares for which the share prices increased on the ex-dividend day (in agreement with 32% price increases in Table 4.2), and then 30% of the shares for which the share price remained constant on the ex-dividend day (consistent with 30% constant prices in Table 4.2).

When the price drop analysis was broken down on a year by year basis, the results were as shown in Figure 4.1. The movement of the market-adjusted versus the basic ex-dividend price drop over the period can be summarized as follows:

Figure 4.1: Ex-dividend day price behaviour from 2006 to 2015

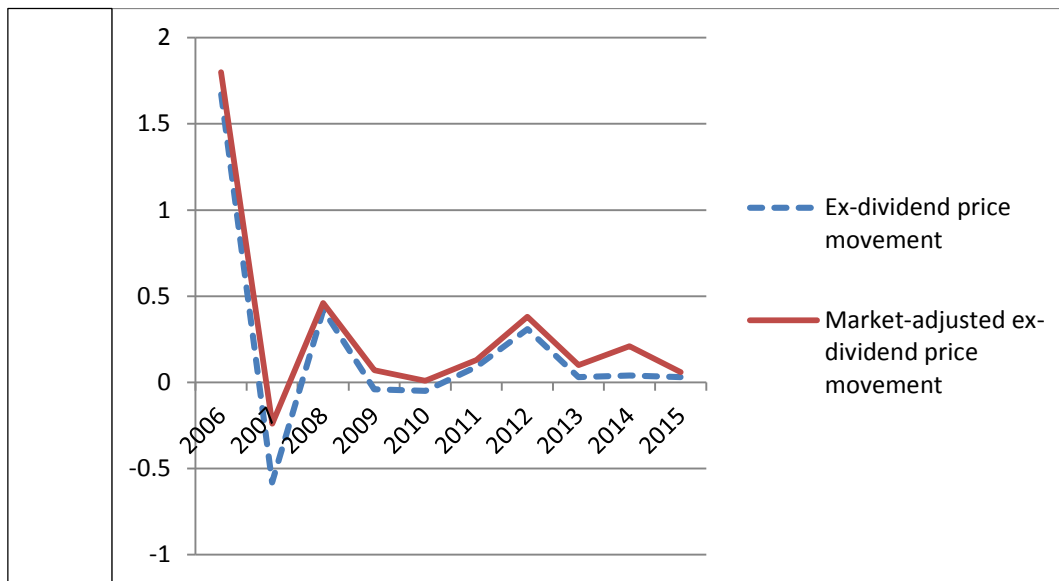


Figure 4.1 shows that the market-adjusted ex-dividend price movement was in tandem with the basic ex-dividend price movement over the nine year period. The price movement is computed as (cum-dividend price minus ex-dividend price) divided by the dividend amount, and thus a positive value is indicative of a price drop on the ex-dividend day, whereas a negative value is indicative of a price increase on the ex-dividend day. An efficient market should have a price movement value of positive one (1). In the graph, the ex-dividend price drop was 1.67 times the dividend amount in 2006. However, in 2007, the share price rose on the ex-dividend day by a ratio of 0.58. From 2008 forward, the share price has dropped in most years, though by less than the dividend amount. The market-adjusted ex-dividend price drop followed a similar pattern over the nine year period, and explained a proportion of the ex-dividend price movement as the continuous line appears above the dotted line. From the graph, it can be seen that there does not seem to be an improvement of the efficiency of the market as would be indicated by a trend towards a price movement of one (1).

Price drop ratios that may be considered outliers, such as the minimum of 22 in Table 4.1 occurred in the year 2007, for which Figure 4.1 indicates a price increase of 0.58, rather than the expected price drop of 1. Removing this from the analysis results in a price rise of 21% (unadjusted ex-dividend price drop ratio) for the year 2007 as compared to 58% previously when it was included. Overall, the finding that the ex-dividend day price drop statistic is less than 100% suggests that the market is not efficient in the semi-strong form, and it is likely that there are arbitrage opportunities on the NSE.

4.4 Ex-dividend Day Volumes

The second objective sought to examine the ex-dividend day volumes of shares on the NSE to determine whether they increased, decreased, or remained constant. It is expected in a semi-strong form efficient market that the ex-day volumes will increase as investors transact to capitalize on the opportunities presented by the declaration of the cash dividends. Panetsidou (2015) noted that an examination of the movements of share trading volume around ex-dividend days more fully explains the ex-dividend day behaviour of shares than an examination of the price movements only.

For each of the cash dividend payments, the daily share trading volumes for 5 days before and 5 days after the ex-dividend day, as well as the ex-dividend day were obtained. A check was done for missing values in the data. With the complete set of data, the analysis was run for the nine years from September 2006 to November 2015 and the abnormal volume ratio generated for each dividend payment. 22 instances were found of no trading of shares during the event window, thus these were eliminated from the analysis.

Table 4.7 provides descriptive statistics for the volume-related variables.

Table 4.7: Ex-day descriptive statistics for volume movements

	Maximum	Minimum	Mean	Standard Deviation	Median	Mode
Abnormal volume ratio	4.50	(1.00)	(0.01)	1.59	(0.19)	(1.00)

The table shows that there were no abnormal ex-dividend day share trading volumes. The mean abnormal volume ratio is -0.01, meaning that trading volumes on the ex-dividend day were lower than the average for the ten days around by 1%. The negative abnormal ex-dividend day volume ratio of 1% indicates that it is likely that there is little trading on the ex-dividend days to take advantage of arbitrage opportunities in the market. This is in line with the ex-dividend price drop ratio of only 20% of the dividend amount as opposed to the expected 100%.

The minimum abnormal volume ratio of -1.00 is indicative of instances in which there was no trading of the shares under study on the ex-dividend day. The same amount of -1.00 is incidentally also the mode, and represents 7% of the shares under study that did not trade on the ex-dividend day. On the other hand, the maximum relates to shares for which the volumes

traded on the ex-dividend day were high relative to the usual volume of shares traded. Detailed review of the share volumes traded showed that some of these are thinly traded, with little activity of buying or selling by investors at any one given point.

Going into further detail, an analysis of the share volumes on the ex-dividend day may be presented as in Table 4.8, categorised into share volumes that increased on the ex-dividend day, share volumes that decreased on the ex-dividend day, and share volumes that remained constant. The shares that were not traded either on the ex-dividend day or throughout the event window are also shown.

Table 4.8: An analysis of the share volume movement categories on the ex-dividend day

	Number of observations	Percentage	Abnormal volume ratio
Share volume increased	154	35%	108%
Share volume decreased	234	53%	-58%
Share volume remained constant	1	0%	-
No trading on ex-dividend day	33	7%	-
No trading during event window	22	5%	-
	444	100%	

From Table 4.8, of the 444 observations of share price movements on the ex-dividend day, 35% (or 154 observations) had increases in share volumes on the ex-dividend day. This was the smaller proportion of the movement. The larger proportion that caused the overall share volume movement on the ex-dividend day was the 53% of observations whose share volumes that decreased, as shown in Table 4.7.

4.5 Price Movement around the Ex-dividend Day

For each of the cash dividend payments, the daily closing prices for 5 days before and 5 days after the ex-dividend day were obtained. A check was done for missing values in the data, and these were obtained. With the complete data set, the analysis was run for the period from September 2006 to November 2015 and the price-drop ratio in addition to the price movement for each of the 10 days generated for each cash dividend payment. In six instances, it was found that there was a special dividend announced with the same ex-dividend date as the final dividend. In this case, these were amalgamated and treated as a single cash dividend payment.

Since the findings show that on average the price drop on the ex-dividend day is very low – 8% of the dividend amount in Table 4.1, further analysis was done to determine whether in

the few days following the ex-dividend day, the price decreases by the entire dividend amount, or at least tends to decrease. This is represented below in Table 4.9.

Table 4.9: Analysis of the price movement around ex-dividend day

Day	-5	-4	-3	-2	-1	Ex-day price	1	2	3	4	5
Share price increased	0%	1%	0%	0%	-2%	0%	-6%	4%	0%	0%	0%
Share price decreased	0%	0%	0%	0%	2%	0%	-1%	2%	0%	-11%	25%
Share price remained constant	0%	0%	0%	0%	0%	0%	-1%	1%	0%	0%	0%

For the shares whose prices increased on the ex-dividend day, the price dropped 6% on the next day, rose 4% on the following day, and thereafter the average price movement was negligible – 0% for the next 3 days. On the other hand, for the shares whose prices decreased on the ex-dividend day, there was a price decrease for the following 4 days, cumulatively 10% drop, but on the fifth day there was a price increase of 25%. Lastly, for the shares whose prices remained constant on the ex-day, the prices dropped by 1% on the next day, rose 1% on the following day, and thereafter there was no further change. Hence, from Table 4.9, it can be seen that the share prices rose, on average, in the 5 days following the ex-dividend day. It therefore does not seem likely that they would not eventually end up dropping by the entire amount of the dividend.

4.6 Chapter Summary

This chapter reviewed the findings of the study on whether the Kenyan stock market is semi-strong form efficient by examining the ex-dividend day price and volume behaviour of shares. It was found that on average, the share price dropped by 8% on the ex-dividend day, and when the market movement (as measured by the NSE 20-share index) was adjusted for, the price drop ratio was 20%. The finding that the ex-dividend day price drop statistic was less than 100% is suggestive that the market may not be semi-strong form efficient and therefore it is likely that there are arbitrage opportunities on the NSE and thus an investor can buy a share cum-dividend, receive the dividend, and then sell the share ex-dividend, at a price higher than the expected ex-dividend price. In addition, it was also found that there were no abnormal trading volumes on the ex-dividend day – trading was 1% below the usual trading levels, which is supportive of the low price drop on the ex-dividend day. Also, the share prices began to rise in the 5 days following the ex-dividend day so it is not likely that they would not eventually end up dropping by the entire amount of the dividend.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study set out to assess whether the Kenyan stock market is semi-strong form efficient by examining price and volume behaviour of shares for cash dividends on the ex-dividend date, as well as how long it took the prices to normalize after the ex-dividend day. The specific objectives of the study were: firstly, examine the behaviour of ex-dividend day prices for shares on the Nairobi Securities Exchange, secondly, to assess the volumes of shares traded around the ex-dividend date for shares on the NSE, and thirdly, to assess how long the share price takes to normalize after the ex-dividend day on the NSE. In order to achieve these objectives, quantitative research methods were used and secondary data was collected. This data was analysed to obtain the market-adjusted price drop ratios and abnormal trading volumes on ex-dividend dates, and the conclusions made are highlighted in this chapter. This chapter highlights the objectives of the study and the methodology used, and then outlines the findings of the research based on each objective – on ex-dividend day share prices in section 5.2.1 and on ex-dividend day share volumes in section 5.2.2, as well as the price normalization in section 5.2.3. Thereafter, recommendations are given based on the findings of the study, and finally the limitations encountered are mentioned.

5.2 Discussion of Ex-dividend Day Price and Volume Behaviour

The movement in ex-dividend day share prices is discussed in section 5.2.1, the movement in ex-dividend day share trading volumes in section 5.2.2 and the price movements around the ex-dividend day in section 5.2.3 in line with the three specific objectives of the study.

5.2.1 Movement in Ex-dividend Day Share Prices

With reference to the first objective which examined semi-strong form efficiency of the NSE using the ex-dividend day share prices, it was found that on average, share prices dropped by 8% of the dividend amount on the ex-dividend day. When the dividend amount was adjusted for market movements using the NSE 20-share index, it was found that share prices fell by 20% of the dividend amount on the ex-dividend day.

The findings of a drop-off ratio of less than one on the Nairobi Securities Exchange is in line with what Akhmedov and Jakob (2010) found in their studies on ex-day behaviour in

Denmark, Dasilas (2009) in Greece, Lasfer (1995) and Kaplanis (1986) in the United Kingdom, Rantapuska (2008) in Finland and Eades et al (1984) in the United States.

It is noted that the periods of the studies carried out are mostly older than a decade ago with the most recent covering the period up to the year 2005. However, the countries in which the research was carried out are generally well-developed, and have had their stock markets in operation for longer periods than the market in Kenya, and thus possibly these older periods are comparable to the Kenyan market which is currently developing.

This differs from what several scholars have found, who had share price drops that were equal to the dividend amounts. Notably, Isaksson and Islam (2013) found that in the Shanghai and New York Stock Exchanges, stock prices fall by an amount that is not statistically different from the dividend on the ex-dividend day, which is consistent with the expectations from theory, but differs from the scenario on the Nairobi Securities Exchange where the price drop was less than the dividend amount. Similarly, Hodgkinson and Wells (2009) in the United Kingdom, Milonas et al (2006) in the Chinese market, and Boyd and Jagannathan (1994) in the United States found that on average the ex-dividend percentage price drop was equal to the dividend amount. This is consistent with the expectations from theory, but differs from the scenario on the Nairobi Securities Exchange where the price drop was less than the dividend amount.

In contrast to these, some studies have found an increase in share price on the ex-dividend day. Panetsidou (2015) used the standard event methodology and multiple regression analysis to assess the price and trading volume behaviour in Romania over the years from 2000 to 2012 and observed that share prices increased, rather than dropping, on the ex-dividend day, implying large profit opportunities for investors in that market. This differs from the scenario on the Nairobi Securities Exchange where the price drop was less than the dividend amount. In the same way, Kato and Loewenstein's (1995) study in Japan from 1981 to 1991 yielded similar results.

Thus, the findings of this study on the NSE are consistent with the results of scholars who are spread over various countries – Denmark (Akhmedov and Jakob, 2010), Finland (Rantapuska, 2008), Canada (Lakonishok and Vermaelen, 1986) and United States (Eades, Hess and Kim, 1984). They are, however, contrary to those from Panetsidou (2015) in

Romania and Kato and Loewenstein (1995) in the Japanese market. The results on the Kenyan market were most similar in time period examined to Panetsidou (2015) who looked at the period from 2000 to 2012. In addition, the results are incompatible with efficient market theory which calls for no arbitrage opportunities on the ex-dividend day as evidenced by a price drop equal to the dividend amount. This was found to be the case in China and United States by Isaksson and Islam (2013), United Kingdom by Hodgkinson and Wells (2009), China by Milonas et al (2006), and United States by Boyd and Jagannathan (1994). From these, it seems that there are varying levels of market efficiency in different countries, and even fluctuating levels of efficiency of the market within the same country such as the United States over time (as can be interpreted from a price drop lower than the dividend amount in the 1962 to 1980 period, then a drop equal to the dividend at a later period, 2005 to 2009). This could mean that the Kenyan market could, too, be growing towards efficiency.

The analysis of the price movement categories in the Kenyan market on the ex-dividend day shows that 39% of the share prices decreased on the ex-dividend day, 32% increased and 29% of the share prices remained constant. When the share prices that decreased were further analysed, it was found that 13 of the 192 observations (or 7% of the 39% that decreased) dropped by the dividend amount on the ex-dividend day – which is what would be expected in a semi-strong efficient market on the ex-dividend day. However, the majority of 93% of the shares dropped by less than the dividend amount on the ex-dividend day on the NSE during the nine year period. Going back to the 32% of the share prices that increased on the ex-dividend day, some of these may be attributed to multiple announcements made together with cash dividend announcements, such as share splits and bonus issues as was seen for a few of the observations where share prices rose on the ex-dividend day.

On comparing these findings to those of a study done by Limungi (2011) on the NSE 20-share index in Kenya for the period from 2003 to 2010, it is found that there have been some changes in the results as follows. Limungi found that stock prices on the ex-dividend day fell by less than the dividend paid for 37% of the observations whereas the current study has found this to be the case for 25% of the observations. Also, he found that share prices dropped by amounts higher than the dividends paid for 36% of the observations whereas the current study found this proportion to be 11%. A similarity in the findings of both studies was in the stock prices on the ex-dividend day that reduced by amounts equal to the dividend which was equal to 3% of the observations for both studies. In addition, there was a change in

the share prices that increased on the ex-dividend day from 14% of the observations in Limungi’s study to 32% in the current study. Lastly, the share prices remained constant when compared to cum-dividend prices for 10% of the observations in Limungi’s study, as compared to 29% for the current study. A summary of this analysis is presented in Table 5.3.

Table 5.1: A summary of the findings of the current study as compared to a previous study on the NSE

	Current study findings (% of observations)	Findings - Limungi (2011) (% of observations)
Share price increased	32%	14%
Share price dropped by dividend amount	3%	3%
Share price dropped by less than dividend amount	25%	37%
Share price dropped by more than dividend amount	11%	36%
Share price remained constant	29%	10%
	100%	100%

In considering why the price drop ratio was very low at 20%, it was considered the effect of taxation on the price drop. The withholding tax rate on dividends in Kenya was 5% for residents and 10% for non-residents. Factoring this into our computation would not fully explain the low price drop as it would result in an increase in the price drop ratio of between 5% and 10%, which would bring the maximum price drop to 30% that is still considered low.

In addition, the low price drop ratio may be due to limits to arbitrage in line with the study by Shleifer and Vishny (1997). Arbitrageurs in the Kenyan market may be unable to take advantage of the opportunities and restore prices to their expected levels on ex-dividend days in the market due to persistent mispricing that makes it unprofitable to do so.

The finding that the ex-dividend day price drop statistic is less than 100% on average is suggestive that the market is not semi-strong form efficient and there are likely to be arbitrage opportunities on the NSE. Thus, an investor can buy a share cum-dividend, receive the dividend, and sell the share ex-dividend, at a price higher than the expected ex-dividend price (that is, the cum-dividend price less the dividend amount).

5.2.2 Movement in Ex-dividend Day Volumes

With reference to the second objective that assessed semi-strong form efficiency of the market as indicated by the volumes of shares traded around the ex-dividend date on the NSE, it was found that there were no abnormal ex-dividend day volumes – in fact trading was 1%

below average trading levels. This indicates that it is likely that the lower trading on the ex-dividend days contributes towards the price drop on the ex-dividend day being only 20% of the dividend amount.

This evidence is in line with the findings of Isaksson and Islam (2013) found that there was no indication of abnormal trading volumes in their study on the Shanghai and New York Stock Exchanges, even though stock prices did fall by the dividend amount on the ex-dividend day. They examined abnormal return and relative trading volume using daily trading volumes to find out the relevance of arbitrage opportunity which might exist on the ex-dividend day due to the difference between the stock price drop and the dividend amount. The finding of abnormal trading volumes of 0% may possibly be attributed to the higher level of efficiency of the Chinese and United States markets which have been in operation for longer than the Kenyan market.

However, several scholars have contrary findings. Panetsidou (2015) observed abnormal trading volumes 30% higher than the average in Romania for the years 2000 to 2012. Correspondingly, Chena, Chowb and Shiuc (2013) in Taiwan, Haesner and Schanz (2013) in Germany, Akhmedov and Jakob (2010) in Denmark, Kato and Loewenstein (1995) in Japan, Bowers and Fehrs (1995) in the United States, Dasilas (2009) in Greece, Lakonishok and Vermaelen (1986) in Canada, it was found that trading volume increased on the ex-dividend day.

5.2.3 Price Movement around the Ex-dividend Day

Since the findings show that on average the price drop on the ex-dividend day is very low – 20% of the dividend amount in Table 4.1, further analysis was done to determine whether in the few days following the ex-dividend day, the price decreases by the entire dividend amount, or tends to decrease. It was found that the share prices rose, on average, in the 5 days following the ex-dividend day.

5.3 Conclusion

Given the findings of this study, after assessing the ex-dividend day share price behaviour on the NSE (which is a drop lower than the dividend amount) and volume behaviour (which is positive abnormal share trading volumes on the ex-dividend day), it is suggestive that the market may not be semi-strong form efficient and there are likely to be arbitrage

opportunities in the Kenyan market. This is because the share price does not drop by the dividend amount on the ex-day, but rather, by a smaller amount – by 20% of the dividend amount when adjusted for market movements, and thus an investor can buy a share cum-dividend, receive the dividend, and sell the share ex-dividend, at a price higher than the expected ex-dividend price. Also, the volumes are lower than average by 1% on the ex-dividend day, suggesting that there is insufficient trading on the ex-day to take advantage of the opportunities in the market and drive the ex-dividend price down by the dividend amount. The lack of abnormal trading volumes is therefore in line with the low price drop ratios of 20%.

5.4 Recommendations and Implications

For investors, ex-dividend price and volume behaviour present an opportunity to make abnormal profits and thus, increase their wealth in the Kenyan market. Based on the research findings that indicate that the share prices drop by less than the dividend amount on the ex-dividend day, investors can profit by purchasing the shares cum-dividend and receiving the dividend, and then selling at the ex-dividend price to arrive at a final position higher than the cum-dividend amount.

For companies, the behaviour of share prices and volumes around the ex-dividend date is one indicator of the relative valuation of dividends as compared to capital gains by investors, which has implications for the dividend policy of companies. Since the share price drops by a smaller amount than the dividend on the ex-dividend day in the Kenyan market, it is indicative that the market discounts dividend payments. Thus the market arrives at an ex-dividend drop that is lower than the dividend amount, suggesting that companies should prefer not to declare dividends, and rather allow the investors to receive returns in the form of capital gains instead.

For academicians, this study builds on the knowledge of ex-dividend price and volume behaviour in the Kenyan market and thus augments existing literature and serves as a source of reference material for future researchers in the area of ex-dividend share prices and volumes.

For regulators, the ex-dividend price and volume behaviour of shares is a pointer to the current level of, and trends in the informational efficiency of the Nairobi Securities

Exchange. This demonstrates the need for investor engagement and education so as to lessen the disparity in knowledge among different investor groups and increase the proportion of those taking advantage of the arbitrage opportunities in the market. Trading higher volumes of shares would thus result in more accurate pricing of shares in the market.

5.5 Suggestions for Further Research

This study focussed on semi-strong form efficiency of the Kenyan stock market by examining the ex-dividend day price and volume behaviour of shares on and around the ex-dividend date. Future research could consider the ex-dividend price and volume by industry in order to consider whether there is a difference in the behaviour based on the industry in which the company operates.

Further research could consider factors, other than those commonly considered (taxation and transaction costs), that could be causing the ex-dividend price drop to be lower than the dividend amount. It is noted that with a price drop of only 18%, transaction costs may not be considered to be a significant deterrent to trading on the ex-day, as this is on average, at about 2% to 3% of the value traded. It could also consider the factors that cause unusual price behaviour such as price rises on the ex-dividend day, as some instances of these were found, and what implications these have for market efficiency.

5.6 Limitations

This study reviewed the period from September 2006 to November 2015 and thus did not consider the period before this from which additional information on the efficiency of the market with respect to the ex-dividend behaviour could be obtained. In addition, the impact withholding tax, currently between 5% and 10% for different investors, was not considered in depth in this study. An analysis of taxes and dividend payments may shed additional light on ex-dividend behaviour.

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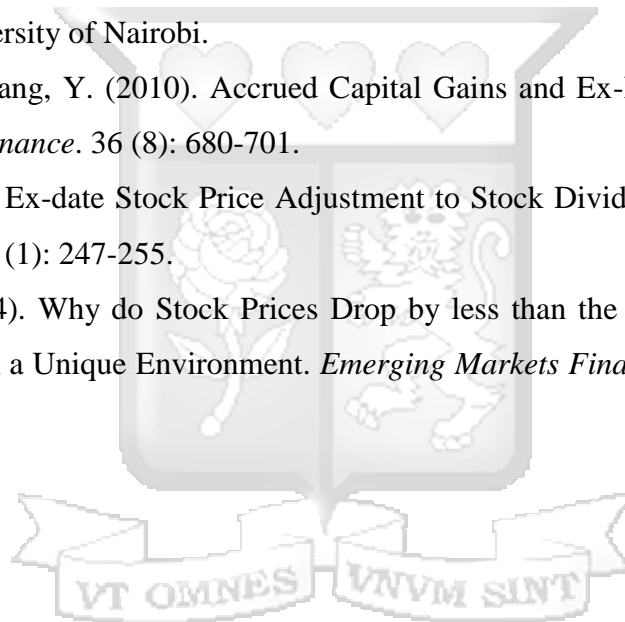
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APPENDICES

APPENDIX I: EX-DIVIDEND PRICE BEHAVIOUR (PRICE DROP RATIO)

Ex-dividend price behaviour (price drop ratio) – Limungi (2011)						
Years	2006	2007	2008	2009	2010	
Companies						
Nation Media Group	40%	60%	227%	25%	150%	
Rea Vipingo	56%	n/a	-219%	25%	-150%	
Kenya Airways	0%	171%	-29%	150%	200%	
EA Cables	57%	-350%	111%	-10%	0%	
Kenya Commercial Bank	50%	-33%	36%	120%	125%	
CMC Holdings	100%	87%	186%	156%	29%	
Kenya Power and Lighting	333%	-133%	325%	125%	-200%	
KenGen	227%	44%	56%	10%	n/a	
Bamburi Cement	-200%	150%	200%	-107%	273%	

APPENDIX II: COMPANIES LISTED ON THE NAIROBI SECURITIES

EXCHANGE 2006 TO 2015¹

Listed companies as at 31 December 2006

Company	ISIN	Year of Listing	Issued Shares
Hutchings Biemer Limited	KE0000000257	1950	360,000
East African Portland Cement Co. Limited	KE0000000190	1950	90,000,000
Car & General (K) Limited	KE0000000109	1940	40,103,308
A.Baumann & Co Limited	KE0000000018	1948	3,840,066
CMC Holdings Limited	KE0000000133	1950	582,709,440
Kakuzi Limited	KE0000000281	1951	19,599,999
Standard Group Limited	KE0000000455	1954	81,731,808
KenolKobil Limited	KE0000000323	1959	1,471,761,200
Kenya Orchards Limited	KE0000000331	1959	12,868,124
Pan Africa Insurance Holdings Limited	KE0000000414	1963	96,000,000
Sasini Limited	KE0000000430	1965	228,055,500
Centum Investment Co Limited	KE0000000265	1967	665,441,775
Limuru Tea Company Limited	KE0000000356	1967	1,200,000
British American Tobacco Kenya Limited	KE0000000075	1969	100,000,000
B.O.C Kenya Limited	KE0000000042	1969	19,525,446
Marshalls East Africa Limited	KE0000000364	1969	14,393,106
Bamburi Cement Limited	KE0000000059	1970	362,959,275
CFC Stanbic of Kenya Holdings Limited	KE0000000091	1970	395,321,638
NIC Bank Limited	KE0000000406	1971	597,282,563
Unga Group Limited	KE0000000497	1971	75,708,873
Carbacid Investments Limited	KE0000000117	1972	254,851,988
Diamond Trust Bank Kenya Limited	KE0000000158	1972	242,110,105
East African Breweries Limited	KE0000000216	1972	790,774,356

Eaagads Limited	KE0000000208	1972	32,157,000
Kapchorua Tea Company Limited	KE0000000229	1972	3,912,000
Kenya Power & Lighting Co Limited	KE0000000349	1972	1,951,467,045
Williamson Tea Kenya Limited	KE0000000505	1972	8,756,320
East African Cables Limited	KE0000000174	1973	253,125,000
Nation Media Group Limited	KE0000000380	1973	188,542,286
Olympia Capital Holdings Limited	KE0000000166	1974	40,000,000
Express Kenya Limited	KE0000000224	1978	35,403,790
Jubilee Holdings Limited	KE0000000273	1984	59,895,000
Barclays Bank of Kenya Limited	KE0000000067	1986	5,431,536,000
Standard Chartered Bank Kenya Limited	KE0000000448	1988	309,159,514
Total Kenya Limited	KE0000000463	1988	175,028,706
Kenya Commercial Bank Limited	KE0000000315	1989	2,984,227,692
Crown Paints Kenya Limited	KE0000000141	1992	23,727,000
Housing Finance Co. Kenya Limited	KE0000000240	1992	235,750,000
Uchumi Supermarket Limited	KE0000000489	1992	265,424,636
Longhorn Kenya Limited	KE2000002275	1993	58,500,000
Sameer Africa Limited	KE0000000232	1994	278,342,393
National Bank of Kenya Limited	KE0000000398	1994	280,000,000
Kenya Airways Limited	KE0000000307	1996	1,496,469,035
Rea Vipingo Plantations Limited	KE0000000422	1996	60,000,000
ARM Cement Limited	KE0000000034	1997	495,275,000
TPS Eastern Africa Limited	KE0000000539	1997	182,174,108
Mumias Sugar Co. Limited	KE0000000372	2001	1,530,000,000
Equity Group Holdings Limited	KE0000000554	2006	3,702,777,020
Eveready East Africa Limited	KE0000000588	2006	210,000,000
KenGen Company Limited	KE0000000547	2006	2,198,361,456
Scangroup Limited	KE0000000562	2006	378,865,102

Additional Companies Listed During 2007

Company	ISIN	Year of Listing	Issued Shares
Access Kenya Group Limited	KE0000000596	2007	218,467,081
Liberty Kenya Holdings Limited	KE2000002168	2007	535,707,499
Kenya Reinsurance Corporation Limited	KE0000000604	2007	699,949,068

Additional Companies Listed During 2008

Company	ISIN	Year of Listing	Issued Shares
Co-operative Bank of Kenya Limited	KE1000001568	2008	4,889,316,295
Safaricom Limited	KE1000001402	2008	40,065,428,000

Note: No additional companies listed or delisted in 2009 or 2010

Additional Companies Listed During 2011

Company	ISIN	Year of Listing	Issued Shares
British-American Investments Co.(Kenya) Limited	KE2000002192	2011	1,938,415,838
Trans-Century Limited	KE2000002184	2011	280,284,476

Additional Companies Listed During 2012

Company	ISIN	Year of Listing	Issued Shares
CIC Insurance Group Limited	KE2000002317	2012	2,615,538,528
Umeme Limited	KE2000005815	2012	1,623,878,005

Additional Companies Listed During 2013

Company	ISIN	Year of Listing	Issued Shares
Home Afrika Limited	KE2000007258	2013	405,255,320
I&M Holdings Limited	KE0000000125	2013	392,362,039

Delisted Companies Listed During 2013

Company	ISIN	Year of Listing	Issued Shares
Access Kenya Group Limited	KE0000000596	2007	218,467,081

Additional Companies Listed During 2014

Company	ISIN	Year of Listing	Issued Shares
Atlas Development & Support Services (GEMS)	KE4000004095	2014	39,139,827
Flame Tree Group Holdings Limited (GEMS)	KE4000001323	2014	161,866,804
Kurwitu Ventures Limited (GEMS)	KE4000001216	2014	102,272
Nairobi Securities Exchange Limited	KE3000009674	2014	194,625,000

Delisted Companies Listed During 2015

Company	ISIN	Year of Listing	Issued Shares
Rea Vipingo Plantations Limited	KE0000000422	1996	60,000,000
CMC Holdings Limited	KE0000000133	1950	582,709,440

¹Source: African Markets website. <https://www.african-markets.com/en/stock-markets/nse/listed-companies>