TESTING THE EXISTENCE OF LOW PRICE EFFECT ON STOCK RETURNS AT THE NAIROBI SECURITIES EXCHANGE

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DECLARATION

I do hereby declare that the work contained in this Master of Science in Finance Degree Project is my own work and has not been previously in its entirety or in part been submitted for a degree in this or any other university.

Signature: ………………………………………… Date: ………………………….

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This research project has been submitted for examination with my approval as the **University Supervisor:**

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DEDICATION

I dedicate this work to my husband Wilson Kahoro, our precious son Brian Murage, and my mother Rose Huku for their prayers, encouragement and every support throughout this research project.

ABSTRACT

The low price effect simply purports that low priced shares significantly outperform high priced shares on a risk-adjusted return basis. The objective of the study was to test the existence of low price effect on stock returns at the NSE. This study used descriptive survey. The study used a census survey of all the companies listed at the NSE for a period of five years from 1/1/2009 to 31/12/2013. An annual review was done at the beginning of each period for companies that satisfied as certain selection criteria. The data included closing monthly value weighted average prices and corporate actions. The firms were ranked according to their previous closing prices before the review period and divided into three equally weighted price portfolios. The monthly portfolio value was computed using share and cash investments in each share for the three portfolios. The portfolio returns were adjusted for risk using the Sharpe measure and tested using a nonparametric Wilcoxon signed rank test. The Wilcoxon signed rank test results ranked low priced portfolio risk adjusted returns higher than both the moderate and high priced portfolio. However, high priced portfolio outperformed the moderate priced portfolio. The test statistic from Wilcoxon signed rank test reported a significant difference between low and moderate priced portfolio, $p<0.05$ ($p=0.043$). The study concluded that the low price effect exists on stock returns at the Nairobi Securities Exchange in the Kenyan Market.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

AMEX - American Stock Exchange

APT   - Arbitrage Pricing Theory

BA   - Bank Acceptance

CAPM - Capital Asset Pricing Model

CBK   - Central Bank of Kenya

CDSC - Central Depository and Settlement Corporation

CMA   - Capital Markets Authority

CM Act - Capital Markets Act (Chapter 485A, Laws of Kenya)

EMH   - Efficient Market Hypothesis

FTSE   - Financial Times Stock Exchange

IFC   - International Finance Corporation

JSE   - Johannesburg Securities Exchange

NASI   - Nairobi Securities Exchange All-share index

NSE   - Nairobi Securities Exchange

NYSE - New York Stock Exchange

N20I   - Nairobi Securities Exchange 20-share index

WSE   - Warsaw Stock Exchange

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Over the years, relationship between low priced stocks and stock returns has been the subject of much empirical discussion within the finance literature. According to Fama (1970), a market is efficient if asset prices fully reflect the information available. As such, it would not be possible to predict the stock returns by trading either on low priced stocks or high priced stocks. However, empirical evidence suggests that the hypothesis has begun to find anomalies and behaviors that couldn't be explained by theories available at the time. One of the oldest anomalies observed in the financial markets is the low price effect which was first observed by Fritzmeier (1936). Low price effect implies that low priced shares significantly outperform high priced shares on a risk-adjusted return basis, Fritzmeier (1936). Presence of low price effect makes a much stronger case for the need to carefully review both our acceptance of the efficient market theory and our methodological procedures.

Generally, the study of low priced effect on stock returns has majorly been concentrated on well-developed stock markets and very little on emerging stock markets especially in Africa. The Nairobi Securities Exchange (NSE) is one of the major securities exchange in Africa and ranked the best in Eastern and Central Africa. This study seeks to investigate the existence of low price effect on stock returns with a view to examine the companies listed at the NSE (CMA, 2013).

1.1.1 The Low Price Effect

The low price effect simply means that low priced shares significantly outperform high priced shares on a risk-adjusted return basis (Fritzmeier, 1936). Fritzmeier's findings have been frequently repeated and extended. Goodman and Peavy (1986) found the anomaly to exist over and above the "small business effect" and the "earnings yield". Investors with low capital as well as those with low number of brokerage account can trade in low priced stocks on securities exchange. The growth potential can be really infinite because it would not take that much to move the price. For instance a small movement from 50 cents to a shilling a share would mean a 100% profit from a share.

However, many investors appear to have an aversion to investing in stock market securities having very low prices. This emerges from a fear that such shares are extremely risky which might result in solvency of the company concerned and the investor's loss of his entire capital. Empirical research to evaluate this policy of avoiding low-priced stocks appears to have contributed very little. Low priced stocks have been found to perform surprisingly well, though the risk is high, the returns have proved to be great (Gilbertson, Affeck-Graves & Money, 1982).

The low price effect can be measured by first determining the level at which a price is referred to as low price. The low price is determined by defining a cut-off price below which a share is classified as a low priced. This usually involves a subjective decision and different researchers have arbitrarily selected different prices (Waelkens & Ward, 1997). Waelkens and Ward (1997) rank prices from the lowest to the highest. Thereafter, portfolios of twenty shares each are formed, grouped as low priced, medium priced and high priced portfolios. A size of twenty shares each is

considered to be well diversified (Affleck-Graves et al., 1982; Page & Palmer, 1991; Waelkens & Ward, 1997). Portfolios are then reconstructed from the entire population of listed ordinary shares annually and shares reallocated to different portfolios in their share price. This procedure ensures that portfolios retain their character, even-balance of shares in terms of value across all periods as well as elimination of inflation impact. The problem of inflation moving barriers of categories is acknowledged where its complexity may not materially affect the end result (Affleck-Graves et al., 1982).

Then, mean monthly excess returns are computed by getting the average of monthly excess return of each portfolio across the review period in order to eliminate seasonal effects. The returns are then adjusted for the underlying risk of each portfolio: Sharpe's reward to variability ratio (Sharpe, 1970) and Treynor's reward to risk ratio (Treynor, 1965). Finally, the presence of low price effect is indicated by higher low priced stocks portfolio's risk adjusted returns compared to that of high priced portfolio's risk adjusted returns (Waelkens & Ward, 1997).

1.1.2 Stock Returns

Stock returns refer to the gains or losses on the portfolio of all stocks that are on the equity markets in a security exchange (Meyers, 2011). Stock returns are of great importance to practitioners in finance in asset allocation, which requires real time forecasts of stock returns in enhancing investment performance. It is thus not surprising that finance practitioners employ a plethora of variables in an attempt to forecast stock returns. Academicians in finance are also keenly interested in predicting stock returns since the ability to predict returns has important implications for test of market efficiency; more generally, understanding the nature of forecasting

3

stock returns helps researchers to produce more realistic asset pricing models that better explain the data (Rapach & Zhou, 2012).

According to Michael and Eugene (2009), it is usually more convenient to summarize information about returns in percentage terms, rather than dollar terms, because that way your return does not depend on how much you actually invest. Percentages tell how much we get for each dollar invested. Reilly and Brown (2002) note that the return from holding an investment over some period say, a year is simply any cash payments received due to ownership, plus the change in market price, divided by the beginning price. The return depends on the increase/decrease in the price of the share over the investment horizon as well as dividend income the share has provided. This is called the Holding Period Return (HPR). Average Return given by the sum of each of the values being considered divided by the total number of the values. It can also be seen as the sum of the various one – period rates of return divided by the number of periods (Pandey, 2005). The result is the historical average of the individual values.

Expected return, on the other hand, refers to the stock return expected on a stock given its current price and expected future cash flows. Expected stock returns refer to the returns on a risky asset expected in the future (Michael & Eugene, 2009). If the stock is in equilibrium, the required rate of stock return will equal to the expected rate of stock return. The portfolio's expected return is the weighted average of its component stock's expected return. The geometric average of returns refers to the nth root of the product resulting from multiplying a series of stock returns together, less one. It gives the true rate of stock return for multiple periods (Rapach & Zhou, 2012).

1.1.3 Low Price and Stock Returns

Market efficient theories assert that it is impossible to exhibit superior returns in a market since current prices reflect all the available information. On the contrary, low price effect implies that an investor can make superior returns from trading on low priced stocks. The Capital Asset Pricing Model (CAPM) proposes that the risk of a specific stock is the sole determinant of the expected rate of return of that stock, (Lintner, 1965; Mossin, 1966 Sharpe, 1964). The implication of the CAPM is that investors would not add anything to predicting the expected rate of return to a stock by analyzing the price of that stock, (Bachrach & Galai, 1979). Similarly, according to the Efficient Market Hypothesis (EMH), it is impossible to outperform the stock market since the market efficiency causes existing share prices to always incorporate and reflect all the relevant information (Fama, Fisher, Jensen and Roll, 1969). This hypothesis implies that an investor would not outperform the market by concentrating on low priced stocks since the level of price does not matter; the price in itself already incorporates the relevant information.

Ross (1976) in his Arbitrage Pricing Theory (APT) starts with the premise that Arbitrage opportunities should not be present in efficient financial markets. Ross's model assumes the presence of a number of sources of systematic risk (firm-specific) which cause variations in expected return values. Accordingly, the APT implies that since the level of a share price is independent of the firm's specific factors, the fact that the price of a stock is categorized as low would not exhibit superior returns. In conclusion, the various theories that relate to the relationship of low share price and stock returns do not support the low price effect.

Finance scholars have studied the effect of low priced stocks on stock returns extensively, but the results have been mixed and inconclusive. Fritzmeier (1936) observed that low priced stocks were characterized by high returns but pointed out that the bigger profits exhibited greater risk and price variability. Pinches and Simon (1973) who employed low common stocks reported high annual and holding period returns for most periods and portfolios. Low priced shares were found to give superior returns compared to both the average and high priced stocks after employing various risk adjustment methods, Edmister and Greene (1980). Blume and Husic (1973) observed a negative relationship between average realized rates of return and price level. However, other studies gave different results; negative correlation was found to hold only for non-split shares (Bar-Yosef and Brown, 1979) while Dubofsky and French (1988) provided evidence of low price effect in the presence of stock split. Allison and Heins (1966) and Clendinin (1951) report that price variability which characterizes low priced stocks should be attributed to their speculative quality and not the fact that they are low priced.

The presence of low price effect was observed even after considering other factors such as leverage, size, book-to-market equity, Earning/price ratio (Goodman & Peavy, 1986), liquidity (Christie, 1982; Dubofsky & French, 1988; Zaremba & Zmudzinsk, 2014) and past returns (Hwang & Lu, 2008). The studies eliminated the contribution of systematic risk in high average returns for the low price portfolio concluding that the price is either surrogate for an unspecified economic factor or the market is inefficient (Bachrach & Galai, 1979; Zaremba & Zmudzinski, 2014). Low price effect has also been explained to have a role in January effect (Branch & Chang, 1990). At the same time, different findings have been reported; Waelkens and Ward (1997)

found high price effect which was inconsistent with Affleck-Graves et al. (1982) at Johannesburg Stock Exchange (JSE).

From the empirical findings of these studies, there seems to be a general agreement that low priced stocks are negatively correlated to the stock returns. Moreover, average and high priced stocks exhibit lower stock returns than their low priced counterparts.

1.1.4 The Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE) has a long history that can be traced to the 1920`s when it started trading in shares when Kenya was still a British colony (IFC/CBK, 1984). Trading on shares was initially conducted in an informal market. The NSE was later established as an overseas stock exchange in 1954. The NSE establishment marked the formalization of share trading and was initiated by stockbrokers who saw the need to access long term capital by private enterprises. NSE has since then grown with the development of the first privatization in 1988, NSE 20-Share Index (N20I) in 1994 and NSE All Share Index (NASI) in 2008, demutualization and automation of trading systems including its WAN in 2006. The Nairobi Stock Exchange Limited was later rebranded to the Nairobi Securities Exchange Limited in 2011. Other reforms in the market include the introduction of new market segments in the market (NSE, 2012). This has led to the increase of the investors trading in the NSE and also the number of companies that are listed in the exchange to the current number of 61 (NSE, 2014).

The NSE is licensed and regulated by the Capital Markets Authority (CMA). This means that NSE falls directly under the regulatory framework of CMA and by extension the framework governing the Central Depository and Settlement System. NSE has the mandate of providing a trading platform for listed securities and oversight role to its member firms. The CMA is an independent public agency established by an Act of Parliament, Capital Markets Act (CM Act), and a regulating body charged with the prime responsibility of supervising, licensing and monitoring the activities of market intermediaries, including the stock exchange and the central depository and settlement system and all the other persons licensed under the CM Act. The Central Depository and Settlement Corporation (CDSC) is a licensee of CMA. It is an independent company mandated to ensure the independence of the clearing, delivery and settlement of securities and risk management. CDSC is committed to enforcing market rules strictly and to move away from the markets reputation of honoring rules in their breach.

Presence of low price effect on a stock exchange would be a source of good news. NSE has been reported to currently experiencing flight due to low share prices. CMA data shows that thousands of local investors have left the equities segment of the NSE in a move analysts say is a reflection of their frustration with the persistence of low share prices. The reports shows that analysts have observed that some investors have diverted their money to real estate, fixed-income or bond markets where returns are reported to stand higher than equities. The exit was reported to have been contributed by the shift to real estate, the long bear run that left the share prices low and disappointment with the performance of Safaricom share price (Ngugi, 2012).

Studies at the NSE, have previously concentrated in other anomalies in the Kenyan stock market but no literature has been done on low price effect on stock returns at the NSE. One of the statistical measures of stock returns is the market model which is an improvement on constant and equivalent to APT. A market index is an example of a market model. Some of the indices at the NSE are: 20-share index (N20I), NSE All Share Index (NASI), Financial Times Stock Exchange (FTSE) NSE Kenya 15 Index, the FTSE NSE Kenya 25 Index and FTSE NSE Kenya Govt. Bond Index. The N20I and average market capitalization registered an upward movement as well as the total quarterly share volume and equity turnover ratio in the second quarter 2013 (CMA, 2013). NSE has 61 listed companies: Agriculture 7, Automobile and Accessories 4, Banking 11, commercial and Services 9, Construction 5, Energy and Petroleum 5, Insurance 6, Investment 3, Manufacturing 9, Telecommunication and Technology 1, and Growth Enterprise Market Segment (GEMS) 1 (NSE, 2014).

1.2 Research Problem

The low price effect implies that low priced shares significantly outperform high priced shares on a risk-adjusted return basis. This effect was first observed by Fritzmeier (1936). Theoretically, it is impossible to exhibit superior stock returns in a market since stock prices reflect all information available (Fama, 1970). At the same time, investors are believed to care much if the share price is low. A fall in share price can make firm vulnerable to a takeover as well as finding difficulties in accessing funds through rights issue. There are a number of factors which contribute to fluctuation of Stock returns; these include company news and performance, industry performance, investor sentiment as well as economic factors (*Factors that can affect,* n.d.).

International empirical studies on low price effect have contributed mixed results. Low priced stocks have been found to outperform high priced shares (Blume and Husic, 1973; Edmister and Greene, 1980; Fritzmeier, 1936; Gilbertson et al., 1982; Goodman and Peavy, 1986; Stoll and Whaley, 1983). However, Clendenin (1951) and Allison and Heins (1966) showed that variability of stock return was a function of investment quality of the firm but not by the fact they were low priced. Strong (1983) and Bar-Yosef and Brown (1979) reported that the effect was held only for the non-split shares. Locally, NSE is ranked as the best in Eastern Africa and one of the major securities exchange in Africa. The CMA is the government's regulator with its main responsibility of ensuring market efficiency at the NSE. NSE is a vast growing securities market with high potential to attract large numbers of investors globally. To ensure that markets perform efficiently, many studies have been done on the market efficiency as well as on the developing phenomenon of market anomalies. The existence of January effect has been reported at the NSE (Nyamosi, 2011; Onyuma, 2009) but later disapproved by John (2012). The day of the week effect has also been reported at the NSE (Kulavi, 2013).

The presence of low price effect would indicate either market inefficiency or misspecifications of asset pricing models. Empirical findings have reported the presence of low price effect in various markets. However, several studies on the NSE have concentrated on other market anomalies but none has been done on low price effect. This research therefore takes advantage of this gap in the quest of testing the presence of financial market anomalies. The question that this study seeks to answer is: Does low price effect exist on stock returns at the NSE?

1.3 Research Objective

To test the existence of low price effect on stock returns at the NSE.

1.4 Value of the Study

The trading of stocks had gained more popularity with increase in investment patterns and volume of trade. None of the market experts can predict precisely the timings for buying and selling of shares, though the technical software can provide support and resistance levels in the chart for the current term. The investment market exhibits high risk and volatility. Market participants seek for predictions in the market. Low price effects are some recurring predictions which may not occur. The study attempts to examine the existence of low price effects in the Kenyan market. There is no study that has been done at the NSE and hence the findings from the study can be useful to existing theory, investors, decision makers and other stock market players for their selection and decision of transaction.

The evidence from examining low price effects on stock returns in a developing and emerging market respectively sheds more light on whether the theory of efficient markets is supported, or contradicted by various empirical findings. This will be mostly of significant interest to researchers.

Any rational investor considers a number of parameters when making investment decisions. This study will be important in assisting the investor to know the best stocks to sell, buy or hold in his portfolio. If low price effect exists at the NSE, then low priced stocks can be bought or included in the portfolio consisting of only such stocks to earn higher returns.

Stock brokers and investment dealers require any crucial information that enables them make decisions on which stocks to trade on and maximize on their returns. This study will provide information as to whether low priced stocks are the best stocks to trade on. It also gives information on low priced stocks to trade at the NSE.

The government, the regulator through the CMA, should consider the low price effect when formulating policies affecting companies which offer low priced stocks for listing. CMA can develop a regulatory framework that facilitates the development of new financial products and institutions which trades low priced stocks.

The management is charged with the responsibility of day to day running of companies. Their decisions and policies may be affected either positively or negatively by the price of stocks included in the company portfolio.

Lastly, the future researchers and academicians can use the findings of this study as a basis for further research and development. It also adds to knowledge in the finance discipline. The keen interest in predicting stock returns has important implications for test of market efficiency. Understanding the nature of forecasting stock returns helps researchers to produce more realistic asset pricing models that better explain the data.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the existing literature on low price effects and stock returns. It particularly discusses the theoretical framework, determinants of stock returns, empirical literature on low price effect and the research gaps at the NSE.

2.2 Theoretical Framework

While conducting the study on the low price effect on stock returns listed at the NSE, it is imperative to appraise key underlying finance theories. The EMH is the most crucial theory and backbone of this study. Given that the study rotates around stock returns, the study also reviews the CAPM and the APT.

2.2.1 The Capital Asset Pricing Model

The CAPM was independently developed by Sharpe (1964), Lintner (1965) and Mossin (1966) as the initial model in asset pricing. It is the most widely used model because of its simplicity with the assumption that investors use the logic of Markowitz in forming portfolios. It further assumes that there is a risk-free asset that has certain return. The basic proposition of the CAPM is that the expected rate of return for each security is a function of the "risk" of that security, and that the risk is measured by the contribution of the security to the variability of the market portfolio. The implication of the CAPM is that knowing the price of a security per se will add nothing to predicting its expected rate of return (Bachrach and Galai, 1979).

Roll (1977) argued that the model cannot be tested because the tests involve a joint hypothesis on the model and the choice of the market portfolio. On the other hand,

many patterns emerge from empirical studies which are not explained by the CAPM; such as: expected returns and earnings to price ratio have a positive relation (Basu, 1977,1983), small capitalizations have higher expected returns than big capitalizations (Banz, 1981), there is a positive relation between the level of debt and stock returns (Bhandari, 1988) and the book to market ratio is considered as an explanatory variable in stock returns (Chan, Hamao and Lakonishok,1991; Fama and French,1992; on Japanese and American markets respectively). In conclusion, since CAPM considers beta as the only explanatory variable, presence of low price effect would therefore be inconsistent with the CAPM.

2.2.2 The Efficient Market Hypothesis

The EMH was initiated by Fama (1970). It contends that investors can be confident that a current market price fully reflects all available information about a security and the expected return based upon this price is consistent with its risks. Therefore, EMH implies that it is impossible to outperform the stock market since the market efficiency causes existing share prices to always incorporate and reflect all the relevant information (Fama, Fisher, Jensen and Roll, 1969). Harvey (1991) notes that it is impossible to outperform the overall market through expert stock selection such as analyzing the stock price range or market timing, and that the only way an investor can possibly obtain higher return is by purchasing riskier investments.

Lakonishok and Marberly (1990), in their argument against the efficient market theory, is that many investors base their expectations on past prices, past earnings, track records and other indicators. Because stock prices are largely based on investors' expectation, many believe it only makes sense that past prices influence future prices.

Fama (1970) divided the overall EMH and the empirical tests of the hypothesis into three sub-hypotheses depending on the information set involved: (1) weak-form EMH, (2) semi-strong form EMH and (3) strong form EMH. He later again divided the empirical results into three groups but shifted the empirical results between the prior categories based on alternative information sets, (Fama, 1991). The weak-form EMH assumes that current stock prices fully reflect all security market information, including the historical sequence of prices, rates of return, trading volume data, and other market generated information, such as odd-lot transactions, block trades, and transactions by exchange specialists. The semi-strong form EMH asserts that security prices adjust rapidly to the release of all public information; that is, current security prices fully reflect all public information. Finally, the strong-form EMH contends that stock prices fully reflect all information from public and private sources, (Fama, 1991).

2.2.3 The Arbitrage Pricing Theory

The APT was initiated by Stephen Ross in 1976. Ross asserts that an asset's price is equivalent to the discounted future cash flows, where the expected return of the asset is a linear function of the various macro economics factors. The APT addresses the unrealistic assumptions of CAPM, based on unsound reasoning, by developing a completely different model (such as, Black, 1972). The model proposes some extensions of the basic CAPM that relaxed one or more of its assumptions (Ross, 1976a, 1976b). Unlike the CAPM, which is a model of financial market equilibrium, the APT starts with the premise that arbitrage opportunities should not be present in efficient financial markets. This assumption is much less restrictive than those required to derive the CAPM.

The APT assumes that there are *n* factors which cause asset returns to systematically deviate from their expected values. The theory does not specify how large the *n* number is, nor does it identify the factors. It simply assumes that *n* factors cause returns to vary together. There may be other, firm-specific reasons for returns to differ from their expected values, but these firm-specific deviations are not related across stocks. Since the firm specific deviations are not related to one another, all return variation not related to the *n* common factors can be diversified away. Based on these assumptions, Ross shows that, in order to prevent arbitrage, an asset's expected return must be a linear function of its sensitivity to the *n* common factors. The APT equation is as follows:

$$E(R_j) = R_f + \beta_{j,1}\lambda_1 + \beta_{j,2}\lambda_2 + \dots + \beta_{j,n}\lambda_n$$

$E(R_j)$ and R_f as defined in CAPM are, the expected returns to the asset j and the risk free rate respectively. Each $\beta_{j,k}$ coefficient represents the sensitivity of the asset j to risk factor k, and λ_k represents the risk premium for factor k.

Similar to CAPM, there is an expression for expected returns that is a linear function for the asset's sensitivity to systematic risk. However, APT assumes *n* sources of systematic risk while CAPM considers only one. According to the model, we would derive that the price of a stock, whether low or high, should not provide superior returns thus low priced stocks should give relatively lower returns compared to the high priced stocks. Presence of low price effect is therefore not consistent with the APT.

2.3 Determinants of Stock Returns of Listed Companies

The problem of how firms choose and adjust their strategic mix of securities to maximize stock return has called for a great deal of attention and debate among corporate financial literature. Identifying the factors that influence stock returns is a major concern for practice and academic research. A number of determinants of stock returns of listed companies such as price range, inflation, leverage, company size, and company age have been discussed as hereunder:

2.3.1 Price Range

Price range of a stock simply shows the highest and the lowest prices for the stock during a certain period. Price range is a major factor that is considered by investors as well as brokers on decisions relating to portfolio selection. Small investors would prefer trading in shares with low prices which are affordable while big corporations would go for high priced stocks to avoid large numbers of stocks which are sometimes limited. EMH states that the current stock prices incorporates all the relevant information implying that there is no value in analyzing the stock price range (Fama, 1970).

Empirical studies on securities exchanges globally have however showed that superior returns are possible through trading in certain price ranges. Low priced stocks have been found to outperform both the average and the high priced stocks (Fritzmeier, 1936). Hwang and Lu (2008) showed that a strategy of buying penny stocks could generate a significant alpha even after considering the transaction costs. Price range was also examined together with financial leverage and an increased volatility in share price for the lower priced shares was found where financial leverage was

reported to explain only a small variation in returns (Christie, 1982). Waelken's and

Ward (1997) found a different kind of results, high priced shares exhibited superior

returns. The presence of abnormal returns from different price ranges is inconsistent

with market efficiency and CAPM.

2.3.2 Inflation

The effects of inflation on the economy are diverse and can be both positive and

negative. The negative effects are however most pronounced and comprise a decrease

in the real value of money as well as other monetary variables over time. As a result,

uncertainty over future inflation rates may discourage investment and savings, and if

inflation levels rise quickly, there may be shortages of goods as consumers begin to

hoard out of anxiety that prices may increase in the future. Financial theorists believe

that there are direct and indirect aftermaths of inflation in every sector of the economy

ranging from exchange rates, investment, unemployment, interest rates, and stock

markets among others. These researchers concluded that inflation and stock markets

share a very close association, and that the rate of inflation influences stock market

returns volatility and risk (Geetha, Mohidin, Chandran & Chong, 2011).

Various researchers, (Du, 2006; Hess & Lee, 1999; Kaul, 1987) stressed the relative

importance of demand and supply shocks in determining the relationship between

stock returns and inflation, where they pointed out that a negative relationship

between stock returns and inflation depicts the presence of supply shocks.

Fama and Schwert (1977) attempted to decompose inflation into expected and

unexpected components and found both pieces to be negatively related to stock

returns. More studies have also emphasized that a negative relationship existed between stock returns and inflation. Other noteworthy observations include (Gultekin, 1983; Jaffe and Mandelker, 1976; Solnik, 1983) who concurred that the stock markets would only be a perfect hedge against inflation if they were independent of the rates of inflation.

Closer home, Geyser and Lowies (2001) studied the impact of inflation on stock prices in two SADC countries with the purpose of determining whether top performing companies that are listed on the Johannesburg Securities Exchange and the Namibian Stock Exchange could provide a perfect hedge against inflation. Mutuku (2013) investigated the impact of inflation on NSE using quarterly returns and showed that there is a negative relationship between inflation and stock returns in Kenya. The mixed results restrained generalization on the relationship between stock prices and inflation rates, where it emerged that only stock for mining companies could provide a hedge against inflation.

2.3.3 Leverage

Leverage refers to the proportion of debt to equity in the capital structure of a firm. The financing or leverage decision is a significant managerial decision because it influences the shareholder's return and risk and the market value of the firm. The ratio of debt-equity has implications for the shareholders' dividends and risk, this affect the cost of capital and the market value of the firm (Pandey, 2007). Gupta (2010) cited some studies showing contradictory results about the relationship between increased uses of debt in capital structure and financial performance. A positive relationship between leverage and financial performance was reported (Berger & Bonaccorsi di

Patti, 2006; Ghosh, Nag & Sirmans, 2000) as well as a negative relationship (Gleason, Mathur & Mathur, 2000; Simerly & Li, 2000). Similarly, Zeitun & Tian (2007) found that debt level is negatively related to financial performance. Omondi and Muturi (2013) in their study at NSE, affirm that leverage has a significant negative effect on financial performance. From their study findings they concluded that as the firm increases debt beyond the optimum level, financial performance declines and the possibility of bankruptcy also increases. However, they explained that an optimal level of leverage can enable a firm to improve its financial performance as it can accrue tax advantage (tax shield) associated with optimum level of debt.

Several researchers have studied firms' debt use and suggested the determinants of financial leverage by reporting that firm's debt-equity decision is generally based on a trade-off between interest tax shields and the costs of financial stress (Upneja & Dalbor, 2001). According to the trade-off theory of capital structure, optimal debt level balances the benefits of debt against the costs of debt (Gu, 1993) hence, use of debt to a certain debt ratio results in higher return on equity. However, the benefit of debt would be lower than the cost after this level of capital structure. In other words, the more a company uses debt, the less income tax the company pays, but the greater its financial risk. Based on the trade-off theory for capital structure, firms can take advantage of debt to make a better return on equity.

2.3.4 Company Size
Previous studies in finance have shown that company size can predict the future stock price (Simerly & Li, 2000). For instance, Hvide and These (2007) in their study concluded that larger firms have better performance. Flamini, McDonald and

Schumacher (2009) suggested that bigger firms are more competitive than smaller firms in harnessing economies of scale in transactions and enjoy a higher level of profits. Athanasoglou, Brissimis and Delis (2005) assert that increase in company size increases the performance of the bank. Almajali, Alamro and Al-Soub (2012) argued that the size of the firm can affect its financial performance. However, for firms that become exceptionally large, the effect of size could be negative due to bureaucratic and other reasons (Yuqi 2007). Omondi and Muturi (2013) in their study hypothesized that company size has no significant effect on the Financial Performance (Return on assets) of Companies listed at Nairobi Securities Exchange. They found that company size had a significant positive effect on financial performance. Their study provides some precursory evidence that company size plays an important role in improving company's financial performance.

2.3.5 Company's Age

Examining the relation between firm age and financial performance would seem to be relevant for both theory and practice. If performance declines as firms grow older, it could explain why most of them are eventually taken over (Loderer, Neusser, & Waelchli, 2009). Age could actually help firms become more efficient. However, old age may also make knowledge, abilities, and skills obsolete and induce organizational decay (Agarwal & Gort, 2002). Sorensen and Stuart (2000) argued that companies age affect the firm's performance. They further argued that organizational inertia operating in old firms tend to make them inflexible and unable to appreciate changes in the environment. Liargovas and Skandalis (2008) reported that older firms are more

skilled since they have enjoyed the benefits of learning and not prone to the liabilities of newness, hence they have a superior performance.

Loderer et al. (2009) found a positive and significant relationship between the age of a company and profitability. Malik (2011) in his Pakistan study found that there is significantly positive relationship between company size and profitability. Omondi and Muturi (2013) in their study hypothesized that company age has no significant effect on the Financial Performance (Return on assets) of companies listed at Nairobi Securities Exchange. They found that company age had a significant positive effect on financial performance. They provide some precursory evidence that company age have an important role in improving company's financial performance.

2.4 Empirical Literature

2.4.1 International Evidence

The low price effect was documented for the first time in the USA by Fritzmeier (1936) in his classic paper on the subject of price-level performance of stocks. He analyzed fluctuations, movements, and leads and lags of computed indexes of groups of ten stocks falling within each of six price groups (under 10 dollars to over 100 dollars) taken from each of four lower grade (Ca, Caa, B, Ba) categories of the NYSE as rated by Moody's for the 1926-1935 period. Both weekly and monthly closing prices were indexed. Indexes were analyzed by a simple plotting on logarithmic graph paper. He pointed out that low-price stocks were more volatile and characterized by high returns compared to high-price stocks in both bull and bear markets but neither low-price nor high-price stocks seemed to lead or lag the general market movement.

However, Clendenin (1951) challenged Fritzmeier results in his study on quality versus price as factors influencing common stock price fluctuation. He used monthly spot prices for an unspecified number of stocks to relate the range to the mean price for the period 1937-1944, the years 1946 and 1948, and November 1948. He concluded that the variability of stock price was not a function of the level of price, but rather a function of stock quality.

Allison and Heins (1966) in their studies on factors affecting stock price variability, examined forty-eight A rated stocks and Sixty two B rated stocks. They used the range/mean as a measure of volatility and regressed it against average price, earnings variability, price-earnings relative, trading turnover, and exchange listing for the year 1959. They found that coefficients for the average stock price variable were very low and concluded that price variability was not a function of stock price but of investment quality of the firm. Unfortunately, the total multiple regression equation explained little of the relative price variability. This may have been because market performance was ignored or because all micro factors contributing to risk were assumed to be incorporated into the stock ratings.

Blume and Husic (1973) confirmed the original study of Fritzmeier (1936) by investigating the beta variability using the modern portfolio theory on the AMEX. They found that using the time-series approach, the beta appeared to be negatively correlated with the stock price. Additional observations from the study showed that average realized rates of return had also a negative relationship with price level.

Drzycimski and Reilly (1978) examined the impact of price level by examining the volatility of a sample of stocks before and after a two-for-one split that assured the stability of the risk for the two samples. The sample is composed of a number of common stocks listed on the New York Stock Exchange (NYSE) that split two-for-one during the period 1964-1976. The two-for-one split criteria was stipulated to ensure a major price change. For each of the 13 years, ten stocks were randomly selected from the list of stocks that split two-for-one. Therefore, the final sample was 130 stocks. The results consistently indicated that the price level did make a difference; lower priced shares were significantly more volatile than comparable higher priced stocks.

However, later studies conducted by Bar-Yosef and Brown (1979) found that negative correlation held only for non-split shares. They showed that the average price range of split securities did not vary predictably by price group but that there was an inverse relationship between price and range for non-split securities.

Bachrach and Galai (1979) on their study on risk-return relationship and stock price, compared risk and return characteristics of shares under and over 20 dollars per share. In their findings, only part of the relatively high average rate of return for the low priced portfolios was attributable to systematic risk. They concluded that either the price was a surrogate for an unspecified economic factor or the market was inefficient.

Edmister and Greene (1980) made similar research by classifying stocks into 60 price categories. They defined low-price as stocks that were selling for ten dollars and

under, and super-low-price was defined as three dollars and under. Their study showed that low-price stock groups outperformed high-price stock groups by a wider margin. The results were found to be most striking for the super-low-price groups and consistent through the 13-year study period and over a large number of listed and unlisted common stocks.

Christie (1982) explained that the increased volatility in share price for the lower priced shares attributable to variances in equity value being strongly positively correlated to financial leverage. However financial leverage only explained 5% and 31% of the variation in returns, depending on the method used to test the relationship.

Stoll and Whaley (1983) put NYSE stocks into ten portfolios according to their market values. They found a monotonic increase in mean price per share and monotonic decrease in the variance of monthly portfolio returns as the portfolios increased in average market value. They also found that transaction costs at least partially account for the abnormality.

Low price anomaly was also confirmed by Goodman and Peavy (1986). They showed that the anomaly was robust to a few other determinants of variations in cross-sectional returns. Their findings also showed that low price effect existed over and above that of the size effect and earning yield effect. In their conclusion, they added that there was an additive effect on return although the factors were highly correlated to each other (Low price, high earning per share, and small market value).

Dubofsky and French (1988) in their study on share price level and risk, took up Christie's (1982) theory by examining variances of stock returns 30 days before and 30 days after stock splits. They provided evidence that the variance of low priced share returns was greater than that of high priced shares even with no differences in financial leverage in the low priced shares.

Branch and Chang (1990) explored the role of share price in identifying stocks particularly likely to outperform the market in January. They found that low price stocks that exhibited poor December performance were likely to rebound in January. This tendency was observed annually for the 1971-1983 sample periods, as well as for the 1984 hold out sample. Similar results were obtained with or without risk adjustment.

Gilbertson et al. (1982) documented the low price effect on the 1968-1979 sample periods in the JSE. The data included all ordinary shares that traded below 30 cents during the sample period which was then adjusted for risk using the Sharpe measure. The results tested by comparing the internal rate of return of low priced shares with other investments. They concluded that the low priced shares on the JSE performed surprising well over the sample period of twelve years

However, the results on the JSE were somehow mixed, as they were contradicted by a later research of Waelkens and Ward (1997) who did not find the low price anomaly on the JSE. Their research used shares in all sectors of the exchange and was not restricted to industrial shares. The excess portfolio returns were adjusted for the underlying risk of each portfolio. They used a non-parametric Wilcoxon signed-rank

test at 5% to determine the significance difference between the risk-adjusted and individual returns. The findings indicated the possible presence of an anomaly of the opposite kind, the high price effect. However, the behavior of this price effect was found to be inconsistent with market efficiency and CAPM, and dependent on the time horizon investigated.

Among the newer papers, it is important to mention the extensive research of Hwang and Lu (2008), examined the cross-sectional effect of the nominal share price. Their findings indicated that share price per se matters in cross-sectional asset pricing: stock return is inversely related to its nominal price. They showed that a strategy of buying penny stocks could generate a significant alpha even after considering the transaction costs. These abnormal returns were robust in the presence of other firm characteristics such as size, book-to-market equity, earnings/price ratio, liquidity and past returns.

The most recent research has been done in Eastern Europe by Zaremba and Zmudzinski (2014) in their study on low price effect on the Polish Market. They investigated the characteristics of the low price anomaly on the WSE. Their research objectives included examination of the interdependence between the low price effect and other return factors: value, size, liquidity and transaction costs. Their computations were based on all stocks listed on the WSE in years 2003 to 2013. They concluded that the low price effect was present on the Polish market, although the statistical significance was very weak. This effect was reported to have disappeared after accounting for transaction costs and liquidity.

Gunarathna (2014) investigated how the market risk premium, firm size, price-earning ratio, and industry effect affect the expected rate of return on common stock of publicly listed companies in Sri Lanka. The study was based on fifteen listed companies over a period of six years from 2006 to 2011 in Hotel and Travel, and Chemical and Pharmaceutical industry of the Colombo Stock Exchange in Sri Lanka. The findings were that the market risk premium has a significant positive relationship with the expected rate of return on common stock which firm size and PE ratio gave a negative correlation. He concluded that risk premium, firm size and price-earning ratio can be considered as determinants of the rate of return on common stock.

2.4.2 Local Evidence: Related Anomalies

Limited studies have been carried out at the NSE with mixed results on existence of January effect. Muragu (1990) examined the price movements at the NSE. His focus was on the level of market efficiency in the stock market. He used the traditional random walk methodology of serial correlation and runs tests. His study recognized and dealt with the quality and quantity of data, and the depth of analysis of the market microstructure. The quality and quantity of data was improved through the creation of a computer database. The study then analyzed all three price series on the exchange: The bid, ask and transaction prices. The findings suggested that with proper control over the quality of the data and the use of a larger number of data observations, the random walk model could have been a good description of successive price returns in an emerging stock market. This was shown to hold irrespective of whether bid, ask, or transaction returns are used. His study found out that the random walk holds for the NSE, which implies that there is no systematic pattern in the price movements and future prices are independent of past prices.

Karungari (2006) in his study on the relationship between trading volume and return volatility based on 20 companies, which constituted the NSE 20 Share Index for a sample period between 1998 and 2002. The study used regression as well as Correlation to determine whether there exists a relationship and the degree of association between trading volume and returns volatility. Return volatility was arrived at through computation of Standard deviation of monthly returns. Correlation coefficient and coefficient of determination were used to find the relationship between returns volatility and trading volumes for the period under study. The findings showed that there was no relationship between trading volume and returns volatility concluding that past history of the series cannot be used to predict the future in any meaningful way.

Nyamosi (2011) examined the existence of January effect at the Nairobi Stock Exchange (NSE). Descriptive research design was used in the study using daily stock prices on 52 firms listed for equity stocks at the NSE between the period 2001 and 2010. Their mean returns were used to investigate the existence of January effect at the NSE. The data comprised of the monthly share prices and returns. Both the regression analysis and t-statistics analysis showed that returns in January were significantly higher compared with the other months. He concluded that the January effect patterns in return and volatility might enable investors strategize and take advantage of relatively regular shifts in the market.

John (2012) also investigated the presence of seasonal effect in stock returns at NSE. The study included 50 companies listed at the NSE as at December 2011. The data comprised of market share prices which was analyzed using simple regression and

correlation analysis, she concluded that January effect had no significant relationship with the stock returns at the NSE but reported that it was period-specific and mostly in value-weighted return series, but not in equal-weighted return series.

Kuria and Riro (2013) did a study on stock market anomalies in the NSE. They examined the NASI and N20I for a period of 12 years up to 2011. Using t-test and F-test they found that the coefficients of July, September and January were significant at 5% level. They concluded that monthly effect existed at the NSE. They further reported that the return in December month is generally lower and in January month higher, as compared to return for other months.

Wachira (2013) tested the existence of January effect at the NSE. The population of interest was all the listed companies for equity stocks at the NSE as at December 2012. The data comprised of daily values of the two major indices; NSE 20-I and NASI. The results using regression analysis showed negative coefficients in the model used implying the existence of January effect with signified higher returns in January than other months. T-statistics analysis indicated that the coefficients were significant confirming that January effect did not exist at NSE.

Kulavi (2013) did a study to establish the existence of day of the week effect and its relationship with Stock market volatility at the Nairobi Securities Exchange. He used descriptive research design and the data constituted of daily stock returns of 50 companies listed continuously at the NSE from 1st Jan 2008 to 31st December 2012. He found that there existed a day of the week effect in the Nairobi Securities Exchange and the highest volatility is experienced on Monday and lowest volatility is

experienced on Thursday. He mentioned that the volatility pattern found on his study did not refute public information release hypothesis.

2.5 Summary of Literature Review

The foregoing theoretical literature review reveals that it is not possible to exhibit superior stock returns in a market. The CAPM model states that beta is the only explanatory variable that can explain cross-sectional differences in average returns. Accordingly, EMH asserts that all information is reflected in the prices meaning that studying the past prices in the weak form would not lead abnormal returns. On the hand, APT model starts with the premise that arbitrage opportunities should not be present in efficient financial markets. APT has an expression for expected returns that is a linear function for the asset's sensitivity to n sources of systematic risk.

Several empirical studies in the world on low price effect have contributed mixed results. Low priced stocks have been found outperform high priced shares (Fritzmeier, 1936; Gilbertson, Affleck-Graves and Money, 1982; Stoll and Whaley, 1983; Goodman and Peavy, 1986). The negative correlation between price and stock returns was also observed in the presence of stock splits (Bar-Yosef and Brown, 1979). The effect was also observed even after considering other factors: leverage, size, book-to-market equity, Earning/price ratio (Goodman and Peavy, 1986), liquidity (Christie, 1982; Dubofsky and French, 1988; Zaremba and Zmudzinsk, 2014) and past returns. The studies have eliminated the contribution of systematic risk in high average returns for the low price portfolio concluding that the price was either surrogate for an unspecified economic factor or the market was inefficient (Bachrach and Galai, 1979; Zaremba and Zmudzinski, 2014). Low price effect has also been explained to have a

role in January effect (Branch and Chang, 1990). At the same time, different findings were reported; Waelkens & Ward (1997) found high price effect which was inconsistent with Gilbertson et al. (1982) at the JSE.

Low price effect asserts that low price shares exhibit superior returns. The presence of this effect would indicate either market inefficiency or misspecifications of CAPM and APT. Empirical findings have reported the presence of low price effect in various markets. These contradicting explanations between the theories and the empirical findings build on our motivation to continually review the market efficiency theories and methodological procedures. Existence of low price effect on stock returns has not been examined at the NSE.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the methodology of the study. It forms a framework for specifying the relationships among the study variables, research design, population of study, data collection methods and data analysis.

3.2 Research Design

Parahoo (1997) describes a research design as a plan that describes how, when and where data are to be collected and analyzed. This study used a descriptive survey aimed at highlighting a characteristic or behavior on one variable due to another variable (Mugenda & Mugenda, 1999). The study applied a survey research. A survey is an attempt to collect data of a population in order to determine the current state of that population with respect to one or more variables (Mugenda & Mugenda, 1999). This study attempts to determine the stock returns behavior with respect to stock price range.

3.3 Population

The population consisted of all the companies listed at the NSE as at 31st December 2013. There were sixty one listed companies at the NSE. This was an appropriate population which would provide the actual situation in the market. The study undertook a census survey where a company was required to have been listed and actively trading over the review period. Furthermore, only ordinary shares of listed companies were included, preference shares were excluded from the study (Appendix 1).

3.4 Data Collection Method

For the purpose of this study, secondary data from the NSE database and official handbooks was used. The data under study included monthly closing prices for individual shares from the NSE database. The study used monthly closing prices in order to reduce the problem of autocorrelation inherent in short-interval share prices from daily or weekly data. Dividends and rights for the data were extracted from the NSE Bulletin and CMA periodic reports. The 91-Day Treasury Bills (TB) average rates from the CBK website was used as the risk free monthly rate (CBK, 2013).

The study period will be arbitrary chosen as 1st January 2009 to 31st December 2013. This will result in five review periods of a year each.

3.5 Data Analysis Technique

The data analysis technique used by Waelkens and Ward (1997) was applied in this study. The data was analyzed by first sorting and ranking all the stocks on the price (P) at a given time. Then, three separate portfolios comprising of stocks of equal sizes according to their price ranges were constructed. Monthly stock returns were computed as follows:

$$R_{i,t} = (P_{i,t} - P_{i,t-1} + D_{i,t})/P_{i,t-1}$$

Where: $R_{i,t}$ = the return on the share i in month t;

$P_{i,t}$ = the price of share at the end of month t;

$P_{i,t-1}$ = the price of share at the end of month t-1;

$D_{i,t}$ = dividend paid during the month t. Monthly dividend is computed by dividing the total dividend paid during the year by twelve months.

To facilitate the comparison of portfolio performance, the approach adopted by Waelkens and Ward (1997) was followed as close as possible. The shares in a portfolio were equally weighted and the monthly excess return of each portfolio calculated as follows (Waelkens and Ward, 1997):

$R_{P,i,t} = \ln (P_t/P_{t-1}) - R_{f,t}$

Where: $R_{P,i,t}$ = Excess return for portfolio i for month t;

     ln   = Natural logarithm;

     P_t = Portfolio value at end of month t;

     P_{t-1} = Portfolio value at end of month t-1;

     $R_{f,t}$ = monthly risk free rate of return

Portfolio value = the sum of the investments in each share in the portfolio, where investments in a share consists of cash investment through sale of rights, dividends, and cash offers.

The returns earned in the different portfolios were adjusted for the underlying risk of each portfolio using Sharpe measure of performance as motivated by CAPM (Waelkens and Ward, 1997).

Sharpe Ratio = mean portfolio excess return/ standard deviation of portfolio excess

          Return.

The output from the above calculations was a five-point series of risk adjusted returns for each of the three portfolios.

Zaremba and Zmudzinsk (2014) computed the stock returns using the classical market model. They regressed the excess portfolio returns against the market portfolio's excess returns using the CAPM. They used the alpha intercept to measure the average annual abnormal return (so called Jensen-alpha). In both models, the zero hypotheses stated that the alpha intercept was not statistically different from zero, while the alternative hypothesis stated that it was actually different from zero. They found the equation parameters using Ordinary Least Squares (OLS) and tested them in parametric way.

3.5.1 Test of Significance

This study used non-parametric Wilcoxon's signed-rank test to determine if there was any significance difference in the risk adjusted returns between the individual portfolios as applied by Waelkens and Ward (1997). The Wilcoxon's signed-rank test was preferred by Waelkens and Ward (1997) to the technically superior paired t-test since a data series of ten points was considered to be too small to adopt the assumptions with the t-test. Similarly, this study used a small data series of five points. The test was conducted at a 5% significance level. The goal of the Wilcoxon's signed-rank test was to understand whether there was any significant association between risk adjusted returns and share price range, and, if so, the nature of the association.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The objective of this study was to test the existence of low price effect on stock returns at the NSE with an aim of determining the efficiency of the Kenyan stock market. In this chapter the researcher presents the research findings that were revealed after data analysis, results and discussion. Section 4.2 describes the nature of data required and the sources of the data for the study. Section 4.3 covers the analytical tests while Sections 4.4 provides discussion of research findings.

4.2 Descriptive Statistics

The study mainly used monthly data on share prices and corporate actions obtained from NSE daily bulletin. The census survey covered the monthly ordinary share data, corporate actions and corporate action dates for the listed companies at the NSE from 1 January, 2009 to 31 December, 2013. The number of listed companies at the NSE rose from 55 in 1 January, 2009 to 63 in 31 December, 2013. To be included in the analysis, each stock had to have been actively trading during the review period of one year. The monthly number of shares was adjusted for stock splits and consolidations, bonus issues and scrip dividends. The cash portfolio returns were computed by adding dividends and rights issues. Suspended shares at the beginning of the review period were not considered; new listings were not taken into account until the following year during portfolio reconstruction; while companies that changed names within the review period were followed into their new names. The number of companies included for data analysis was 47 for 2009, 52 for 2010 and 2011, 53 for 2012 and 57 for 2013.

The data also included a three month TB rate for the review period obtained from the CBK website. The three month TB average rate was also used as the risk free rate in calculating the excess portfolio returns. Waelken's and Ward (1997) used bank acceptance rate (BA rate) on cash investments but the rate was not easily available for our study since different banks in Kenya use different BA rates.

To achieve our objective of testing the existence of low price effect on stock returns at the NSE, the data was grouped into three equally weighted portfolios with an investment of Kes 1,000.00 in each share at the beginning of each of the five review periods. This resulted into a 60 months data set.

Table 4.1 below lists the descriptive statistics of the monthly excess portfolio returns for the 60 months (January 2009 – December 2013) under the study.

Table 4.1 Descriptive Statistics (Mean and median of the 60 monthly Excess Portfolio Returns)

Monthly Excess Return			
	Excess returns of low priced portfolio	Excess returns of moderate priced portfolio	Excess returns of high priced portfolio
Population (N)	60	60	60
Mean (%)	-1.12	-2.03	-1.98
Median (%)	-0.52	-0.90	-3.52
Maximum (%)	36.83	34.53	51.35
Minimum (%)	-49.60	-30.57	-58.08
Std. dev (%)	14.77	13.79	18.30

Source: Research Findings

The research findings from table 4.1 showed that the low priced portfolio reported the highest average monthly excess returns of -1.12% followed by high priced portfolios with -1.98% and the moderate priced portfolio with -2.03%.

The researcher also calculated Sharpe ratio over the whole 5 year period using the 60 monthly excess returns to calculate the mean and the standard deviation. Below are the findings presented in table 4.2.

Table 4.2 Descriptive Statistics (Sharpe Ratio for the 60 months investment period)

January 09 - December 13			
	Excess returns of low priced portfolio	Excess returns of moderate priced portfolio	Excess returns of high priced portfolio
Population (N)	60	60	60
Mean (%)	-1.12	-2.03	-1.98
Median (%)	-0.52	-0.90	-3.52
Maximum (%)	36.83	34.53	51.35
Minimum (%)	-49.60	-30.57	-58.08
Std. Dev (%)	14.77	13.79	18.30
Sharpe Measure (%)	**-7.59**	**-14.75**	**-10.84**

The above table 4.2 showed a curvilinear relationship between portfolio standard deviation and the portfolio price level. Moderate priced portfolio gave the lowest standard deviation of 13.79%, implying that it had the lowest risk compared to the other two extreme portfolios with the high priced portfolio being more risky at 18.30% compared to the low priced portfolio with 14.77%. When the average excess returns were adjusted for risk, low priced portfolio was ranked as the highest with -

7.59%, while high priced portfolio followed with -10.84% and moderate priced portfolio exhibiting the of -14.75%.

The researcher also analyzed the monthly mean risk adjusted returns for each year. Table 4.3 below gives the descriptive of the mean monthly risk adjusted portfolio returns for the five years period.

Table 4.3 Descriptive Statistics (Risk Adjusted Portfolio Returns for 5 year Period)

		Risk adjusted returns of low priced portfolio	Risk adjusted returns of moderate priced portfolio	Risk adjusted returns of high priced portfolio
Population (N)	Valid	5	5	5
	Missing	0	0	0
Mean (%)		-2.79	-14.82	-9.47
Median (%)		-3.72	-13.55	-10.91
Std. Deviation %		23.08	19.27	18.20
Minimum (%)		-34.06	-44.87	-31.23
Maximum (%)		22.23	6.86	16.41

Source: Research Findings

From the results obtained in table 4.3, it is observed that the mean of risk adjusted returns of low priced portfolio was registered as the highest at -2.79% compared to moderate priced portfolio with the lowest mean of -14.82%, and the high priced portfolio recording a slightly higher mean of -9.47%.The standard deviation for the three portfolio risk adjusted returns was shown to have an inversely relationship with the price level. High priced portfolio had the lowest standard deviation of 18.20%, and therefore the lowest risk while the low priced portfolio with a standard deviation of 23.08% being the riskiest. The findings also indicated the highest maximum risk adjusted returns of 22.23% from low priced portfolio in year 2010 while the lowest

minimum risk adjusted return of -0.4487 was obtained from moderate portfolio in year 2011. The above results implied that low priced shares not only exhibit the highest risk adjusted returns but also give the highest maximum values. These results support the low price effect hypothesis.

4.3 Wilcoxon Signed Ranks Test

The researcher used Wilcoxon signed ranks test to determine whether or not there was a significant association between risk adjusted returns and the share price range, and if so, the nature of the association. This test was done at a significance level of 5%. The results of the ranks are presented in the table 4.4.

Table 4.4 Wilcoxon Signed Ranks Test (Sharpe's Index)

Ranks		N	Mean Rank	Sum of Ranks
Risk adjusted returns of moderate priced portfolio - Risk adjusted returns of low priced portfolio	Negative Ranks	5[a]	3.00	15.00
	Positive Ranks	0[b]	.00	.00
	Ties	0[c]		
	Total	5		
Risk adjusted returns of high priced portfolio - Risk adjusted returns of low priced portfolio	Negative Ranks	4[d]	3.25	13.00
	Positive Ranks	1[e]	2.00	2.00
	Ties	0[f]		
	Total	5		
Risk adjusted returns of high priced portfolio - Risk adjusted returns of moderate priced portfolio	Negative Ranks	2[g]	2.00	4.00
	Positive Ranks	3[h]	3.67	11.00
	Ties	0[i]		
	Total	5		
a. Risk adjusted returns of moderate priced portfolio < Risk adjusted returns of low priced portfolio				
b. Risk adjusted returns of moderate priced portfolio > Risk adjusted returns of low priced portfolio				
c. Risk adjusted returns of moderate priced portfolio = Risk adjusted returns of low priced portfolio				
d. Risk adjusted returns of high priced portfolio < Risk adjusted returns of low priced portfolio				
e. Risk adjusted returns of high priced portfolio > Risk adjusted returns of low priced portfolio				
f. Risk adjusted returns of high priced portfolio = Risk adjusted returns of low priced portfolio				
g. Risk adjusted returns of high priced portfolio < Risk adjusted returns of moderate priced portfolio				
h. Risk adjusted returns of high priced portfolio > Risk adjusted returns of moderate priced portfolio				
i. Risk adjusted returns of high priced portfolio = Risk adjusted returns of moderate priced portfolio				

Source: Research Findings

From the findings in the table 4.4, it was observed that the difference of risk adjusted returns of low priced portfolio from risk adjusted returns of moderate priced portfolio scored a negative ranking of 5 out of 5 which implied that the low priced portfolio outperformed the moderate priced portfolio. This was represented by a mean rank of 3.0. On the other hand, a positive rank of 0 out of 5 for both moderate and low portfolios implied that none of the values from the moderate priced portfolio exceeded those of the low priced portfolio.

Similarly, the results on the difference in risk adjusted returns of low priced portfolio from high priced portfolio showed a negative ranking of 4 out of 5 with a mean of 3.25. The results also showed a positive rank of 1 out of 5 with a mean of 2.0. This meant that the high priced portfolio outperformed the low priced portfolio in 1 out of 5. From the results between high and low priced portfolios, it is explained that the low priced portfolio risk adjusted returns were higher than the high priced portfolio risk adjusted returns.

Finally, the findings on the difference between the risk-adjusted returns of moderate priced portfolio from high priced portfolio gave a negative rank of 2 out of 5 with a mean of 2. On the same results, a positive rank of 3 out of 5 was obtained with a mean of 3.67. This implied that risk adjusted returns for high priced portfolio were higher than those of moderate priced portfolio. From the above, it was clearly shown that the low priced portfolio was ranked higher than the moderate and high priced portfolios in terms of the risk adjusted returns.

The researcher used the test of statistics to check whether there was any significance difference at 5% level of significance in the risk adjusted returns in relation to the price range. The test of statistics of Z and P values were obtained as detailed in the below table 4.5.

Table 4.5 Test of Statistics (Sharpe's Index)

Test Statistics[a,c]			A	B	C
Z			-2.023[b]	-1.483[b]	-.944[d]
Asymp. Sig. (2-tailed)			.043	.138	.345
Monte Carlo Sig. (2-tailed)	Sig.		.066	.192	.441
	95% Confidence Interval	Lower Bound	.061	.184	.431
		Upper Bound	.071	.199	.451
Monte Carlo Sig. (1-tailed)	Sig.		.033	.098	.211
	95% Confidence Interval	Lower Bound	.030	.092	.203
		Upper Bound	.037	.104	.219
a. Wilcoxon Signed Ranks Test					
b. Based on positive ranks.					
c. Based on 10000 sampled tables with starting seed 1314643744.					
d. Based on negative ranks.					
A= Risk adjusted returns of moderate priced portfolio - Risk adjusted returns of low priced portfolio					
B= Risk adjusted returns of high priced portfolio - Risk adjusted returns of low priced portfolio					
C= Risk adjusted returns of high priced portfolio - Risk adjusted returns of moderate priced portfolio					

Source: Research findings.

From the above findings shown in table 4.5, if z-score is not within $-1.96 < Z < 1.96$, then we conclude that there was a significance difference on risk adjusted returns of both portfolios. The results showed a Z-score = -2.023 and a p=0.043 implying that there was a significant difference in the risk adjusted returns between low and moderate priced portfolios, Z=-2.023, p <0.05 (P=0.043).

The results from the same table 4.5, on the difference between low priced and high priced portfolios gave a Z=-1.483 and p=0.192. This implied that there was no significant difference in risk adjusted returns between low priced portfolio and high priced portfolio, Z=-1.483, P>0.05. Similar conclusions were also drawn regarding the results on moderate price portfolio and high priced portfolio. The findings showed that there was no significant difference in risk adjusted returns of high priced portfolio and low priced portfolio, Z=-0.944, P>0.05 (P=0.345).

4.4 Discussion of Research Findings

The risk adjusted stock returns were analyzed for low, moderate and high priced portfolios. The descriptive statistics in table 4.1 showed that the excess portfolio returns were highest for low priced portfolios compared to both moderate and high portfolios for the five years period. However, there was no any pattern observed since high priced portfolio had higher risk adjusted returns than the moderate priced portfolios. This shows that there exists a pattern between stock returns and low share price range which is negative. These findings are consistent with earlier research conducted by Gilbertson et al. (1982) on the low price effect at the JSE.

The table 4.2 depicts similar findings even after the returns were adjusted for the underlying risk using Sharpe's measure calculated using excess returns for the 60 months period. The Sharpe's ratio ranked low priced portfolio as the highest followed by high and moderate portfolios respectively. These results are very similar with the findings in table 4.1 before risk adjustment, and, with exception of moderate portfolio, the results show a strong low price effect.

45

The table 4.3 presents that low priced portfolio recorded the highest risk adjusted returns with the highest standard deviation. The results also demonstrate that low priced portfolio gave the highest maximum values. The efficient market theories suggest that superior stock returns are only possible in the presence of high risk. The findings in the table 4.3 are inconsistent with these theories implying that the market is inefficient or a low price anomaly would be present at the NSE.

The table 4.4 results from the Wilcoxon signed rank test presented a higher rank for low priced portfolio higher when compared to moderate priced portfolio. The mean rank for this comparison was 3.00 for negative rank. In addition, the low and high priced portfolios were compared, the low priced portfolio was had a rank of 4/5 higher than the high priced portfolio. This was followed by a mean rank of 3.25. The findings also ranked high priced portfolio at 3/5, higher than moderate portfolio with a mean rank of 3.67. Thus, the Wilcoxon signed rank test results showed that low price portfolio was ranked higher than both moderate and higher portfolio, followed by high priced portfolio and the moderate priced portfolio scoring the lowest rank.

The test of statistics results in table 4.5, indicated that a significant difference was only recorded for differences between low priced and moderate priced portfolios, $z=-2.023$, $p<0.05$ ($p=0.043$). However, the difference between the other portfolios was not significant with $p>0.05$ ($P=0.138$ and $p=0.345$).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter covers the summary of the findings, conclusion, recommendations, limitations of the study and suggestions for further research.

5.2 Summary of the Findings

The objective of the study was to test for the existence of low price effect on stock returns at the NSE. The study used data from the NSE for all the listed companies on annual basis from 1 January 2009 to 31 December 2013. This is different from research done on the WSE and JSE which included sample stocks. The findings indicated that low share price portfolio was characterized by superior risk adjusted returns compared to both high and moderate share price portfolios. The findings also revealed that high share price portfolio outperformed the moderate share price portfolio on risk adjusted returns basis. The analysis was also done using a non parametric test, Wilcoxon signed rank test. The results ranked the low priced portfolio as the highest followed by high and moderate priced portfolios respectively. The test statistic results showed that the difference in returns was only significant between low and moderate price portfolios. The findings showed that low price effect was significant at the NSE.

The findings of this study are strongly supported by a critical data analysis which ensured all forms of returns were considered. The study accounted for cash returns through dividends, sale of rights issue as well as share returns inform of bonus issues, stock splits and scrip dividends. The cash received during the review period was also

compounded using short term interest risk free rate with an assumption that investors are risk averse. Although, the data used was monthly, the corporate actions were followed to their actual dates of performance which ensured accurate data was used. Seasonal effects reported at the NSE were removed by use mean monthly data.

The study also involved reconstruction of portfolios from the entire population of listed ordinary shares annually and shares reallocated to different portfolios in their share price. This procedure ensured that portfolios retained their character, even-balance of shares in terms of value across all periods as well as elimination of inflation impact. The problem of inflation moving barriers of categories was acknowledged where its complexity may not materially affect the end result.

The findings show that there is an association between stock returns and share price range with a negative relationship. This is consistent with research done by previous researchers on low price effect. Gilbertson et al. (1982) found this relationship on their study done for a period of 12 years. Their data consisted of low price shares traded below 30 cents and a risk adjustment using Sharpe measure. Their showed that low priced shares at the JSE were higher after comparing the internal rate of return with other investments. However, Waelkens and Ward (1997) using a similar methodology to the one used in this study, found a positive relationship between share price and stock returns.

The findings of this study are also consistent with those of Zaremba and Zmudzinski (2014) who reported that the low price effect was present on the Polish market. Their study included other return factors: value, size, liquidity and transaction costs.

However, they reported that the statistical significance was very weak which disappeared after accounting for transaction costs and liquidity.

From the above findings, we can deduce that low price effect exist on stock markets. The findings of this study are consistent with the several researches done on other markets. This purports that low priced shares performs better than average and high priced shares. However, the relationship between price and risk adjusted returns is only negative for low priced shares. As the price increase, the findings show that the high priced portfolio performs better than average priced portfolio.

5.3 Conclusion

This study has shown that the low price effect exists on stock returns at the NSE, this supports the studies on the AMEX, and JSE by Affleck-Graves et al. (1982) who showed that low priced shares recorded superior returns compared to the index. The findings of this research do indicate the possible presence of low price anomaly which was independent on the time horizon. It was also observed that the low price effect was independent of risk factor – low priced portfolio exhibited superior risk adjusted returns.

The study also explains that though the low priced shares are inversely related to risk adjusted returns, this does not hold for average and high priced shares. The impact of this study on investors is that they are advised to apply a strategy of investing in low priced shares for superior returns. However, a critical analysis to determine the shares categorized as low price, is paramount as they are likely to underperform. In addition, the results show that the mean returns are negative for all the portfolios.

The presence of low price effect at the NSE would indicate market inefficiency or misspecification of CAPM. From the study, the investors who were reported to have flown from stock market for real estate due to frustrations from low share prices can now be consoled. This study shows that there is hope in trading in low priced shares at the NSE.

5.4 Recommendations

The low price effect purports that there is the existence of a pattern on the part of the stock returns, whereby these returns are linked to a particular price range. NSE also depicts this pattern. The low price effect on the stock return might enable the investors and stock brokers to take advantage of the regular shifts in the market by designing trading strategies, which account for such predictable pattern. The investors can include stocks consisting of only low prices when forming portfolios hence making arbitrage profits.

The study also indicate that the stock market anomaly do exist at the NSE. Hence, the study recommends to the government to come up with more regulations which will improve the efficiency of the stock market. The government should put in place more regulation so that the stock market becomes a fair playing ground with minimal cases of exploitation. The government is in a better position to monitor the performance of the stock market hence ensuring economic stability of the country.

This study also recommends to the management charged with the responsibility of day to day running of companies, to incorporate the price of stocks when making decisions and policies. The management can maintain an investment strategy in low

priced stocks which increases the companies' profits thus enhancing the shareholders' value.

The presence of low price effect in an emerging and developing market respectively indicate market inefficiency or that the CAPM is mis-specified. This study recommends that more research on market efficiency should be done to determine if the stock markets are efficient.

5.5 Limitations of the Study

The study covered a period of five years from 1 January, 2009 to 31 December 2013. This period gave five annual data sets which were tested for significance using a non parametric test – Wilcoxon signed rank test. This recorded results of overall lack of statistical significance which could have been due to the power of this test. A longer research period would have justified the use of parametric tests which could have given refined results.

The other weighting schemes were not taken into consideration. The study used valued weighted average prices but did not consider the liquidity, leverage, size, brokerage costs and transaction costs. Zaremba and Zmudzinski (2014), in a study on the Polish market, included examination of the interdependence between the low price effect and other return factors: value, size, liquidity and transaction costs. In their findings, they found that the low price effect disappeared after accounting for transaction costs and liquidity.

51

The study made certain assumption when analyzing the data. Rights issues were assumed to have been sold and cash received invested at the TB rate rather than buying the rights issues which could have gained higher returns from appreciation than from cash investments.

5.6 Suggestions for Further Research

The study covered a period of five years. It is possible that a shorter period could have an impact on the findings of this study. It is crucial to conduct a similar study that covers a longer period as well as a larger number of portfolios and thus allow the use of parametric test which can give better results.

The low price effect can also be tested together with other return factors such as liquidity and leverage factors to ascertain if similar findings can be obtained. This can also be extended to the East African Market as well as in other African markets.

The study used the closing value weighted average price which is determined by both the high and low prices of the last day trading. The use of bid/ask price, used by Waelken's and Ward (1997) at the JSE, which is said to reflect a closer estimation of the true market value can be used to determine if the findings would be consistent with this study.

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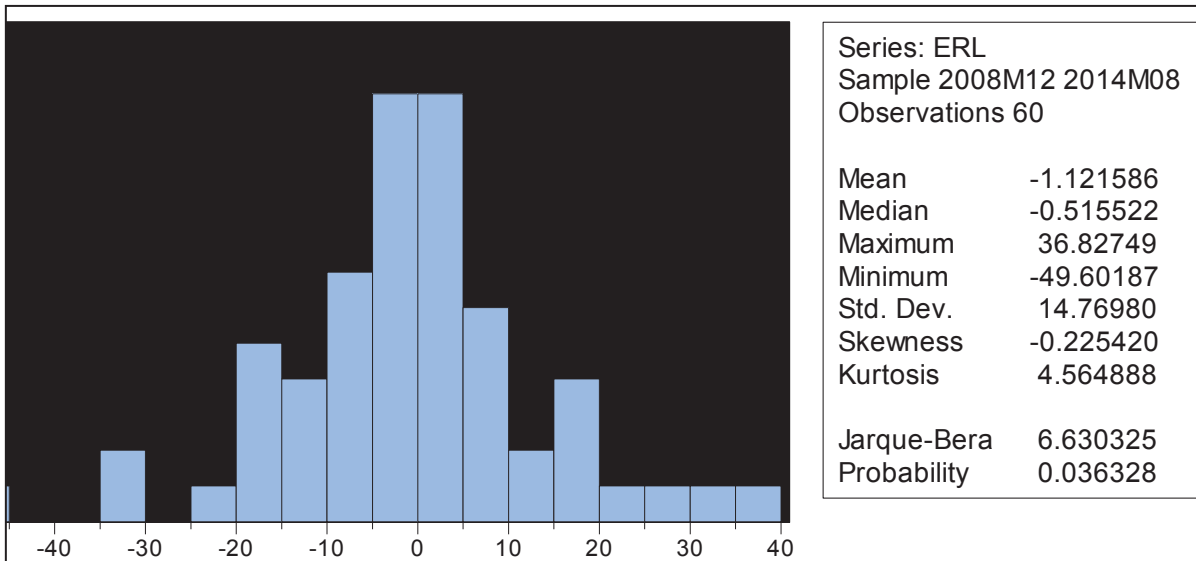
APPENDICES

Appendix 1: Companies Listed at the NSE as at 31st December 2013

AGRICULTURAL

1	Eaagads Ltd Ord 1.25 **AIMS**
2	Kakuzi Ltd Ord.5.00
3	Kapchorua Tea Co. Ltd Ord Ord 5.00 **AIMS**
4	The Limuru Tea Co. Ltd Ord 20.00 **AIMS**
5	Rea Vipingo Plantations Ltd Ord 5.00
6	Sasini Ltd Ord 1.00
7	Williamson Tea Kenya Ltd Ord 5.00 **AIMS**

AUTOMOBILES & ACCESSORIES

8	Car & General (K) Ltd Ord 5.00
9	CMC Holdings Ltd Ord 0.50
10	Marshalls (E.A.) Ltd Ord 5.00
11	Sameer Africa Ltd Ord 5.00

BANKING

12	Barclays Bank of Kenya Ltd Ord 0.50
13	CFC Stanbic of Kenya Holdings Ltd ord.5.00
14	Diamond Trust Bank Kenya Ltd Ord 4.00
15	Equity Bank Ltd Ord 0.50
16	Housing Finance Co.Kenya Ltd Ord 5.00
17	I&M Holdings Ltd Ord 1.00
18	Kenya Commercial Bank Ltd Ord 1.00
19	National Bank of Kenya Ltd Ord 5.00
20	NIC Bank Ltd Ord 5.00
21	Standard Chartered Bank Kenya Ltd Ord 5.00
22	The Co-operative Bank of Kenya Ltd Ord 1.00

COMMERCIAL AND SERVICES

23	Express Kenya Ltd Ord 5.00 **AIMS**
24	Hutchings Biemer Ltd Ord 5.00
25	Kenya Airways Ltd Ord 5.00
26	Longhorn Kenya Ltd Ord 1.00 **AIMS**
27	Nation Media Group Ltd Ord. 2.50
28	Scangroup Ltd Ord 1.00
29	Standard Group Ltd Ord 5.00
30	TPS Eastern Africa Ltd Ord 1.00
31	Uchumi Supermarket Ltd Ord 5.00

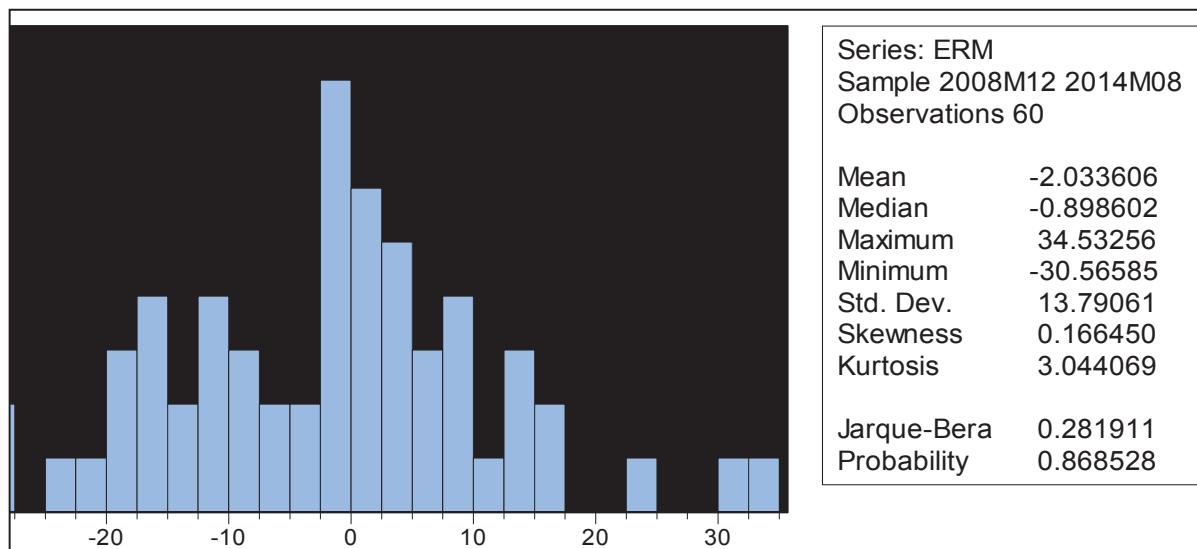|	CONSTRUCTION & ALLIED
32	ARM Cement Ltd Ord 1.00
33	Bamburi Cement Ltd Ord 5.00
34	Crown Paints Kenya Ltd Ord 5.00
35	E.A.Cables Ltd Ord 0.50
36	E.A.Portland Cement Co. Ltd Ord 5.00
	ENERGY & PETROLEUM
37	KenGen Co. Ltd Ord. 2.50
38	KenolKobil Ltd Ord 0.05
39	Kenya Power & Lighting Co Ltd Ord 2.50
40	Total Kenya Ltd Ord 5.00
41	Umeme Ltd Ord 0.50
	INSURANCE
42	British-American Investments Co.(Kenya) Ltd Ord 0.10
43	CIC Insurance Group Ltd Ord.1.00
44	Jubilee Holdings Ltd Ord 5.00
45	Kenya Re Insurance Corporation Ltd Ord 2.50
46	Liberty Kenya Holdings Ltd Ord.1.00
47	Pan Africa Insurance Holdings Ltd Ord 5.00
	INVESTMENT
48	Centum Investment Co Ltd Ord 0.50
49	Olympia Capital Holdings Ltd Ord 5.00
50	Trans-Century Ltd Ord 0.50 **AIMS**
	MANUFACTURING & ALLIED
51	A.Baumann & Co Ltd Ord 5.00 **AIMS**
52	B.O.C Kenya Ltd Ord 5.00
53	British American Tobacco Kenya Ltd Ord 10.00
54	Carbacid Investments Ltd Ord 1.00
55	East African Breweries Ltd Ord 2.00
56	Eveready East Africa Ltd Ord.1.00
57	Kenya Orchards Ltd Ord 5.00 **AIMS**
58	Mumias Sugar Co. Ltd Ord 2.00
59	Unga Group Ltd Ord 5.00
	TELECOMMUNICATION & TECHNOLOGY
60	Safaricom Ltd Ord 0.05
	GROWTH ENTERPRISE MARKET SEGMENT (GEMS)
61	Home Afrika Ltd Ord 1.00

Source: NSE Bulletin 2013

Appendix 2: Graph of Descriptive Statistics for Excess Returns for Low Priced Portfolio (in %).
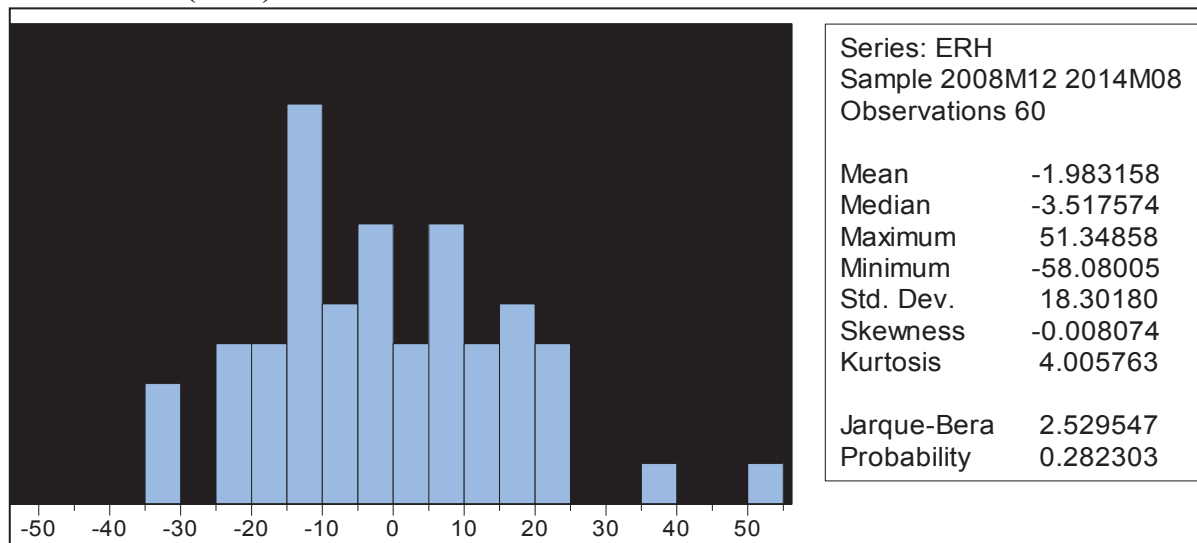

Series: ERL	
Sample 2008M12 2014M08	
Observations 60	
Mean	-1.121586
Median	-0.515522
Maximum	36.82749
Minimum	-49.60187
Std. Dev.	14.76980
Skewness	-0.225420
Kurtosis	4.564888
Jarque-Bera	6.630325
Probability	0.036328

Source: Research Findings

Appendix 3: Graph of Descriptive Statistics for Excess Returns for Moderate Priced Portfolio (in %).

Series: ERM	
Sample 2008M12 2014M08	
Observations 60	
Mean	-2.033606
Median	-0.898602
Maximum	34.53256
Minimum	-30.56585
Std. Dev.	13.79061
Skewness	0.166450
Kurtosis	3.044069
Jarque-Bera	0.281911
Probability	0.868528

Source: Research Findings

Appendix 4: Graph of Descriptive Statistics for Excess Returns for High Priced Portfolio (in %).

Series: ERH	
Sample 2008M12 2014M08	
Observations 60	
Mean	-1.983158
Median	-3.517574
Maximum	51.34858
Minimum	-58.08005
Std. Dev.	18.30180
Skewness	-0.008074
Kurtosis	4.005763
Jarque-Bera	2.529547
Probability	0.282303

Source: Research Findings