# THE LOW SHARE PRICE EFFECT ON THE NAIROBI SECURITIES EXCHANGE

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# DECLARATION

This research project is my own work and has never been presented for a degree in this or any other university.

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

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To God, be all the Glory.

# DEDICATION

I dedicate this project to my family for all the support and encouragement they accorded me towards making this research project a success.

# ABSTRACT

The low price effect is a phenomenon where low priced stocks significantly outperform the high priced stocks on a risk-adjusted basis. The objective of this study was to test the existence of the low share price effect at the Nairobi Securities Exchange with a view of examining all firms listed for the period 2010-2014 using the methodology by Zaremba and Zdmuzinski (2014). The study adopted a descriptive survey research design and used secondary data (monthly share price and market capitalization data) from the NSE database. All stocks were first sorted based on the price (P) at the start of each year to arrive at a low priced portfolio, mid-priced portfolio and high priced portfolio. Portfolio returns were then calculated using equal and market capitalization schemes and tested against market returns using the Capital Asset Pricing Model (CAPM). The equation parameters were determined using Ordinary Least Squares and tested in the parametric way at 5% significant level. The findings indicated that all portfolios were sensitive to the returns from the market portfolio. A 1% change in risk-adjusted market returns resulted to approximately 1% change in risk-adjusted excess portfolio returns. The mid-priced portfolios however performed slightly better than the low and high priced portfolios. The Jensen Alpha was zero in all portfolios at $p > 0.05$, an indication that managers earned zero-risk adjusted returns. The study concluded that the Low Share Price effect does not exist at the NSE, an implication of increased market efficiency.

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# LIST OF ABBREVIATIONS

AMEX- American Stock Exchange

APT - Arbitrage Pricing Theory

CAPM - Capital Asset Pricing Model

CDS - Central Depository System

CMA - Capital Markets Authority

EMH - Efficient Market Hypothesis

FTSE - Financial Times Stock Exchange

IPO - Initial Public Offering

JSE - Johannesburg Securities Exchange

MPT - Modern Portfolio Theory

NSE - Nairobi Securities Exchange

NASI - Nairobi Securities Exchange All- share index

N20I - Nairobi Securities Exchange 20- share index

NYSE - New York Stock Exchange

TSE - Tehran's Stock Exchange

WSE - Warsaw Stock Exchange

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the study

An efficient capital market is one in which security prices fully reflect all the available information (Fama, 1970). However, over time academics in both finance and economics have found anomalies and behaviors that cannot be explained by the theories available. Schwert (2002) evidenced that stock prices do not respond instantaneously to news while Mokua (2003) appreciated that stock markets may have inefficiencies. Nevertheless, Eugene Fama affirmed that despite the fact that some anomalies cannot be explained by financial theory, market efficiency should not be entirely forsaken to favor behavioral finance. He further pointed out that most of the anomalies found in finance theories could be considered merely short term chance events that are automatically corrected by the market itself over time (Fama, 1998).

The low price effect is a phenomenon where low priced shares significantly outperform the high priced shares on a risk-adjusted basis. Generally, inadequate studies on the low share price effect have been conducted at the Nairobi Securities Exchange (NSE). This study sought to investigate the efficiency of NSE by testing the existence of low price effect on stock returns with a view of examining all firms listed at the NSE.

### 1.1.1 Market Efficiency

Market efficiency is an essential quality of a sophisticated market. Accordingly, markets in developed countries are able to attract greater attention from global investors. African stock markets in particular have to prove that they are becoming

more efficient in order to increase their share of global investment funds (Agathee, 2008). Studies carried out indicate that most stock markets are either efficient in the weak or semi-strong form and hence the existence of market anomalies. Los (2004) tested the efficiency of Asian stock markets and found that none of the markets was stationary or showed independent innovations. Mokua (2003) study showed no weekend anomalies but appreciated that stock markets may have inefficiencies which contradict the EMH.

Existence of market imperfections undeniably leads to stock return seasonalities and the more predictable the returns are, the lower the risk a concept that gives value to the study of stock market behavior (Choudhry, 2000). Substantial understanding of stock market anomalies is thus important since investors can use the knowledge to buy low and sell high and thereof making higher profits in efficient markets.

### 1.1.2 Low Price Effect

The low price effect is a phenomenon where low priced shares significantly outperform high priced shares on a risk-adjusted basis. This anomaly was first documented by Fritzmeier (1936) and over time research on its existence in various financial markets has yielded mixed results. Edmister and Greene (1980) found that low priced stocks outperformed both average and high priced stocks after employing various risk adjustment methods. In other studies, Affleck-Graves and Bradfield (1991) found that the firm size, liquidity and dividend yield did not influence the asset pricing on JSE an implication that investors should not expect to earn abnormal returns by investing in small companies, high dividend shares or less liquid shares.

Waelkens and Ward (1997) tested the high price effect at JSE whereas Huku (2013) evidenced the existence of the anomaly at the NSE.

Generally, low priced stocks tend to be more risky than high priced stocks in the sense that their price could continue falling contrary to the expectations of the market of them being undervalued. For purposes of this study, a stock was considered to be low priced if it was traded at less than Ksh. 10 over the review period. The selection of the price was a merely subjective decision and according to Waelkens and Ward (1997), different researchers randomly select different prices.

The low price effect was tested using the Jensen Alpha which measured whether fund managers underperformed or out-performed the market (Zaremba and Żmudziński, 2014). Theoretically, it is expected that the Jensen Alpha is not statistically different from zero, an implication that fund managers earn zero risk-adjusted excess returns. The presence of the anomaly is indicated by higher risk adjusted excess returns by the low priced portfolio as compared to the mid and high priced portfolios.

### 1.1.3 Stock Returns

The ordinary stock returns refers to the collection of earnings which come to belong to a shareholder during a financial period and includes the price changes of a share over a period, dividend per share which is paid to the shareholders after tax deduction, advantages resulting from the priority of buying stocks and advantages of stock dividend or bonus issues (Ghaemi & Tusi, 2007). For purposes of this study, stock returns only included the monthly price change.

Empirical evidence on stock returns addresses the slew of factors that influence stock returns including stock return anomalies. Ghaemi et al. (2007) investigated the factors effective in the returns of common stock of companies approved in Tehran's Stock Exchange (TSE) and the findings indicated a significant and positive relationship between the stock returns and systematic risk index, company's size and P/E ratio. Kuria and Riro (2013) provided evidence on the presence of seasonal effect at the NSE.

Stock returns can be calculated using the simple or logarithm return methods. There has been a debate over which is the most appropriate. Hall (2011) argued that logarithm returns produce better results in terms of log normality, approximation of raw log equality, time additivity, mathematical ease and numeric stability whereas Kothari and Warner (1997) showed that logarithmic returns are negatively skewed such that test statistics are unlikely to be well specified. This study adopted the simple method to calculate monthly stock returns.

### 1.1.4 Low Priced Effect and Stock Returns

Changes in stock prices constitute a key component of stocks returns. A considerable body of finance theory and empirical evidence attribute the return on an asset to the notion of variance. Sharpe (1964), Black and Scholes (1974) related the change in the price of an asset to its own variance or the covariance between its return and the return on the market portfolio. Pindcyk (1984) attributed the decline in stock prices to increase in volatility whereas Porteba and Summers (1986) argued that the increase in volatility was not persistent enough to cause the decline. Again, Fama (1970) disputed

that it is impossible to earn abnormal returns in an efficient market since all the relevant and available information is reflected in the stock prices.

Freitzmeier (1936) observed that low priced stocks outperformed the high priced stocks and exhibited greater price variability whereas Walkens and Ward (1997) evidenced the high price effect at JSE. Allison and Heins (1966) however argued that the price of a stock was not a function of price level but rather of the stock quality of the firm. Haugen (1971) purported that price variability was negatively correlated to the spread between expected rate of growth in dividends and the rate of return required by investors and concluded that ceteris paribus, the ordinary stock market was amply imperfect to cause low priced stocks to trade with greater variability. Huku (2013), Zaremba and Żmudziński (2014) evidenced the low price effect on stock returns at NSE and WSE respectively.

Clearly, the topic of price effect and stock returns is and has been a controversial topic. Despite this, finance theory point of view is that low priced stocks should not yield superior returns to high priced stocks. The existence of the anomaly provides evidence for market inefficiency or misspecification in the asset pricing models adopted.

### 1.1.5 Nairobi Securities Exchange (NSE)

The NSE was set up in 1953 and charged with the responsibility of developing the market and regulating trading activities. In 2012, the demutualization process come in handy as it paved way for improved governance and increased market efficiency and competitiveness against alternative trading systems. Currently, NSE operates 4 major

indices; the NSE 20 Share Index (N20I), NSE 25 Share Index (N25I), NSE All Share Index (NASI) and the FTSE NSE indexes. The introduction of N25I in 2015 was informed by the need to have a reference benchmark that can be used by Capital Markets players, as plans are made to launch the NSE Derivatives Market.

The N20I and N25I track the performance of the 20 and 25 best performing companies listed on the NSE. Selection is usually based on a weighted market performance for a 12 month period based on a minimum market capitalization of Ksh. one billion, free float of at least 20% and superior profitability and dividend record. NASI on the other hand reflects the total market value of all stocks traded on the NSE in one day (NSE, 2015). Investors use these indices as a benchmark to weigh the performance of their individual stocks and since outperforming the market is always a difficult task, most of them tend to develop portfolios that mimic these indexes.

Nyamosi (2014) carried out a study to test whether NSE was efficient in the semi strong form. He measured efficiency by the speed of price adjustment after earnings announcements. The study found that excess returns were realized both before and after the day of announcement. There was also evidence of the market anomalies of overreaction and under reaction which over ruled efficiency in the semi strong form. The presence of the low price effect at the NSE would indicate either market inefficiency or misspecification in the asset pricing model adopted.

### 1.2 Research Problem

The low price effect is an anomaly where low priced stocks significantly outperform high priced stocks on a risk-adjusted basis. The existence of anomalies in financial

markets is a clear cut evidence of inefficiency, a loophole that grants some market participants the potential to influence the price of a stock through their own buying or selling and as a result disturbing the credibility and general acceptability of the market (Fama, 1970). Stock pricing plays a crucial role in ensuring that markets are indeed efficient but unfortunately, research indicates that many financial markets are inefficient an implication that prices are unfair. Los (2004) found that none of the Asian stock markets was stationary or showed independent innovations while Zaremba and Żmudziński (2014) evidenced the low price effect at the Polish Market.

Studies conducted indicate that NSE is efficient in the weak form. Nyamosi (2012) evidenced the market anomalies of overreaction and under reaction and found that excess returns were realized both before and after the day of announcement whereas Kahuthu (2011) showed that herd instinct behaviour among investors had a direct effect on stocks traded and stock prices. Karimi (2013) however, indicated that there is no one model to predict share prices at the NSE which to some considerable extend concured with the Random Walk Hypothesis which states that stock prices follow a random walk and as follows cannot be predicted (Alexandre, 1961; Fama, 1965).

Global studies on the low price effect on stock returns have yielded mixed results. Freitzmeier (1936) observed significant performance and greater price variability by the low priced stocks. Bachrach and Galai (1979) compared risk and return characteristics of shares of under and over $20 per share and found that 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 market was inefficient or the price was a proxy for an unspecified economic factor. Christie (1982) found that increased

volatility in share price for the lower priced shares was attributable to variances in equity value being positively correlated to financial leverage.

The presence of low price effect would indicate either market inefficiency or deficiencies in asset pricing models. In my opinion this anomaly has not been sufficiently tested at the NSE having had only come across a single research on low price effect and stock returns by Huku (2013) who evidenced its existence at NSE using the methodology by Walkens and Ward (1997). This exceptional gap prompted my interest to test its existence using a different model by Zaremba and Żmudziński (2014). The study sought to find answers to the question: Does the Low Price Effect exist 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 findings of this study will be of benefit to:

**Investors** – any rational investor takes into account several factors when making investment decisions. This study is important as it will assist them to know whether buying low priced stocks can earn them higher returns than high priced stocks. If the low price effect exists in NSE market, then investors can compose low priced stock portfolios to earn higher returns.

**Government** – as a regulator through the CMA, the government should put into consideration the low price effect when formulating policies that affect the listed companies.

**Stock brokers and portfolio managers** - these would require any crucial information that may enable them know which stocks to buy/sell in order to maximize on their clients returns. This study provides crucial information as to whether low priced stocks are better performers than the mid and high priced stocks. The study will also enable them to adjust their trading expectations.

**Management** – A company's management is charged with the responsibility of day to day running of companies. Their decisions and policies may be affected positively or negatively by the seasonality on the company's stock price. This study will help to know whether a low priced stock can guarantee them continuous access to capital and if yes, probably consider doing a stock split to make their shares more affordable to the general public.

**Academicians** – this study can be used as a basis for further research on this subject. It also adds knowledge to the finance discipline. Evidence obtained from this study will cast more light on the support of the theory that markets are efficient.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter provides an extensive review of existing literature and theories on share price effect on stock returns. It also discusses some of the factors that influence stock returns including price, liquidity, value and size.

## 2.2 Theoretical Framework

The theoretical framework will guide the research in determining what variables to measure and what statistical relationships to look for. The theories reviewed are: Modern Portfolio Theory (MPT), Efficient Market Hypothesis (EMH), Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Model (APT).

### 2.2.1 Modern Portfolio Theory (MPT)

The MPT was pioneered by Markowitz (1952) who stressed that portfolio building is a perfect tool for minimizing investment risk. His theory was built on the proverb that "it is not wise to put your all eggs in one basket" and emphasized that it is not about the number of different assets that an investor holds but rather the strength of the relationship of the assets forming the portfolio. Accordingly, investor's choice of the assets forming part of their portfolio is dependent on their risk tolerance on the efficient frontier whether risk averse, risk taker or risk neutral.

Curtis (2004) however argued that MPT describes how markets work but not how people work which sets a difficult puzzle since investors at times indeed act rationally and logically and well, other times with lots of subjectivity. West (2006) criticized

MPT on the basis of the assumptions it's founded on, which he described as merely unrealistic and impractical; for instance price availability on continuous basis, nil transaction cost/agency costs/ bankruptcy costs, total risk elimination etc. Hubbard (2009) also contended that MPT doesn't make the slightest attempt to clarify the concealed structure of price changes. Yet again, the use of indifference curves in explaining investor's utility is more theoretical and construction can be extremely difficult in reality (Wooley, 2012).

### 2.2.2 Capital Asset Pricing Model (CAPM)

CAPM was developed by Treynor (1961), Sharpe (1964), Lintner (1965) and Mossin (1966) as an extension to Markowitz's (1952) portfolio theory. The model provides a single period time framework for measuring systematic risks of individual assets forming a portfolio, measuring the systematic risk of a portfolio and then relating all this to the systematic risk of a market portfolio. It assumes a well hedged portfolio where all the unsystematic risks are eliminated through portfolio building leaving the systematic risks as the only relevant risk which is measured using the beta coefficient.

Grigoris and Stravos (2006) tested the validity of CAPM in Greek Security Market where the concept of high risk high return did not hold whereas Basu (1977) was first to document the existence of P/E ratio effect anomaly which is contrary to the predictions of CAPM. Harrington (1987) attributed the disparity to the slew of assumptions of CAPM that are out rightly unrealistic whereas Reilly and Brown (1997) argued that regardless of all these assumptions being illogical and groundless, they did not affect the applicability of CAPM. Nonetheless, Muthama, Munene and

Tirimba (2014) come to a conclusion that indeed there is solid empirical evidence discrediting CAPM but it is not sufficient to repudiate the CAPM.

### 2.2.3 Arbitrage Pricing Theory

The APT was initiated by Stephen Ross in 1976 in response to the weaknesses of CAPM. The model assumes that a factor model describes asset returns, there are many assets so investors can form well-diversified portfolios that eliminate asset-specific risk and no arbitrage opportunities exist among well-diversified portfolios. In the 1st assumption the number of factors is not specified. The 2nd assumption allows investors to form portfolios with factor risk but without asset specific risk while the 3rd assumption is the condition of financial market equilibrium (Ross & Roll, 1980).

Empirical evidence indicates that assumption 2 is reasonable since when a portfolio contains many stocks, the asset-specific or non-systematic risk of individual stocks makes almost no contribution to the variance of portfolio returns. Roll and Ross (2001) found that only 1%-3% of a well-diversified portfolio's variance comes from the non-systematic variance of the individual stocks in the portfolio.

Korajczyk and Connor (1986), Ozcam (1997), Ramadan (2012) tested the validity of APT and established that at the market level, the return on market portfolio was significantly explained by the macroeconomic variables. Altay (2003) used various key macroeconomic indicators of the economy in Turkey and found that none of the factors tested had an impact on the stock returns while according to Van Horne (1989), security prices are indeed influenced but by only a limited set of factors.

Comparing the form of APT's specification of the expected return-risk relationship with that of CAPM, it is a single, market-wide risk factor for the CAPM versus several factors in the APT that capture the salient nuances of that market-wide risk. The equation for the APT also proposes a security market plane with *K* risk factors and one additional dimension for the security's expected return, instead of a line connecting risk and expected return. Brown and Weinstein (1983) found no convincing asymmetry between APT and CAPM whereas Van Horne (1989) asserted that APT could as well become the basic theory of evaluating security returns backed up by CAPM.

### 2.2.4 Efficient Market Hypothesis (EMH)

Eugene Fama is accredited with the development of EMH theory in 1970. This theory suggests that at any given time, security prices fully reflect all the available information an indication that arbitrage opportunities are not possible in an efficient market. EMH widely supports the Random Walk Hypothesis which states that stock prices follow a random walk and as follows cannot be predicted (Fama, 1965; Alexander, 1981).

Fama divided the overall EMH and the empirical tests of the hypothesis into three sub hypotheses depending on the information set involved that is the weak form, semi strong form and the strong form. The weak form hypothesizes that the current stock prices reflect all the currently available market information a signifier that technical analysts cannot possibly use past data to predict future prices. The semi strong form assumes that stock prices reflect all publicly available information meaning any new public information released is immediately reflected in the stock prices an indication

that fundamental analysis cannot be relied upon to earn abnormal returns. Finally, the strong form assumes that current stock prices reflect all information whether public or private, a symbol of market perfection (Fama, 1991).

Burse and Green (2001) and Fielitz (1971) emphasized that in reality prices would not react instantaneously to news and thus speed of price reaction could as well be a measure of security markets competitiveness and efficiency. Malkiel (2003) supported the EMH but only in the long run when the true value of a security wins. He argued that in the short run psychological biases tend to influence security prices. Poterba and Summers (1989) contended that most of the stock's price movements cannot be foot printed on public announcements, findings ascertained by Roll (1998).

### 2.3 Determinants of Stock Returns

A security market is an institution where buying and selling of securities takes place based on the forces of demand and supply. Some of the factors that influence stock returns include price, liquidity, size, value, leverage, momentum and inflation.

#### 2.3.1 Price of a stock

Changes in stock prices constitute a key component of stocks returns. Fundamentally, it is expected that high priced stocks perform better than low priced stocks and thus the low price effect anomaly. Various studies on the price effect on stock returns have yielded diverse results. For instance, Freitzmeier (1936) observed that low priced stocks performed better and exhibited greater price variability while Walkens and Ward (1997) evidenced the high price effect at JSE. Allison and Heins (1966) argued that stock price was not a function of the level of price but rather of the stock quality

of the firm an indication that the low-priced good- quality stocks should not show exceptional price risk.

Low priced stocks generally tend to be more risky due to their price volatility and the mere fact that their price could actually continue falling contrary to the expectations of the market of them being undervalued. That said, their beta is also expected to be high and thus the high returns which are a compensation to investors for taking the risky investment (Reilly & Brown, 2002). Baker (2008) however argued that low-volatility and low-beta portfolios offered an enviable combination of high average returns and small drawdowns, an outcome that opposes the fundamental principle of asset pricing models that risk is compensated with higher expected return (Sharpe, 1964).

### 2.3.2 Liquidity

Investors consider a number of factors including exogenous transaction costs, demand pressure, inventory risk, asymmetric information etc. when deciding on which asset to invest in (Amihud, Mendelson, & Pedersen, 2005). These factors are in one way or the other the sources illiquidity which impose costs to the holder of the assets an indication that risk averse investors should require a compensation for holding them which creates the risk of unexpected decrease in liquidity. The compensation for the costs and risk associated with illiquidity should be reflected in a higher expected return (Dalgaard, 2009).

Generally, there is no common definition for liquidity. However, researchers and academicians agree that it is the backbone of asset pricing as it affects future cash

flows. Kemp (2014) defined liquidity as the ability to trade a substantial amount of a financial asset at close to current market prices while Wyss (2004) attributed liquidity to four dimensions; trading time, the ability to buy/sell a security at about the same price at the same, the ability to buy/sell a certain amount of an asset without the influence of the quoted price and lastly the ability to buy/sell a certain amount of an asset with little influence on the quoted price.

Liquidity facilitates investment in financial markets as it is associated with lower transaction costs (Chordia et al., 2001) and allows investors to acquire or dispose of securities quickly and at the same time companies issuing these securities can enjoy continuous access to capital. Jones (2002) discovered that liquidity and transaction cost had more predictive power on stock returns than dividend yields. Levine and Zervous (1998) found that liquidity contributed significantly to the GDP growth of the sample of countries they used in their study.

### 2.3.3 Company Size

Theoretically, large capitalization (caps) stocks are expected to perform better than small cap stocks and thus the small size effect anomaly. Studies on the effect of size on stock returns are traced back to Banz (1981) and Brown et al. (1983) who discovered that firms with low market capitalization stocks performed way better than large caps stocks after controlling for risk. These findings were contrary to the assumptions of CAPM laid by Sharpe (1964).

In their defense, the proponents of CAPM argued that small firms tend to have higher beta than large firms, an implication that higher returns are expected on average.

However, Fama and French (1992) reported that the market beta had little or no ability in explaining the variation in stock returns. Recent studies by Patel (2012) in developed and emerging stock markets indicated that small firms do not significantly generate different returns than large firms, an indication that stock markets no longer exhibit a size effect or a reverse size effect.

### 2.3.4 Book to Market Value

The use of the Book to market ratio to predict stock returns was first documented by Rosenberg, Reid and Lainstein (1985) and later confirmed by Fama and French (1998). Fama and French (1993) claimed that variables which are not part of the CAPM including book-to-market ratio had the ability to explain the variability in stock returns because they are proxies for common risk factors in stock returns. In effect, high book-to-market should ratio should reflect high risk and thus high return provided the market is efficient. Despite strong objection from behavioral finance scholars for example, Kahneman and Tversky (1994), market efficiency proponents have continued to defend the positive relationship (Malkiel, 2003; Fama & French, 2006).

### 2.3.5 Leverage

According to Lintner (1956) and Gordon (1959), a shift in leverage is critical as it can either increase or decrease the financial burdens of a company an indication that firms should determine their optimal capital structure. Modgliani and Miller (1958) argued that as debt increases so does the riskiness of the stock meaning that equity shareholders will demand a higher return for their stocks. However, at very high levels of debt, a firm can be vulnerable to financial distress and thus the importance of

striking the balance between tax advantages enjoyed and minimizing financial risk (Modgliani & Miller, 1984).

Empirical work on leverage and stock returns has produced mixed results with Hamada (1972) and Bhandari (1988) showing that stock returns increase in leverage and Korteweg (2004) , Dimitrov and Jain (2005) and Penman (2007) showing decrease in leverage. Nissim et al. (2003) found that portfolios with the lowest financial leverage were more profitable than portfolios with high financial leverage.

### 2.3.6 Momentum

Momentum investing is buying of stocks that have had an exemplary performance in the last few months and disposing of the low performers. Jagadeesh and Titman (1993) found that indeed best performers continue to outperform low performers within a lapse 3-12 months, findings contrary to the propositions of CAPM and EMH. Lou and Polk (2014) however argued that momentum strategies are crowded by arbitrage capital and these strategies are hardly profitable and making long horizon abnormal returns is statistically not possible. Kahneman and Tversky (1979) attributed the momentum effect to anchoring and adjustment heuristics whereas Larson (2013) stated that there is not a generally accepted theory that explains the causes of momentum in the financial markets.

### 2.3.7 Inflation

Increases in inflation has been found to fuel increases in the cost of capital which eventually leads to weaker economic performance in the future and reduced corporate profits (Fama & Schwert, 1977). According to Bekaert and Engstrom (2009),

countries with a high incidences of stagflation should have relatively high correlations between bond yields and equity yields findings contradicting Kaul (1987), David and Kutan (2003) who established that inflation had weak predictive power on stock market volatility and returns.

Studies on inflation and stock returns have generally yielded mixed results. Lee (2010) found that there was a positive relationship between inflation and stock prices during the pre-World War II but negative one during the post-World War II. Sharpe (2000) concluded that expected inflation can either positively or negatively influence stock returns depending on the ability to hedge and the government's money supply policies. Nwokoma (2005) found a positive relationship between stock returns and inflation in Nigeria, but inconclusive results for Kenya and South Africa.

### 2.4 Empirical Evidence

The low price effect was first documented in the USA by Fritzemeier (1936). Fritzemeier analyzed fluctuations, movements, and leads and lags of computed indexes of groups of ten stocks falling within each of six price groups (under $10 to over $100) taken from each of four lower grade (Ca, Caa, B, Ba) categories of the NYSE for the 1926-1935 period. He established that low priced stocks were more volatile and outperformed both mid and high priced stocks in both bull and bear markets and neither low priced nor high priced stocks seemed to lead or lag the general market movement. His study however had several limitations; stocks were grouped by prices rather than examining individual stocks, the sample was badly skewed towards high risk securities, quality variable was ignored and the time period of the study was rather unique and could have possibly corrupted the results yielded.

In response, Clendenin (1951) sought out to challenge Fritzmeier's results using monthly spot prices for an unspecified number of stocks. He related the range to the mean price for the period 1937-1944, 1946 and 1948. He concluded that the variability of stock price was not a function of the level of price but of stock quality an implication that the low priced good quality stocks did not show exceptional price risk. Allison and Heins (1966) later confirmed Clendenin's findings after examining 48 A rated stocks and 62 B rated stocks.

Altman and Schwartz (1970) recognized that the volatility of price movements was rather vague and so attempted to find a comprehensive definition. They studied the stability of volatility over time, separated stock volatility into its unique and market related components, and its long run and short run fluctuations. Two basic price volatility models were formulated to examine weekly closing prices for 20 stocks randomly selected from the American Stock Exchanges (AMEX) S & P 500 index for the period 1962-1968. They concluded that categorizing stocks based on price volatility was not warranted since the volatility measures in themselves were volatile.

Subsequently, Haugen (1971) accepted the concept of differing price variability and attempted to identify characteristics unique to volatile prices. He examined 475 industrial companies during the 1948-1967 period. The findings indicated that price variability was negatively correlated to the spread between expected rate of growth in dividends and the rate of return required by investors. He concluded that ceteris paribus, the ordinary stock market was amply imperfect to cause low priced stocks to trade with greater variability than high price stocks.

Klemkosky and Petty (1973) carried out studies on a sample of 160 industrial firms listed at the NYSE with a view of finding out what causes price variability. They grouped the stocks into quartiles according to price variability and gathered data relating to measures of financial risk, fixed charge coverage, growth in price and earnings, variability of earnings and dividends, price relatives, dividend yield, supply of stock, stock turnover, and the average price per share. Their results indicated that low price stocks exhibited greater price variability and volatility than high priced stocks.

Pinches and Simon (1972) examined two alternative portfolio accumulation studies: the buy and hold strategy and the fixed proportion strategy using low priced stocks of under $5 traded at the AMEX from 1965-1970 with the objective of identifying possible rates of return from investing in low priced stocks. They assumed that security selection rules and portfolio strategies once established remain constant over time, only prior information was available to investors and securities were infinitely divisible. Their findings indicated that annual and holding period returns for most periods and portfolios were unusually high.

Bar- Yosef and Brown (1979) considered both time series and cross sectional data for non-split group and a split group to identify the relationship between share price and systematic risks. Their research was motivated by Graham and Dodd (1976), who suggested that low share price was associated with higher risk and thus higher returns. Their results indicated that only non-split shares showed a negative correlation between share price and systematic risk. These findings coincided with later studies of splits and analyses of post-split abnormal returns by Strong (1983), Ikenberry,

Rankine and Stice (1996), Desai and Jain (1997) who documented positive post-split price drift.

Bachrach and Galai (1979) classified stocks above and under $20 per share as high priced and low priced respectively for the period 1926-1968 with a view of comparing their risk and return characteristics. Their results showed that most stocks of under $20 were delisted from the market due to liquidation problems facing the company or external capital reorganization. They also found that systematic risk only explained part of the high returns associated with low priced portfolios and concluded that either the market was inefficient or price was a proxy for an unspecified economic factor.

Similar studies were conducted by Edmister and Greene (1980) indicated that low priced shares outperformed high priced after controlling for risk. Christie (1982) attributed the increased volatility in share price to the strong positive correlation between variances in equity value and financial leverage. Financial leverage was only found to explain between 5% and 31% of the variation on returns. Dubofsky and French (1988) examined the volatility of stock returns 30 days before and after the stock split to extend Christies' work. They documented higher volatility by low priced shares even without differences in financial leverage for the low priced shares.

Stoll and Whaley (1983), grouped NYSE stocks into ten portfolios based on their market values. The average price per share was found to increase while variance of returns decreased as the portfolios increased in average market value. Goodman and Peavy (1986) confirmed the superior performance of low priced stocks and showed that the anomaly was more prevalent in financial markets than the size effect and

earnings yield effect. These findings were consistent with Basu and Reinganum (1981) who suggested the P/E ratio is capable of explaining a considerable portion of the variation in cross-sectional security returns.

Studies on low share price effect at the JSE yielded mixed results. Gilbertson et al. (1982), Affleck- Graves et al. (1982) and Brown and Marsh (1983) documented the low price effect on JSE whereas Walkens and Ward (1997) observed the high price effect. Interestingly, the small firm effect was also found not to exist at the JSE and Bradfield (1991) concluded that the CAPM was a good measure of asset pricing at the JSE.

Hwang and Lu (2008) sought to understand why US stocks share prices had remained remarkably constant since the Great Depression despite inflation and motivations for firms to split their stocks. Their findings showed a negative relationship between stock return and nominal price, an implication that buying cheap stocks generated significant excess returns over what is predicted by asset pricing models even after considering transaction costs. The presence of other firm characteristics such as earning/price ratio size, book to market value, past returns and liquidity were found to facilitate excessive stock returns for the low priced shares.

Muimi (2010) evaluated investor rationality at the NSE. The study tested overreaction by investors to news and performance of companies listed at the NSE. The results showed that investors overreacted to both good and bad news. The loser portfolio outperformed the winner portfolio by about 35.92%, confirming investor's irrationality. This findings were consistent with Werah (2006) and Waweru et al.

(2008) who tested existence of herd behaviour, regret aversion, overconfidence and anchoring at NSE.

Lisiolo (2011) sought out to establish whether the NSE experienced price momentum in the period 2000-2007 and to test whether momentum profitability could be explained by, and was compensation for, risk. The findings indicated that NSE experienced significant degree of price momentum in the period covered, momentum profitability could not be explained by the risk factors of Fama-French, and that there was no size effect to momentum. This implied that investors could earn abnormal returns by adopting momentum-based trading strategies and perhaps that behavioral factors and psychological biases are a major influence on the demand and supply forces at the NSE.

Huku (2013) divided firms listed at the NSE from 2009-2013 into three equally weighted portfolios after ranking them according to their previous closing prices before the review period. The portfolio returns were adjusted for risk using the Sharpe Measure of portfolio performance. The results indicated a negative relationship between low price shares and risk adjusted returns, but a positive relationship for the medium and high priced shares. The results also revealed that high share price portfolios outperformed moderate share price portfolios on a risk-adjusted basis.

Ndii (2013) followed up on the studies by Nyabuto (2011) and Alagidede (2011) and tested the existence of January effect at the NSE. The results showed negative coefficients in the model used which confirmed the existence of January effect since they signified higher returns in January than other months of the year.

Zaremba and Żmudziński (2014) tested the presence of the low price effect on the Polish market. The analysis was based on all stocks listed at the Warsaw Stock Exchange (WSE) for the period 2003-2013 and their findings evidenced the existence of the anomaly. The low price effect however disappeared after accounting for liquidity and transaction costs. No exceptional interactions were found between price and other factors influencing stock returns.

Gunarathna (2014) carried out a study to investigate the effect of firm size, price-earnings ratio, market risk premium and industry effect on the expected rate of return on common stock by examining fifteen publicly listed companies from 2006 to 2011 in the Colombo Stock Exchange. The findings of the study revealed a positive relationship for market risk premium, negative relationship for firm size and P/E ratio and no relationship between industry effect and expected return of common stock. They concluded that risk premium, price earnings ratio and size factor were viable determinants of stock returns.

Peris (2014) investigated bonds returns and the day of the week effect at the NSE. The study was based on corporate bonds issued by eleven firms as at 31st December 2013.The results showed that there was a significant relationship between bond market return and the five days of the week. From the analysis, Tuesday had the highest return while Wednesday had the lowest negative return compared to other days. Winfred (2012) and Ambrose (2011) arrived at the similar conclusions. Kuria and Riro (2013) evidenced the presence of the day of the week effect, weekend effect and monthly effect at the NSE.

Gregory (2014) sought to establish whether monthly market anomalies existed at the NSE and -if yes- their level of persistency. The study relied on monthly closing NSE 20- share index data from 2010-2013. The summary statistics revealed that the average returns and standard deviation on each month of the year varied .Two months presented significant P-value; March (the second period), and July (the whole period). No other Month-of-the-Year effect was observed from the data. The results indicated inefficiency at the NSE.

Mghendi (2014) investigated the small firm effect on stock market returns at the NSE. All firms listed at the NSE from 2008-2013 were divided into four portfolios according to their market capitalization. The findings showed that monthly returns had varying degrees but small sized firms demonstrated a more positive influence on the monthly returns for the six year period leading to the conclusion that small sized firms had a significant positive influence on the monthly returns of companies at the NSE and thus the existence of small firm effect.

Nyaga (2014) tested the existence of the low price earning effect at the NSE for the period 2008-2013. The share return was statistically insignificant to the P/E ratio showing that the ratio did not influence the share return at the NSE. He concluded that a lower P/E did not necessarily guarantee higher returns because it could possibly be that the firms are more risky and in return investors demand a higher required rate of return. Moreover, a low P/E ratio did not imply that the current price was cheap or undervalued and hence higher return were not generated in the consecutive period.

## 2.5 Summary of Literature Review

Studies on low price effect and stock returns have yielded mixed results. Fritzmeier (1936), Edmister and Greene (1980), Gilbertson et al. (1982), Stoll and Whaley (1983), Goodman and Peavy (1986), Huku (2013) and Zaremba and Żmudziński (2014) recorded existence of the low price effect anomaly. Walkens and Ward (1997) observed the high price effect whereas Clendenin (1951) and Allison Heins (1966) documented that variability of stock price was not a function price but rather of the investment quality of the firm.

In my opinion this anomaly has not been sufficiently tested at the NSE having had only come across a single research on low price effect and stock returns by Huku (2013) who evidenced its existence at NSE using the methodology by Walkens and Ward (1997). This interesting gap prompted my interest to test its existence using a different model by Zaremba and Żmudziński (2014).

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This topic discusses the methodology of the study. It clearly points out both the dependent and independent variables to be used in the study, the research design, the population and sample, data collection techniques and data analysis methods.

## 3.2 Research Design

Wyk (2011) defined a research design as the overall plan for connecting the conceptual research problems to the applicable and achievable empirical research. This study adopted a descriptive survey research design to ascertain and describe the characteristics of stock price and stock returns as well the relationship between the two variables at NSE. The survey method was used to facilitate collection of descriptive data (Borg & Gall, 1989).

## 3.3 Population and Sample

The population of interest in the study consisted of all sixty one actively trading firms quoted at the NSE for equity trading from 1st Jan 2010 to 31st December 2014 as shown in Appendix 1. The study was a census study since there was no sampling.

## 3.4 Data Collection

Secondary data obtained from the NSE database was used. The data comprised of monthly share prices and market capitalization for the period under review. The monthly prices were preferred since they reduced autocorrelation inherent in daily and weekly data.

### 3.5 Data Analysis Technique

The study adopted the analysis technique by Zaremba and Żmudziński (2014). All stocks were sorted based on the price (P) at a given time to arrive at three separate portfolios; Low priced portfolio, Mid-priced portfolio and High priced portfolio. The selection of the cut off prices was a merely subjective decision. Waelkens and Ward (1997) explained that different researchers randomly select different prices. Monthly stock returns were calculated as;

$R_{i,t} = \{(P_{i,t} - P_{i,t-1})/ P_{i,t-1}\}*100$

Where; $R_{i,t}$ = the return of share *i* in month t

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

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

Equal and market capitalization weighting schemes were used to aid in the calculation of the portfolio returns. The performance of the portfolios was then tested against the CAPM model (Cambell, Lo & MacKinlay, 1997; Cochrane, 2005).

**CAPM model: $Rpt - RF = \alpha_i + \beta i\ (ERm - RF)$**

Where; Rpt = the portfolio return

ERm = the market portfolio (NASI Index) return

$\alpha_i$, = the Jensen Alpha

$\beta_i$ = the beta coefficient of each portfolio

RF = the risk free rate of return. The average rate of return on government securities was used as its proxy.

### 3.5.1 Test of Significance

The equation parameters were determined using Ordinary Least Squares and tested in the parametric way at 5% significant level to identify whether there was a significant difference between returns generated from the various portfolios. The $\alpha_i$ intercept (Jensen Alpha) measured the average abnormal return from each portfolio. The Null hypothesis stated that the alpha intercept was not statistically different from zero while the Alternative hypothesis stated that it is actually different from zero. A t-test was applied to test the significance of the coefficients.

# CHAPTER FOUR

# DATA ANALYSIS, RESULTS AND DISCUSSION

## 4.1 Introduction

This chapter presents the results of the study after analysis of data. The main aim of the study was to test the existence of low price effect on stock returns. The data was collected from all companies listed at NSE for the period 2010 – 2014. The study used both descriptive and inferential statistics to analyze the data found. Data analysis results were presented using tables.

## 4.2 Descriptive Statistics

The study used monthly share prices to calculate the monthly return of each stock in the three separate portfolios. Portfolio reconstruction was done at the beginning of each year and only stocks listed for the entire year were considered for analysis purposes. This sub-section gives the summary statistics of the main variables that have been included in the model.

**Table 4.1: Descriptive Statistics- Equal Weighting Scheme**

| | **Low Priced** | **Mid- priced** | **High priced** | **Market** |
|---|---|---|---|---|
| | **Rpt-RF** | **Rpt-RF** | **Rpt-RF** | **ERm-RF** |
| N | 58 | 58 | 58 | 58 |
| Mean | -0.0775 | -0.0771 | -0.0779 | -0.0752 |
| Standard error | 0.0110 | 0.0098 | 0.0086 | 0.0092 |
| Median | -0.0883 | -0.0771 | -0.0768 | -0.0787 |
| Standard Deviation | 0.0837 | 0.0748 | 0.0656 | 0.0704 |
| Sample Variance | 0.0070 | 0.0056 | 0.0043 | 0.0050 |
| Kurtosis | 0.9613 | 1.5053 | -0.1434 | 0.9914 |
| Skewness | 0.4676 | 0.2032 | 0.0046 | 0.3017 |
| Range | 0.4217 | 0.4496 | 0.3252 | 0.3919 |
| Minimum | -0.2743 | -0.2812 | -0.2290 | -0.2530 |
| Maximum | 0.1474 | 0.1684 | 0.0962 | 0.1389 |

The results showed that the mid-priced portfolio had the highest risk-adjusted mean return of -7.71% compared to the low priced portfolio with a mean of -7.75% and the high priced portfolio with lowest mean return of -7.79%. The low priced portfolio was the riskiest portfolio with a standard deviation of 8.37% whereas the high priced portfolio was the least risky with a standard deviation of 6.56%. The results also indicated the highest maximum and lowest minimum risk-adjusted returns of 16.84% and -28.12% respectively from the mid-priced portfolio. The results implied that the mid-priced portfolios not only exhibited the highest mean risk-adjusted excess returns but also gave the highest and lowest maximum and minimum values. These results did not support the low price effect hypothesis.

Analysis of skewness showed all portfolios were approximately symmetric with coefficients of approximately 0.5, 0.2 and 0 for the low, mid and high priced portfolio. The low and mid-priced portfolios were slightly peaked with statistics of 1.0 and 1.5 respectively whereas the high priced portfolio had a statistic of approximately zero. The results implied a fairly normal distribution.

**Table 4.2: Descriptive Statistics- Capitalization Weighting Scheme**

| | **Low Priced** | **Mid- priced** | **High priced** | **Market** |
|---|---|---|---|---|
| | **Rpt-RF** | **Rpt-RF** | **Rpt-RF** | **ERm-RF** |
| N | 58 | 58 | 58 | 58 |
| Mean | -0.0664 | -0.0745 | -0.0761 | -0.0730 |
| Standard error | 0.0109 | 0.0100 | 0.0089 | 0.0086 |
| Median | -0.0564 | -0.0670 | -0.0709 | -0.0660 |
| Standard Deviation | 0.0832 | 0.0765 | 0.0678 | 0.0658 |
| Sample Variance | 0.0069 | 0.0059 | 0.0046 | 0.0043 |
| Kurtosis | -0.2956 | 0.5118 | -0.6701 | -0.0285 |
| Skewness | -0.2480 | -0.4392 | -0.2553 | -0.3771 |
| Range | 0.3743 | 0.4062 | 0.2637 | 0.3097 |
| Minimum | -0.2531 | -0.3137 | -0.2266 | -0.2556 |
| Maximum | 0.1212 | 0.0924 | 0.0370 | 0.0541 |

The results showed that the low priced portfolio had the highest risk-adjusted mean return of -6.64% compared to the mid-priced portfolio with a mean of -7.45% and the high priced portfolio with lowest mean return of -7.61%. The low priced portfolio was the riskiest portfolio with a standard deviation of 8.32% whereas the high priced portfolio was the least risky with a standard deviation of 6.78%. The highest maximum risk-adjusted returns of 12.12% were registered from the low priced portfolio and the lowest minimum risk-adjusted returns of -31.37% was obtained from the mid-priced portfolio. The results implied that the low priced portfolios not only exhibited the highest mean risk-adjusted returns but also gave the highest maximum values. These results supported the low price effect theory.

Analysis of skewness showed that the all portfolios were symmetric with coefficients of -0.3, -0.4 and -0.3 for the low, mid and high priced portfolio. The low and high priced portfolios were slightly platykurtic with statistics of -0.3 and -0.7 respectively whereas the mid-priced portfolio was slightly peaked with a statistic of 0.5. The results implied a fairly normal distribution.

### 4.3 Regression Analysis

The regression method used for this study was the ordinary least square method (OLS) which is best linear unbiased estimator of the coefficients due to its consistency, low level of biasness and efficiency. This method assumes linearity between the dependent variable and the independent variable and thus was used to determine the line of best fit for the model through minimizing the sum of squares of the distances from the points to the line of best fit.

**Table 4.3: Model Summary**

| **EQUAL WEIGHTING** | | | | |
|---|---|---|---|---|
| | **R** | **R Square** | **Adjusted R Square** | **SE of Estimate** |
| Low priced portfolio | 0.857 | 0.735 | 0.730 | 0.044 |
| Mid-priced portfolio | 0.965 | 0.931 | 0.930 | 0.020 |
| High priced portfolio | 0.916 | 0.838 | 0.835 | 0.027 |
| | | | | |
| **CAPITALIZATION WEIGHTING** | | | | |
| Low priced portfolio | 0.748 | 0.600 | 0.552 | 0.056 |
| Mid-priced portfolio | 0.954 | 0.910 | 0.908 | 0.023 |
| High priced portfolio | 0.921 | 0.848 | 0.845 | 0.027 |

The R values in Table 4.3 denotes the correlation coefficient between the risk-adjusted excess return on the price portfolios (dependent variable) and the market portfolio (independent variable) and was used to establish whether a linear relationship exists between the two variables and if yes, the nature of the relationship. The coefficient values established in all scenarios were above 0.74, an implication that a good relationship exists between risk-adjusted excess portfolio and market returns. The R-square values present the strength of the relationship between the variables. From the adjusted determination coefficients, a strong linear relationship was established between the dependent and independent variables. Adjusted R-square values of 0.55 and above were established in all scenarios clearly reflecting the increased explanatory power of model.

**Table 4.4: Analysis of Variance (ANOVA)**

| **EQUAL WEIGHTING** | | | | | |
|---|---|---|---|---|---|
| **Low Priced portfolio** | **df** | **Sum of Squares** | **Mean Square** | **F** | **Sig.** |
| Regression | 1 | 0.294 | 0.294 | 155.082 | 0.000 |
| Residual | 56 | 0.106 | 0.002 | | |
| Total | 57 | 0.400 | | | |
| | | | | | |
| **Mid- Priced Portfolio** | | | | | |
| Regression | 1 | 0.297 | 0.297 | 756.750 | 0.000 |
| Residual | 56 | 0.022 | 0.000 | | |
| Total | 57 | 0.319 | | | |
| | | | | | |
| **High Priced Portfolio** | | | | | |
| Regression | 1 | 0.206 | 0.206 | 290.328 | 0.000 |
| Residual | 56 | 0.040 | 0.001 | | |
| Total | 57 | 0.246 | | | |
| | | | | | |
| **MARKET CAPITALISATION WEIGHTING** | | | | | |
| **Low Priced portfolio** | | | | | |
| Regression | 1 | 0.221 | 0.221 | 71.090 | 0.000 |
| Residual | 56 | 0.174 | 0.003 | | |
| Total | 57 | 0.395 | | | |
| | | | | | |
| **Mid- Priced Portfolio** | | | | | |
| Regression | 1 | 0.304 | 0.304 | 564.209 | 0.000 |
| Residual | 56 | 0.030 | 0.001 | | |
| Total | 57 | 0.334 | | | |
| | | | | | |
| **High Priced Portfolio** | | | | | |
| Regression | 1 | 0.222 | 0.222 | 312.352 | 0.000 |
| Residual | 56 | 0.040 | 0.001 | | |
| Total | 57 | 0.262 | | | |

In order to establish the strength of the model in explaining the relationship between the dependent variable (Risk- adjusted excess return on the individual portfolios) and the independent variable (Risk-adjusted excess return on the market portfolio), the study conducted an Analysis of Variance (ANOVA). The findings were as shown in Table 4.4 which presents relatively high f-values at $p < .001$ for all portfolios in either weighting schemes. This indicates that the regression model was significant in explaining the relationship between the two variables.

**Table 4.5: Regression Coefficients**

| **EQUAL WEIGHTING** | | | | | | |
|---|---|---|---|---|---|---|
| **Low priced Portfolio** | **Coefficients** | **SE** | **t stat** | **P-value** | **Lower 95%** | **Upper 95%** |
| Intercept | -0.001 | 0.008 | -0.099 | 0.921 | -0.018 | 0.016 |
| X Variable 1 | 1.020 | 0.082 | 12.453 | 0.000 | 0.856 | 1.184 |
| | | | | | | |
| **Mid-Priced Portfolio** | | | | | | |
| **Intercept** | 0.000 | 0.004 | 0.002 | 0.999 | -0.008 | 0.008 |
| X Variable 1 | 1.026 | 0.037 | 27.509 | 0.000 | 0.951 | 1.100 |
| | | | | | | |
| **High Priced Portfolio** | | | | | | |
| Intercept | -0.014 | 0.005 | -2.676 | 0.010 | -0.024 | -0.003 |
| X Variable 1 | 0.854 | 0.050 | 17.039 | 0.000 | 0.753 | 0.954 |
| | | | | | | |
| **MARKET CAPITALIZATION WEIGHTING** | | | | | | |
| **Low priced Portfolio** | | | | | | |
| Intercept | 0.003 | 0.011 | 0.234 | 0.816 | -0.019 | 0.025 |
| X Variable 1 | 0.946 | 0.112 | 8.432 | 0.000 | 0.721 | 1.170 |
| | | | | | | |
| **Mid-Priced Portfolio** | | | | | | |
| Intercept | 0.006 | 0.005 | 1.402 | 0.166 | -0.003 | 0.016 |
| X Variable 1 | 1.109 | 0.047 | 23.753 | 0.000 | 1.016 | 1.203 |
| | | | | | | |
| **High Priced Portfolio** | | | | | | |
| Intercept | -0.007 | 0.005 | -1.303 | 0.198 | -0.017 | 0.004 |
| X Variable 1 | 0.949 | 0.054 | 17.673 | 0.000 | 0.841 | 1.057 |

From the table, the t-stats for the intercept (Jensen Alpha) in all portfolios in either weighting schemes were quite low and interestingly at $p > 0.05$. Moreover, the value under the Null hypothesis ($\alpha_i=0$) fell between lower 95% and Upper 95% bounds in all portfolios. Equally, the beta coefficients were approximately 1% with significant t-stats at $p < .001$ in all portfolios which indicated that portfolio returns were sensitive to the returns from the market portfolio. It is also evident that taking the independent variables' value at zero, the return from the portfolios was approximately zero percent.

**The established regression equations and their implications were:**

**EQUALLY WEIGHTED**

**Low priced portfolio: Rpt - RF = -0.001+ 1.020 (ERm- RF)**

A 1% change in the risk-adjusted excess market return resulted to a 1.02% change portfolio returns. A Jensen alpha of -0.001 ≈ 0 implied that managers earned zero risk-adjusted excess returns.

**Mid- priced portfolio: Rpt - RF = 0.000+ 1.026 (ERm- RF)**

A 1% change in the risk-adjusted excess market return resulted to a 1.026% change in portfolio returns. A Jensen alpha of 0 implied that managers earned zero risk-adjusted excess returns.

**High priced portfolio: Rpt - RF = -0.014+ 0.854 (ERm- RF)**

A 1% change in the risk-adjusted excess market return resulted to a 0.854% change in portfolio returns. A Jensen alpha of -0.014 ≈ 0 implied that fund managers earned zero risk-adjusted excess returns.

**WEIGHTED USING MARKET CAPITALIZATION**

**Low priced portfolio: Rpt - RF = 0.003+ 0.946 (ERm- RF)**

A 1% change in the risk-adjusted excess market return resulted to a 0.946% change in portfolio returns. A Jensen alpha of 0.003 ≈ 0 implied that fund managers earned zero risk- adjusted excess returns.

**Mid- priced portfolio: Rpt - RF = 0.006+ 1.109 (ERm- RF)**

A 1% change in the risk-adjusted excess market return resulted to a 1.109% change in portfolio returns. A Jensen alpha of 0.006 ≈ 0 implied that fund managers earned zero risk- adjusted excess returns.

**High priced portfolio: Rpt- RF = -0.007+ 0.949 (ERm- RF)**

A 1% change in the risk-adjusted excess market return resulted to a 0.949% change in portfolio returns. A Jensen alpha is -0.007 ≈ 0 implied that fund managers earned zero risk-adjusted excess returns.

### 4.4 Interpretation and Discussion of Findings

The descriptive statistics in table 4.1 and 4.2 evidenced that the highest mean risk-adjusted returns were generated from the mid-priced portfolio using the equal weighting scheme and from the low priced portfolio using the market capitalization scheme for the five year period. This implied that the low price effect only existed in the market capitalization scheme. The difference in performance arose due the varied features, pros and cons of each scheme. Vilkov et al. (2012) evidenced that the superior performance of the equal weighted portfolios was due to the higher return along with the less negatively skewed returns. They also found that equal-weighted portfolios outperformed the cap-weighted portfolios because they were highly exposed to market, size, and value-risk factors and had a higher alpha.

The statistics also revealed that the low priced stocks had the highest standard deviation as compared to the mid and high priced stocks which implied that

irrespective of the weighting scheme adopted, the low priced stocks exhibited greater price variability.

The Analysis of Variance (ANOVA) findings in table 4.4 indicated relatively high f-values at $p < .001$ for all portfolios in either weighting schemes which implied that the model was significant in explaining the relationship between the dependent variable (Risk-adjusted excess return on the individual portfolios) and the independent variable (Risk-adjusted excess return on the market portfolio). Moreover, the R and Adjusted R Square coefficients in table 4.3 depicted a strong linear relationship between the dependent and independent variables to mean that the market risk-adjusted returns were significant determinants of the expected portfolio risk-adjusted returns. The results also indicated that other factors other than market returns contributed to the varying nature of portfolio returns.

The regression above (table 4.5) evidenced that the anomaly does not exist at the NSE. An intercept of approximately zero from all portfolios implied that managers earned zero risk-adjusted returns from the market. Notably, the probability that alpha intercept is zero was quite high in all portfolios which prompted accepting the Null hypothesis which stated that the alpha intercept was not statistically different from zero. Moreover, beta coefficients of approximately 1% at $t > 2$ and $p < .0001$ indicated that the returns from the individual portfolios were sensitive to the returns of the market portfolios. From the analysis, the mid-priced portfolios performed slightly better against the market with positive returns of 1.026% and 1.109% as compared to the low priced portfolios returns of 1.020% and 0.946% and the high priced portfolios

returns of 0.854% and 0.949% in equal and market capitalization weighting schemes respectively.

These findings contradicted Huku (2013) who tested the existence of low share price effect on stock returns of companies listed at NSE using the methodology by Walkens and Ward (1997). The non- existence of the low share price effect at NSE as indicated by the findings above is a proof of increased efficiency at NSE. This implies that irrespective of the portfolios formed, managers should expect to earn close to market returns on either margins, positive or negative.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

This chapter summarizes the findings of the study. It presents the findings obtained and recommendations thereafter. It also highlights the limitations encountered during the study and gives suggestions for further study.

## 5.2 Summary of Findings

The objective of this study was to investigate the existence of low share price effect on stock returns of companies listed at the NSE. To achieve this objective, monthly returns were calculated for the low priced, mid-priced, and high priced portfolio using equal and market capitalization weighting for the period 2010-2014 and tested against the market portfolio returns. Portfolio reconstruction was done at the beginning of each year which involved grouping the stocks based on each stock's end year closing price and only stocks listed for the whole year were considered for the analysis.

The descriptive statistics results showed that all portfolios had a negative mean return ranging between -6% and -8% on a risk-adjusted basis with the equal weighted portfolios generating higher mean returns. Analysis of skewness and kurtosis indicated a fairly normal distribution of data in either weighting scheme. The R values, R square and Adjusted R-square reflected a strong linear relationship between the risk-adjusted excess return on the price portfolios (dependent variable) and the market portfolio (independent variable). It also indicated that the portfolio returns were sensitive to other factors other than market returns. The ANOVA test presented relatively high f-values at $p < .001$ which indicated that the regression model was

significant in explaining the relationship between risk-adjusted portfolio and market returns.

The findings also presented that the portfolio returns were sensitive to the returns of the market (NASI) portfolio. This was indicated by a beta coefficient of roughly 1% which implied that a 1% change in the market risk-adjusted return resulted into 1% change in the portfolio returns. The mid-priced portfolios however generated slightly higher returns than the low and high priced portfolios. The Jensen alpha (intercept) was approximately 0% across all portfolios in either weighting schemes implying that fund managers earned zero risk-adjusted excess portfolio returns.

The findings provided evidence of the non-existence of low share price effect on stock returns at the NSE by displaying a significant intercept value and beta coefficient across all portfolios. The findings of this study were inconsistent with those of Zaremba and Zmudzinski (2014) and Huku (2013) who evidenced the presence of the low price effect at the WSE and NSE respectively. Zaremba and Zmudzinski (2014) statistical significance was however weak and the effect disappeared completely after accounting for liquidity and transaction costs.

### 5.3 Conclusions and Recommendations

The study concluded that the low share price effect on stock returns does not exist at the NSE an indication of increased level of market efficiency. This implies that managers should expect to earn close to market returns irrespective of the portfolios created based on price. This can possibly be explained by for instance demutualization of NSE in 2012 which paved way for increased competition among

alternative trading systems and boosted the confidence of the investors in the market, reducing the ability of a single investor to affect the price of securities through their own buying and selling. It also means that the market participants are now more informed about trading activities and thus reduced investor irrationality and behavioral trading.

The findings of study were consistent with existing finance literature on market efficiency. Fama (1970) argued that beating the market is often a matter of chance and not skill and emphasized that most of the market anomalies are short term chance events that are automatically corrected by the market itself in due time. Investors should therefore invest most of their funds in mid-priced and low priced portfolios since they generate slightly higher returns than high priced portfolios and strive to earn market returns. The study also concluded that the CAPM (Treynor, 1961; Sharpe, 1964; Lintner, 1965 & Mossin, 1966) was sufficient in explaining the relationship between the risk adjusted returns from the individual and market portfolios.

The study recommends that investors should make an attempt to understand their behavioral biases, review them periodically and regulate their investment environment by for instance by trading once every month and preferably on the same day of the month as an important step to avoiding these biases. Investors should also diversify their portfolios by basing their selection of stocks on liquidity or any other set quantitative investment criteria for example growth in earnings so that in the event of unexpected losses in a group of stocks, such losses can be offset by gains elsewhere.

### 5.4 Limitations of the Study

Firstly, the model used only two weighting schemes to calculate portfolio returns. Inclusion of other schemes for instance liquidity weighting could have possibly brought out a different picture of the relationship between portfolio returns and market returns.

Secondly, dividends, sale of rights issue as well as share returns inform of bonus issues and stock splits were excluded from the stock returns and could have posed a risk of underestimation of stock returns.

Thirdly, the study did not attempt to establish the relationship between the low price effect and other rate of return factors such as liquidity, value, size and transaction costs which could have provided information whether the effect exists after accounting for these factors.

Fourthly, the time available for the study was not sufficient enough to extensively gather all the relevant data. Similarly, the study covered a period of five years from 1st January 2010 to 31st December 2014. A longer research period could have most probably given clearer results.

Finally, the findings were inconsistent with recent research findings by Huku (2013) on the low price effect and stock returns at the NSE. The reasons for the discrepancy remain unknown. Inclusion of 2013 in the analysis could also have had an effect on the regression output due to the electioneering effect as a result of the 2013 general elections.

### 5.5 Suggestions for further Research

Other weighting schemes could also be adopted in testing the existence of low share price effect at the NSE. For instance, liquidity weighting schemes and the use of other asset pricing models for example the market model in testing the relationship between the two variables.

A similar study can be conducted and include dividends, sale of rights issue as well as share returns inform of bonus issues, stock splits and script dividends as part of stock returns. The study can extend to test the existence of the low price effect in other securities markets in Africa.

The low share price effect can be tested together with other rate of return factors such as liquidity, value and size to ascertain whether the findings hold including whether the effect exists after accounting for transaction costs.

The study covered a period of five years. Similar studies with extended periods could be carried out to substantiate or negate the findings of this study.

More research on low share price effect can be conducted using various pricing models to determine whether this effect exists at the NSE. Additionally, the election years (2007 and 2013) can be eliminated from the analysis to do away with any electioneering effect on the summary output.

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# APPENDICES

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

| COMMERCIAL AND SERVICES | BANKING |
|---|---|
| Express Ltd. Ord 5.00<br>Kenya Airways Ltd. Ord 5.00<br>Nation Media Group Ord. 2.50<br>Standard Group Ltd. Ord 5.00<br>TPS Eastern Africa (Serena) Ltd. Ord 1.00<br>Scangroup Ltd. Ord 1.00<br>Uchumi Supermarket Ltd. Ord 5.00<br>Hutchings Biemer Ltd. Ord 5.00<br>Longhorn Kenya Ltd. | Barclays Bank Ltd. Ord 0.50<br>CFC Stanbic Holdings Ltd. ord.5.00<br>I&M Holdings Ltd. Ord 1.00<br>Diamond Trust Bank Kenya Ltd. Ord 4.00<br>Housing Finance Co Ltd. Ord 5.00<br>Kenya Commercial Bank Ltd. Ord 1.00<br>National Bank of Kenya Ltd. Ord 5.00<br>NIC Bank Ltd. 0rd 5.00<br>Standard Chartered Bank Ltd. Ord 5.00<br>Equity Bank Ltd. Ord 0.50<br>The Co-operative Bank of Kenya Ltd. Ord 1.00 |
| **TELECOMMUNICATION AND TECHNOLOGY** | **GROWTH ENTERPRISE MARKET SEGMENT** |
| Safaricom Ltd. Ord 0.05 | Home Afrika Ltd. Ord 1.00 |
| **MANUFACTURING AND ALLIED** | **AGRICULTURAL** |
| B.O.C Kenya Ltd. Ord 5.00<br>British American Tobacco Kenya Ltd. Ord 10.00<br>Carbacid Investments Ltd. Ord 5.00<br>East African Breweries Ltd. Ord 2.00<br>Mumias Sugar Co. Ltd. Ord 2.00<br>Unga Group Ltd. Ord 5.00<br>Eveready East Africa Ltd. Ord.1.00<br>Kenya Orchards Ltd. Ord 5.00<br>A.Baumann CO Ltd. Ord 5.00 | Eaagads Ltd. Ord 1.25<br>Kapchorua Tea Co. Ltd. Ord 5.00<br>Kakuzi Ord 5.00<br>Limuru Tea Co. Ltd Ord 20.00<br>Rea Vipingo Plantations Ltd. Ord 5.00<br>Sasini Ltd. Ord 1.00<br>Williamson Tea Kenya Ltd. Ord 5.00 |

| AUTOMOBILES AND ACCESSORIES | CONSTRUCTION AND ALLIED |
|---|---|
| Car and General (K) Ltd. Ord 5.00<br>CMC Holdings Ltd. Ord 0.50<br>Sameer Africa Ltd. Ord 5.00<br>Marshalls (E.A.) Ltd. Ord 5.00 | Athi River Mining Ord 5.00<br>Bamburi Cement Ltd. Ord 5.00<br>Crown Berger Ltd. 0rd 5.00<br>E.A.Cables Ltd. Ord 0.50<br>E.A.Portland Cement Ltd. Ord 5.00 |
| **ENERGY AND PETROLEUM** | **INVESTMENT** |
| KenolKobil Ltd. Ord 0.05<br>Total Kenya Ltd. Ord 5.00<br>KenGen Ltd. Ord. 2.50<br>Kenya Power & Lighting Co Ltd.<br>Umeme Ltd. Ord 0.50 | Olympia Capital Holdings Ltd. Ord 5.00<br>Centum Investment Co Ltd. Ord 0.50<br>Trans-Century Ltd. |
| **INSURANCE** | |
| Jubilee Holdings Ltd. Ord 5.00<br>Pan Africa Insurance Holdings Ltd. 0rd 5.00<br>Kenya Re-Insurance Corporation Ltd. Ord 2.50<br>Liberty Kenya Holdings Ltd.<br>British-American Investments Company ( Kenya) Ltd. Ord 0.10<br>CIC Insurance Group Ltd. Ord 1.00 | |

**Appendix 2: Portfolio Returns for Low priced Portfolio using Equal and Capitalization weighting schemes.**

| | EQUAL WEIGHTING | | | MARKET CAP WEIGHTING | |
|---|---|---|---|---|---|
| **Prd** | **Rpt-RF(y)** | **ERm-RF(x)** | | **Rpt-RF(y)** | **ERm-RF(x)** |
| 1 | 12.17% | 1.43% | | 7.61% | 2.05% |
| 2 | -3.18% | -5.01% | | -3.56% | -4.52% |
| 3 | 14.74% | 13.89% | | -2.37% | 0.72% |
| 4 | 1.82% | -1.36% | | 3.24% | 0.74% |
| 5 | -10.10% | -5.99% | | -7.36% | -2.38% |
| 6 | -0.80% | -1.34% | | 3.71% | -0.37% |
| 7 | 0.27% | 2.12% | | 0.90% | 3.88% |
| 8 | -3.60% | -0.90% | | -14.24% | -4.10% |
| 9 | -3.21% | 0.81% | | -4.87% | 1.20% |
| 10 | -1.88% | -1.42% | | 6.21% | 1.99% |
| 11 | -13.08% | -9.72% | | -9.22% | -7.31% |
| 12 | -6.44% | -0.32% | | 0.06% | -0.75% |
| 13 | -8.81% | -1.40% | | -8.35% | -2.63% |
| 14 | -12.22% | -6.61% | | -16.66% | -5.60% |
| 15 | -8.65% | -9.17% | | -1.30% | -8.04% |
| 16 | -0.27% | -1.69% | | -0.20% | 1.43% |
| 17 | -10.70% | -9.19% | | -5.84% | -12.01% |
| 18 | -11.80% | -11.84% | | -9.01% | -13.00% |
| 19 | -14.11% | -17.51% | | -17.46% | -16.67% |
| 20 | -20.06% | -18.77% | | -25.31% | -20.90% |
| 21 | -6.57% | -15.28% | | -11.41% | -17.78% |
| 22 | -15.39% | -8.06% | | -12.55% | -7.02% |
| 23 | -27.43% | -25.30% | | -24.01% | -25.56% |
| 24 | -13.83% | -17.93% | | -13.11% | -14.39% |
| 25 | -23.41% | -19.37% | | -16.62% | -19.70% |
| 26 | -21.33% | -17.77% | | -22.55% | -13.34% |
| 27 | -13.17% | -18.16% | | -15.49% | -16.20% |

| Prd | Rp-RF | ERm-RF | | Rpt-RF | ERm-RF |
|---|---|---|---|---|---|
| 28 | -4.70% | -10.25% | | -7.93% | -11.76% |
| 29 | -4.24% | -8.14% | | -11.21% | -10.56% |
| 30 | -12.85% | -9.88% | | -3.76% | -6.51% |
| 31 | -10.47% | -11.56% | | -6.88% | -10.50% |
| 32 | -14.03% | -12.80% | | -11.71% | -9.69% |
| 33 | -4.28% | -7.47% | | -4.55% | -5.82% |
| 34 | -10.78% | -6.74% | | -5.45% | -3.50% |
| 35 | -10.97% | -11.88% | | 0.73% | -9.13% |
| 36 | -9.23% | -9.23% | | -10.21% | -6.69% |
| 37 | -1.15% | -2.17% | | 2.65% | 1.01% |
| 38 | -9.48% | -4.54% | | -3.79% | -4.92% |
| 39 | 12.08% | 6.65% | | 3.76% | 5.41% |
| 40 | -8.85% | -12.91% | | -2.85% | -12.65% |
| 41 | -5.48% | -5.41% | | -7.46% | -3.52% |
| 42 | -16.14% | -13.84% | | -16.32% | -16.10% |
| 43 | -0.89% | -1.49% | | 4.91% | 0.82% |
| 44 | -12.55% | -11.33% | | -5.15% | -11.17% |
| 45 | -5.92% | -8.80% | | -0.11% | -3.65% |
| 46 | -6.41% | -3.97% | | 0.44% | -4.74% |
| 47 | -3.67% | -7.19% | | 2.38% | -6.28% |
| 48 | -10.36% | -11.71% | | -11.60% | -12.99% |
| 49 | -5.32% | -5.46% | | -9.11% | -11.14% |
| 50 | -2.98% | -6.41% | | -0.37% | -6.42% |
| 51 | -8.66% | -11.07% | | -0.94% | -7.47% |
| 52 | -9.14% | -5.85% | | -2.85% | -3.84% |
| 53 | 0.98% | -7.69% | | -8.93% | -11.12% |
| 54 | -13.71% | -9.91% | | -15.14% | -8.24% |
| 55 | -19.85% | -9.84% | | -23.18% | -10.51% |
| 56 | -9.97% | -6.91% | | -5.11% | -4.74% |
| 57 | 10.53% | 7.38% | | 12.12% | -4.82% |
| 58 | -20.05% | -9.87% | | -17.85% | -11.71% |

**Appendix 3: Portfolio Returns for Mid- priced Portfolio using Equal and Capitalization weighting schemes**

| | EQUAL WEIGHTING | | | MARKET CAP WEIGHTING | |
|---|---|---|---|---|---|
| **Prd** | **Rp-RF** | **ERm-RF** | | **Rpt-RF** | **ERm-RF** |
| 1 | 0.85% | 1.43% | | 2.41% | 2.05% |
| 2 | -6.41% | -5.01% | | -7.77% | -4.52% |
| 3 | 16.84% | 13.89% | | 2.74% | 0.72% |
| 4 | -1.62% | -1.36% | | 1.96% | 0.74% |
| 5 | -7.58% | -5.99% | | -1.83% | -2.38% |
| 6 | -0.84% | -1.34% | | -2.95% | -0.37% |
| 7 | 2.67% | 2.12% | | 6.30% | 3.88% |
| 8 | -0.21% | -0.90% | | -0.69% | -4.10% |
| 9 | 1.37% | 0.81% | | 2.80% | 1.20% |
| 10 | -0.96% | -1.42% | | -1.15% | 1.99% |
| 11 | -7.86% | -9.72% | | -7.16% | -7.31% |
| 12 | -1.34% | -0.32% | | 0.23% | -0.75% |
| 13 | -0.90% | -1.40% | | 0.11% | -2.63% |
| 14 | -7.90% | -6.61% | | -5.40% | -5.60% |
| 15 | -12.23% | -9.17% | | -10.67% | -8.04% |
| 16 | -1.87% | -1.69% | | 1.90% | 1.43% |
| 17 | -5.68% | -9.19% | | -6.34% | -12.01% |
| 18 | -14.30% | -11.84% | | -14.21% | -13.00% |
| 19 | -18.97% | -17.51% | | -17.81% | -16.67% |
| 20 | -18.65% | -18.77% | | -21.85% | -20.90% |
| 21 | -15.90% | -15.28% | | -20.02% | -17.78% |
| 22 | -6.98% | -8.06% | | -4.77% | -7.02% |
| 23 | -28.12% | -25.30% | | -31.37% | -25.56% |
| 24 | -19.67% | -17.93% | | -15.41% | -14.39% |
| 25 | -16.69% | -19.37% | | -18.57% | -19.70% |
| 26 | -19.78% | -17.77% | | -16.30% | -13.34% |
| 27 | -20.42% | -18.16% | | -17.07% | -16.20% |

| Prd | Rp-RF | ERm-RF | | Rpt-RF | ERm-RF |
|---|---|---|---|---|---|
| 28 | -10.23% | -10.25% | | -10.73% | -11.76% |
| 29 | -10.75% | -8.14% | | -12.61% | -10.56% |
| 30 | -10.78% | -9.88% | | -11.24% | -6.51% |
| 31 | -10.37% | -11.56% | | -9.57% | -10.50% |
| 32 | -12.14% | -12.80% | | -9.17% | -9.69% |
| 33 | -7.84% | -7.47% | | -6.68% | -5.82% |
| 34 | -0.14% | -6.74% | | -0.18% | -3.50% |
| 35 | -14.06% | -11.88% | | -15.40% | -9.13% |
| 36 | -6.53% | -9.23% | | -4.04% | -6.69% |
| 37 | -3.76% | -2.17% | | -1.40% | 1.01% |
| 38 | -3.77% | -4.54% | | -2.08% | -4.92% |
| 39 | 7.01% | 6.65% | | 9.24% | 5.41% |
| 40 | -14.28% | -12.91% | | -16.39% | -12.65% |
| 41 | -6.40% | -5.41% | | -6.01% | -3.52% |
| 42 | -13.64% | -13.84% | | -16.62% | -16.10% |
| 43 | -1.28% | -1.49% | | 0.52% | 0.82% |
| 44 | -10.05% | -11.33% | | -9.65% | -11.17% |
| 45 | -8.75% | -8.80% | | -6.56% | -3.65% |
| 46 | -2.26% | -3.97% | | -2.26% | -4.74% |
| 47 | -5.50% | -7.19% | | -9.22% | -6.28% |
| 48 | -11.28% | -11.71% | | -12.80% | -12.99% |
| 49 | -5.65% | -5.46% | | -9.66% | -11.14% |
| 50 | -9.07% | -6.41% | | -6.62% | -6.42% |
| 51 | -11.67% | -11.07% | | -6.71% | -7.47% |
| 52 | -7.54% | -5.85% | | -2.20% | -3.84% |
| 53 | -9.54% | -7.69% | | -11.48% | -11.12% |
| 54 | -7.08% | -9.91% | | -7.40% | -8.24% |
| 55 | -10.41% | -9.84% | | -11.13% | -10.51% |
| 56 | -7.21% | -6.91% | | -3.28% | -4.74% |
| 57 | 0.87% | 7.38% | | -5.00% | -4.82% |
| 58 | -9.97% | -9.87% | | -12.90% | -11.71% |

**Appendix 4: Portfolio Returns for the High priced Portfolio using Equal and Capitalization weighting schemes**

| | EQUAL WEIGHTING | | | MARKET CAP WEIGHTING | |
|---|---|---|---|---|---|
| **Prd.** | **Rp-RF** | **ERm-RF** | | **Rpt-RF** | **ERm-RF** |
| 1 | -4.02% | 1.43% | | -3.00% | 2.05% |
| 2 | -3.68% | -5.01% | | -2.07% | -4.52% |
| 3 | 9.62% | 13.89% | | 1.28% | 0.72% |
| 4 | -2.02% | -1.36% | | -2.58% | 0.74% |
| 5 | -0.98% | -5.99% | | 0.87% | -2.38% |
| 6 | -1.04% | -1.34% | | -0.95% | -0.37% |
| 7 | 2.63% | 2.12% | | 3.70% | 3.88% |
| 8 | 0.40% | -0.90% | | -0.84% | -4.10% |
| 9 | 2.00% | 0.81% | | 3.18% | 1.20% |
| 10 | -1.72% | -1.42% | | 2.60% | 1.99% |
| 11 | -9.72% | -9.72% | | -6.22% | -7.31% |
| 12 | 1.50% | -0.32% | | -2.44% | -0.75% |
| 13 | 0.98% | -1.40% | | -2.51% | -2.63% |
| 14 | -3.10% | -6.61% | | -2.05% | -5.60% |
| 15 | -7.16% | -9.17% | | -8.47% | -8.04% |
| 16 | -2.20% | -1.69% | | 1.65% | 1.43% |
| 17 | -13.84% | -9.19% | | -18.03% | -12.01% |
| 18 | -8.71% | -11.84% | | -13.55% | -13.00% |
| 19 | -16.36% | -17.51% | | -15.64% | -16.67% |
| 20 | -19.15% | -18.77% | | -18.90% | -20.90% |
| 21 | -16.07% | -15.28% | | -18.47% | -17.78% |
| 22 | -5.41% | -8.06% | | -6.67% | -7.02% |
| 23 | -22.90% | -25.30% | | -22.52% | -25.56% |
| 24 | -16.62% | -17.93% | | -14.15% | -14.39% |
| 25 | -20.32% | -19.37% | | -22.66% | -19.70% |
| 26 | -12.32% | -17.77% | | -5.89% | -13.34% |
| 27 | -19.29% | -18.16% | | -15.70% | -16.20% |

| Prd | Rp-RF | ERm-RF | | Rpt-RF | ERm-RF |
|---|---|---|---|---|---|
| 28 | -13.26% | -10.25% | | -14.69% | -11.76% |
| 29 | -8.38% | -8.14% | | -8.31% | -10.56% |
| 30 | -6.03% | -9.88% | | -3.63% | -6.51% |
| 31 | -13.56% | -11.56% | | -13.37% | -10.50% |
| 32 | -10.93% | -12.80% | | -9.13% | -9.69% |
| 33 | -7.27% | -7.47% | | -5.69% | -5.82% |
| 34 | -7.16% | -6.74% | | -5.63% | -3.50% |
| 35 | -11.17% | -11.88% | | -9.16% | -9.13% |
| 36 | -12.97% | -9.23% | | -7.15% | -6.69% |
| 37 | -1.13% | -2.17% | | 2.55% | 1.01% |
| 38 | -5.24% | -4.54% | | -8.54% | -4.92% |
| 39 | 0.99% | 6.65% | | 2.18% | 5.41% |
| 40 | -13.59% | -12.91% | | -14.44% | -12.65% |
| 41 | -3.50% | -5.41% | | 1.25% | -3.52% |
| 42 | -13.49% | -13.84% | | -15.48% | -16.10% |
| 43 | -1.62% | -1.49% | | -1.23% | 0.82% |
| 44 | -10.59% | -11.33% | | -16.75% | -11.17% |
| 45 | -8.91% | -8.80% | | -2.90% | -3.65% |
| 46 | -6.22% | -3.97% | | -10.13% | -4.74% |
| 47 | -14.36% | -7.19% | | -11.15% | -6.28% |
| 48 | -13.70% | -11.71% | | -14.40% | -12.99% |
| 49 | -5.87% | -5.46% | | -13.38% | -11.14% |
| 50 | -4.34% | -6.41% | | -6.45% | -6.42% |
| 51 | -11.53% | -11.07% | | -8.95% | -7.47% |
| 52 | -7.46% | -5.85% | | -6.45% | -3.84% |
| 53 | -8.77% | -7.69% | | -10.70% | -11.12% |
| 54 | -10.80% | -9.91% | | -9.19% | -8.24% |
| 55 | -8.18% | -9.84% | | -8.94% | -10.51% |
| 56 | -7.91% | -6.91% | | -7.03% | -4.74% |
| 57 | -3.27% | 7.38% | | -5.52% | -4.82% |
| 58 | -12.35% | -9.87% | | -8.91% | -11.71% |