

**THE RELATIONSHIP BETWEEN ACCOUNTING PROFITABILITY AND  
EQUITY STOCK MARKET PRICES OF FIRMS LISTED ON THE NAIROBI  
SECURITIES EXCHANGE**

**By**

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## DECLARATION

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

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Finally, I wish to express my gratitude to all my colleagues who, in one way or another, contributed to the painstaking effort towards the completion of the project.

## **DEDICATION**

I dedicate this project to my supervisor, lecturers, family and friends who supported me throughout the strenuous journey to complete the project and the MBA programme as a whole.

## ABSTRACT

This study investigated the relationship between financial performance and share market prices of fourteen manufacturing and commercial firms listed on the Nairobi Securities Exchange (NSE). Financial performance was represented by return on equity (ROE), return on capital employed (ROCE), earnings per share (EPS) and the price-earnings (P/E) ratios, the independent or predictor variables, while market share price (SMP) was the dependent or response variable. An empirical causal quantitative survey design was applied, which involved collecting quantitative secondary data from annual audited company financial statements and from NSE-published market statistics over the five year period, 2011-2015. The study primarily applied correlation and regression techniques in data analysis. The study results indicated that the selected independent variables cannot be exclusively used to explain movements in market share prices of firms listed on the NSE. Correlation analysis revealed that: (i) no single predictor variable individually had a clear association pattern with the SMP; (ii) only three out of six possible combinations of two predictor variables demonstrated a consistent *positive* association pattern with the SMP, that is, ROCE and EPS, ROCE and P/E ratio, and EPS and P/E ratio; (iii) all possible four combinations of three predictor variables demonstrated a consistent *positive* association pattern with the SMP; while (iv) the combination of all four predictor variables demonstrated a consistent *perfectly positive* association pattern with the SMP. However, although the correlation analysis in this study provided some comforting results, these were quickly rebuffed by the results of regression analysis employed to assess the explanatory power of the independent variables over the dependent variable. *The regression findings indicated that there was no single regression predictor model capable of accurately predicting or estimating the SMP of NSE firms under study. To this extent, the study results were largely inconclusive.* Despite this inconclusiveness, the study results may be used as a source of additional evidence that listed share prices are influenced by many factors besides accounting profitability. Hence, technical predictions using only a number of selected accounting profitability variables could potentially give rise to incorrect or inconclusive results.

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## ABBREVIATIONS AND ACRONYMS

ABC	A. Baumann Company Limited
ADS	Atlas Development & Support Services Limited
BAT	British American Tobacco Kenya Limited
BOC	British Oxygen Company Kenya Limited
CIL	Carbacid Investments Limited
CUL	Current Liabilities
EABL	East African Breweries Limited
EBIT	Earnings Before Interest and Tax
EEA	Eveready East Africa Limited
EMH	Efficient Market Hypothesis
EPS	Earnings Per Share
EXP	Express Kenya Limited
FMCG	Fast Moving Consumer Goods
FTG	Flame Tree Group Holdings Limited
HBL	Hutchings Biemer Limited
INT	Interest Expense (net)
KOL	Kenya Orchards Limited
Kshs	Kenya Shillings
KQ	Kenya Airways Limited
LPL	Longhorn Publishers Limited
MBV	Market-to-Book Value
M	Million
SMP	Market Price per Share
MSC	Mumias Sugar Company Limited
NMG	Nation Media Group
NSE	Nairobi Securities Exchange
Ord	Ordinary
PAT	Profit After Tax
PBT	Profit Before Tax

P/E	Price to Earnings Ratio
ROA	Return on Assets
ROE	Return on Equity
ROCE	Return on Capital employed
SCA	Scangroup Limited
SGL	Standard Group Limited
SHF	Shareholders' Funds
TOA	Total Assets
TPS	TPS Eastern Africa (Serena) Limited
USL	Uchumi Supermarket Limited
UGL	Unga Group Limited

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the Study

Stock market efficiency in free-market economies is recognised as a major positive contributor to the overall economy in terms of resource mobilisation for business, channelling investible funds from surplus to deficit agents of the economy, providing individuals and institutions with viable investment opportunities, and facilitating the efficient allocation of scarce financial resources. If a free economy is an integrated and fused system that works efficiently, then it should be able to value most, if not all, investments fairly, consistently and efficiently, especially those whose securities are openly traded in active securities exchanges such as the NSE. But is this true for listed shares on the NSE? This study aimed to attempt to answer this question by investigating whether published historical company accounting profitability, represented by four selected profitability ratios, has any significant influence on or relationship with a company's share price at the NSE over the 5-year period from January 2011 through December 2015 in the context of the Efficient Market Hypothesis (EMH) formulated by Eugene Fama in 1970. The study focused on firms in two investment sectors of the NSE; namely, the Manufacturing & Allied sector, and the Commercial & Services sector.

An empirical causal quantitative research design was used to analyse the effect of company accounting profitability on market price per share for shares listed on the NSE. This entailed collecting secondary quantitative data from audited financial statements of all sampled firms and from the NSE market statistics. The data was analysed with the aid of Microsoft Excel Data Analysis Toolkit for the calculation of correlation and linear regression statistics. The study attempted to address two broad questions, namely: (i) whether the NSE as a market accords with the EMH principles; and (ii) whether it is possible to predict the general direction of NSE stock market prices based on past published company profitability performance.

#### 1.1.1 Accounting profitability

In this study, a firm's accounting profitability was represented by four profitability ratios namely; return on equity (ROE), return on capital employed (ROCE), earnings per share (EPS) and the price-earnings (P/E) ratio. ROE and ROCE were calculated from each firm's annual audited financial statements obtained from the NSE or company website. The EPS and

P/E ratio for each firm were obtained from the NSE 2015-2016 Handbook. These four ratios comprised the independent variables for this study. The following definitions of the independent variables were adopted from Jordan et al (2008).

ROE was calculated as a percentage equal to Net Income (profit after tax) divided by Shareholders' Funds. ROE is one measure of how efficiently a company uses its assets to produce earnings. Net income is for the full year. Shareholder's Funds exclude preference share capital.

ROCE was calculated as Earnings Before Interest and Tax (EBIT) divided by Total Assets after deducting Current Liabilities. This ratio indicates the efficiency and profitability of a company's capital investments. ROCE should ideally always be higher than the rate at which the company borrows funds.

EPS was the basic (rather than diluted) EPS as reported in the annual audited financial statements of each company. If a company has made a loss, the figure becomes „loss per share“ as the EPS figure will have a negative prefix.

The P/E ratio was calculated as Current Stock market price divided by EPS. The P/E gives an idea of what the market is willing to pay for the company's earnings. The higher the P/E the more the market is willing to pay for the company's earnings and vice versa.

### **1.1.2 Market Price per Share**

According to Jessica (2015), the SMP of common stock is a useful analytical tool when determining if an investment in a firm is worthwhile. The SMP was the dependent variable in this study and was obtained from the published NSE 2015-2016 Handbook for each year for each company under the study. The SMP is a critical metric in the operations of securities/capital markets. This is because it provides a sense of a firm's performance and value at a point in time. Without market price per share, it would be impossible for investors to buy securities or for firms to issue shares that can be subsequently trading.

### **1.1.3 Accounting profitability and Stock Market Price per Share**

General logic would indicate that a firm's accounting profitability is expected to have a significant relationship with the stock market price (SMP), hence the study assessed the strength and direction of that relationship using correlation and regression analysis. The

selected financial ratios were regressed against the SMP both partially (bivariate regression) and simultaneously in various combinations (multiple regression). The overall four-predictor regression analytical model for the study was as follows:

$$\text{SMP-predicted} = a + (b_1) \text{ROE} + (b_2) \text{ROCE} + (b_3) (\text{EPS}) + (b_4) \text{P/E} + \varepsilon$$

Where: a is a constant (y-intercept)

ROE, ROCE, EPS and P/E were the independent variables

$b_1 \dots b_4$  were the regression coefficients (“r”)

$\varepsilon$  was the error term [meaning the unexplained difference between actual SMP and SMP-predicted]

For results interpretation purposes, a coefficient of correlation “r” of  $\geq 0.75$  was taken as implying a strong association between the independent variable and the SMP; if  $0.51 \leq r \leq 0.74$ , a moderate association was inferred; and if “r”  $\leq 0.5$ , a weak/low association was inferred. On the other hand, a coefficient of determination “R<sup>2</sup>” of  $\geq 0.90$  was taken as implying that the underlying independent variable or variables potentially can fully explain variations in the SMP. However, in order to improve the model’s predictive power, the Adjusted R Squared (R<sup>2</sup>) from regression analysis was used to infer the explanatory power of the independent variable (s) over the dependent variable. Adjusted R Squared (R<sup>2</sup>) improves the „quality“ of R<sup>2</sup> by eliminating chance or random occurrences, and is often preferred when more than one predictor variables are used. Hence an Adjusted R Squared (R<sup>2</sup>) of 0.85 would be taken to imply that the underlying independent variable (s) has (have) significant explanatory and predictive power over the dependent variable (SMP). These statistics were derived by the use of Microsoft Excel Data Analysis Toolkit.

#### **1.1.4 The Nairobi Securities Exchange**

The Nairobi Securities Exchange (NSE) is an active market for both primary security issues and secondary trading of securities. It has a total of 13 Investment Sectors with 65 firms in total. The Manufacturing & Allied and Commercial & Services sectors, selected for this study, together have 20 companies, accounting for 30% of all 65 NSE-listed companies. All the 65 listed firms will form the total population for the purposes of this study.

The NSE, though not in name, has actually existed long before the Independence of Kenya in 1963. Dealing in shares and stocks started in the 1920s when the country was still a British colony. However, the market was not formal as there were no any rules and regulations to govern stock broking activities. Trading took place on a „gentleman's agreement“ basis. In 1951, an Estate Agent by the name of Francis Drummond established the first professional stock broking firm. He also approached the then Finance Minister of Kenya, Sir Ernest Vasey and impressed upon him the idea of setting up a stock exchange in East Africa. The two approached London Stock Exchange officials in July of 1953 and the London officials accepted to recognize the setting up of the Nairobi Stock Exchange (NSE) as an overseas stock exchange.

In 1954 the NSE was then constituted as a voluntary association of stockbrokers registered under the Societies Act. Since Africans and Asians were not permitted to trade in securities, until after the attainment of independence in 1963, the business of dealing in shares was confined to the resident European community. At the dawn of independence, stock market activity slumped due to uncertainty about the future of independent Kenya. 1988 saw the first privatisation through the NSE, of the successful sale of a 20% government stake in Kenya Commercial Bank. Since then the NSE has undergone tremendous transformation to become the largest and most active securities exchange in East and Central Africa. The member firms of the NSE are investment firms (stock brokers) licensed to buy and sell securities listed on the NSE after fulfilling general licensing requirements as required by the Capital Markets Authority (CMA). The NSE recently demutualized its shares so that its ownership shares are now traded at the exchange like any other quoted shares. (Source: Adopted from NSE publications and website, 2015).

## **1.2 Research Problem**

A securities market is a collection of financial markets, financial intermediaries, laws and regulations, as well as techniques through which fixed income securities, equities and other securities are packaged, traded and yields are determined. Securities/capital markets facilitate widespread ownership of financial assets thereby reducing the concentration of economic power in the hands of a few. Due to the significance of securities/capital markets and the need for the economy to grow, the managers of the “free economies” have over the years been

persistently promoting the securities/capital market as an engine of growth to provide a viable yet efficient means of resource mobilisation and allocation. The question whether securities market returns can be predicted from published financial/accounting numbers has occupied many researchers in this area. The starting point almost always is the assumption that the securities market operates in an efficient-rational fashion under the framework of the EMH, so that securities of “better” performing firms procure consistently better returns than their “poorer” performing counterparts, regardless of sector or industry. According to Fama (1976) the theory of the EMH of financial markets holds that the security prices tend to fluctuate randomly around their intrinsic values, return quickly to their equilibrium, and fully reflect the latest information available, meaning that investment strategies based on past information cannot consistently earn positive abnormal returns over extended periods of time. Unfortunately, despite a large quantity of studies in this area, researchers are yet to arrive at a consensus regarding the predictability of securities’ prices based past accounting profitability.

Tremendous amounts of past research evidence provides near-consensus that securities markets in developed countries almost achieve EMH principles since they are efficient both at operational and informational flow levels. However, this cannot be said of developing countries like Kenya. Many studies have been carried out both in Kenya and other developing economies on the relationship between share market price and company accounting profitability, with varying findings. For example, in a study of the NSE regarding stock market efficiency in developing countries, Muragu (1990) noted that the results obtained were *consistent* with the weak-form principles of the EMH. In a more recent study, Mburu (2014) found that there was an *insignificant* relationship between stock returns and the P/E ratio but a positive relationship between the stock returns with ROE and MBV, and that some sectors of the NSE recorded *positive but moderate* association between stock returns and the P/E ratio. In another study of the Pakistan Stock Exchange (PSE) on the impact of accounting profitability on share price, Hassan (2010), using a combination of profitability and other financial ratios, concluded that, based on the overall findings, his research model empirically accepted and signified the fact that company accounting profitability had a *significant* impact on the price of its shares on the PSE. In yet another study in Indonesia, Su and Nardy (2012) found that unlike EPS, ROE and ROA individually had a *significant* influence on stock return. But this finding on EPS was contradicted by another study on the relationship between ROA,



ROE and EPS against stock return conducted by Jogiyanto (2003), which showed that ROE *doesn't have a significant* influence on stock return, ROA had a *significant* influence and EPS had a *strong relationship* with stock price. Hence, it is this inconclusive nature of past research results that provided impetus and context for the present study.

A share/security price in an efficient market provides investors with a fairly reliable measure of a firm's performance and value; but is the NSE an efficient market? Does it value equity securities consistently in line with company performance? The assumption that the NSE as a market is efficient in pricing securities cannot be made in the absence of robust evidence. The NSE has continued to grow in complexity; this, coupled with improved information availability and the existence of robust information processing technologies, means that it is possible to improve on the existing research evidence and enrich knowledge in this area. Hence, the uncertainty surrounding the efficiency of securities pricing at the NSE is the chief source of motivation for this study. Therefore, based on the mixed past research findings on the influence of company profitability on share market price, this study sought to extend and, hopefully, improve on existing research evidence. As Muragu (1990) noted, extension of evidence is acceptable in its own right. Keane (1983) said that conclusion of one or two studies should not be interpreted as grounds for slackening the pace or scope of current research activities. By investigating the influence of the four profitability ratios on SMP, this study attempted to establish the extent to which the NSE, as a liberalised market, followed the EMH principles in answering the general question: to what extent does published company accounting profitability (indicating good or bad results), influence the determination of a company's SMP at the NSE?

### **1.3 Research Objective**

This study aimed to provide empirical evidence about the influence of accounting profitability on stock market prices for companies listed on the NSE.

### **1.4 Value of the Study**

This study would have some practical benefits for company management in facilitating managerial decision making, and for investors/shareholders to make informed investment decisions, hence ensuring efficient allocation of scarce capital resources and their prudent management.

The study was also expected to breathe a fresh layer of knowledge into the general body of academic and practical fields regarding the level of efficiency of the NSE in the pricing of individual securities.

The study could also serve as a guide for future reference for both practitioners and academicians interested in conducting or extending capital markets research in accounting.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Literature review was undertaken to identify existing research gaps. This chapter reviewed a number of investment and cognitive theories, a review of past empirical literature on financial investments and stock returns, and finally, gave the conceptual framework for the study.

#### **2.2 Theoretical Literature Review**

This section examined five theories relevant to the study at hand. These are: (i) the Efficient Market Hypothesis; (ii) the Castle-in-the-Air Theory; (iii) the Firm-Foundation Theory, (iv) Theory of Investment Value; and (v) the Prospect Theory.

##### **2.2.1 Efficient Market Hypothesis**

Fama (1970) formulated the Efficient Markets Hypothesis (EMH), also popularly known as the Random Walk Theory. The EMH is a cornerstone of modern financial theory, and is the proposition that current stock/share prices fully reflect available information about the value of the firm, and there is no way to earn excess profits (more than the market overall) by using this information. Importantly, the role of an efficient stock market has been expounded by Stiglitz (1981), who points out that *“there is a general consensus that when financial markets are very competitive and efficient, prices quickly reflect all the available information. There is also a widespread belief that competitive and efficient markets enable the efficient allocation of scarce capital among alternative investment opportunities”*. The EMH is highly controversial and is often disputed because substantial and long-lasting inefficiencies have been observed in developed economies where a lot of research has been conducted. Despite heavy criticism, many modern researchers still consider that the EMH remains a worthwhile starting point. Indeed, according to Jordan and Miller (2008), stock market efficiency is perhaps the most researched subject in financial management theory and practice. According to Malkiel B G (2003), critics of the EMH have blamed the belief in efficient-rational markets for much of the global financial crises that have occurred in the last one decade or so.

### **2.2.2 The Castle-in-the-Air Theory**

Keynes (1936) opined that professional investors prefer to devote their energies not to estimating intrinsic values, but rather to analysing how the crowd of investors is likely to behave in the future and how, during periods of optimism, they tend to build their hopes into sort of „castles in the air“. The successful investor tries to beat the market by estimating what investment situations are most susceptible to public castle-building and then buying before the crowd. As a result, Keynes said, most people are „largely concerned, not with making superior long-term forecasts of the probable yield of an investment over its whole life, but with foreseeing changes in the conventional basis of valuation a short time ahead of the general public“. Keynes, in other words, applied psychological principles rather than financial evaluation to the study of the stock market. An investment is worth a certain price to a buyer because he expects to sell it to someone else at a higher price. The new buyer in turn anticipates that future buyers will assign a still-higher value. There is no reason, only mass psychology. This theory might less charitably be called the “greater fool” theory in that it is perfectly all right to pay three times what something is worth as long as later on you can find someone else “foolish enough” to pay five times what it is worth. The castle-in-the-air theory has many advocates, in both the financial and the academic communities.

### **2.2.3 The Firm-Foundation Theory**

The firm-foundation theory, formulated by Guild (1931) argues that each investment instrument, be it a piece of real state or a common stock, has a firm anchor of something called “intrinsic value”, which can be determined by careful analysis of present conditions and future prospects. When market prices fall below or rise above this firm foundation intrinsic value, a buying or selling opportunity arises, because this fluctuation will eventually be corrected. Investing then becomes a dull but straightforward matter of comparing something’s actual price with its firm foundation of value. The Theory believes and tries to understand the intrinsic value of any stock or other asset. Accordingly, buyers and traders should meet in the market and trade at (the prevailing) price. However, this does not establish the risk involved in the transaction. Total returns are the expected return plus the unexpected return, where unexpected returns represent risk. The condition in the market either keeps the price below the intrinsic value or above it - it rarely remains at or around the intrinsic value. This position

offers the investor a choice - in case he/she is able to buy the stock or the real estate below its intrinsic value, he/she shall make profits when the price goes above the intrinsic value.

#### **2.2.4 The Prospect Theory**

The Prospect Theory, postulated by Tversky et al (1979), is a collection of ideas that provides an alternative to classical, rational economic decision making. According to Jordan et al (2008), the foundation of prospect theory rests on the idea that investors are much more distressed by prospective losses than they are happy about prospective gains. They contend that research has found that a typical investor considers the pain of, say, a Kshs.100 loss to be about twice as great as the pleasure received from a gain of, say, Kshs.100. Also, they indicate that research has found that investors respond in different ways to identical situations – that, the difference depends on whether the situation is presented in terms of losses or in terms of gains. According to this theory, investors are risk-averse and seem to be willing to take more risk to avoid the loss of a Shilling than they are to make a Shilling profit. Therefore, the essence of the Prospect Theory is the focus on gains and losses and the tendency of investors to be risk-averse with regard to gains, but become risk-taking when it comes to losses.

#### **2.2.5 Cognitive Theories affecting Investment Decisions**

Empirical analyses have consistently found problems with the EMH, the most consistent being that stocks with low P/E ratios (and similarly, low price to cash-flow or book value) often out-perform other stocks. Alternative theories have proposed that cognitive biases cause these inefficiencies, leading investors to purchase over-priced stocks. Today, the intellectual dominance of the EMH has become far less universal, with many financial economists and statisticians now believing that stock prices are at least partially predictable. Empirical research evidence exists to show that in addition to the availability of “hard” company accounting profitability information regarding decisions to invest in security exchanges, cognitive factors are also largely at play. Some of the most significant cognitive influences, including frame dependence, mental accounting, loss aversion, and the gamblers’ fallacy are explained below.

##### **2.2.5.1 Frame Dependence**

According to Shefrin et al (2000), *frame dependence* means that the way people behave depends on the way that their decision problems are framed. Jordan et al (2008) assert that if

an investment problem is presented in two different (but really equivalent) ways, investors often make inconsistent choices; that is, the way that a problem is described or phrased or framed seems to matter to people. According to Tversky et al (1986), the rational theory of choice assumes description invariance, that is, equivalent formulations of a choice problem should give rise to the same preference order. However, contrary to this assumption, there is much evidence that variations in the framing of options (e.g., in terms of gains or losses) yield systematically different preferences.

#### **2.2.5.2 Mental Accounting and Loss Aversion**

According to Jordan et al (2008), *mental accounting* is the habit or behaviour of associating a stock with its purchase price. As such, as the price of the stock changes over time, an investor will have unrealised gains or losses when he compares the current price with the purchase price. Through time, he will mentally account for these gains and losses, and how he feels about the investment will depend on whether he is ahead (gaining) or behind (losing). Mental accounting makes an investor have a personal relationship with each of his stocks and, as a result, selling one of them becomes more difficult, especially selling a stock at a price lower than its purchase price. *Loss aversion* is closely related to mental accounting and refers to an investor's reluctance to sell investments after they have fallen in value. Jordan et al (2008) quotes the legendary investor, Warren Buffet thus: „*The stock doesn't know you own it. You have feelings about it, but it has no feelings about you. The stock doesn't know what you paid. People shouldn't get emotionally involved with their stocks*’.

#### **2.2.5.3 The Hot-Hand Fallacy and Clustering Illusion**

Per Gilovich et al (1985), the *hot-hand fallacy*, as applied to investments, would refer to the investors' belief that past success will breed future success based on observation. This implies that companies that have had exceptionally good performance (the „hot“ company) this year will continue to do so next year and beyond. They also believe that a poorly performing company this year will continue to do poorly next year and beyond. Jordan et al (2008) observe that despite the universal disclaimer that „past performance is no guarantee of future results“ many investors clearly endlessly chase past returns. Related to the „hot-hand“ fallacy is the *clustering illusion*, which is the human belief that random events that occur in clusters are not really random (Jordan et al, 2008). If, for example, one flips a fair coin twenty times, we all know that each time the chance of „heads“ or „tails“ coming up is 50-50; but if five

„heads“ come up in a row, the investor with a clustering illusion may be inclined to believe that „heads“ are more likely than „tails“ to come up at the sixth flip and subsequent throws.

#### **2.2.5.4 The Gambler's Fallacy**

Tversky et al (1986) opine that the *gambler's fallacy* arises out of a belief in a “law of small numbers”, or the erroneous belief that small samples must be representative of the larger population. The fallacy is actually the opposite of the clustering illusion and, according to Jordan et al (2008), it is committed when people assume that a departure from what occurs on average will be corrected in the short run – that, because an event has not happened recently, it is „overdue“ and is more likely to occur than not. The term *gambler's fallacy* is derived from the psychology of betting. For example, if a gambler bets on his lucky number, and wins several times in a row; the gambler's fallacy predicts that his lucky number will be less likely than not to come up on the next bet. Many investors make investment errors and biases based on this fallacy.

#### **2.2.5.5 Other Cognitive Biases**

There are many other well-researched cognitive influences that affect stock market investment decisions as indeed any other investment decisions. These influences, adopted from Jordan et al (2008) are briefly described below.

*Recency bias* is the tendency of human beings to give recent events more importance and prominence in thought than less recent events. This bias is related to the law of small numbers. For example, investors may pour their money in a company that has shown very good performance in the last two years despite the fact that the company had performed very poorly over the previous five years.

*Self-attribution bias* his occurs when an investor attributes good outcomes to his or her own skills, but blames bad outcomes on bad luck. This is related to the cognitive bias of over-confidence in one's skills.

*Availability bias*: An investor suffers from availability bias when he puts too much weight on information that is easily available and places too little weight on information that is hard to attain. As such, his financial decisions suffer for considering only information that is easy to obtain.

### 2.3 Empirical Literature Review

This section examined a number of past studies conducted in the area of stock market behaviour and factors that drive stock prices undertaken both in Kenya and elsewhere. These were summarised as follows.

In a recent study on the *Relationship between Price Earnings Ratio and Stock Return for Firms Quoted on NSE*, Mburu (2014) found that there was an insignificant relationship between stock returns and the P/E ratio but a positive relationship between the stock returns with ROE and MBV. The causal survey study applied regression analysis and concluded that there was strong relationship between ROE and MBV, and MBV could be a better predictor of stock returns than the P/E ratio. Further research study was recommended to assess whether the MBV can predict the stock returns in both short and long term for firms listed on the NSE.

In her study on *the Effect of behavioural factors on individual investor choices at the NSE*, using a descriptive study design, descriptive statistics and correlation analysis, Shikuku (2014) established varied factors that determine the individual investor's behaviour, with herding, loss aversion, regret aversion, price changes, market information, past trends of stocks, overconfidence and anchoring highly affecting their decisions, while mental accounting emerged as the least significant factor determining the individual investors' behaviour. Future studies were recommended to confirm the findings of this research on behavioural finance related to individual investors' decision making processes.

In another study conducted by Su et al (2012) on *the Influence of accounting profitability on stock return in basic and chemicals industry in Indonesia*, based on 3 financial ratios (ROA, ROE, and EPS), the causal survey research found, through regression analysis, that ROA and ROE had a positive and significant influence on stock return. However, the EPS value individually had no significant influence on stock return. Simultaneously, all three ratios (ROA, ROE, and EPS) had a significant influence on stock.

Another Kenyan study by Kithinji et al (2010) on *Stock Market Performance before and after General Elections - a Case Study of the NSE*, analysed the performance of the NSE before and after the general elections held in 1992, 1997, 2002 and 2007. The study used a causal survey design and regression analysis, and showed that the NSE performance was influenced by



political activities and expectations around the election period in the short-term. The study also revealed that in the first two years after the general elections the NSE performed better than in the last two years before the next general elections. The poor performance before the election could be attributed to investor anxiety and panic associated with the pre-election period; hence the pre-election period was not conducive for short-term investments.

In a Pakistani study titled *The Impact of Accounting profitability of the Company on its Share Price: Evidence from Pakistan Stock Exchange (PSE)*, Hassan (2010) used share prices as the “explained variable” and six financial ratios (Return on Assets - ROA, Dividend Cover Ratio - DCR, Current Ratio - CR, Earnings per Share - EPS, Return on Equity - ROE and Cash Flow Ratio - CFR) as “explanatory variables” in a causal survey design. The empirical results of regression analysis showed that all the independent variables explained changes in the dependent variable by 50.9%. Based on the overall findings, the model empirically accepted and signified the fact that company accounting profitability had a significant impact on the price of its shares on the PSE.

Using similar techniques to Hassan above, Jogiyanto (2003) studied *the Relationship between ROA, ROE, and EPS against Stock Return* in Indonesia and found that ROA had a significant influence on stock return implying that when net profit increases and total assets decrease, ROA also increased as well. This meant that management successfully utilised the company’s assets (either current assets or fixed assets) and eventually the stock price increased which had attracted many investors to the stock.

According to a study in Indonesia by Mulyadi (2001), ROE doesn’t have a significant influence on stock return. It meant that the higher the ROE, the stock return would not necessarily get higher as well and that ROE is not relevant as a tool for investors to make investment decisions and predict the stock return.

In a study titled *Stock Market Efficiency in Developing Countries: A Case Study of the Nairobi Stock Exchange* conducted more than a quarter century ago, Muragu (1990) attempted to answer the question - are successive share price returns on the NSE independent random variables so that price returns cannot be predicted from historical price returns? In answering the above question, the findings of the study 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 (EMH) can be a good description of successive price returns in an emerging stock market. This was contrary to most of the earlier evidence that the random walk model does not apply in such markets. The results obtained were therefore consistent with the weak-form (principles) of the EMH. Overall, this study provided evidence that small markets, such as the NSE, may provide empirical results consistent with weak-form efficiency. These results did not categorically say that the market (NSE) was weak-form efficient, but rather that the results did not contradict the weak-form of the EMH.

#### **2.4 Determinants of Market Price per Share**

According to Fama (1970), in a completely idealistic “perfect market”, only the market forces of supply and demand would be expected to drive the SMP. However, the real world has many imperfections that cause distortions in the market and these also influence the SMP. However, for this study, the quantifiable parameters of ROE, ROCE, EPS and P/E ratio were singled out as the key determinants of SMP. The following definitions of the parameters have been adapted from Jordan et al (2008).

*Return of equity (ROE) = Net Income (or profit after tax) / Shareholders' Equity.* ROE is one measure of how efficiently a company uses its assets to produce earnings. Generally, a healthy company may produce a ROE in the 13% to 15% range. While ROE is a useful measure, it may have some flaws that may give a false picture. For example, if a company had a heavy debt and raises additional capital through borrowing rather than issuing stock, this would reduce its net book value.

*Return on capital employed (ROCE) = EBIT / (Total Assets-Current Liabilities).* This is a ratio that indicates the efficiency and profitability of a company's capital investments. ROCE should always be higher than the rate at which the company borrows; otherwise, any increase in borrowing would reduce shareholders' earnings.

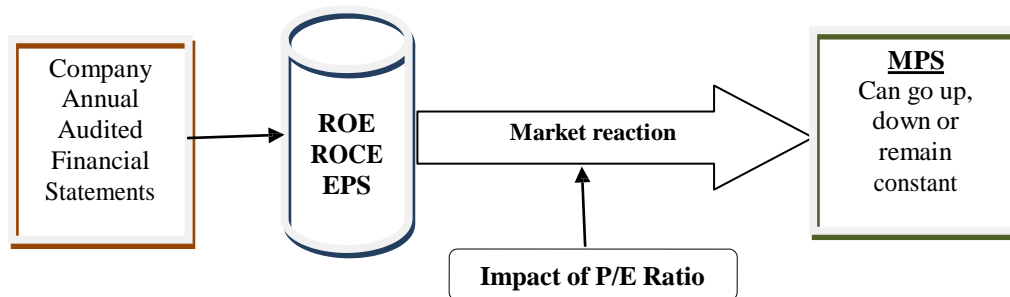
*Earnings per share (EPS).* This is the basic (rather than diluted) EPS as appearing or as reported in the audited income statement for each company. If a company has made a loss, the figure becomes „loss per share“ as the EPS figure will have a negative prefix.

*Price-earnings (P/E) Ratio = Current Share Market Price / EPS.* This ratio gives an idea of what the market is willing to pay for the company's earnings. The higher the P/E the more the

market is willing to pay for the company's earnings. The P/E is the most popular metric for stock analysis, although it is far from the only one to consider. For this study, the NSE-published P/E ratio was used.

## 2.5 Conceptual Framework

A sound conceptual framework provides a useful guide for interpreting information intelligently and, thereby, enabling the conversion of such information into meaningful knowledge. The conceptual framework for this study was as follows:



Source: Researcher developed

## 2.6 Summary of Literature Review

This chapter reviewed the relevant existing theoretical and empirical literature related to the study of factors influencing share/security prices. The chapter also highlighted the conceptual framework for the proposed study. From the empirical literature review on the NSE and other developing countries, *it is evidently inconclusive whether or not accounting profitability has an impact on share prices*. For example:

Mburu (2014) found an *insignificant* relationship between stock returns and P/E ratio but a positive relationship between the stock returns with ROE and MBV, yet some sectors of the NSE recorded *positive but moderate* association between stock returns and the P/E ratio. But Mulyadi (2001) found that ROE doesn't have a significant influence on stock return. This is a direct contradiction that calls for further research in this area.

Another contradiction comes from Su et al (2012) who found in Indonesia that ROA and ROE individually had a *positive and significant* influence on stock return; but EPS individually had *no significant* influence on stock return; and simultaneously all three ratios (ROA, ROE, and

EPS) had a *significant* influence on stock. This present study sought to re-measure the influence of ROE and EPS (among other ratios) on SMP.

Shikuku (2014) established varied factors determining an individual investor's behaviour, with herding, loss aversion, regret aversion, price changes, market information, past trends of stocks, overconfidence and anchoring identified as highly affecting those decisions. But these factors were inherently difficult to measure and assess. The present study used clearly quantifiable independent and dependent variables.

Hence, the present study sought to demonstrate the correlation and the strength of the relationship between the selected four accounting profitability ratios and SMP at the NSE and, hopefully, help in expanding the knowledge base on the pricing efficiency of the NSE.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter outlines the research methodology to be adopted for this study. In particular, the chapter highlights the research design, the study population and sample, data collection and data analysis techniques, and finally, the expected results interpretation framework is provided.

#### **3.2 Research Design**

Cooper et al (2003) define „research design“ as the plan and structure of investigations so conceived as to obtain answers to research questions. An empirical causal quantitative survey design was applied in this study. This design involved collecting quantitative secondary data for all members of the sampled population and for the NSE.

#### **3.3 Population**

Mugenda et al (2003) define „population“ as the entire group of individuals, events or objects having a common observable characteristic. Cooper et al (2003) view „population“ as the (total) collection of elements about which we wish to make some inferences. The total population for this study was all the 65 companies listed on the NSE.

#### **3.4 Sample**

According to Polit et al (1996), „sampling“ refers to the process of selecting a portion of the population to represent the entire population in a study. Researchers rarely survey the entire population for two main reasons: (i) the cost is normally too high, and (ii) the population is dynamic in that the individuals (or subjects) making up the population may change over time. Purposive sampling, which is a non-probability technique, was employed to pick the study sample in order to include representation critical to achieving the research objectives. Accordingly, only two investment sectors – the Manufacturing & Allied and the Commercial & Services sectors – were sampled from the study population. These two sectors together have 20 companies, 10 in each sector. The sample of 20 firms was further aligned to the objectives of the study through appropriate adjustments and elimination based on the following sampling criteria:

- i) A company must have been listed on the NSE over the entire 5-year study period;
- ii) A company's shares must have been actively traded over the entire 5-year study period;
- iii) A company must have sufficient and publicly available financial data to support the research over the entire 5-year study period.

### 3.5 Data Collection

This study was based exclusively on quantitative (numerical) secondary data in analysing the relationship between the dependent and the independent variables. The data for this study was obtained from reports analysis from two main sources; namely, from each sample company's annual audited financial statements and market statistical data from the NSE for the 5-year period. Specifically, the data was collected as follows:

*Company accounting profitability:* Published annual audited company financial statements were analysed for the calculation of ROE and ROCE ratios. The published annual financial statements were freely available from the companies' websites, NSE website and other Internet sources.

*NSE market statistics:* Values for SMP, EPS, and P/E ratios for each of the companies under study were obtained from the NSE 2015-2016 Handbook.

### 3.6 Data Analysis

*Correlation and Regression Analysis:* The Coefficient of Correlation denoted by "r" and other regression statistics were calculated and interpreted as appropriate. Both bivariate and multiple regression statistics were calculated. Bivariate regression examined the effect of each individual independent variable on the dependent variable. According to Siegel (2000), multiple regression is the procedure of predicting a single dependent variable from two or more independent variables. The study used multiple regression to examine the effect of combining any two, any three, or all four financial ratios on SMP. Correlation and regression statistics were computed using Microsoft Excel Data Analysis Toolkit software. The overall regression analytical model was as follows:

$$\text{SMP-predicted} = a + (b_1) \text{ROE} + (b_2) \text{ROCE} + (b_3) (\text{EPS}) + (b_4) \text{P/E} + \varepsilon$$

While the values of  $a$ ,  $b_1$ ,  $b_2$ ,  $b_3$ , and  $b_4$  are important for generating the regression equation, they have another important use. For example, the value  $b_1$  tells us how SMP is predicted to vary as ROE is varied and ROCE, EPS and P/E are all held constant. In statistical terms, we can see how SMP varies with the variable ROE while controlling for the influence of the variable ROCE by considering  $b_1$ . The value of  $b_2$  can be similarly useful in predicting how SMP varies with ROCE while controlling for the influence of ROE, EPS and P/E, etc.

## **CHAPTER FOUR**

### **DATA ANALYSIS, RESULTS AND DISCUSSION**

#### **4.1 Introduction**

This chapter presents mechanics of data analysis, the results of the study and a discussion of the findings. These are discussed in relation to the study objective using descriptive and inferential analyses to explain the emerging patterns of from data analysis, which was conducted mainly through correlation and regression analyses between the independent variables and dependent variable. Tables and figures and figures are used to demonstrate data analysis, the study results and to support the related discussions.

#### **4.2 Data Collection**

##### **4.2.1 Overview**

Data on the four profitability ratios (ROE, ROCE, EPS and P/E ratio), which comprised the independent variables, was obtained from annual audited company financial statements for the period 2011 through 2015 and from the NSE Handbooks as appropriate. Company financial statements were used to obtain data on EPS and for the calculation of ROE and ROCE. Data on the P/E ratio was obtained from the NSE 2015-2016 Handbook. Data values for the dependent variable (SMP) were also obtained from the NSE 2015-2016 Handbook.

##### **4.2.2 Eliminated Sample Units**

Out of the 10 firms sampled under the Commercial & Services sector, 3 firms were eliminated on account of not meeting the sampling criteria of being actively traded over the 5-year study period. The same number of firms was eliminated under the Manufacturing & Allied sector on the same grounds. This left an actual sample size of 14 firms, 7 under each sector under study. These are listed in *Appendix 2*, while the eliminated 6 firms are listed in *Appendix 3*.

##### **4.2.3 Summary of Data Collected on the Study Variables**

Tables 1 to 3 below provide a summary of the values for both the independent variables (ROE, ROCE, EPS and P/E ratio) and the dependent variable (SMP) for each study year and each study company. The detailed calculations of ROE and ROCE are provided in *Appendix 4 through Appendix 8*.



The values for EPS were taken from the annual audited company financial statements as given, while values for the P/E ratios and SMP were taken from the NSE 2015-2016 Handbook as given.

**Table 1: Summary of Calculated ROE and ROCE for 2011 - 2015**

Sector/Company		ROE (%)					ROCE (%)				
		2015	2014	2013	2012	2011	2015	2014	2013	2012	2011
<b>Commercial &amp; Services Sector</b>											
1	EXP	-0.50	-0.43	0.00	0.07	-1.34	-0.17	-0.18	0.02	0.06	-0.42
2	KQ	4.32	-0.12	-0.25	0.07	0.15	-0.30	-0.04	-0.14	0.06	0.11
3	NMG	0.23	0.27	0.32	0.36	0.33	0.28	0.38	0.42	0.43	0.45
4	SCG	0.06	0.07	0.10	0.15	0.21	0.05	0.08	0.11	0.18	0.24
5	SGL	-0.19	0.13	0.12	0.10	0.09	-0.11	0.18	0.18	0.18	0.15
6	TPS	-0.03	0.03	0.04	0.03	0.08	0.02	0.03	0.07	0.06	0.09
7	UCM	-4.63	0.11	0.11	0.09	0.17	-2.83	0.14	0.16	0.14	1.68
<b>Manufacturing &amp; Allied Sector</b>											
1	BAT	0.56	0.52	0.49	0.46	0.48	0.62	0.57	0.56	0.55	0.55
2	BOC	0.09	0.13	0.10	0.14	0.11	0.09	0.13	0.12	0.18	0.14
3	CAB	0.16	0.23	0.25	0.24	0.21	0.17	0.21	0.26	0.25	0.20
4	EAB	0.72	0.75	0.86	1.35	0.34	0.43	0.42	0.49	0.56	0.37
5	EEA	-0.10	-0.81	0.11	0.20	-0.44	-0.06	-0.58	0.18	0.26	-0.37
6	MSC	-0.78	-0.25	-0.12	0.13	0.13	-0.80	-0.21	-0.08	0.09	0.14
7	UGL	0.12	0.10	0.08	0.09	0.12	0.09	0.10	0.08	0.12	0.16

Source: Researcher-calculated from respective annual audited financial statements

**Table 2: Values of Annual EPS and P/E Ratios for 2011 - 2015**

Sector/Company		EPS (Kshs)					P/E Ratio				
		2015	2014	2013	2012	2011	2015	2014	2013	2012	2011
<b>Commercial &amp; Services Sector</b>											
1	EXP	-1.70	-2.32	0.01	0.37	6.47	-	0.23	602.95	9.51	-0.60
2	KQ	-17.21	-2.25	-6.35	3.58	7.65	-0.48	-5.49	-2.38	3.88	4.21
3	NMG	11.80	13.10	13.40	13.30	12.70	16.20	20.15	19.48	16.46	18.28
4	SCG	1.12	1.50	2.60	2.21	2.55	8.94	14.46	21.99	30.39	12.97
5	SGL	-2.95	2.57	2.41	2.56	2.69	-7.90	12.88	11.21	9.72	12.59
6	TPS	-1.63	1.35	2.26	3.60	4.51	-32.22	39.56	18.38	12.01	13.24
7	UCM	-10.85	1.45	1.00	0.91	1.47	-0.95	8.81	13.33	17.48	7.75
<b>Manufacturing &amp; Allied Sector</b>											
1	BAT	49.76	42.55	37.24	32.71	30.98	15.77	21.15	15.98	15.07	7.94
2	BOC	7.61	11.76	10.38	10.11	7.71	13.40	10.63	12.04	9.84	12.96
3	CAB	1.55	1.93	1.87	11.46	8.89	10.97	10.32	10.00	10.91	10.29
4	EAB	11.27	8.21	8.55	13.46	9.30	25.22	33.32	38.80	15.76	17.11
5	EEA	-0.37	-0.85	0.21	0.33	-0.59	-8.24	-4.32	12.57	5.99	-2.96
6	MSC	-3.04	-1.77	-1.09	1.32	1.26	-0.77	-1.61	-3.87	4.64	5.66
7	UGL	5.27	3.65	2.59	2.81	3.57	17.62	14.83	9.72	15.11	6.18

Source: Annual audited company financial statements and NSE 2015-2016 Handbook

**Table 3: Market Price per Share (SMP) for 2011 - 2015**

Sector/Company		SMP (Kshs)				
		2015	2014	2013	2012	2011
<b>Commercial &amp; Services Sector</b>						
1	EXP	4.50	6.50	3.90	3.50	3.90
2	KQ	8.20	12.40	12.50	13.95	32.25
3	NMG	191.00	263.00	314.00	263.00	140.00
4	SCG	30.00	45.75	48.25	68.50	41.50
5	SGL	28.00	34.75	26.00	21.80	25.00
6	TPS	25.00	36.00	45.50	40.00	55.00
7	UCM	8.95	12.75	17.93	18.04	11.40
<b>Manufacturing &amp; Allied Sector</b>						
1	BAT	785.00	900.00	595.00	493.00	246.00
2	BOC	102.00	125.00	125.00	99.50	100.00
3	CAB	16.95	149.00	140.00	125.00	91.50
4	EAB	304.00	289.00	320.00	223.00	195.00
5	EEA	3.05	3.65	2.70	2.00	1.75
6	MSC	2.35	2.85	4.20	6.10	7.15
7	UGL	46.75	39.75	34.00	69.50	36.00

Source: NSE 2015-2016 Handbook

### 4.3 Response Rate

As the research design involved only the collection of secondary quantitative data (without any primary data collection) the data response rate was calculated as the actual sample firms selected divided by the total sample group that was initially selected, hence:

Total sample group = 20 firms

Actual sample size tested = 14 firms (6 firms were eliminated as explained above)

Hence, response rate =  $14 / 20 = \underline{70\%}$

This response rate was deemed sufficiently high as not to affect the reliability of data analysis and the study results.

### 4.4 Data Validity

Data obtained from annual audited company financial statements for the calculation of ratios was standardized by applying the same definition of terms for the calculation of those ratios. NSE-listed companies are required to comply with a strict regime of local laws and regulations on the reputation of their auditors and disclosure of information in the financial statements. The format and contents of these statements are also dictated by International Financial Reporting Standards (IFRS). Hence, the strict control regime around the annual audited company financial statements ensures a high level of validity and reliability.

#### 4.5 Correlation and Regression Analysis

Correlation coefficients were calculated to assess the association, if any, between SMP and a company's accounting profitability (represented by ROE, ROCE, EPS and P/E ratio) for Commercial Sector and Manufacturing Sector firms listed on the NSE. For results interpretation purposes, a coefficient of correlation "r" of 1.00 was taken to imply a *perfect* association between the independent variable (s) and the SMP; an r of  $\geq 0.75$  was taken as implying a *strong* association; an r of  $0.51 \leq r \leq 0.74$  was taken as implying a *moderate* association; and an r  $\leq 0.5$  was taken as implying a *weak/low*. The r can range from -1 to +1. The coefficients of correlation are described below under sections 4.5.1 through 4.5.4.

##### 4.5.1 Collinearity Tests

According to Thomas B (2012), collinearity occurs when two predictor variables (e.g.  $x_1$  and  $x_2$ ) in a multiple regression have a non-zero correlation. For this study, the extent of collinearity between the independent variables was assessed among the six possible combinations of any two variables using MS Excel multiple regression data analysis tool. The results of the collinearity tests revealed varying degrees of collinearity, ranging from a zero or very low collinearity to medium and high collinearity as summarised in **Table 4** below.

**Table 4: Summary of Collinearity ( $R^2$ ) Test Results**

	Regression of:					
	ROE on ROCE	ROE on EPS	ROE on P/E	ROCE on EPS	ROCE on P/E	EPS on P/E
	Collinearity "r"					
<b>Commercial &amp; Services Firms</b>						
EXP	0.97636	0.98267	0.20190	0.96247	0.22708	0.18160
KQ	0.56570	0.61230	0.00010	0.99081	0.25823	0.25788
NMG	0.84344	0.57815	0.00207	0.64066	0.15147	0.29717
SCG	0.99948	0.57881	0.09092	0.57631	0.10008	0.28626
SGL	0.99645	0.97998	0.97422	0.98058	0.95950	0.98266
TPS	0.84040	0.86176	0.43701	0.83624	0.12424	0.35264
UCM	0.84677	0.99848	0.67598	0.85565	0.38421	0.64297
<b>Manufacturing &amp; Allied Firms</b>						
BAT	0.89141	0.91657	0.16012	0.90260	0.11065	0.34474
BOC	0.68124	0.35658	0.75870	0.08805	0.52442	0.63744
CAB	0.87383	0.05523	0.34003	0.07839	0.14891	0.08627
EABL	0.93947	0.43886	0.00491	0.42428	0.00190	0.49499
EEAL	0.98514	0.90784	0.38986	0.95363	0.45964	0.64368
MSC	0.99047	0.88164	0.32988	0.81657	0.25588	0.63942
UGL	0.29194	0.63571	0.00000	0.00178	0.29671	0.24303

Source: Researcher calculated

As a consequence then, collinearity was judged as having no significant effect on the study predictor variables.

#### 4.5.2 Multicollinearity Tests

According to Thomas B (2012), multi-collinearity occurs when more than two predictor variables (e.g.,  $x_1$ ,  $x_2$  and  $x_3$ ) are inter-correlated. For this study, the extent of multicollinearity among the independent variables was assessed for the eight possible combinations of any three and all four of the independent variables using MS Excel multiple regression data analysis tool. The results of the multicollinearity tests revealed varying degrees of multicollinearity, ranging from negative-to-low-to-medium-to-strong multicollinearity among the independent variables as summarised in **Table 5** below.

**Table 5: Summary of Multicollinearity (Adjusted  $R^2$ ) Test Results**

	Regression of:							
	ROE on ROCE & EPS	ROE on ROCE & P/E	ROE on EPS & P/E	ROCE on EPS & P/E	ROE on ROCE, EPS & P/E	ROCE on ROE, EPS & P/E	EPS on ROE, ROCE & P/E	P/E on EPS, ROE & ROCE
Multicollinearity Adjusted " $R^2$ "								
<b>Commercial &amp; Services Firms</b>								
EXP	0.97830	0.95393	0.96711	0.93328	0.95664	0.91205	0.93351	-1.90690
KQ	0.38054	0.54623	0.67192	0.98164	0.62259	0.97888	0.98472	0.09667
NMG	0.69043	0.91620	0.54377	0.28765	0.99992	0.99988	0.99945	0.99965
SCG	0.99898	0.99944	0.18882	0.17523	0.99943	0.99942	0.33277	0.22977
SGL	0.99313	0.99711	0.96372	0.96165	0.99983	0.99982	0.99902	0.99914
TPS	0.77971	0.94161	0.76077	0.78466	0.89420	0.90477	0.71156	0.59118
UCM	0.99720	0.89946	0.99942	0.79451	0.99920	0.71668	0.99906	0.85551
<b>Manufacturing &amp; Allied Firms</b>								
BAT	0.85771	0.79949	0.91322	0.95996	0.91516	0.96085	0.98752	0.83937
BOC	0.63456	0.67665	0.57071	0.48581	0.35911	0.23237	0.22305	0.64149
CAB	0.74922	0.86390	0.04137	-0.36356	0.76127	0.66044	-1.56774	-0.28690
EABL	0.88230	0.88048	0.49877	0.52944	0.76607	0.78039	0.53399	0.17962
EEAL	0.98194	0.97898	0.92576	0.96975	0.96394	0.98531	0.96578	0.53580
MSC	0.99806	0.99446	0.93603	0.89370	0.99649	0.99417	0.96742	0.62148
UGL	0.93146	-0.17122	0.68139	-0.27125	0.93420	0.73746	0.92313	0.07451

Source: Researcher calculated

As a consequence, then, multicollinearity was judged as having no significant effect on the study predictor variables.

#### 4.5.3 Correlation Coefficients for Individual Independent Variables on SMP

The correlation coefficients ( $r$ ) for each individual independent variable against the dependent variable (SMP) are summarised in **Table 6** below.

**Table 6: Coefficient of Correlation for Individual Independent Variables on SMP**

Firm	ROE	Association with SMP	ROCE	Association with SMP	EPS	Association with SMP	P/E Ratio	Association with SMP
<b>Commercial &amp; Services Firms</b>								
EXP	0.08	Weak +	0.22	Weak +	0.12	Weak +	0.27	Weak +
KQ	0.40	Weak +	0.74	Moderate +	0.77	Strong +	0.59	Moderate +
NMG	0.20	Weak +	0.15	Weak +	0.69	Moderate +	0.39	Weak +
SCG	0.39	Weak +	0.41	Weak +	0.48	Weak +	0.96	Strong +
SGL	0.02	Weak +	0.06	Weak +	0.10	Weak +	0.00	None
TPS	0.98	Strong +	0.97	Strong +	0.91	Strong +	0.52	Weak +
UCM	0.67	Moderate +	0.41	Weak +	0.64	Moderate +	0.94	Strong +
<b>Manufacturing &amp; Allied Firms</b>								
BAT	0.71	Moderate +	0.65	Moderate +	0.84	Strong +	0.93	Strong +
BOC	0.01	Weak +	0.27	Weak +	0.76	Strong +	0.22	Weak +
CAB	0.96	Strong +	0.80	Strong	0.14	Weak +	0.62	Moderate +
EABL	0.15	Weak +	0.12	Weak +	0.36	Weak +	0.87	Strong +
EEA	0.46	Weak +	0.40	Weak +	0.44	Weak +	0.31	Weak +
MSC	0.88	Strong +	0.85	Strong +	0.97	Strong +	0.81	Strong +
UGL	0.21	Weak +	0.07	Weak +	0.09	Weak +	0.55	Moderate +

As can be seen in Table 6, the association between individual independent variables and the SMP is *positive* and ranges from none-existent to very weak to very strong. As explained below, no single independent variable individually seems to have consistent „strength range“ of positive association with SMP. To this extent then, it seems reasonable to conclude that no clear association pattern has emerged between individual predictor variables and the SMP.

*ROE association with SMP:* All commercial & services firms showed a weak-to-moderate association between ROE and SMP, except TPS, which showed a strong association with a high coefficient of correlation (r) of 98%. On the other hand, only two manufacturing firms, CAB and MSC showed a strong association between ROE and SMP, with an r of 96% and 88%, respectively, with the rest showing a weak-to-moderate association. Overall then, only 3 out of 14 firms (21%) demonstrated a strong association between ROE and SMP. Consequently, ROE could be viewed as having a *positive* but *inconclusive* association with SMP.

*ROCE association with SMP:* All commercial & services firms showed a weak-to-moderate association between ROE and SMP, except TPS, which showed a strong association with a high r of 97%. On the other hand, only two manufacturing firms, CAB and MSC showed a strong association between ROE and SMP, with an r of 80% and 85%, respectively, with the rest showing a weak-to-moderate association. Overall then, only 3 out of 14 firms (21%)

demonstrated a strong association between ROCE and SMP. Consequently, ROCE could be viewed as having a *positive* but *inconclusive* association with SMP.

*EPS association with SMP:* Only two commercial & services firms, KQ and TPS showed a strong association between EPS and SMP, with an  $r$  of 77% and 91%, respectively, with the rest showing a weak-to-moderate association. On the other hand, three manufacturing firms, BAT, BOC and MSC, showed a strong association between EPS and SMP, with an  $r$  of 84%, 76% and 97%, respectively, with the rest showing a weak-to-moderate association. Overall then, only 5 out of 14 firms (36%) demonstrated a strong association between EPS and SMP. Consequently, EPS could be viewed as having a *positive* but largely *inconclusive* association with SMP.

*P/E ratio association with SMP:* Only two commercial & services firms, SCG and UCM showed a strong association between the P/E ratio and SMP, with an  $r$  of 96% and 94%, respectively, with the rest showing a weak-to-moderate association. On the other hand, three manufacturing firms, BAT, EABL and MSC, also showed a strong association between the *P/E ratio* and SMP, with an  $r$  of 93%, 87% and 81%, respectively, with the rest showing a weak-to-moderate association. Overall then, only 6 out of 14 firms (43%) demonstrated a strong association between P/E ratio and SMP. As a result, the P/E ratio could be viewed as having a *positive* but largely *inconclusive* association with SMP.

#### **4.5.4 Correlation Coefficients for Combined Two Independent Variables on SMP**

The correlation coefficients for the combination of any two independent variables against the dependent variable (SMP) are summarised in Tables 7 and 8 below. As can be seen from the tables, the association between the simultaneous combination of any two independent variables and the SMP is *positive* and ranges from very weak-to-moderate-to-very strong. As explained below, only three two-predictor combinations (ROCE & EPS, ROCE & P/E ratio and EPS & P/E ratio) seem to have consistent „strength range“ of positive association with SMP, which a clear *positive association* pattern with SMP.

**Table 7: Correlation Coefficients for Combined Two Independent Variables on SMP**

Firm	ROE & ROCE	Association with SMP	ROE & EPS	Association with SMP	ROE & P/E	Association with SMP
<b>Commercial &amp; Services Firms</b>						
EXP	0.97	<i>Strong +</i>	0.33	<i>Weak +</i>	0.27	<i>Weak +</i>
KQ	0.78	<i>Strong +</i>	0.84	<i>Strong +</i>	0.72	<i>Moderate +</i>
NMG	0.22	<i>Weak +</i>	0.85	<i>Strong +</i>	0.43	<i>Weak</i>
SCG	0.89	<i>Strong +</i>	0.49	<i>Weak</i>	0.97	<i>Strong +</i>
SGL	0.74	<i>Moderate +</i>	0.59	<i>Moderate +</i>	0.15	<i>Weak</i>
TPS	1.00	<i>Perfectly +</i>	0.98	<i>Strong +</i>	1.00	<i>Perfectly +</i>
UCM	0.85	<i>Strong +</i>	0.96	<i>Strong +</i>	0.96	<i>Strong +</i>
<b>Manufacturing &amp; Allied Firms</b>						
BAT	0.65	<i>Moderate +</i>	0.90	<i>Strong +</i>	1.00	<i>Perfectly +</i>
BOC	0.50	<i>Weak +</i>	0.94	<i>Strong +</i>	0.42	<i>Weak +</i>
CAB	0.99	<i>Strong +</i>	0.96	<i>Strong +</i>	0.96	<i>Strong +</i>
EABL	0.13	<i>Weak +</i>	0.58	<i>Moderate +</i>	0.89	<i>Strong +</i>
EEA	0.64	<i>Moderate +</i>	0.46	<i>Weak +</i>	0.46	<i>Weak +</i>
MSC	0.93	<i>Strong +</i>	0.97	<i>Strong +</i>	0.96	<i>Strong +</i>
UGL	0.30	<i>Weak +</i>	0.25	<i>Weak +</i>	0.59	<i>Moderate +</i>

*ROE & ROCE association with SMP:* One commercial & services firm, TPS, showed a *perfectly positive* correlation with SMP (r=100%); four firms, EXP, KQ, SCG and UCM showed a strong correlation with SMP (r=97%, 78%, 89% and 85%, respectively); and only two firms, NMG and SGL, showed a weak-to-moderate *positive* association between ROE & ROCE and SMP, with an r of 22% and 74%, respectively. On the other hand, only two manufacturing firms, CAB and MSC showed a strong *positive* association between ROE & ROCE and SMP, with an r of 99% and 93%, respectively, with the rest showing a weak-to-moderate *positive* association ranging from 13% (EABL) to 65% (BAT). Overall then, 7 out of 14 firms (50%) demonstrated a strong-to-perfect *positive* association between ROE & ROCE and SMP. Consequently, the simultaneous combination of ROE and ROCE could be viewed as having a *positive* but rather *inconclusive* association with SMP.

*ROE & EPS association with SMP:* Four commercial & services firms, KQ, NMG, TPS and UCM, showed a *strong positive* correlation with SMP (r=84%, 85%, 98% and 96%, respectively); one firm, SGL, showed a moderate *positive* association between ROE & EPS and SMP, with an r of 59%; and two firms, EXP and SCG showed a weak r of 33% and 49%, respectively. On the other hand, four manufacturing firms, BAT, BOC, CAB and MSC showed a *strong positive* association between ROE & EPS and SMP, with an r of 90%, 94%, 96% and 97%, respectively; EABL showed a moderate positive association with an r of 58%; while EEA and UGL had a weak positive association with an r of 46% and 25%, respectively. Overall then, 8 out of 14 firms (57%) demonstrated a *strong positive* association between

ROE & EPS and SMP. Consequently, the simultaneous combination of ROE and EPS could be viewed as having a *strong positive* and reasonably *inconclusive* association with SMP.

*ROE & P/E ratio association with SMP:* One commercial & services firm, TPS, showed a *perfectly positive* correlation with SMP (r=100%); two firms, SCG and UCM showed a *strong positive* correlation with SMP (r=97%, 96%, respectively); and four firms, EXP, KQ, NMG and SGL, showed a *weak-to-moderate positive* association between ROE & P/E ratio and SMP, with an r of 27%, 72%, 43% and 15%, respectively. On the other hand, one manufacturing firm, BAT, showed a *perfectly positive* correlation with SMP (r=100%); three firms, CAB, EABL and MSC showed a *strong positive* association between ROE & P/E ratio and SMP, with an r of 96%, 89% and 96%, respectively; and two firms, BOC and EEA showing a *weak positive* association with an r of 42% and 46%, respectively. Overall then, 7 out of 14 firms (50%) demonstrated a *strong-to-perfect positive* association between ROE & P/E ratio and SMP. Consequently, the simultaneous combination of ROE and P/E ratio could be viewed as having a *positive* but rather *inconclusive* association with SMP.

**Table 8: Correlation Coefficients for Combined Two Independent Variables on SMP**

Firm	ROCE & EPS	Association with SMP	ROCE & P/E	Association with SMP	EPS & P/E	Association with SMP
<b>Commercial &amp; Services Firms</b>						
EXP	0.57	Moderate +	0.29	Weak +	0.27	Weak
KQ	0.81	Strong +	0.78	Strong	0.81	Strong
NMG	0.96	Strong +	0.39	Weak +	0.69	Moderate +
SCG	0.49	Weak +	0.97	Strong	0.96	Strong
SGL	0.30	Weak +	0.34	Weak +	0.82	Strong
TPS	0.97	Strong +	0.91	Strong	0.91	Strong
UCM	0.80	Strong +	0.97	Strong	0.96	Strong
<b>Manufacturing &amp; Allied Firms</b>						
BAT	0.98	Strong +	0.99	Strong +	1.00	Perfectly +
BOC	0.92	Strong +	0.66	Moderate +	1.00	Perfectly +
CAB	0.81	Strong +	0.87	Strong +	0.70	Moderate +
EABL	0.59	Moderate +	0.89	Strong +	0.95	Strong +
EEA	0.46	Weak +	0.41	Weak +	0.45	Weak +
MSC	0.97	Strong +	0.96	Strong +	0.97	Strong +
UGL	0.11	Weak +	0.71	Moderate +	0.69	Moderate +

*ROCE & EPS association with SMP:* Four commercial & services firms, KQ, NMG, TPS and UCM showed a *strong positive* correlation with SMP (r=81%, 96%, 97%, 80%, respectively); and three firms, EXP, SCG, and SGL, showed a *weak-to-moderate positive* association between ROCE & EPS and SMP, with an r of 57%, 49%, and 30%, respectively. On the other hand, four manufacturing firms, BAT, BOC, CAB and MSC showed a *strong positive* association between ROCE & EPS and SMP, with an r of 98%, 92%, 81% and 97%, respectively; one firm, EABL showed a moderate positive association with an r of 59%; and



two firms, EEA and UGL showed a *weak positive* association with an r of 46% and 11%, respectively. Overall then, 8 out of 14 firms (57%) demonstrated a *strong positive* association between ROCE & EPS and SMP. Consequently, the simultaneous combination of ROCE & EPS could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

*ROCE & P/E ratio association with SMP:* Four commercial & services firms, KQ, SCG, TPS and UCM showed a *strong positive* correlation with SMP (r=78%, 97%, 91%, 97%, respectively); and the other three firms, EXP, NMG, and SGL, showed a *weak positive* association between ROCE & P/E ratio and SMP, with an r of 29%, 39%, and 34%, respectively. On the other hand, four manufacturing firms, BAT, CAB, EABL and MSC also showed a *strong positive* association between ROCE & P/E ratio and SMP, with an r of 99%, 87%, 89% and 96%, respectively; two firms, BOC and UGL, showed a *moderate positive* association with an r of 66% and 71%, respectively; only one firm, EEA, showed a *weak positive* association with an r of 41%. Overall then, 8 out of 14 firms (57%) demonstrated a *strong positive* association between ROCE & P/E ratio and SMP. Consequently, the simultaneous combination of ROCE & P/E ratio could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

*EPS & P/E ratio association with SMP:* Five commercial & services firms, KQ, SCG, SGL, TPS and UCM showed a *strong positive* correlation with SMP (r=81%, 96%, 82%, 91%, and 96%, respectively); one firm, NMG, showed a *moderate positive* association with an r of 69%; while one firm, EXP, showed a *weak positive* association between EPS & P/E ratio and SMP, with an r of 27%. On the other hand, two manufacturing firms, BAT and BOC showed a perfectly positive association (r=100%); two firms, EABL and MSC, showed a *strong positive* association between EPS & P/E ratio and SMP, with an r of 95%, and 97%, respectively; two firms, CAB and UGL, showed a *moderate positive* association with an r of 70% and 69%, respectively; only one firm, EEA, showed a *weak positive* association with an r of 45%. Overall then, 9 out of 14 firms (64%) demonstrated a *strong positive* association between EPS & P/E ratio and SMP. Consequently, the simultaneous combination of EPS & P/E ratio could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

#### 4.5.5 Correlation Coefficients for Combined Three Independent Variables on SMP

The correlation coefficients for the combination of any three independent variables against the dependent variable (SMP) are summarised in Tables 9 below. As can be seen from the table, the association between the simultaneous combination of any three independent variables and the SMP is *positive* and ranges from weak-to-moderate-to-strong-to-perfect. As explained below, all four three-predictor combinations (ROE, ROCE & EPS; ROE, ROCE & EPS, ROE, ROCE & P/E ratio; and ROCE, EPS & P/E ratio) seemed to have a consistent „strength range“ of *positive* association with SMP, which was evidently conclusive.

**Table 9: Correlation Coefficients for Combined Three Independent Variables on SMP**

Firm	ROE, ROCE & EPS	Association with SMP	ROE, ROCE & P/E	Association with SMP	ROE, EPS & P/E	Association with SMP	ROCE, EPS & P/E	Association with SMP
<b>Commercial &amp; Services Firms</b>								
EXP	1.00	Perfectly +	0.97	Strong +	0.46	Weak +	0.56	Moderate +
KQ	0.95	Strong +	0.79	Strong +	0.84	Strong +	0.85	Strong +
NMG	0.97	Strong +	0.97	Strong +	0.96	Strong +	0.96	Strong +
SCG	0.96	Strong +	1.00	Perfectly +	0.98	Strong +	0.96	Strong +
SGL	0.85	Strong +	0.82	Strong +	0.89	Strong +	0.90	Strong +
TPS	1.00	Perfectly +	1.00	Perfectly +	1.00	Perfectly +	0.99	Strong +
UCM	1.00	Perfectly +	0.97	Strong +	0.97	Strong +	0.99	Strong +
<b>Manufacturing &amp; Allied Firms</b>								
BAT	0.99	Strong +	1.00	Perfectly +	1.00	Perfectly +	1.00	Perfectly +
BOC	0.94	Strong +	0.66	Moderate +	1.00	Perfectly +	1.00	Perfectly +
CAB	0.99	Strong +	0.99	Strong +	0.96	Strong +	0.87	Strong +
EABL	0.59	Moderate +	0.89	Strong +	0.99	Strong +	1.00	Perfectly +
EEA	0.94	Strong +	0.74	Moderate +	0.46	Weak +	0.56	Moderate +
MSC	1.00	Perfectly +	0.96	Strong +	0.98	Strong +	0.97	Strong +
UGL	0.94	Strong +	0.95	Strong +	0.81	Strong +	0.91	Strong +

*ROE, ROCE and EPS association with SMP:* Three commercial & services firms, EXP, TPS and UCM showed a *perfectly positive* association (r=100%); the remaining four firms showed a *strong positive* correlation with SMP with an r of 95%, 97%, 96%, and 85%, respectively); On the other hand, one manufacturing firm, MSC, showed a *perfectly positive* association (r=100%); five firms, BAT, BOC, CAB, EEA and UGL, showed a *strong positive* association between ROE, ROCE and EPS and SMP, with an r of 99%, 94%, 99%, 94%, and 94%, respectively; only one firm, EABL, showed a *moderate positive* association with an r of 59% Overall then, an overwhelming 13 out

of 14 firms (93%) demonstrated a *strong-to-perfect positive* association between ROE, ROCE and EPS and SMP. Consequently, the simultaneous combination of ROE, ROCE and EPS could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP. *ROE, ROCE and P/E ratio association with SMP:* Two commercial & services firms, SCG and TPS showed a *perfectly positive* association ( $r=100\%$ ); and the remaining five firms showed a *strong positive* correlation with an  $r$  of 97%, 79%, 97%, 82%, and 97%, respectively); On the other hand, one manufacturing firm, BAT, showed a *perfectly positive* association ( $r=100\%$ ); four firms, CAB, EABL, MSC and UGL, showed a *strong positive* association between ROE, ROCE and P/E ratio and SMP, with an  $r$  of 99%, 89%, 96%, 95%, respectively; only two firms, BOC and EEA, showed a *moderate positive* association with an  $r$  of 66% and 74%, respectively. Overall then, an overwhelming 12 out of 14 firms (86%) demonstrated a *strong-to-perfect positive* association between ROE, ROCE and P/E ratio and SMP. Consequently, the simultaneous combination of ROE, ROCE and P/E ratio could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

*ROE, EPS and P/E ratio association with SMP:* One commercial & services firm, TPS, showed *perfectly positive* association ( $r=100\%$ ); six firms showed a *strong positive* correlation with an  $r$  ranging from 84% to 98%; only EXP showed a *weak positive* association with an  $r$  of 46%. On the other hand, two manufacturing firms, BAT and BOC showed a *perfectly positive* association ( $r=100\%$ ); four firms, CAB, EABL, MSC and UGL, showed a *strong positive* association between ROE, EPS and P/E ratio and SMP, with an  $r$  of 96%, 99%, 98%, and 81% respectively; only one firm, EEA, showed a *weak positive* association with an  $r$  of 46%. Overall then, an overwhelming 12 out of 14 firms (86%) demonstrated a *strong-to-perfect positive* association between ROE, EPS and P/E ratio and SMP. Consequently, the simultaneous combination of ROE, EPS and P/E ratio could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

*ROCE, EPS and P/E ratio association with SMP:* All except one commercial & services firms, showed a *strong positive* correlation with an  $r$  ranging from 85% to 99%; only EXP showed a *moderate positive* association with an  $r$  of 56%. On the other hand, three manufacturing firms, BAT, BOC and EABL showed a *perfectly positive* association ( $r=100\%$ ); three firms, CAB, MSC and UGL, showed a *strong positive* association between

ROCE, EPS and P/E ratio and SMP, with an r of 87%, 97%, and 91% respectively; only one firm, EEA, showed a *moderate positive* association with an r of 56%. Overall then, an overwhelming 13 out of 14 firms (93%) demonstrated a *strong-to-perfect positive* association between ROCE, EPS and P/E ratio and SMP. Consequently, the simultaneous combination of ROCE, EPS and P/E ratio could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

#### 4.5.6 Correlation Coefficients for all Four Combined Independent Variables on SMP

The correlation coefficients for the combination of all four independent variables against the dependent variable (SMP) are summarised in Tables 10 below.

**Table 10: Correlation Coefficients for all Four Combined Independent Variables on SMP**

Firm	ROE, ROCE EPS & P/E	Association with SMP
<b>Commercial &amp; Services Firms</b>		
EXP	1.00	<i>Perfectly +</i>
KQ	1.00	<i>Perfectly +</i>
NMG	0.96	<i>Strong +</i>
SCG	1.00	<i>Perfectly +</i>
SGL	1.00	<i>Perfectly +</i>
TPS	1.00	<i>Perfectly +</i>
UCM	1.00	<i>Perfectly +</i>
<b>Manufacturing &amp; Allied Firms</b>		
BAT	1.00	<i>Perfectly +</i>
BOC	1.00	<i>Perfectly +</i>
CAB	1.00	<i>Perfectly +</i>
EABL	1.00	<i>Perfectly +</i>
EEA	1.00	<i>Perfectly +</i>
MSC	1.00	<i>Perfectly +</i>
UGL	1.00	<i>Perfectly +</i>

Table 10 above demonstrated that all the four predictor variables simultaneously have a *perfectly positive* association with the SMP for all firms, except one firm (NMG), which however, showed a very strong positive association with an r of 96%. Consequently, the simultaneous combination of ROE, ROCE, EPS and P/E ratio could be viewed as having a *strong positive* and reasonably *conclusive* association with SMP.

## 4.6 Regression Analysis

Regression analysis was used in this study to develop potential regression models for predicting SMP from a company's accounting profitability (represented by ROE, ROCE, EPS and P/E ratio) with the objective of assessing the explanatory power of accounting profitability over movements in the SMP for firms listed on the NSE. The potential regression models were variously based on various scenarios, namely: (i) each one of the four independent variables against SMP, (ii) any combination of two independent variables against SMP, (iii) any combination of three independent variables against SMP; and (iv) all four independent variables combined against SMP.

The three most important regression statistics used to gauge the predictive power of the independent variables over the SMP are: (i) the coefficient of determination, also called R Squared ( $R^2$ ), (ii) the Adjusted R Squared ( $R^2$ ), (iii) and the model's standard error. The standard error is the error one would expect to obtain between the predicted and actual dependent variable, SMP in this study. It is worth noting that Adjusted R Squared ( $R^2$ ) improves the „quality“ of  $R^2$  by eliminating chance or random occurrences. Hence an Adjusted R Squared ( $R^2$ ) of 0.85 would be taken to imply that the underlying independent variable (s) has (have) significant explanatory and predictive power over the dependent variable (SMP). These statistics were derived by the use of Microsoft Excel Data Analysis Toolkit.

### 4.6.1 One-Predictor Models

The general analytical model for a linear one-predictor model is:

$$\text{SMP-predicted} = a + bX + \varepsilon \quad \text{where } a = \text{constant}; b = \text{coefficient of } X; \varepsilon = \text{error term}$$

$X = \text{ROE or ROCE or EPS or P/E ratio}$

The resultant regression models are discussed below.

#### 4.6.1.1 ROE and ROCE Models

Table 11 below provides a summary of the regression results of the one-predictor model after regressing ROE and ROCE individually against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 11: ROE and ROCE individually as Predictor Variable**

Firm	ROE				ROCE			
	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model
<b>Commercial</b>								
EXP	.01	-.33	1.38	SMP=4.4-0.2ROE	.05	-.27	1.35	SMP=4.3-1.4ROCE
KQ	.16	-.12	9.96	SMP=17.5-1.9ROE	.55	.40	7.26	SMP=18.5+42.9ROCE
NMG	.04	-.28	77.44	SMP=148.9+282.7ROE	.02	-.30	78.15	SMP=174.4+153.4ROCE
SCG	.15	-.13	14.91	SMP=36.5+86.4ROE	.16	-.12	14.79	SMP=37.4+72ROCE
SGL	.00	-.33	5.57	SMP=27.2-0.73ROE	.00	-.33	5.56	SMP=27.4-2.5ROCE
TPS	.97	.95	2.40	SMP=31.9+286.9ROE	.94	.91	3.29	SMP=19.9+384.0ROCE
UCM	.44	.26	3.49	SMP=14.9+1.3ROE	.17	-.11	4.27	SMP=14+1ROCE
<b>Manufacturing</b>								
BAT	.51	.35	206.78	SMP=-1,727.4+4,622.8ROE	.42	.22	225.35	SMP=-2,866.7+6059.9ROCE
BOC	.00	-.33	15.53	SMP=109.4+8.1ROE	.07	-.24	14.95	SMP=126.2-120.2ROCE
CAB	.92	.89	17.97	SMP=-213.2+1,478.2ROE	.65	.53	36.79	SMP=-148.33+1,155.3ROCE
EABL	.01	-.32	62.32	SMP=253.6+15.7ROE	.01	-.31	62.21	SMP=226+88.9ROCE
EEA	.21	-.05	0.79	SMP=2.5-0.9ROE	.16	-.12	0.82	SMP=2.5-0.9ROCE
MSC	.77	.70	1.14	SMP=5.4+4.8ROE	.72	.62	1.27	SMP=5.3+4.6ROCE
UGL	.04	-.28	16.30	SMP=62.7-174.8ROE	.00	-.33	16.63	SMP=41.7+31.9ROCE

From the Adjusted R<sup>2</sup>, it is observed that ROE individually has a negative impact on SMP for 5 out of 7 commercial firms and a positive effect on SMP for 2 firms (TPS and UCM). This means that ROE explains 95% and 26% of the variance in the SMP of both firms, respectively. For manufacturing firms, the Adjusted R<sup>2</sup> is also negative for 5 out of 7 firms, but a positive effect on SMP for two firms (CAB and MSC). This means that ROE explains 89% and 70% of the variance in the SMP of both firms, respectively. Since negative Adjusted R<sup>2</sup> values are a contradiction to the model's expectations (an increase in profitability would be expected to have a positive effect on the SMP), it seems plausible to conclude that ROE individually has little explanatory or predictive power over SMP.

In the case of ROCE, the Adjusted R<sup>2</sup> is also observed to have a negative impact on SMP for 5 out of 7 commercial firms and a positive effect on SMP for two firms (KQ and TPS). For manufacturing firms, the Adjusted R<sup>2</sup> is negative for 4 out of 7 firms, but a positive effect on SMP for three firms (BAT, CAB and MSC). Consequently, except for TPS with a high Adjusted R<sup>2</sup> value of 91%, it seems reasonable to conclude that ROCE individually has little explanatory or predictive power over SMP. This is because negative Adjusted R<sup>2</sup> values are a contradiction to the model's expectations since an increase in profitability would be expected to have a positive effect on the SMP.

#### 4.6.1.2 EPS and P/E Ratio Models

Table 12 below provides a summary of the regression results of the one-predictor model after regressing EPS and the P/E individually against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 12: EPS and P/E Ratio individually as Predictor Variable**

	EPS				P/E Ratio			
Firm	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model
<b>Commercial</b>								
EXP	.01	-.32	1.37	SMP=4.4-0.2*EPS	.07	-.24	1.33	SMP=4.6-0.0*P/E
KQ	.60	.46	6.91	SMP=18.1+0.8*EPS	.35	.13	8.77	SMP=15.9+1.3*P/E
NMG	.48	.31	57.00	SMP=-704.7+73*EPS	.15	-.13	72.92	SMP=-38.22+15*P/E
SCG	.23	-.02	14.15	SMP=26.3+10.3*EPS	.92	.90	4.51	SMP=18.7+1.6*P/E
SGL	.01	-.32	5.54	SMP=27.4-0.2*EPS	1.95	-.33	5.57	SMP=27.1+0.0*P/E
TPS	.83	.77	5.35	SMP=31.7+4.3*EPS	.27	.03	11.00	SMP=38+0.2*P/E
UCM	.41	.21	3.6	SMP=14.4+0.5*EPS	.89	.85	1.57	SMP=8.7+0.6*P/E
<b>Manufacturing</b>								
	EPS				P/E Ratio			
Firm	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model
BAT	.71	.61	159.50	SMP=-480.1+28*EPS	.86	.81	110.31	SMP=-158.4+50.2*P/E
BOC	.58	.44	10.12	SMP=56.5+5.7*EPS	.05	-.27	15.16	SMP=133.1-1.9*P/E
CAB	.02	-.31	61.33	SMP=96.5+1.6*EPS	.38	.17	48.81	SMP=922.8-78*P/E
EABL	.13	-.16	58.51	SMP=356.1-8.9*EPS	.76	.69	30.46	SMP=143+4.7*P/E
EEA	.20	-.07	0.80	SMP=2.6-0.7*EPS	.10	-.20	0.85	SMP=2.7-0*P/E
MSC	.95	.92	0.58	SMP=5.2+1*EPS	.66	.55	1.39	SMP=4.2+0.4*P/E
UGL	.01	-.32	16.60	SMP=49.5-1.2*P/E	.31	.08	13.88	SMP=23.4+1.7*P/E

From the Adjusted R<sup>2</sup>, it is observed that EPS individually has mixed impacts on SMP (negative and positive effects). Only for MSC does EPS seem to have a powerful predictive power with an Adjusted R<sup>2</sup> value of 92% and a low standard error of 0.58. The rest of the firms show either negative or low positive values for Adjusted R<sup>2</sup>, which makes it reasonable to conclude that EPS individually has little explanatory or predictive power over SMP. This is because negative Adjusted R<sup>2</sup> values are a contradiction to the model's expectations since an increase in profitability would be expected to have a positive effect on the SMP.

In the case of the P/E ratio, the Adjusted R<sup>2</sup> is also observed to have mixed impacts on SMP (negative and positive effects) for both commercial and manufacturing firms. Only for SCG does the P/E ratio seem to have a powerful predictive power with an Adjusted R<sup>2</sup> value of 90% and a standard error of 4.51. The rest of the firms show either negative or low-to-moderate positive values for Adjusted R<sup>2</sup>. It seems reasonable then to conclude that the *P/E ratio individually has little explanatory or predictive power over SMP*. This is because negative Adjusted R<sup>2</sup> values are a contradiction to the model's expectations since an increase in profitability would be expected to have a positive effect on the SMP.

## 4.6.2 Two-Predictor Models

The general analytical model for a linear two-predictor model is:

$$\text{SMP-predicted} = a + bX + cK$$

where

$a$  = constant;

$b$  = coefficient of X;

$c$  = coefficient of K;

X and K = Simultaneous combination of ROE and ROCE or ROE and EPS or ROE and P/E ratio or ROCE and EPS or ROCE and P/E ratio or EPS and P/E ratio

### 4.6.2.1 Simultaneous Combination of ROE & ROCE and ROE & EPS

Table 13 below provides a summary of the regression results of the two-predictor model after regressing ROE and ROCE combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 13: Simultaneous Combination of ROE & ROCE and ROE & EPS as Predictor Variables**

Firm	ROE and ROCE				ROE and EPS			
	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model
<b>Commercial</b>								
EXP	.93	.88	0.4	SMP=4.7+13ROE-39.5ROCE	.11	-.79	1.6	SMP=4.5-4.9ROE-EPS
KQ	.61	.22	8.3	SMP=18+1.8ROE+58.7ROCE	.70	.40	7.3	SMP=17.1+2.5ROE+1.2EPS
NMG	.05	-.90	94.5	SMP=149.3+547.7ROE-206.4ROCE	.73	.46	50.4	SMP=-1,173.1-1,067.3ROE+134.5EPS
SCG	.78	.57	9.2	SMP=150.8-7,714.8ROE+6,211.9ROCE	.24	-.53	17.3	SMP=-26.5+10.1ROE+9.6EPS
SGL	.54	.09	4.6	SMP=61.7+440ROE-475.8ROCE	.35	-.30	5.5	SMP=31.9+146.7ROE-8.2EPS
TPS	.99	.99	1.4	SMP=26.4+176ROE+165.7ROCE	.97	.93	2.9	SMP=31.9+292ROE-0.1EPS
UCM	.71	.43	3.1	SMP=16.3+3.6ROE-3.3ROCE	.91	.83	1.7	SMP=26.8+34.8ROE-13.2EPS
<b>Manufacturing</b>								
BAT	.52	.31	251.4	SMP=-1,134.3+6,206.3ROE-2,429.9ROCE	.81	.62	157.6	SMP=1,771.3-7169.8ROE+63.3EPS
BOC	.25	-.51	16.5	SMP=108.8+471.5ROE-391.5ROCE	.88	.76	6.7	SMP=76.8-436.2ROE-8.7EPS
CAB	.99	.96	10.7	SMP=-210.4+2,511.3ROE-1,027.7ROCE	.92	.85	20.9	SMP=-215.1+1,512.6ROE-1.1EPS
EABL	.02	-.97	76.1	SMP=186.7-28.8ROE+227.1ROCE	.34	.33	62.5	SMP=384.3+91.2ROE-18.8EPS
EEA	.41	-.19	0.8	SMP=2-7.5ROE+7.8ROCE	.21	-.58	0.97	SMP=2.5-0.8ROE-0.1EPS
MSC	.86	.73	1.1	SMP=5.5+21.7ROE-16.9ROCE	.95	.90	0.66	SMP=5.1-1.5ROE+1.3EPS
UGL	.09	-.83	19.5	SMP=60.7-288.8ROE+122.4ROCE	.06	-.88	19.8	SMP=66.7-319.3ROE+3EPS

From the Adjusted R<sup>2</sup>, it is observed that combining ROE and ROCE only has a significant positive explanatory effect on the SMP of TPS and CAB with Adjusted R<sup>2</sup> values of 99% and 96%, respectively. This means that combining ROE and ROCE explains 99% and 96% of the variance in the SMP of both firms, respectively. The rest of the firms show either negative or low positive values for Adjusted R<sup>2</sup>, which makes it reasonable to conclude that the combination of ROE and ROCE does not have a clearly discernible predictive power over



SMP.

In the case of the combination of ROE and EPS, the Adjusted R<sup>2</sup> values are also a mixture of negative and positive effects on SMP for both commercial and manufacturing firms. Only for TPS and MSC does the combination of ROE and EPS seem to have a powerful predictive power with Adjusted R<sup>2</sup> values of 93% and 90%, respectively, and standard errors of 2.9 and 0.66, respectively. The rest of the firms show either negative or low-to-moderate positive values for Adjusted R<sup>2</sup>. This makes it reasonable to conclude that the *combination of ROE and EPS does not have a clearly apparent predictive power over SMP*.

#### 4.6.2.2 Simultaneous Combination of ROE & P/E Ratio and ROCE & EPS

Table 14 below provides a summary of the regression results of the two-predictor model after regressing ROE and the P/E ratio combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 14: Simultaneous Combination of ROE & P/E and ROCE & EPS as Predictor Variables**

Firm	ROE and P/E Ratio				ROCE and EPS			
	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model
<b>Commercial</b>								
EXP	.08	-.85	1.6	SMP=4.7+0.1ROE-P/E	.33	-.35	1.39	SMP=4.4-18.2ROCE+1.2EPS
KQ	.52	.03	9.3	SMP=17.7-2ROE+1.4P/E	.66	.32	7.8	SMP=16.2-152.9ROCE+3.3EPS
NMG	.18	-.63	87.5	SMP=-110.4+258.7ROE+14.7P/E	.93	.86	26.1	SMP=-1,481.1-1,108.9ROCE+167EPS
SCG	.93	.87	5.2	SMP=16.8+23.9ROE+1.5P/E	.24	-.53	17.3	SMP=27.1+15.9ROCE+8.9EPS
SGL	.02	-.95	6.7	SMP=24.8-34.2ROE-0.5P/E	.09	-.83	6.5	SMP=24+76.3ROCE-4.01EPS
TPS	.99	.99	-1.3	SMP=31.6+330.3ROE-0.1P/E	.99	.99	-1.3	SMP=21.4+330.3ROCE+0.7EPS
UCM	.93	.85	1.6	SMP=6.6-0.7ROE+0.7P/E	.64	.27	3.5	SMP=15-3.1ROCE+1.4EPS
<b>Manufacturing</b>								
BAT	1	1	9.5	SMP=-1,355.5+2,639.4ROE+41.4P/E	.95	.90	79.1	SMP=6,091-14853.9ROCE+78.1EPS
BOC	.18	-.65	17.3	SMP=252.6-467.2ROE-7.6P/E	.85	.65	7.5	SMP=77-241.4ROCE+6.9EPS
CAB	.92	.84	21.4	SMP=-81.6+1,400.4ROE-11P/E	.66	.31	44.5	SMP=-151.2+1,194.5ROCE-1.1EPS
EABL	.79	.58	35.1	SMP=121.3+25ROE+4.8P/E	.35	-.31	62.1	SMP=251.4+454.1ROCE-18.7EPS
EEA	.21	-.58	.97	SMP=2.5-0.8ROE+0P/E	.21	-.57	.97	SMP=2.4+1.3ROCE-1.6EPS
MSC	.92	.83	.85	SMP=5+3.4ROE-0.3P/E	.95	.89	.68	SMP=5.2-0.9ROCE+1.2EPS
UGL	.35	-.30	16.5	SMP=40.9-174.4ROE+1.7P/E	.01	.98	20.3	SMP=46+30.1ROCE-1.2EPS

From the Adjusted R<sup>2</sup>, it is observed that combining ROE and the P/E ratio has a significant positive effect on the SMP only for TPS with an Adjusted R<sup>2</sup> value of 99%. The rest of the firms show either negative or low-to-moderate positive values for Adjusted R<sup>2</sup>. Negative Adjusted R<sup>2</sup> values are a contradiction to the model's expectations since an increase in profitability would be expected to have a positive effect on the SMP. It seems reasonable, therefore, to conclude that the *combination of ROE and the P/E ratio does not have a clearly apparent predictive power over SMP*.

In the case of the combination of ROCE and EPS, the Adjusted R<sup>2</sup> values also show a mixture

of negative and positive effects on SMP for both commercial and manufacturing firms. Only for TPS, BAT and UGL does the combination of ROCE and EPS seem to have a powerful predictive power over SMP, with Adjusted R<sup>2</sup> values of 99%, 90% and 98%, respectively, and standard errors of -1.3, 79.1 and 20.3, respectively. The rest of the firms show either negative or low-to-moderate positive values for Adjusted R<sup>2</sup>. Since an increase in profitability would be expected to have a positive effect on the SMP, it seems reasonable to conclude that the *combination of ROCE and EPS does not have an apparent predictive power over SMP*.

#### 4.6.2.3 Simultaneous Combination of ROCE & P/E Ratio and EPS & P/E Ratio

Table 15 below provides a summary of the regression results of the two-predictor model after regressing ROCE and the P/E ratio combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 15: Simultaneous Combination of ROCE & P/E and EPS & P/E as Predictor Variables**

Firm	ROCE and P/E Ratio				EPS and P/E Ratio			
	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model	R <sup>2</sup>	Adj R <sup>2</sup>	Std Error	SMP Prediction Model
<b>Commercial &amp; Services Firms</b>								
EXP	.08	-.83	1.6	SMP=4.5-0.8ROCE-0P/E	.07	-.86	1.6	SMP=4.6-0EPS-0P/E
KQ	.61	.23	8.3	SMP=18+34.5ROCE+0.7P/E	.65	.30	7.9	SMP=17.7+0.6EPS+0.6P/E
NMG	.15	-.70	89.3	SMP=-38.7+4.2ROCE+15P/E	.48	-.04	69.8	SMP=-704.3+72.3EPS+0.5P/E
SCG	.93	.87	5.1	SMP=17.4+20ROCE+1.5P/E	.92	.85	5.5	SMP=19.9-0.9EPS+1.6P/E
SGL	.12	-.77	6.4	SMP=27.8-65.1ROCE+0.9P/E	.68	.35	3.9	SMP=18.8-12.2EPS+3.4P/E
TPS	.97	.95	2.6	SMP=20.5+357.6ROCE+0.1P/E	.83	.66	6.5	SMP=31.7+4.3EPS+0P/E
UCM	.94	.88	1.4	SMP=7.6-0.7ROCE+0.7P/E	.93	.85	1.6	SMP=7-0.3EPS+0.7P/E
<b>Manufacturing &amp; Allied Firms</b>								
BAT	.99	.98	40.4	SMP=-2,091+3,555.4ROCE+43.4P/E	1	1	27.1	SMP=-523.2+15.1EPS+35.8P/E
BOC	.43	-.14	14.3	SMP=254.2-400ROCE-7.7P/E	.99	.98	1.7	SMP=-116.2+12EPS-9.5P/E
CAB	.76	.51	37.5	SMP=371.4+956.9ROCE-45.4P/E	.49	-.03	54.3	SMP=1,037.7+4EPS-90.8P/E
EABL	.79	.58	35.3	SMP=89+117.4ROCE+4.8P/E	.89	.79	24.9	SMP=-35.3+12.6EPS+6.7P/E
EEA	.17	-.67	1	SMP=2.6-0.8ROCE-0P/E	.20	.60	1	SMP=2.4-0.8EPS+0P/E
MSC	.92	.83	.85	SMP=4.9+3.2ROCE+0.3P/E	.95	.89	.68	SMP=5.1+EPS+0.1P/E
UGL	.50	.01	14.5	SMP=-15.9+254.4ROCE+2.6P/E	.48	-.05	14.8	SMP=37.4-6.5EPS+2.5P/E

From the Adjusted R<sup>2</sup>, it is observed that combining ROCE and the P/E ratio has a significant positive explanatory effect on the SMP only for TPS and BAT with Adjusted R<sup>2</sup> values of 95% and 98%, respectively. This means that combining ROCE and the P/E ratio explains 95% and 98% of the variance in the SMP of both firms, respectively. The rest of the firms show either negative or low-to-moderate positive values for Adjusted R<sup>2</sup>. Since an increase in profitability would be expected to have a positive effect on the SMP, it seems reasonable to conclude that the *combination of ROCE and the P/E ratio does not have a clearly apparent predictive power over SMP*.

In the case of the combination of EPS and P/E ratio, the Adjusted R<sup>2</sup> values also show a mixture of negative and positive effects on SMP for both commercial and manufacturing firms, some with high and other low Adjusted R<sup>2</sup> values. As in the other cases above, this scenario makes it reasonable to conclude that the *combination of EPS and P/E ratio does not have an apparent predictive power over SMP*.

### 4.6.3 Three-Predictor Models

The general analytical model for a linear three-predictor model is:

$$\text{SMP-predicted} = a + bX + cK + dP + \varepsilon$$

where  $a$  = constant;  $b$  = coefficient of X;

$c$  = coefficient of K;  $d$  = coefficient of P

X, K and P = Simultaneous combination of ROE, ROCE and EPS or ROE, EPS and P/E ratio or ROCE, EPS and P/E ratio

$\varepsilon$  = error term

These models are explained below.

#### 4.6.3.1 Simultaneous Combination of ROE, ROCE & EPS

Table 16 below provides a summary of the regression results of the three-predictor model after regressing ROE, ROCE and EPS combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 16: Simultaneous Combination of ROE, ROCE & EPS**

Firm	ROE, ROCE & EPS Combined			
	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Error	SMP Prediction Model
<b>Commercial &amp; Services Firms</b>				
EXP	.99	.97	.20	SMP=4.8+16.6ROE-38.8ROCE-0.8EPS
KQ	.90	.61	5.9	SMP=12.7+4.6ROE-301.7ROCE+6.5EPS
NMG	.93	.72	36.1	SMP=-1,480+194ROE-1,229ROCE+166EPS
SCG	.92	.68	7.9	SMP=143.3-8,171.1ROCE+6,497.5ROCE+12.2EPS
SGL	.72	.11	5.1	SMP=60.2+485ROE-406.9ROCE-6.1EPS
TPS	1	1	0.1	SMP=24.5+218.2ROE+206.4ROCE-1.2EPS
UCM	1	1	0.2	SMP=25.7+30.7ROE-2ROCE-11EPS
<b>Manufacturing &amp; Allied Firms</b>				
BAT	1	.88	87.1	SMP=6,386.8-3,423.7ROE-13,092.5ROCE+89.1EPS
BOC	.89	.55	9.0	SMP=78.4-307.6ROE-89ROCE+8.3EPS
CAB	.98	.93	14.1	SMP=-211.5+4,494.8ROE-993ROCE-0.6EPS
EABL	.35	-1.61	87.7	SMP=293+30.3ROE+314.2ROCE-19EPS
EEA	.88	.51	.54	SMP=0.7-15.8ROE+26.2ROCE-6.2EPS
MSC	1	1	.28	SMP=4.6-39.1ROE+30.3ROCE+2.9EPS
UGL	.89	.56	9.5	SMP=112.9-4,263.9ROE+1,452.3ROCE+55.9EPS

From the Adjusted  $R^2$  values, the three-predictor model combining ROE, ROCE and the EPS demonstrates mixed results, which contradict the model's expectations. For example, the model is fully able to explain all variations in the SMP for 6 of the 14 firms (perfect predictive power), with an Adjusted  $R^2$  value ranging from 88% to 100%; but the Adjusted  $R^2$  value for EABL is negative and some Adjusted  $R^2$  values are too low (e.g. 11% for SGL), which shows a measure of unreliability of the model. To this extent then, it seems reasonable to conclude that the *combination of ROE, ROCE and the EPS ratio does not have a clearly discernible predictive power over the SMP.*

#### 4.6.3.2 Simultaneous Combination of ROE, ROCE & P/E Ratio

Table 17 below provides a summary of the regression results of the three-predictor model after regressing ROE, ROCE and the P/E ratio combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 17: Simultaneous Combination of ROE, ROCE & P/E Ratio**

ROE, ROCE & P/E Ratio Combined				
Firm	$R^2$	Adjusted $R^2$	Standard Error	SMP Prediction Model
<b>Commercial &amp; Services Firms</b>				
EXP	.94	.74	.61	SMP=4.8+12.9ROE-39.2ROCE-0P/E
KQ	.62	-.51	11.54	SMP=17.9+ROE+46.5ROCE+0.4P/E
NMG	.94	.76	33.60	SMP=-1,197.1+6,037ROE-4,579.1ROCE+77P/E
SCG	1	1	.46	SMP=73.5-3,452.6ROE+2,782ROCE+1.1P/E
SGL	.68	-.30	5.50	SMP=81.4+700.5ROE-650.4ROCE-1.5P/E
TPS	1	1	1.49	SMP=29.1+259.8ROE+79.6ROCE-0.1P/E
UCM	.94	.76	1.99	SMP=8.2+0.3ROE-ROCE+0.6P/E
<b>Manufacturing &amp; Allied Firms</b>				
BAT	1	1	8.77	SMP=-1,492.8+2,260.3ROE+568.8ROCE+41.6P/E
BOC	.43	-1.27	20.26	SMP=255.4-6.9ROE-397.9ROCE-7.8P/E
CAB	1	.95	12.07	SMP=-398.7+2,848.8ROE-1,252.4ROCE+15.7P/E
EABL	.79	.17	49.55	SMP=131.8+32.1ROE-36.1ROCE+4.8P/E
EEA	.55	-.80	1.04	SMP=1.8-11.2ROE+13.1ROCE-0.1P/E
MSC	.92	.66	1.20	SMP=4.9+1.6ROE+1.7ROCE+0.3P/E
UGL	.90	.62	8.92	SMP=6.3-702.1ROE+567ROCE+3.7P/E

From the Adjusted  $R^2$  values, the three-predictor model combining ROE, ROCE and the P/E ratio demonstrates mixed results, which contradict the model's expectations. For example, the model is fully able to explain all variations in the SMP for 4 of the 14 firms (perfect predictive power) under study, with an Adjusted  $R^2$  value ranging from 95% to 100%; but some Adjusted  $R^2$  values are negative, which shows a measure of unreliability of the model. To this extent then, it seems reasonable to conclude that the *combination of ROE, ROCE and the P/E ratio does not have a clearly discernible predictive power over the SMP.*

#### 4.6.3.3 Simultaneous Combination of ROE, EPS & P/E Ratio

Table 18 below provides a summary of the regression results of the three-predictor model after regressing ROE, ROCE and the P/E ratio combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 18: Simultaneous Combination of ROE, EPS & P/E Ratio**

	ROE, EPS & P/E Ratio Combined			
Firm	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Error	SMP Prediction Model
<b>Commercial &amp; Services Firms</b>				
EXP	.21	-2.17	2.13	SMP=4.9+6.1ROE-1.2EPS-0P/E
KQ	.70	-.19	10.26	SMP=17.1+2.8ROE+1.2EPS-0.1P/E
NMG	.93	.71	37.06	SMP=-1,582.8-1,994.5ROE+226.4EPS-28P/E
SCG	.96	.84	5.57	SMP=21.3+67ROE-6.3EPS+1.7P/E
SGL	.80	.19	4.35	SMP=22.8+92.5ROE-15.6EPS+2.9P/E
TPS	1	1	1.71	SMP=31.7+344.6ROE-0.2EPS-0.1P/E
UCM	.95	.79	1.85	SMP=15.8+16.2ROE-6.3EPS+0.4P/E
<b>Manufacturing &amp; Allied Firms</b>				
BAT	1	1	11.4	SMP=-1,228.2+2,227.6ROE+2.5EPS+40.4P/E
BOC	1	1	2.22	SMP=-98.7-54.3ROE+11.9EPS+8.7P/E
CAB	.93	.70	29.42	SMP=-161.3+1,475.2ROE-0.9EPS-4.4P/E
EABL	.98	.92	15.60	SMP=-207.3-87.1ROE+30.1EPS+9.1P/E
EEA	.21	-2.15	1.37	SMP=2.5-1.1ROE+0.3EPS-0P/E
MSC	.95	.80	.92	SMP=5.2-2.3ROE+1.5EPS-0.1P/E
UGL	.66	-.35	16.77	SMP=-20.2+908.2ROE-22.1EPS+4.2P/E

From the Adjusted R<sup>2</sup> values, the three-predictor model combining ROE, EPS and the P/E ratio demonstrates mixed results, which contradict the model's expectations. For example, the model is fully able to explain all variations in the SMP for 4 of the 14 firms (perfect predictive power), with an Adjusted R<sup>2</sup> value ranging from 92% to 100%; but some Adjusted R<sup>2</sup> values are negative, which shows a measure of unreliability of the model. To this extent then, it seems reasonable to conclude that the *combination of ROE, EPS and the P/E ratio does not have a clearly apparent predictive power over the SMP.*

#### 4.6.3.4 Simultaneous Combination of ROCE, EPS & P/E Ratio

Table 19 below provides a summary of the regression results of the three-predictor model after regressing ROE, ROCE and the P/E ratio combined against the dependent variable (SMP). Interpretation comments are provided below the table.

**Table 19: Simultaneous Combination of ROCE, EPS & P/E Ratio**

ROCE, EPS & P/E Ratio Combined				
Firm	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Error	SMP Prediction Model
<b>Commercial &amp; Services Firms</b>				
EXP	.33	-1.68	1.96	SMP=4.4-17.6ROCE+1.2EPS-0P/E
KQ	.72	-.13	10.00	SMP=15.7-157.6ROCE+3.3EPS+0.6P/E
NMG	.93	.72	36.22	SMP=-1,488.9-1,117ROCE+171.3EPS-2.4P/E
SCG	.93	.71	37.06	SMP=-1,582.8-1,944.2ROCE+226.4EPS-28P/E
SGL	.81	.25	4.18	SMP=13.8+103ROCE-18EPS+3.6P/E
TPS	1	.94	2.77	SMP=17.1+483.6ROCE-1.8EPS+0.1P/E
UCM	.94	.76	2.00	SMP=7.8-0.8ROCE+0.1EPS+0.6P/E
<b>Manufacturing &amp; Allied Firms</b>				
BAT	1	1	33.72	SMP=526.4-2,360ROCE+24.7EPS+31.1P/E
BOC	1	1	1	SMP=-142+45.2ROCE+12.6EPS+10.7P/E
CAB	.76	.04	52.5	SMP=424.2+907.8ROCE+0.9EPS-49.8P/E
EABL	1	1	1.62	SMP=-95.6-495.2ROCE+32.9EPS+9.6P/E
EEA	.31	-1.74	1.28	SMP=1.8+5.9ROCE-5.9EPS+0.1P/E
MSC	.95	.79	.96	SMP=5.2-0.9ROCE+1.2EPS+0P/E
UGL	.83	.32	11.89	SMP=-12.2+364.1ROCE-9.6EPS+4.1P/E

From the Adjusted R<sup>2</sup> values, the three-predictor model combining ROCE, EPS and the P/E ratio demonstrates mixed results, which contradict the model's expectations. For example, the model is fully able to explain all variations in the SMP for four of the fourteen firms (perfect predictive power) under study, with an Adjusted R<sup>2</sup> value ranging from 94% to 100%; but some Adjusted R<sup>2</sup> values are negative, which shows a measure of unreliability of the model. To this extent then, it seems reasonable to conclude that the *combination of ROCE, EPS and the P/E ratio does not have a clearly apparent predictive power over the SMP.*

#### 4.6.4 Four-Predictor Model

The general analytical model for a linear four-predictor model is:

$$\text{SMP-predicted} = a + bX + cK + dP + eQ + \varepsilon$$

where  $a$  = constant;  $b$  = coefficient of X;

$c$  = coefficient of K;  $d$  = coefficient of P

$e$  = coefficient of Q

X, K, P and Q = Simultaneous combination of ROE, ROCE, EPS and the P/E ratio

$\varepsilon$  = error term

Table 20 below provides a summary of the regression results of the four-predictor model after regressing all the four independent variables combined (ROE, ROCE, EPS and P/E ratio) on the dependent variable (SMP).

**Table 20: Simultaneous Combination of ROE, ROCE, EPS & P/E Ratio**

ROE, ROCE, EPS & P/E Ratio Combined				
Firm	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Error	SMP Prediction Model
<b>Commercial &amp; Services Firms</b>				
EXP	1	65,535	0	SMP=4.9+16.7ROE-37.9ROCE-0.9EPS-0P/E
KQ	1	65,535	0	SMP=10.5+8.3ROE-432.4ROCE+9.7EPS-1.5P/E
NMG	1	65,535	0	SMP=2,660.7+83,354.8ROE-48,827.6ROCE-2,207.7EPS+1,095.2P/E
SCG	1	65,535	0	SMP=76.2-3,666.1ROE+2,948.2ROCE+0.9EPS+1.1P/E
SGL	1	65,535	0	SMP=-207.8-2,356.2ROE+2,566.2ROCE-71.4EPS+19.7P/E
TPS	1	65,535	0	SMP=25.7+223ROE+199.2ROCE-1.2EPS-0P/E
UCM	1	65,535	0	SMP=27.4+33.4ROE-2.1ROCE-12EPS-0.1P/E
<b>Manufacturing &amp; Allied Firms</b>				
BAT	1	65,535	0	SMP=-2,396.8+2,938.7ROE+2,121.4ROCE-10.2EPS+46.1P/E
BOC	1	65,535	0	SMP=-125.4-120.5ROE+83.8ROCE+12.7EPS+9.9P/E
CAB	1	65,535	0	SMP=-566.6+3,098.4ROE-1,352.7ROCE-1.6EPS+29.5P/E
EABL	1	65,535	0	SMP=-108.8-9.2ROE-454ROCE+33.1EPS+9.7P/E
EEA	1	65,535	0	SMP=-0-16.1ROE+31.7ROCE-11EPS+0.1P/E
MSC	1	65,535	0	SMP=4.7-42.9ROE+32ROCE+3.5EPS-0.1P/E
UGL	1	65,535	0	SMP=57.8-2,702.4ROE+1,107.3ROCE+30.6EPS+2.1P/E

The four-predictor model combining ROE, ROCE, EPS and the P/E ratio has given rise to *meaningless* Adjusted R<sup>2</sup> values (65,535). A plausible explanation for this *meaningless* result is the likely possibility of two or more of the independent variables being linearly related or dependent on each other. A solution to this problem would be to exclude one or all of such variables. However, that is outside the scope of this study. To this extent then, it seems reasonable to conclude that the four-predictor model *combining ROE, ROCE, EPS and the P/E has inconclusive predictive power over the SMP.*

#### **4.7 Research Findings**

Based on the results of correlation analysis performed (correlation coefficients calculated), it was clear that: (i) no single predictor variable individually had a clear association pattern with the SMP; (ii) only three out of six combinations of two predictor variables demonstrated a consistent association pattern with the SMP; (iii) all four combinations of three predictor variables demonstrated a consistent association pattern with the SMP; and (iv) the combination of all four predictor variables demonstrated a consistent *perfectly positive* association pattern with the SMP.

From the regression analysis, the general study findings indicated that there is no single regression predictor model capable of accurately predicting the SMP of firms listed on the NSE, at least based on the Adjusted R<sup>2</sup> (coefficient of determination) values derived from regression analyses performed. The results are summarised in the Table 19 below.

**Table 21: Summary of Correlation and Regression Results**

Study Assertion	Do research results support study assertion? Yes/No	
	Correlation	Regression
<b>Bivariate Regression Results</b>		
ROE individually has a significant influence on SMP.	No	No
ROCE individually has a significant influence on SMP..	No	No
EPS individually has a significant influence on SMP.	No	No
P/E individually has a significant influence on SMP.	No	No
<b>Multiple Regression Results – Two Ratios Combined</b>		
ROE and ROCE simultaneously have a significant influence on SMP.	No	No
ROE and EPS simultaneously have a significant influence on SMP.	No	No
ROE and P/E simultaneously have a significant influence on SMP.	No	No
ROCE and EPS simultaneously have a significant influence on SMP.	Yes	No
ROCE and P/E simultaneously have a significant influence on SMP.	Yes	No
EPS and P/E simultaneously have a significant influence on SMP.	Yes	No
<b>Multiple Regression Results – Three Ratios Combined</b>		
ROE, ROCE and EPS simultaneously have a significant influence on SMP.	Yes	No
ROE, ROCE and P/E simultaneously have a significant influence on SMP.	Yes	No
ROE, EPS and P/E simultaneously have a significant influence on SMP.	Yes	No
ROCE EPS and P/E simultaneously have a significant influence on SMP.	Yes	No
<b>Multiple Regression Results – All Four Ratios Combined</b>		
ROE, ROCE, EPS and P/E simultaneously have a significant influence on SMP.	Yes	No



## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This study was conducted to assess the relationship, if any, between accounting profitability (represented by four profitability ratios – ROE, ROCE, EPS and P/E ratio) and stock market price per share (SMP) for firms listed on the NSE, with a focus on Commercial & Services sector firms and Manufacturing & Allied sector firms over the 5-year period from 2011 through 2015. The profitability ratios were the independent variables and SMP was the dependent variable. The study adopted a causal quantitative survey design in which secondary data on the variables was obtained from both annual audited company financial statements and the NSE 2015-2016 Handbook.

#### 5.2 Summary of Findings

The study results indicated that the selected independent variables cannot be exclusively used to explain movements in stock market price (SMP) of firms listed on the NSE. From the correlation analysis performed: (i) no single predictor variable individually had a clear association pattern with the SMP; (ii) only three out of six combinations of two predictor variables demonstrated a consistent association pattern with the SMP - ROCE and EPS, ROCE and P/E ratio, and EPS and P/E ratio; (iii) all four combinations of three predictor variables demonstrated a consistent *positively strong* association pattern with the SMP; and (iv) the combination of all four predictor variables demonstrated a consistent *perfectly positive* association pattern with the SMP. However, although the correlation analysis in this study provided some comforting results, these were quickly rebuffed by regression analysis designed to assess the explanatory power of the independent variables over the dependent variable. The regression findings indicated that there was no single regression predictor model capable of accurately predicting the SMP of firms listed on the NSE. To this extent, therefore, the study results were judged to be largely inconclusive at least for the selected NSE-listed firms.

### **5.3 Conclusions**

The results of the study's empirical analysis were inconclusive and were largely consistent with most of the findings in the literature review and support the evidence accounting profitability, indicating good or bad results, is not the only significant factor driving stock market prices. Although, the study did not reveal the other factors affecting stock market prices, it was evident that share prices are influenced by many factors so that technical predictions using only a number of select accounting profitability variables could potentially give rise to incorrect or inconclusive results. Securities markets are complex operations, hence finding a consistent pattern in stock market prices as a whole is a fairly problematic and difficult task, especially when using limited data and a limited time period, such as the 5-year period selected for this study. This, therefore, remains a fertile area of future research as capital market researchers in accounting continue to travel the arduous path towards the search for a valid and reliable predictor model for stock market prices.

### **5.4 Recommendations**

This study focused on 14 NSE-listed firms for the five-year period, 2011-2015. The nascent level of development of the NSE, coupled with low levels of national economic integration and flow of information, compounded by the seasonality and cyclic nature of securities markets, as well as the time period selected for the study may have affected the final results. The operationalisation of the variables defining „accounting profitability“ may also be of concern; for example, the calculation of ROE and ROCE may not necessarily be the same in all cases. Also, the intentional selection of a predictor variable with a bearing on the dependent variable (such as the P/E ratio) could also complicate the interpretation of the study's results. Further, potential collinearity between and among the independent variables could also affect the final study results, although this matter was assessed and somewhat dispelled in this study.

### **5.5 Limitations of the Study**

A number of limitations may have resulted in the inconclusive nature of the study. Firstly, while there are 10 investment sectors at the NSE, the study only assessed two sectors. Accordingly, it is not possible to extrapolate the findings of the study to the other sectors of the NSE. Secondly, the listed firms in the sectors selected for the study have differing

financial year ends (31-March, 30-June, 30-September, and 31-December). As a consequence, the comparability of their audited financial results drawn to different dates, and the resultant profitability ratios, is inherently problematic. Thirdly, due to the large volume of data, a lot of annual averaging was performed, hence producing inherent distortions to information particularly where there may be large deviations over the averaging period. Fourthly, stock market prices were taken at „face value“ as they appeared in the NSE’s publications. The effects of equity volume trades were completely disregarded in the study. As volume usually has a major effect on prices, this may somewhat have compromised some of the study findings. Fifthly, the effects of important and major company events such as rights issues, bonus issues and profit warnings were not built into the study. Finally, by taking stock market prices at „face value“, the study assumed, perhaps fatally to the findings, that there was no significant difference between market prices quoted as cum-dividend, ex-dividend, cum-all, ex-all, cum-rights, ex-rights, etc. and prices without such characteristics.

## **5.6 Recommendations for Further Research**

Flowing from the present study, the possible areas of further research recommended are:

- i) The present study can be extended to cover longer time periods and more firms listed on the NSE.
- ii) The present study centred on linear relationships between the independent and dependent variables and may be extended to include non-linear relationships, and the deployment of other multivariate statistical forecasting models to verify the results.
- iii) A similar study could be undertaken but incorporate the effects of such factors and events as rights issues, bonus issues and profit warnings and the effects of prices quoted as cum-dividend, ex-dividend, cum-all, etc., within the study period as such events often have significant effects on SMP, EPS and the P/E ratio.
- iv) A similar study could also be undertaken using different measures of company accounting profitability beyond ROE and ROCE.
- v) Future studies could consider including all sectors and companies listed on the NSE for a more comprehensive comparative assessment of the influence of profitability on NSE.

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## APPENDIX 1 – ALL NSE LISTED COMPANIES BY SECTOR

<b>AGRICULTURAL</b>	
1.	Eaagads Ltd Ord 1.25
2.	Kapchorua Tea Co. Ltd Ord Ord 5.00
3.	Kakuzi Ord.5.00
4.	Limuru Tea Co. Ltd Ord 20.00
5.	Rea Vipingo Plantations Ltd Ord 5.00
6.	Sasini Ltd Ord 1.00
7.	Williamson Tea Kenya Ltd Ord 5.00
<b>AUTOMOBILES AND ACCESSORIES</b>	
1.	Car and General (K) Ltd Ord 5.00
2.	Sameer Africa Ltd Ord 5.00
3.	Marshalls (E.A.) Ltd Ord 5.00
<b>BANKING</b>	
1.	Barclays Bank Ltd Ord 0.50
2.	CFC Stanbic Holdings Ltd ord.5.00
3.	I&M Holdings Ltd Ord 1.00
4.	Diamond Trust Bank Kenya Ltd Ord 4.00
5.	HF Group Ltd Ord 5.00
6.	KCB Group Ltd Ord 1.00
7.	National Bank of Kenya Ltd Ord 5.00
8.	NIC Bank Ltd Ord 5.00
9.	Standard Chartered Bank Ltd Ord 5.00
10.	Equity Group Holdings Ord 0.50
11.	The Co-operative Bank of Kenya Ltd Ord 1.00
<b>COMMERCIAL AND SERVICES</b>	
1.	Express Ltd Ord 5.00
2.	Kenya Airways Ltd Ord 5.00

3.	Nation Media Group Ord. 2.50
4.	Standard Group Ltd Ord 5.00
5.	TPS Eastern Africa (Serena) Ltd Ord 1.00
6.	Scangroup Ltd Ord 1.00
7.	Uchumi Supermarket Ltd Ord 5.00
8.	Hutchings Biemer Ltd Ord 5.00
9.	Longhorn Publishers Ltd
10.	Atlas Development and Support Services
<b>CONSTRUCTION AND ALLIED</b>	
1.	Athi River Mining Ord 5.00
2.	Bamburi Cement Ltd Ord 5.00
3.	Crown Berger Ltd Ord 5.00
4.	E.A.Cables Ltd Ord 0.50
5.	E.A.Portland Cement Ltd Ord 5.00
<b>ENERGY AND PETROLEUM</b>	
1.	KenolKobil Ltd Ord 0.05
2.	Total Kenya Ltd Ord 5.00
3.	KenGen Ltd Ord. 2.50
4.	Kenya Power & Lighting Co Ltd
5.	Umeme Ltd Ord 0.50
<b>INSURANCE</b>	
1.	Jubilee Holdings Ltd Ord 5.00
2.	Pan Africa Insurance Holdings Ltd Ord 5.00
3.	Kenya Re-Insurance Corporation Ltd Ord 2.50
4.	Liberty Kenya Holdings Ltd
5.	Britam Holdings Ltd Ord 0.10
6.	CIC Insurance Group Ltd Ord 1.00
<b>INVESTMENT</b>	

1.	Olympia Capital Holdings Ltd Ord 5.00
2.	Centum Investment Co Ltd Ord 0.50
3.	Trans-Century Ltd
4.	Home Afrika Ltd Ord 1.00
5.	Kurwitu Ventures
<b>INVESTMENT SERVICES</b>	
1.	Nairobi Securities Exchange Ltd Ord 4.00
<b>MANUFACTURING AND ALLIED</b>	
1.	B.O.C Kenya Ltd Ord 5.00
2.	British American Tobacco Kenya Ltd Ord 10.00
3.	Carbacid Investments Ltd Ord 5.00
4.	East African Breweries Ltd Ord 2.00
5.	Mumias Sugar Co. Ltd Ord 2.00
6.	Unga Group Ltd Ord 5.00
7.	Eveready East Africa Ltd Ord.1.00
8.	Kenya Orchards Ltd Ord 5.00
9.	A.Baumann CO Ltd Ord 5.00
10.	Flame Tree Group Holdings Ltd Ord 0.825
<b>TELECOMMUNICATION AND TECHNOLOGY</b>	
1.	Safaricom Ltd Ord 0.05
<b>REAL ESTATE INVESTMENT TRUST</b>	
1.	Stanlib Fahari I-REIT



## APPENDIX 2 – LIST OF FIRMS ACTUALLY SAMPLED

Sector and Firms	Year-End	Company Brief
<b>Commercial &amp; Services Sector Firms</b>		
1. Express Ltd	31-Dec	The principal activities of the group are that of clearing and forwarding services for air and sea as well as warehousing and logistics services.
2. Kenya Airways Ltd	31-Mar	The principal activities of the Group are international, regional and domestic carriage of passengers and cargo by air, the provision of ground handling services to other airlines and the handling of import and export cargo.
3. Nation Media Group	31-Dec	Founded by His Highness the Aga Khan in 1959, its was quoted on the NSE since 1973 and also cross listed on the Dar es Salaam, Kampala and Kigali securities exchanges. The principal activities of the Group are the publication, printing and distribution of newspapers and magazines, radio and television broadcasting and digital operations in the East African countries of Kenya, Uganda, Rwanda and Tanzania.
4. Scangroup Ltd	31-Dec	WPP-Scangroup is a subsidiary of WPP and is listed on the NSE. It is the largest marketing and communication group operating a multiagency model across multiple disciplines in sub Saharan Africa. Specifically, the group comprises the ad agencies Ogilvy & Mather, SCANAD, JWT and BluePrint Marketing; media firms Group M, MediaCom Africa, Mindshare and MEC; public relations agencies Ogilvy PR and H+K Strategies; market research agency Millward Brown; specialty communication firms Roundtrip and Geometry Global and digital companies Ogilvy One, Squad Digital and SCANAD Digital.
5. Standard Group Ltd	31-Dec	This is a multi-media organization with investments in media platforms spanning newspaper print operations, television, radio broadcasting, digital and online services, as well as outdoor advertising. The Group is recognised as a leading multi-media house in Kenya with a key influence in matters of national and international interest.
6. TPS Eastern Africa (Serena) Ltd	31-Dec	TPS Eastern Africa Limited (TPSEAL) trading as the Serena Hotels, Tourism Promotion Services (TPS), offers quality accommodation, conference and holiday solutions in a collection of 24 hotels, safari lodges, camps and resorts within 6 Countries in the Africa. In 1997, the Kenyan Operations were floated in the NSE and in 2006 when the operations in Tanzania and Zanzibar came to maturity the Group in East Africa was restructured and the Company, TPS Eastern Africa Limited (TPSEAL) became a public company.
7. Uchumi Supermarket Ltd	30-Jun	The principal activity of the company is that of operating retail supermarkets.
<b>Manufacturing &amp; Allied Sector Firms</b>		
1 B.O.C Kenya Ltd	31-Dec	The principal activity of the Group is the manufacture and sale of industrial gases, medical gases and welding products
2 British American Tobacco Kenya Ltd	31-Dec	BAT is a Kenya-based company, and part of the British American Tobacco Group, the world's second largest tobacco Group. The core operations in Kenya are cigarette manufacturing for domestic and export consumption, cut rag (semi processed) tobacco manufacture for Egypt, leaf growing operations, and green leaf threshing in Thika. It began operations in Kenya in 1907. BAT is listed on the NSE since 1969.

Sector and Firms	Year-End	Company Brief
3 Carbacid Investments Ltd	31-Jul	The company is an investment and holding company with three subsidiaries. The principal activities of Carbacid (CO2) Limited involve the mining and sale of Carbon dioxide gas, while Goodison Twenty Nine Limited and Goodison Forty Seven Limited are investment companies.
4 East African Breweries Ltd	30-Jun	EABL is East Africa's leading branded alcohol beverage business with an outstanding collection of brands that range from beer, spirits and adult non-alcoholic drinks. It has breweries, distilleries, support industries and a distribution network across the region.
5 Eveready East Africa Ltd	30-Sep	Eveready is the largest supplier of portable power solutions in East Africa. We have one of the biggest dry cell battery manufacturing plants in the region. The business has a broad split between Personal Care items i.e. shavers and razors under the Schick brand Portable Power Solutions that include lanterns and torches, primary dry cell batteries and rechargeables under the Energizer & Eveready brand names and a range of Automotive batteries under the Turbo brand name.
6 Mumias Sugar Co. Ltd	30-Jun	The principal activities of the company are the production and sale of sugar, ethanol, water and the generation and sale of electricity. It was listed on the NSE in 2001.
7 Unga Group Ltd	30-Jun	This is a Kenya-based holding company that has a majority shareholding in companies involved with the manufacture and marketing of a broad range of human nutrition, animal nutrition and animal health products. Unga Limited, one of Kenya's oldest companies, was established in 1908 with the aim of serving the milling needs of the fledgling wheat growing industry.

Source: NSE 2015-2016 Handbook and website

## APPENDIX 3 – LIST OF FIRMS NOT MEETING SAMPLING CRITERIA

Sector and Firms	Company Brief	Reason for elimination from Study Sample
<b>Commercial &amp; Services Sector Firms</b>		
1. Atlas Development and Support Services	Atlas provides turn-key support service solutions to multiple sectors including oil & gas, mining, construction, NGO and government, enabling its clients to operate efficiently and maximise performance.	NSE market data only available for three years – 2013, 2014 and 2015, thereby not meeting the sampling criteria.
2. Hutchings Biemer Ltd	The company is a retailer of office and home furnishings.	Suspended from trading since February 2001.
3. Longhorn Publishers Ltd	The company is incorporated in Kenya with operations in Uganda, Tanzania and Rwanda. Its main business is the development, publication, marketing and distribution of educational and general books. It was incorporated on 14th May 1993.	Listed on the NSE in May 2012, thereby not meeting the sampling criteria.
<b>Manufacturing &amp; Allied Sector Firms</b>		
A. Baumann CO Ltd	This is an investment and trading firm. Its trading division deals in electrical, agricultural and construction equipment. It has five subsidiaries including A. Baumann Kenya, Amalgamated Alloys Ltd, Wafco Ltd, Animatics Ltd and Wigso Holdings Ltd.	Suspended from trading since May 2008.
2. Flame Tree Group Holdings Ltd	Founded in 1989, Flame Tree is a leading regional manufacturing Group – listed on the Nairobi Securities Exchange (NSE: FTG) – with operations in Mauritius, Kenya, Rwanda, Ethiopia, Dubai and Mozambique. It operates in FMCG industry, plastics and trading, with a brand portfolio that includes Roto Tanks, Jojo Plastics, Zoe, Cerro, Alana Skin, Siora, Happy's and Buildmart.	Obtained NSE listing in 2014
3. Kenya Orchards Ltd	Kenya Orchards Limited engages in processing and selling fruits, vegetables, and other food products in Kenya. The company is based in Nairobi, Kenya.	NSE market data only available for two years – 2014 and 2015, thereby not meeting the sampling criteria.

Source: NSE 2015-2016 Handbook and website

## APPENDIX 4 – CALCULATION OF ANNUAL ROE AND ROCE: 2015

### Calculation formulas

**ROE = Profit after tax / Shareholders' funds = PAT/SHF**

**ROCE = Earnings before interest and tax / (Total assets - current liabilities) = EBIT / (TOA-CUL)**

		PBT	INT	PAT	EBIT	TOA	CUL	SHF	ROE	ROCE
		Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	%	%
		a	b	c	d=a+b	e	f	g	h=c/g	h=d/(e-f)
<b>Commercial &amp; Services Firms</b>										
1	EXP	-75.73	16.82	-60.09	-58.92	441.90	96.58	120.12	-0.50	-0.17
2	KQ	-29,712.00	-	-25,743.00	-29,712.00	182,063.00	81,753.00	-5,963.00	4.32	-0.30
3	NMG	2,823.20	-316.30	2,071.10	2,506.90	12,696.70	3,591.10	8,953.70	0.23	0.28
4	SCG	875.27	-436.10	478.67	439.17	12,468.48	3,678.46	8,604.26	0.06	0.05
5	SGL	-395.80	163.64	-289.60	-232.16	3,872.49	1,671.87	1,509.83	-0.19	-0.11
6	TPS	-210.98	467.36	-280.61	256.39	15,815.80	2,234.33	9,685.35	-0.03	0.02
7	UCM	-3,513.06	335.85	-3,421.36	-3,177.21	6,302.25	5,179.95	739.36	-4.63	-2.83
<b>Manufacturing &amp; Allied Firms</b>										
1	BAT	7,138.90	337.95	4,976.26	7,476.85	18,681.18	6,600.70	8,853.18	0.56	0.62
2	BOC	221.72	-63.68	148.60	158.04	2,320.96	606.85	1,714.11	0.09	0.09
3	CAB	580.47	-117.88	393.86	462.58	2,968.73	247.13	2,477.03	0.16	0.17
4	EAB	14,151.24	4,074.38	9,574.91	18,225.62	66,939.78	24,930.77	13,353.18	0.72	0.43
5	EEA	-98.91	50.27	-77.71	-48.64	1,511.67	651.31	806.29	-0.10	-0.06
6	MSC	-6,307.26	915.85	-4,644.80	-5,391.41	20,403.56	13,640.59	5,932.04	-0.78	-0.80
7	UGL	635.70	-37.06	621.87	598.63	8,671.79	2,302.17	5,355.28	0.12	0.09

Source: Researcher-calculated from respective annual audited financial statements

## APPENDIX 5 – CALCULATION OF ANNUAL ROE AND ROCE: 2014

		PBT	INT	PAT	EBIT	TOA	CUL	SHF	ROE	ROCE
		Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	%	%
		a	b	c	d=a+b	e	f	g	h=c/g	h=d/(e-f)
<b>Commercial &amp; Services Firms</b>										
1	EXP	-76.44	13.88	-77.35	-62.55	477.92	126.59	180.21	-0.43	-0.18
2	KQ	-4,861.00	1,601.00	-3,382.00	-3,260.00	148,657.00	63,756.00	28,229.00	-0.12	-0.04
3	NMG	3,624.00	-287.40	2,410.20	3,336.60	11,944.30	3,118.30	8,768.10	0.27	0.38
4	SCG	912.28	-248.25	625.48	664.02	13,284.10	4,440.01	8,542.63	0.07	0.08
5	SGL	326.08	118.42	220.51	444.50	3,575.41	1,153.15	1,740.91	0.13	0.18
6	TPS	220.10	189.64	274.42	409.74	15,939.18	2,770.76	10,412.49	0.03	0.03
7	UCM	432.78	64.64	364.32	497.42	6,918.85	3,404.14	3,337.34	0.11	0.14
<b>Manufacturing &amp; Allied Firms</b>										
1	BAT	6,095.42	267.53	4,255.31	6,362.95	18,253.51	7,182.91	8,126.92	0.52	0.57
2	BOC	277.98	-53.10	229.63	224.89	2,300.32	553.13	1,747.19	0.13	0.13
3	CAB	597.26	-89.02	490.64	508.24	2,533.16	155.76	2,160.17	0.23	0.21
4	EAB	10,389.67	4,319.80	6,858.61	14,709.47	62,865.94	27,460.65	9,100.85	0.75	0.42
5	EEA	-248.01	40.64	-177.59	-207.38	930.06	572.29	218.46	-0.81	-0.58
6	MSC	-3,405.05	662.19	-2,706.60	-2,742.86	23,563.09	10,635.15	10,641.81	-0.25	-0.21
7	UGL	567.74	26.00	474.49	593.74	8,026.58	2,172.39	4,687.24	0.10	0.10

Source: Researcher-calculated from respective annual audited financial statements

## APPENDIX 6 – CALCULATION OF ANNUAL ROE AND ROCE: 2013

		PBT	INT	PAT	EBIT	TOA	CUL	SHF	ROE	ROCE
		Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	%	%
		a	b	c	d=a+b	e	f	g	h=c/g	h=d/(e-f)
<b>Commercial &amp; Services Firms</b>										
1	EXP	-1.70	8.08	0.23	6.38	480.53	161.19	198.52	0.00	0.02
2	KQ	-10,826.00	486.00	-7,864.00	-10,340.00	122,696.00	50,841.00	31,209.00	-0.25	-0.14
3	NMG	3,587.10	-265.50	2,625.70	3,321.60	10,970.70	3,116.40	8,243.40	0.32	0.42
4	SCG	963.09	-37.66	831.33	925.44	12,744.58	4,259.75	8,126.45	0.10	0.11
5	SGL	300.68	119.13	189.49	419.81	3,606.14	1,300.15	1,582.99	0.12	0.18
6	TPS	755.72	128.11	451.00	883.83	16,136.10	2,618.11	10,556.08	0.04	0.07
7	UCM	393.59	16.06	264.70	409.65	4,227.84	1,684.49	2,343.36	0.11	0.16
<b>Manufacturing &amp; Allied Firms</b>										
1	BAT	5,469.96	262.28	3,723.69	5,732.23	16,985.92	6,781.10	7,571.61	0.49	0.56
2	BOC	308.39	-52.27	202.64	256.12	2,633.09	544.01	2,076.06	0.10	0.12
3	CAB	634.69	-86.04	475.54	548.65	2,204.40	88.42	1,924.43	0.25	0.26
4	EAB	11,114.92	4,018.72	6,522.20	15,133.64	57,720.46	26,606.85	7,598.60	0.86	0.49
5	EEA	60.11	29.01	45.09	89.12	941.80	444.02	395.92	0.11	0.18
6	MSC	-2,222.70	779.62	-1,660.41	-1,443.08	27,281.99	8,408.77	13,382.49	-0.12	-0.08
7	UGL	389.46	8.95	338.20	398.41	8,108.38	3,166.86	4,291.30	0.08	0.08

Source: Researcher-calculated from respective annual audited financial statements

## APPENDIX 7 – CALCULATION OF ANNUAL ROE AND ROCE: 2012

		PBT	INT	PAT	EBIT	TOA	CUL	SHF	ROE	ROCE
		Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	%	%
		a	b	c	d=a+b	e	f	g	h=c/g	h=d/(e-f)
<b>Commercial &amp; Services Firms</b>										
1	EXP	-13.24	32.45	13.03	19.21	495.61	161.49	198.29	0.07	0.06
2	KQ	2,146.00	1,097.00	1,660.00	3,243.00	77,432.00	23,756.00	23,023.00	0.07	0.06
3	NMG	3,504.60	-322.00	2,615.20	3,182.60	10,677.40	3,216.70	7,323.50	0.36	0.43
4	SCG	1,095.06	-166.13	752.01	928.93	8,646.96	3,389.27	4,899.63	0.15	0.18
5	SGL	265.36	157.93	183.31	423.29	3,501.55	1,118.70	1,838.90	0.10	0.18
6	TPS	462.67	210.32	234.74	672.98	13,357.69	2,173.75	7,927.24	0.03	0.06
7	UCM	371.91	25.08	242.54	396.99	4,941.89	2,203.77	2,657.81	0.09	0.14
<b>Manufacturing &amp; Allied Firms</b>										
1	BAT	4,754.30	304.35	3,270.85	5,058.65	15,176.50	6,052.68	7,097.92	0.46	0.55
2	BOC	286.69	-30.08	197.37	256.62	1,989.54	523.23	1,454.81	0.14	0.18
3	CAB	535.44	-65.49	389.29	469.96	2,012.82	150.17	1,652.77	0.24	0.25
4	EAB	15,253.05	2,422.92	11,186.11	17,675.97	54,171.27	22,483.78	8,302.84	1.35	0.56
5	EEA	68.91	50.32	70.08	119.24	1,150.73	695.76	349.49	0.20	0.26
6	MSC	1,764.03	193.47	2,012.68	1,957.49	27,400.11	5,720.66	15,602.59	0.13	0.09
7	UGL	512.57	10.59	348.20	523.16	6,399.83	1,967.95	3,967.89	0.09	0.12

Source: Researcher-calculated from respective annual audited financial statements

## APPENDIX 8 – CALCULATION OF ANNUAL ROE AND ROCE: 2011

		PBT	INT	PAT	EBIT	TOA	CUL	SHF	ROE	ROCE
		Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	Kshs.M	%	%
		a	b	c	d=a+b	e	f	g	h=c/g	h=d/(e-f)
<b>Commercial &amp; Services Firms</b>										
1	EXP	-222.35	73.40	-229.09	-148.95	766.80	409.48	170.56	-1.34	-0.42
2	KQ	5,002.00	1,207.00	3,538.00	6,209.00	78,712.00	22,209.00	23,143.00	0.15	0.11
3	NMG	2,810.00	-	2,007.00	2,810.00	8,816.00	2,531.00	6,122.00	0.33	0.45
4	SCG	1,280.10	-139.92	911.12	1,140.18	8,489.94	3,797.60	4,354.91	0.21	0.24
5	SGL	232.10	117.45	147.35	349.55	3,512.26	1,194.52	1,654.07	0.09	0.15
6	TPS	853.13	163.85	615.89	1,016.98	13,131.84	1,615.30	8,046.82	0.08	0.09
7	UCM	514.83	3,630.00	390.43	4,144.83	4,004.72	1,542.19	2,279.17	0.17	1.68
<b>Manufacturing &amp; Allied Firms</b>										
1	BAT	4,484.12	172.04	3,097.76	4,656.16	13,750.55	5,340.63	6,412.07	0.48	0.55
2	BOC	214.95	-19.86	150.60	195.08	1,816.80	458.79	1,328.55	0.11	0.14
3	CAB	374.21	-37.33	302.20	336.88	1,739.99	45.70	1,467.37	0.21	0.20
4	EAB	12,258.99	174.45	9,023.66	12,433.43	49,519.36	15,509.19	26,755.18	0.34	0.37
5	EEA	-173.21	42.01	-123.99	-131.20	1,016.91	658.43	279.41	-0.44	-0.37
6	MSC	2,646.58	168.49	1,933.23	2,815.06	23,176.52	2,961.69	14,476.01	0.13	0.14
7	UGL	631.07	12.27	441.04	643.34	5,708.90	1,618.80	3,744.95	0.12	0.16

Source: Researcher-calculated from respective annual audited financial statements