

**RELATIONSHIP OF MACROECONOMIC FACTORS AND CAPITAL  
STRUCTURE OF NON FINANCIAL FIRMS LISTED AT THE NAIROBI  
SECURITIES EXCHANGE**

**BY**

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**KCA UNIVERSITY**

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**JANUARY 2016**

**DECLARATION**

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

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I do hereby confirm that I have examined the master's dissertation of

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And have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

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# **RELATIONSHIP OF MACROECONOMIC FACTORS AND CAPITAL STRUCTURE OF NON FINANCIAL FIRMS LISTED AT THE NAIROBI SECURITIES EXCHANGE**

## **ABSTRACT**

An investor's analysis of a firm's prospect starts with an analysis of the economy. In most instances the performance of a firm depends largely on the performance of the economy. This research extends literature on the relationship of macroeconomic factors and capital structure of Non-Financial firms listed at the Nairobi Securities Exchange. In particular, the study analyses the effect of Inflation rate, Interest rate, GDP growth rate and the capital structure of listed firms. The study uses Secondary data collected from companies annual financial statements obtained from the NSE handbooks. Further information was collected from the Capital Markets Authority, the Central Bank of Kenya and the Kenya National Bureau of Statistics. The research was carried out on 33 Non-Financial Firms listed at the Nairobi Securities Exchange. The Random effects model shows that inflation rate and Interest rate have a positive relationship while the GDP growth rate has a negative relationship to capital structure. Size of a firm as a mitigating variable in the study has a positive relationship to capital structure. The data collected was analyzed using the panel multiple regression analysis. The Research is expected to add up to the existing literature on the influence of macroeconomic variables on capital structure.

**Key words:** Macroeconomic factors, Capital Structure, Non-Financial firms, Inflation rate, Interest rate, GDP growth rate, Firm size.

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## **DEDICATION**

To my beloved husband Dennis and daughters Denise and Dorine for their love, understanding and unwavering support.

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## **ACRONYMS AND ABBREVIATIONS**

CBK	Central Bank of Kenya
CMA	Capital Markets Authority
GDP	Gross Domestic Product
KBRR	Kenya Banks' Reference Rate
KFRS	Kenya Financial Stability Report
KNBS	Kenya Bureau of Statistics
NSE	Nairobi Securities Exchange
IRA	Insurance Regulatory Authority
RBA	Retirement Benefits Authority
REITS	Real Estate Investment Trust
SASRA	Sacco Societies Regulatory Authority
OECD	Organization for Economic Cooperation and Development

## DEFINITION OF TERMS

**Debt:** is the capital that a business raises by taking out a loan that is repayable at some future date (Periasamy, 2009).

**Default:** is the situation in which a firm violates the debt agreement with regard to repayment resulting to a legal action being taken (Berger and Di Patti, 2006)

**Equity financing:** is the mode of business financing that involves raising of money from the owners of the business (Pandey, 2009).

**Exogenous Shocks:** Unexpected or unpredictable event that affects an economy either positively or negatively (Varangis, Varma, dePlaa and Nehru, 2004).

**Failure:** is a situation where the realized rate of return on invested capital is considerably lower than the existing rates of similar investments (Berger and Di Patti, 2006).

**Financial distress:** is a situation when a company has insufficient cash flows to cover its obligations and incurs a decline in its market value (Whitaker, 1999).

**Financial leverage:** is the use of fixed charges source of funds such as debt, bond and debenture capital along with the owner's equity in the Capital Structure (Muritala, 2012).

**Financial risk:** This is the increased risk of equity holders due to financial gearing. It is due solely to the Capital Structure of a firm or the level of gearing (Gwatidzo and Ojah, 2014).

**Gearing:** is a measure of a company's financial leverage and shows the extent to which its operations are funded by lenders versus shareholders. It refers to the ratio between a company's stock price and price of its warrants (Lee,2008).

**Growth:** is a determinant of a firm's performance or the ability to generate profit (Muritala, 2012).

**Inflation rate:** is the rate of change in the general level of prices in the economy over a period of time (Hatzinikolaou, Katsimbus and Noulas, 2002).

**Interest rate:** is the token paid for abstinence and inconvenience experienced for having to part with an asset whose liquidity is high (Osoro and Ogeto, 2014).

**Macroeconomic:** is the field of economics that studies the behavior of the aggregate economy and examines changes in unemployment, national income, rate of growth, gross domestic product, and inflation and price level (Investopedia) .

**Macroeconomic Environment:** refers to the conditions that exist in the economy as a whole and included trend in the gross domestic product, inflation, employment, and spending, monetary and fiscal policy (Investopedia)

**Monetary Policy:** is a tool that is used to preserve the value of the currency and involves controlling liquidity circulation in the economy. The volume of liquidity in circulation influences the levels of interest rates that eventually affect prices and the debt interest cost (CBK, 2015)

# CHAPTER ONE

## INTRODUCTION

### **1.1 Background of the study**

The Macroeconomic environment influences the performance of firms in terms of their Capital Structure, profitability and growth. The influence of macroeconomic factors varies across countries and largely depends on a country's corporate debt structure. External determinants of Capital Structure play an important role in financial decision making process (Abor, 2008). Capital Structure has been defined by Dare and Sola (2010) as the way a corporation can finance its assets through a combination of equity and debt. Capital Structure is determined by factors such as the ability of the firm to generate cash flows, trading industry, stock market conditions, regulatory frame work, risk consideration and the flotation costs (Nyanamba, Nyangweso and Omari, 2013).

The Capital Structure of a firm can be related to the economy and the financial sector system available in its country of operation. Abor (2008) in his study enumerates that to understand how firms in developing countries finance their operations, it is important to examine the determinants of financing or their Capital Structure decisions. He notes that policy issues have an implication on interest rate and security price determination and their regulation. Muthama, Mbaluka and Kalunda (2013) find that one of the most perplexing issue currently facing financial managers is the relationship between Capital Structure and the macro economic variables. Decision makers therefore have to constantly be in control of the Capital Structure determinants to maintain an optimal level of debt and equity in the Capital Structure (Kariuki and Kamau, 2014). Baral (2004) in his study on Nepal firms identified that Capital Structure of a firm is determined by both internal and external factors. He described the external variables as a country's tax policy and inflation while the internal

factor determinants as size of a firm, firm growth rate, business risk, profitability, dividend payout and the debt service capacity. De jong, Kabir and Nguyen (2007) in the analysis of the direct impact of country specific factors observed that certain factors like GDP growth rate, bond market development and creditor right protection significantly explained the variation in Capital Structure across countries. A study by Booth, Aivazian, Demirguc-Kunt and Maksimovic (2001) focused on Capital Structure in developing countries in which they provided evidence on the influence of macroeconomic factors over Capital Structure.

The economic state of a country affects the performance of its organizations, thus when the economy is performing well the investors and shareholders anticipate that the company will perform well and lead to growth of their wealth (Osoro and Ogeto, 2014). Kenya operates within an international context and developments in global economies have an effect on the domestic macro financial conditions. The country's exposure to global changes through trade, net capital flows, labour movements and foreign exchange market makes the economy vulnerable to external dynamics (KNBS, 2012). Global influences affect domestic economies such as experienced in year, 2006 the economy experienced inflation at 14% due to an exogenous shock. There was a slow expansion of global output in Europe that led to the European economies going into a mild recession. In 2007 the economy had a recovery and the economy grew to 7% from 6.3% in the year 2006 reflecting an 11% increase in GDP growth. The Kenya shilling was stable and the appreciation of the shilling against major world currency eased the inflationary pressure decreasing the inflation rate from 14% to 9.8% (KNBS, 2007).

Abaidoo and Kwenin (2013) argue that expected inflation positively influence corporate performance and profitability. A change in the inflation rate is expected to have a significant effect in the purchasing power of money and the cost of production. Inflation therefore increases the profit margin due to the inflation differential on input and final output.

Inflation also affects aggregate demand and the cost of production and reduces the cost of borrowing decreasing the value of debt. It is against this empirical knowledge that this research is carried out to determine the relationship of inflation and capital structure of a firm.

The average commercial banks' lending interest rate had an increasing trend from year 2005 at 12.89%, 13.64% in 2006, 13.33% in 2007, and 14.02% in year 2008, 14.8% in 2009, 14.36% in 2010, 15.05% in 2011 and 19.65% in 2012. The high interest rate was attributed to a rise in demand for credit from the private sector and to certain extent inflation. There was a decline in year 2013 to 17.31% to a low of 16.51% in 2014 attributed to a response to a monetary policy signal by the Central Bank of Kenya. Despite the market having an improved credit demand by the private sector the lending rates had remained high indicating inefficiency in the credit markets. This led to the introduction of the Kenya Banks' Reference Rate (KBRR) to address the rigidity of the credit markets so that the private sector can borrow at affordable rates (Central Bank Statistics, 2005-2014).

There was an economic growth in the year 2005 to 2007 and GDP rose from 5.8% in year 2005 to 7% in the year 2007. The economic growth was attributed to a stable political environment that provided a stable macroeconomic environment. During the period a number of companies floated their company share and the firms reported an over subscription on their initial public offers. Firms that traded their initial offer of stocks at the time were e.g. Safaricom and Eveready company shares. The stability of an economy is key to its economic growth and most important its political stability. Political instability of an economy has a negative influence in its economic growth as experienced in 2008, the unexpected outcome of the election in the year 2007-2008 resulted to violence and led to an economic growth decline to a low of 1.7% from a GDP growth rate of 7.1% in the year 2007 (KNBS, 2008). The post-election violence affected the Kenyan economy; there was a decline in economic growth, a depreciation of the domestic currency and an increase in the value of Capital Structure.

The size of a firm determines its ability to caution itself from the external influences in its operations. Large firms are expected to have less risk as they are diversified in nature comparable to small firms that are likely to be affected by external influences. Large listed companies are not likely to be affected by the macroeconomic variables. Gianetti (2003) demystifies this and argues that the failure to find an impact by the macroeconomic factors could be related to the large size of the listed firms. In her study she analyzed a sample of unlisted firms in eight countries and found that there was a significant influence of macroeconomic factors on leverage. Akintoye (2009) argues that firm's will have smaller costs of financial distress if they retain large investments in tangible assets than those that rely on intangible assets.

In Kenya the government tackles the economic slumps and growth by enforcing monetary policies that respond to the increase/decline in inflation. Different countries have different institution arrangements and hence it's imperative to understand the existing market, its regulations and the role that the banks and the security markets play (Abor, 2008). The financial sector in Kenya is composed of the Central Bank of Kenya (CBK), 44 Commercial Banks, 16 Non-Banking Financial Institutions and the Nairobi Securities Exchange. The market is regulated by the Fiscal and Monetary policies that are instituted by both the Government and the Central Bank of Kenya to enhance economic stability and address the fluctuations in the economy. The Kenyan market is less developed comparable to the developed economies whose capital market systems are elaborate and efficient (Ongore, 2011). The capital market is yet to make any significant contribution to development (Mwangi, Anyango and Amenya, 2012). Most investors have hence resulted to Commercial banks as the main source of leverage.

The Central Bank of Kenya (CBK) established in 1966 through an Act of Parliament, has its responsibilities stated in Article 231 of the Kenyan Constitution; to formulate and

implement Monetary Policy, to foster liquidity, solvency and the proper functioning of a stable financial system. The responsibility to formulate the Monetary Policy lies with the Monetary Policy Committee which sits once every two months or at the request of at least four members. Monetary policy in Kenya mainly targets two variables i.e. inflation and output. The main goal of monetary policy is to keep the level of aggregate expenditure in an economy broadly consistent with production capacity in order to guard the economy from prolonged recession or rampant inflation. The Central Bank of Kenya uses interest rates and reserve money as the instruments of monetary policy (Nyamongo and Ndirangu, 2013). Price stability is crucial for a proper functioning market based economy and encourages long-term investments. In order to attract investment and saving the CBK policies safeguard the public from unfair lending rates or low saving deposit rates from the Commercial Banks, notable among this is the introduction of the Kenya Bank's Reference Rate (KBRR) and a reduction or increase in the retention rate. The CBK introduced the KBRR rate as a uniform base lending rate across the banking sector which involves publication of information on interest rates for the banking sector. The KBRR is expected to increase transparency, competition and enhance credit access to enable consumers compare the pricing of loan products. A reduction or increase in the retention rate leads to an increase or decline in credit uptake from the commercial banks. Commercial Banks play a vital role in the economic resource allocation of the country (Ongore and Kusa, 2013). The banking sector in Kenya has grown to incorporate the Non-Financial Banking institutions and has had several transformations all geared towards improvement of service delivery. The banking sector offers many banking products such as overnight lending, overdraft, loan financing and deposits. Recently the banking industry has grown with an introduction of Islamic banking further widening the financial industry.

The Capital Markets Authority of Kenya is charged with the responsibility of promoting and facilitating the development of an orderly and efficient capital market in Kenya. The CMA provides a model of the financial product as finance acquired using either the primary or secondary market. The primary market has both the Equity and Debt market. Equity is offered in form of ordinary shares while the debt market trades in treasury bonds, corporate bonds, preference shares, municipal bonds, and asset backed securities, and mortgage backed securities. The secondary market has the derivative market, exchange traded funds and Real Estate Investments Trust (REITS). The derivatives market trades in futures and options, swaps and commodity futures. The main source of financing in Kenya is debt and equity where over the last 15 years the capital market has raised over kshs.1.3 trillion through bond and equity issuance. The amounts were raised through Initial Public Offer (IPO's), Rights issue and Public offers. (CMA, 2014). Foreign investment is another form of raising capital; Kenya through Vision 2030 is geared to become an international financial center and provides an opportunity for foreign investors to invest up to 75% of the investment in local firms.

The Nairobi Securities Exchange (NSE) was established in 1954 as a voluntary association of Stockbrokers and was registered under the Societies Act in 1991 as the Nairobi Stock Exchange; it is incorporated under the Companies Act Cap 486 with the mandate to provide a trading platform for listed securities and overseeing the firms. Currently there are 53 firms listed. NSE facilitates mobilization of capital and provides savers with an alternative saving tool. It provides firms with financing, issuance of corporate bonds and allows firms to cross list in other Exchanges such as the Uganda Stock Exchange where firms such as Uchumi, Kenya Airways, Centum, KCB and Equity bank are listed. Non-financial firms or corporations are corporations whose principal activity is the production of market goods or financial services (Organization of Economic Cooperation Development, 2001). Capital

Structure of financial firms and non-financial firms are different because of the nature of operations and financial conditions. Non-financial firms are mainly associated with production, therefore their main requirements for capital is to acquire production facilities.

### ***1.1.1 An Overview of Economic Growth in Kenya***

In most African countries political instability, high levels of external debt, weak governance and economic policies facilitate a decline in confidence and subsequently to poor market performance. Kenya's political instability, trade imbalance high levels of external debt was found to affect its economic growth and its economic performance lagged comparable to other sub-Saharan economies (KNBS, 2007). Kenya imports more than it exports creating a trade deficit balance. The trade deficit problem has been attributed to exogenous shocks, drought, and oil price fluctuations. The trade deficit has continued to grow from a deficit of 426,993m in 2002 to a deficit of 539.1m in 2014 in the current account. There has been enormous growth in imports where most of the imports are imports on food and manufactured goods. Inflation trends in Kenya have been largely influenced by the increase on the prices on imports of fuel and food (KNBS, 2012). The economy has witnessed a significant change in inflation over time. In 2006 the economy experienced inflation at 14% there was a slow expansion of global output in Europe that led to the European economies going into a mild recession. In 2007 the economy had a recovery and the economy grew to 7% from 6.3% in the year 2006 reflecting an 11% increase in GDP growth. The Kenya shilling was stable and the appreciation of the shilling against major world currency eased the inflationary pressure decreasing the inflation rate from 14% to 9.8% (KNBS, 2007). In 2010 there was a challenge as the economy experienced instability in foreign exchange largely due to the rise in oil prices in oil producing nations of Northern Asia and the Middle East. The government set up initiatives to counter the shocks. One of the initiatives was to attract foreign direct investment in the country (World Bank, 2013).

Kenya's blueprint for development and future planning is Vision 2030 which serves as a guide to the country's goal of becoming a middle income nation by 2030. The vision anchored on 3 pillars namely Economic, Social and Political governance aims at transforming Kenya into a newly industrialized economy. The Economic pillar aims at achieving an annual GDP growth of 10% every year and sustaining it till year 2030. Kenya as an open economy with a fully liberalized financial market allows free movement of capital into and outside the economy. The country enjoys capital flows in terms of foreign direct investments (FDI), capital transfers and investments from Diaspora remittances (CMA, 2011).

### ***1.1.2 Capital Structure of Non- Financial Firms in Kenya***

Capital Structure of a firm is determined by several factors such as volatility, the stock market and macroeconomic conditions. Pandey (2009) considered an optimal Capital Structure as one of the areas where decision makers influence the company value and risk. In Kenya listed firms are professionally managed, bigger in size with a high turnover compared to unlisted firms and hence have better options to raise capital for operations. Listed firms are publicly owned and thus have higher scrutiny comparable to unlisted firms. Studies show that performance of firms can also be influenced by ownership identity and in the Kenyan context most firms have a high ownership concentration (Ongore, 2011). Leverage in large firms is expected to be high based on two assumptions; one, firms that are profitable are expected to have high leverage because bankruptcy costs decline when a firm is profitable. Two, the interest shield granted on debt interest payment is expected to induce firm's to finance with debt. So why do we have few firms taking up leverage? Two factors can be invoked as the reason for the low debt; bankruptcy costs due to inability to repay the debt and debt related agency costs. There have been significant instances of insolvency among non-financial firms listed in NSE. In the period 2003-2009 firms such as Uchumi Supermarkets, A. Bauman, Hutchings Biemer, East African Packaging, Theta Group, Lornho EA ltd, Regent

undervalued assets, were under receivership, delisted from the NSE or undertaking financial restructuring. (CMA, 2002-2012).

## **1.2 Statement of the Problem**

Finance theories have provided mixed predictions on what is a firm's optimal Capital Structure. Joeever (2006) posits that the higher the interest rates the lower the leverage since managers are more likely to avoid using debt when interest rates are high. Gulati and Zantout (1997) and Arriff, Taufiq, and Shamsheer (2008) in their studies advocate for firms to adjust their debt ratio towards a target ratio that a firm can sustain without suffering loss which is consistent with the dynamic trade off theory. Empirical studies aimed at assessing how macroeconomic indicators affect Capital Structure of a firm have provided mixed results. Mule, Mukras and Oginda (2013) in their study concluded that leverage and debt maturities of firms increase with the rise in GDP per capita and growth of the economy. An Increase in inflation rate causes leverage and short term debt to decrease while long term debt increases. Booth et al (2001) recognizes that a country's book debt ratio increases during recessions and falls during expansionary period. An Increase in inflation rate causes total leverage and short term debt to decrease while long term debt increases.

Previous studies on the determinants of capital structure decisions consider the influence of internal factors and do not consider other factors likely to influence the capital structure decision. The theoretical and empirical literature indicates macroeconomic variables significantly play a role in the Capital Structure decision. The literature however indicates that there is conflict on when to take leverage or use internal financing in an expansionary period. Following the literature both theory and empirical evidence does not outline clearly how macroeconomic variables affect a firm's capital structure. This study intends to establish whether inflation rate, interest rate and GDP growth have an influence in the capital structure

of firms listed at the NSE and investigates further on the relationship between the macroeconomic variables and a company's capital structure.

### **1.3 Objective of the Study**

#### ***1.3.1 General objective***

The purpose of the study is to investigate the effect of the macroeconomic factors on the Capital Structure of non-financial firms listed at the Nairobi Securities Exchange.

#### ***1.3.2 Specific objectives***

- i) To establish the relationship between inflation and Capital Structure of non-financial firms listed in the NSE.
- ii) To establish the relationship between interest rate and Capital Structure of non-financial firms listed in the NSE.
- iii) To establish the relationship between GDP growth rate and Capital Structure of non-financial firms listed in the NSE.
- iv) To establish the mediating effect of firm size on capital structure of non-financial firms listed in the NSE.

### **1.4 Research Questions**

- i) What is the relationship between inflation and Capital Structure?
- ii) What is the relationship between the interest rate and Capital Structure?
- iii) What is the relationship between GDP growth rate and Capital Structure?
- iv) What is the relationship between firm size and Capital Structure?

### **1.5 Justification of the study**

External factors are sector wide or countrywide factors which are beyond the control of the company (Ongore and Kusa, 2013). The macroeconomic variables therefore are expected to affect a firm's Capital Structure, its profitability and growth. The effect of the

macroeconomic variables therefore is of concern to an investor and the economy. The relationship of inflation, the banks' lending rate, GDP growth rate, firm size and Capital Structure is relevant in this study.

### **1.6 Limitation of the Study**

Firms listed at the Nairobi Security Exchange are regulated and monitored by the Capital Markets Authority and the Nairobi Securities Exchange and hence the regulators play a role and provide guidance on Capital Structure formation. Listed companies have to adhere to the rules and guidelines set up by the regulators. This is considered a limitation to the study in that the companies listed in the market have an oversight body that to a large extent determines their Capital Structure.

Financial reports at times have insufficient disclosure, and inaccurate information, this is likely to be a challenge on the accuracy of data collected (CMA, 2014). A limitation to the study was the unit of study which limited its scope to listed firms thereby limiting the number firms used to carry out the research. The period of study could be considered not exhaustive in that the period was found not to register very volatile economic situations affecting the macroeconomic factors such as interest rate and inflation. The interest rate and inflation rate did not register marginal rate variances and were found to have minimal rate variances almost a seamless constant percentage rate in the period of study.

### **1.7 Significance of the Study**

The study is relevant to the government and provides information on how macroeconomic variables influence the firms' and industries. Prospecting Investors intending to invest will find the study useful in identifying the industry with least risk attributable to events they cannot control. The Research study will be important to other researchers who using the

information will interrogate further the factors identified in the study as limiting factors to fostering economic investment and growth.

### **1.8 Scope of the Study**

The study analyzed panel data set over the period between 2005 and 2014. In the period the economy experienced both an economic decline and growth. The economic decline was as a result of the post-election violence in 2007-2008. The economy however stabilized and has had a GDP growth from the year 2009-2014.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The determination of a company's Capital Structure constitutes a difficult decision, one that involves several factors such as risk and profitability. In an economic environment that presents a high degree of instability the decision on Capital Structure becomes more difficult (Gichangi, 2011). Capital Structure refers to the mix of debt and equity used by a firm in financing its assets. A company's goal in formulating Capital Structure is mainly based on ensuring that there is lower cost of capital, owner's wealth is maximized and the company achieves an optimal Capital Structure. Capital Structure study has been found to be important and previous studies have provided evidence that Capital Structure affects the firm value and firm performance.

Gulati and Zantout (1997) in their study provide that small firms need to design strategic performance strategies to cope with the market. They provide an option that firms should minimize and hedge against effects such as the differential rate of inflation between product prices and factor inputs which are likely to affect the firms' profit margin and real growth. Another risk is that of interest rate fluctuations that affect growth of a firm prospect. Economic growth indicators are not easy to control e.g.in the year 2011 the Kenyan economy experienced a very unpredictable movement of the economic growth indicators. Lending interest rates were high, inflation was high and foreign currency rates were very volatile (CMA, 2011).

#### **2.2 Theoretical Review**

There are two schools of thoughts that revolve around Capital Structure. One school argues that a judicious mixture of debt and equity capital can maximize the value of the firm

considering Capital Structure as relevant. The other school of thought is that led by Modigliani and Miller that contends that the financing decision does not affect the value of the firm (Baral, 2004). Literature relating to capital structure and the value of a firm takes departure from the school of thought by Modigliani and Miller (1958) in their irrelevance hypothesis. Studies on Capital Structure offer different results indicating that a firm's capital structure choice positively affects the firm's value.

### ***2.2.1 Pecking Order Theory***

According to Fama and French (2002) Pecking order theory goes against the idea of companies having a unique combination of debt and equity finance which minimizes their cost of capital. The theory suggests that when a company is looking at financing its long term investments it has a defined order of preference in respect of the sources of finance available to it i.e. retained earnings, debt and finally equity. Myers (1977) however argues that due to agency problems, firms investing in assets that may generate high growth opportunities in the future face difficulties in borrowing against such assets. For this reason, we may now instead expect a negative relationship between growth and leverage. The pecking order theory is usually interpreted as predicting an inverse relation between leverage and size. The argument is that large firms have been around longer, are better known. Profitable firms are therefore likely to borrow less, because they have more internal financing available while less profitable firms require external financing and consequently accumulate debt. According to the pecking order theory ceteris paribus leverage is a greater preference as a mode of external financing and the most preferred source of finance. Pecking Order theory predicts that information asymmetry between the managers and investors create a preference ranking over financing sources. The pecking order theory holds that leverage should decline during expansion as firms prefer to use internal financing comparable to debt.

### ***2.2.2 Trade-off Theory***

According to the trade-off theory more profitable firms are exposed to lower risks of bankruptcy and have greater incentive to employ debt to exploit interest tax shields. According to Myers (1984) a firm that follows the trade-off theory sets a target debt ratio and then gradually moves towards the target. Frank and Goyal (2005) state that to achieve the target debt ratios will be done in phases, first phase static trade off theory firms have an optimal Capital Structure which they determine by trading off the benefits against the cost of the use of debt. In the second phase is the dynamic trade off theory where a firm exhibits adjustment behavior to the target debt ratio and gradually tries to reach the target (Gulati and Zantout, 1997). According to Mahmud (2003) a leveraged firm conforms to a certain mix of debt and equity. Trade off theory explains this in that a levered firm has both a positive and a negative opposing position. One is that the firm derives tax savings due to the interest tax shield while the negative option is that high leverage is associated with a situation where the risk of default is high. The Theory advocates that firms with large proportion of tangible assets tend to borrow more than small firms. According to the trade-off model as interest rate increases the tax advantage of debt rises and firms choose to take advantage of debt. In the dynamic trade off theory firms adjust their debt ratio towards the target ratio.

### ***2.2.3 Market Timing Strategy Theory***

According to Baker and Wurgler (2002) Market timing theory is based on the argument that the firms time when to issue equity stocks to the public. The argument relates to previous studies by Booth et.al (2001) and Muthama et.al (2013) who concluded that macro-economic factors influence Capital Structure in different ways. An increase in the GDP growth rate leads to firms using long term debt. Inflation has no influence in the long term debt while interest rates have a positive influence on the long term debt ratio. The Market Timing Theory reveals that due to changes in macroeconomic factors the cost of capital and debt

varies as well. The market timing theory argues that firms time their equity issues in the sense that they issue new stocks when the stocks are undervalued in the market and repurchase the stocks when the stocks are overvalued. This theory was introduced by Baker & Wurgler (2002). The theory suggests that managers should be able to identify the time periods during which equity issuance would be most appropriate. The alternative would be debt where the tax shield should be equitable to the interest costs attributable to the debt to ensure that leverage would be most appropriate compared to issuing equity. According to Market Timing Theory firms are more likely to issue equity when their market values are high relative to book and past market values and to repurchase equity when their market values or share prices are low i.e. firms prefer external equity when the cost of equity is low and prefer debt when the cost of equity is high. The theory suggests that the manager's ability to time the equity market affects the company's security issuance decision and ultimately the Capital Structure of the company. Managers should identify and determine times when leverage issuance is less costly than other financing options as proposed by the equity market timing theory.

#### ***2.2.4 Efficient Market Hypothesis***

Fama and French (2002) proposed the concept that financial markets are "informationally efficient" i.e. the market reflects all relevant information about an economic environment. The implication of the hypothesis is that when new information about the market is received this information is received in the market. Gregoriou (2009) however argued that perfect efficiency is an unrealistic benchmark that is unlikely to hold in practice and offered the notion that relative efficiency would be more appropriate. This would mean that the market efficiency of one market would best be measured against another e.g. an auction market versus a dealers market. Most investors make their investment decisions based on the fundamental analysis of the environment where they consider factors such as monetary and

fiscal policies, the political environment and industry trends (Apostolou, 2000). However when there is asymmetric information about risk, adverse selection arguments for debt apply. Firms prefer to issue external equity depending on whether asymmetric information problems concern value or risk (Frank and Goyal, 2007).

### **2.3 Empirical Literature**

Abor (2008) in trying to understand how firms in developing countries finance their operations noted that company financing decisions involve a wide range of policy issues. The policies have implications for capital market development, interest rate, security price determination and regulation. Gulati and Zantout (1997) discuss the disadvantage that small firms have in financing their investments by issuing common shares. According to Harris and Raviv (1991) “leverage increases with fixed assets, non-debt tax shields, investment opportunities, firm size, and decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product”. A survey of the real effect of financial constraints during financial crises reveals that constrained firms would use internal funding and put more effort in obtaining credit from the banks anticipating restricted access to credit in the future (Campello, Graham, and Harvey, 2010).

Countries with high inflation are associated with high uncertainty. Demircug-Kunt and Maksimovic, (1996) find that when interest rates increases, firms are less willing to finance new investments due to increase in the cost of borrowings. Gulati and Zantout (1997) in their study found that the inflation rate and interest rates were important factors that significantly influenced the Capital Structure of firms. A study by Booth, Aivazian, Demircug-Kunt and Maksimovic (2001) focused on Capital Structure in developing countries in which they provided evidence on the influence of macroeconomic factors over Capital Structure and concluded that real economic growth tends to increase total debt ratio and long term book debt and high inflation leads to a decrease in the total debt ratio and long term book debt

ratio. Muthama et.al (2013) in an empirical analysis of macroeconomic influences on capital structure of listed firms in Kenya in the period 2004-2008 using econometric analysis of multiple regression found that GDP growth rate had a positive influence on long term debt ratio and a negative influence on total debt ratio and short term debt. Inflation was found to have a negative influence on the short term debts while interest rates as measured by the treasury bills have a positive influence on the long term debt ratio and total debt ratio and a negative influence on the short term debt ratio. Abzari.et.al (2012) in their study noted that the GDP growth rate was expected to be positively related to leverage and high interest rate would lead firms to increase their debt ratio because of its tax benefit or decrease to reduce the bankruptcy risk. Doku, Adjasi and Sarpong-Kumankuma (2011) in a study on twenty one listed firms on the Ghana stock exchange over the period 1995-2015 using panel data found that firms in developing countries especially in Africa have limited sources of financing and the most available financing is mainly from commercial banks. When interest rates increases, firms are less willing to finance new investments due to increase in the cost of borrowings. Interest rate is therefore expected to be inversely related with leverage and debt maturities for all types of firms (Bartholdy and Mateus, 2008).

Gwatidzo and Kalu (2014) in their study of firm's debt choice decision in eleven African countries find that effective legal and political infrastructure fosters firm's preference for bank debt while macro instability discourages preference for non-bank debt. Most executives in selecting the target debt ratio pay attention to the debt levels present in their industry. Dejong, et.al (2007) finds a significant impact of country specific factors such as the degree of development in the banking sector, equity and bond markets. Inflation prevailing in the economy has a considerable impact on the performance of companies and high inflation affects business. Inflation rate as measured in the study using the consumer price index can be said to track the price of goods and services over time, a high inflation rate raises the cost

of living and results to a shift of resources from investment to consumption (Kirui, Wawire and Onono, 2014). A low interest rate stimulates investment growth by making credit available easily and cheaply as it implies a lower cost of finance for companies and therefore assures them of higher profitability.

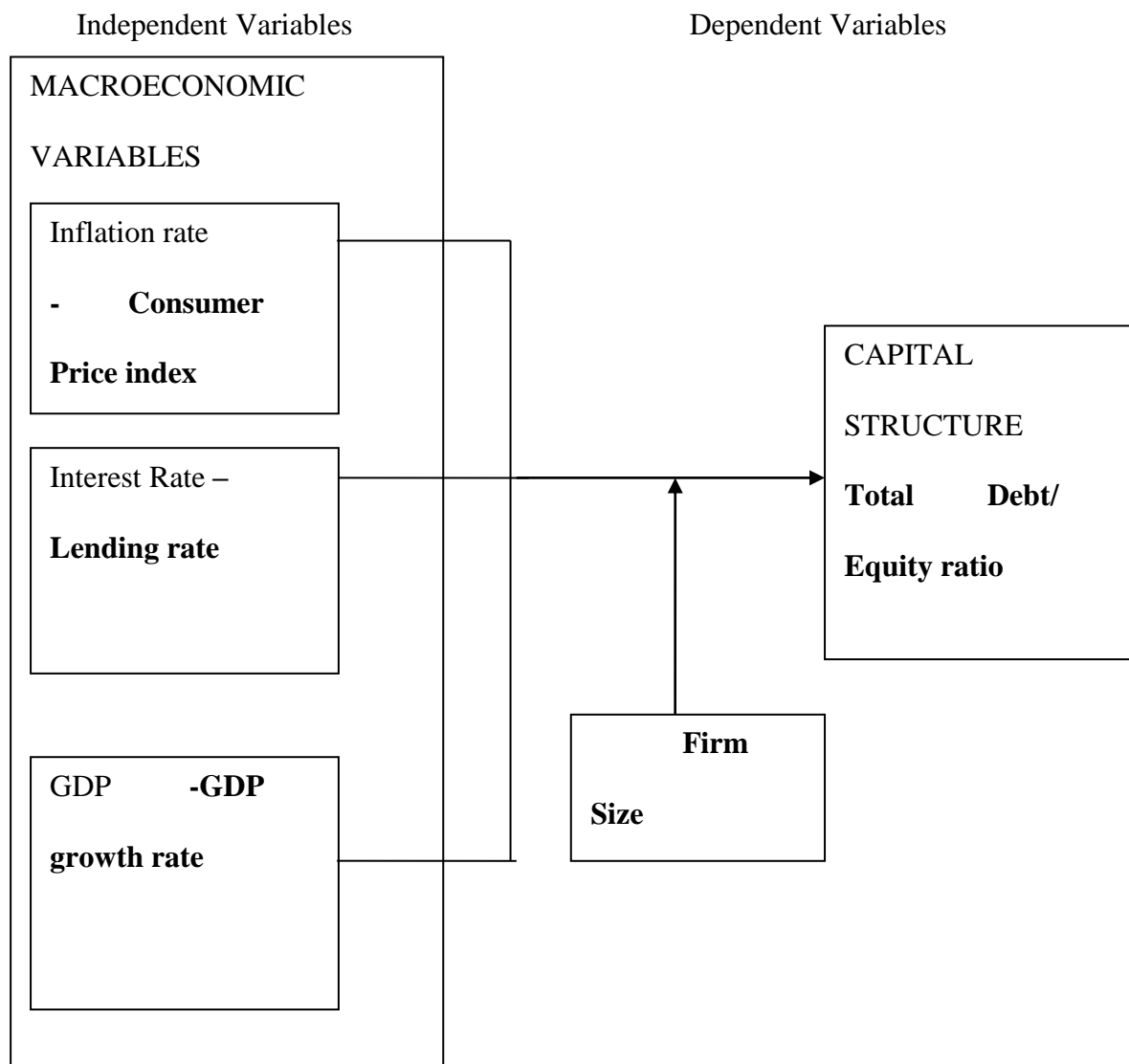
Previous studies carried out on Capital Structure have established that firms use various strategies to come up with a firms' Capital Structure. Debt according to the pecking order theory is most preferred due to its tax advantages. Halov and Heider (2005), concur with the pecking order theory in that when there is adverse selection about a firm's value, firms prefer to issue debt over outside equity. However, when there is asymmetric information about risk, adverse selection arguments for debt apply and firms prefer to issue external equity over debt. Booth et.al (2001) in a study on capital structure in developing countries finds that the more profitable the firm the lower the debt ratio. The finding is consistent with the pecking order theory and supports the existence of significant information asymmetries.

Olweny and Shipho (2011) in their study assume that macroeconomic factors would affect all the listed companies in the same way. The assumption however is refuted in the study by Osoro and Ogeto (2014) in that the effects of macroeconomic factors differ from one industry to another and hence the findings obtained from a research in one industry cannot be applied to all sectors. Bhamra, Kuehn and Strebulaev (2011) find that firms are more conservative in their financial policy knowing that there is a possibility of rare economic crises A survey of the real effect of financial constraints during financial crises reveals that constrained firms would use internal funding and put more effort in obtaining credit from the banks anticipating restricted access to credit in the future (Campello, Graham, and Harvey, 2010). Gulati and Zantout (1997) concluded that in order to immunize the firms' growth potential investments against the effects of inflation and interest rate fluctuations

management would have to make frequent adjustments to their Capital Structure. High inflation rate favors investing on long term debt while increased interest rate makes firms to prefer short term borrowing.

## 2.4 Conceptual Framework

**FIGURE 1**  
**Relationship between Macroeconomic Factors and Capital Structure**



*Source: Author, 2015*

The capital structure is described by the total debt equity ratio. Periasamy (2009) describes the ideal debt equity as 1:1. The ratio is thus seen as a signal to a firm's performance and most firms prefer to take minimal risk and are cautious of the amount of debt they are willing to contract in.

Inflation rate as determined by consumer price index means a change in the inflation rate has a significant effect in the purchasing power of money and the cost of production. Inflation affects aggregate demand and the cost of production and reduces the cost of borrowing decreasing the value of debt. Interest rates during the period of economic expansion tend to increase. A volatile interest rates environment therefore affects portfolio valuations and is a risk to equity. GDP growth is as a result of the contribution of the various investment sectors in the economy. A growing economy means improved business. GDP growth therefore is related to a firm's growth.

Large firms have less risk and are more diversified therefore their accessibility to debt is easier comparable to small firms. Small firms however have limited assets and thus are not likely to access debt easily as large firms.

## **2.5 Conclusion**

In studying the effect of macroeconomic variables we cannot negate the need to adjust the capital structure to match the economic conditions prevailing at a given time. Mwangi, Anyango and Ameyia (2012) in their study on Capital Structure adjustment speed of adjustment and optimal target leverage among firms quoted on the Nairobi Stock Exchange find that there is evidence of an adjustment process in firm's use of debt supporting the target behavior by managers. They note that Kenyan firms have a low debt ratio and many firms do not depart so much from their target. Arriff et.al (2008) finds that the speed of Capital Structure adjustment is significantly slower for financially distressed firm.

## **CHAPTER 3**

### **METHODOLOGY**

#### **3.1 Introduction**

The chapter details the methodology employed in the study. Leedy (1993) explains research methodology as an operational framework within which facts are placed so that meaning can be seen more clearly. The chapter provides information on the methods and procedures that were adopted to meet the objectives set for the research. Among the areas discussed in the research methodology are research design, population, data collection procedure and analysis.

#### **3.2 Research design**

The research is a correlation study and seeks to identify the relationship between the variables and observe whether a change in one of the variables leads to a change in the other variables. Descriptive research design has been used to test the relationship between Capital Structure of firms listed at the NSE and inflation, interest rate, GDP growth rate and the size of the firm. The study involved gathering the financial statements of the firms for a period of 10 yrs. from 2005 to 2014. The period of study provided recent statistics and was found to include economic happenings that were likely to significantly influence the firm's choice of capital structure. The year 2008-2009 experienced an economic slump due to the post-election violence which led to a decline in economic growth, the promulgation of the constitution in 2010 in effect introduced new policy and laws that would impact on economic development, and the period 2005-2012 was the maiden phase of Vision 2030 which anticipated that the economy would have an annual economic growth of 10%.

#### **3.3 Population of the Study**

The target population of the study comprised the 43 non-financial firms listed at the NSE (Appendix I). Companies in the financial sector are highly regulated by the Central Bank and hence the macroeconomic influences are unlikely to affect them hence they were excluded in

the study. Firms listed at The Nairobi Securities Exchange were found ideal to carry out the study as the data was available, reliable and accessible. The criterion of choice was that the firm had been actively trading in the period of study 2005-2014.

### 3.4 Data Collection Instruments

The study relied on secondary data. The macroeconomic data for the period 2005-2014 was extracted from the Economic Survey and Statistical Abstracts by the Kenya National Bureau of Statistics and the Central Bank of Kenya.

### 3.5 Data Collection Procedure

Descriptive research methodology was used to examine the effects of the macroeconomic variables against the capital structure of a firm. The method involved measuring the relationship between the variables. Secondary data to collect information for the study was sourced from the Kenya National Bureau of Statistics, the CMA and NSE and the CBK on line data.

### 3.6 Model Specification

To test the empirical relation between capital structure and the macroeconomic variables the study used a panel regression model.

$$Y_{it} = \alpha_{it} + \beta_1 \chi_{it} + \beta_2 r_{it} + \beta_3 g_{it} + \beta_4 s_{it} + \varepsilon_{it} \dots\dots\dots (i)$$

Where

$Y_{it}$  = Debt Equity ratio over 10 year period

$\chi_{it}$  = Annual inflation rate over 10 year period

$r_{it}$  = Interest rate of bank  $i$  at period  $t$

$g_{it}$  = Annual GDP growth rate over the 10 year period

$s_{it}$  = Size of firm  $i$  at period  $t$

$\alpha'$  = Constant term of the model

$\beta$  = Coefficients of the model

$\varepsilon_{it}$  = Error term

### **3.6.1 Measurement of Variables**

**Capital structure:** The debt to equity ratio measures the relative proportion of the shareholders' equity and debt used to finance the firm's assets.

**Inflation Rate:** Inflation is the rate at which the general level of price is rising. High inflation is associated with a very volatile economy and is not a favorable condition for business as it's likely to disrupt the company's profitability, capital expenditure and earnings. Hatzinikolaou, Katsimbus and Noulas (2002) in their study found that inflation increases business risk as it refers to a more volatile operating income that causes uncertainty in the tax shield. When there is inflation most firms are also likely to use internal funds to run the operations thereby avoiding leverage. The study used inflation rate as measured by the annual change in consumer price index and hypothesizes that:

*Ho<sub>1</sub>: Inflation rate has no significant effect on capital structure of a firm.*

**Interest Rate:** Interest rate may be defined as the cost of borrowing and determines the cost and availability of credit in an economy. A low interest rate implies lower cost of finance for companies leading to profitability. High interest rate is expected to lead to lower profitability. The study used the banks' lending rate and hypothesized that:

*Ho<sub>2</sub>: Interest rate has no significant effect on the capital structure of a firm.*

**GDP Growth Rate:** The rate of growth of the national economy is an important variable and acts as a pointer to the economic situation of an economy. An economy has different economic cycles that have an influence on the performance of the company or industry. The research sought to identify whether the GDP growth has any significant relationship with the capital structure decision. The study hypothesized that:

*Ho3: Annual GDP growth rate has no significant effect on the capital structure of a firm.*

**Size:** Firm size has been found to have a strong relationship to capital structure. Large firms have high proportions of assets and hence have asset security to use as collateral when taking up debt. Large firms therefore are expected to have a positive relationship with leverage. The study used log of total assets to determine the size of the firm and hypothesized that:

*Ho4: Firm size has no significant effect on the capital structure of a firm.*

**TABLE 1**  
**Summary of the study variables and the measure**

Variable	Model Proxy	Measure
Leverage	y	Debt/ Equity
Inflation Rate	x	Annual Change in the Consumer Price index
Interest Rate	r	-Lending rate
GDP Growth Rate	g	Annual growth rate
Size of the Firm	s	Log of Assets.

*Source: Muthama et.al (2013), Osero and Ogeto (2014)*

### **Validity and Reliability Tests**

Several tests were conducted in order to give the estimated model the proper functional and mathematical form. Preliminary tests carried out were the normality tests, and the Hausman specification test.

### **3.7 Data Analysis**

Descriptive statistics was used to compare the variables numerically and to ascertain a pattern in the data set. The tests included tests on frequency, mean, median and standard deviation. Panel multiple regression analysis was performed to determine the effect of macroeconomic variables on the Capital Structure of firms listed at the Nairobi Securities Exchange.

## **CHAPTER FOUR**

### **DATA ANALYSIS AND DISCUSSION OF THE FINDINGS**

#### **4.1 Introduction**

This chapter covers data analysis, findings and discussions of the research. The results of the study are based on the objectives and research questions presented. The purpose of the study was to determine the relationship of the macroeconomic variables and capital structure of firms listed at the NSE Kenya. Secondary data was collected from annual financial statements obtained from the NSE handbooks, Capital Markets Authority, the CBK and the Kenya National Bureau of Statistics (KNBS). Out of the 43 Non-Financial firms listed at the NSE, 33 firms were included in the study. A number of factors were considered in the selection, one that the firm was active and had not been suspended from active trading in the period of study and that the firm had prepared and submitted its financial report for publication. The firms' included in the study had their published reports publicized and submitted to the NSE in the period of study. The response ratio was 76.74%, and thus considered satisfactory for analysis Appendix II.

#### **4.2 Descriptive Statistics**

The study examined the debt equity ratio of firms listed at the NSE. The data collected was done annually to coincide with the end of the financial year to which it was expected that the management, auditors have examined the financial reports and have submitted them as the final financial report to the NSE. The analysis was done on the basis of the 6 industrial sectors of firms listed at the NSE i.e. the Agricultural sector, Automobile and Accessories, Commercial and Services sector, Construction and Allied, Energy and Petroleum, Manufacturing and allied and Telecommunication sectors, and results tabulated in Table 2.

**TABLE 2**  
**Debt Equity Ratio from 2005 to 2014**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AGRICULTURAL	0.50	0.52	0.47	0.56	0.48	0.51	0.42	3.96	0.36	0.30
AUTOMOBILES AND ACCESSORIES	1.31	1.33	1.21	1.97	1.26	3.14	1.32	2.67	0.98	1.19
COMMERCIAL AND SERVICES	1.72	1.43	1.42	1.29	1.46	1.35	1.57	2.33	1.11	1.33
CONSTRUCTION AND ALLIED ENERGY AND PETROLEUM	1.39	1.32	1.22	1.11	0.92	1.28	1.24	2.08	1.33	1.62
MANUFACTURING AND ALLIED	0.68	0.57	0.71	0.67	0.77	0.92	0.90	2.69	1.24	1.98
TELECOMMUNIC ATION	0.72	0.85	0.74	0.79	0.67	0.69	2.45	0.61	0.48	2.06
<b>Mean</b>	<b>1.06</b>	<b>1.04</b>	<b>0.98</b>	<b>1.03</b>	<b>1.01</b>	<b>1.25</b>	<b>1.17</b>	<b>2.65</b>	<b>1.13</b>	<b>1.35</b>
<b>Std. Dev.</b>	<b>0.86</b>	<b>0.71</b>	<b>0.62</b>	<b>0.74</b>	<b>0.73</b>	<b>1.34</b>	<b>0.95</b>	<b>1.25</b>	<b>0.92</b>	<b>1.34</b>
<b>Min</b>	<b>0.00</b>	<b>0.19</b>	<b>0.00</b>	<b>0.18</b>	<b>0.18</b>	<b>0.17</b>	<b>0.19</b>	<b>1.19</b>	<b>0.15</b>	<b>0.17</b>
<b>Max</b>	<b>3.25</b>	<b>3.02</b>	<b>2.57</b>	<b>4.02</b>	<b>3.42</b>	<b>7.50</b>	<b>3.94</b>	<b>6.24</b>	<b>3.22</b>	<b>5.91</b>

*Source: Data analysis from NSE (Listed Company Annual Financial Reports)*

The agricultural sector had a relatively low risk with a debt equity ratio of 0.3 to 0.56 with an exception of the year 2012. The debt equity ratio in year 2012 was 3.96 indicating that there was aggressive use of debt financing in the year. The low debt equity ratio was indicative of a high margin of safety in the agricultural sector. The automobile and accessories sector was seen to have a relatively high equity debt ratio of 0.98 to 3.14 with the highest debt equity ratio in the year 2010 where one of the firms Marshalls E. Africa had a debt equity ratio of 7.5:1. The commercial and services sector had a relatively high debt equity ratio the least debt equity ratio at 1.11 in year 2013 to a high of 2.33 in the year 2012. The construction and allied sector had a high debt equity ratio with the highest being observed in the year 2012 at a

ratio of 2.08. The energy and petroleum sector had a high debt equity ratio in the year 2011, 2013 and 2014 indicating ratios of 2.24, 2.3, and 2.12. The manufacturing sector was relatively low compared to the automobiles and accessories, commercial and services, construction and allied sector and the energy and petroleum sector with a high ratio experienced in the year 2012 at 1.98.

The findings on the debt equity ratio of the firms found that the mean was highest in 2012 with a mean average of 2.65 while the least debt equity ratio was in the year 2007 at 0.98. The debt equity ratio indicates that debt was preferred in the year 2012 comparable to equity and exceeded the optimal expected debt to equity ratio of 1:1. This increase however can be related to increase in short term financing in the year as the mean declines in the year 2013-2014. The standard deviation was highest in year 2010, 2012 and 2014 with a minimum debt equity ratio of 0.17, 1.19 and 0.17 while maximum debt equity ratio recorded was 7.5, 6.24 and 5.91 respectively.

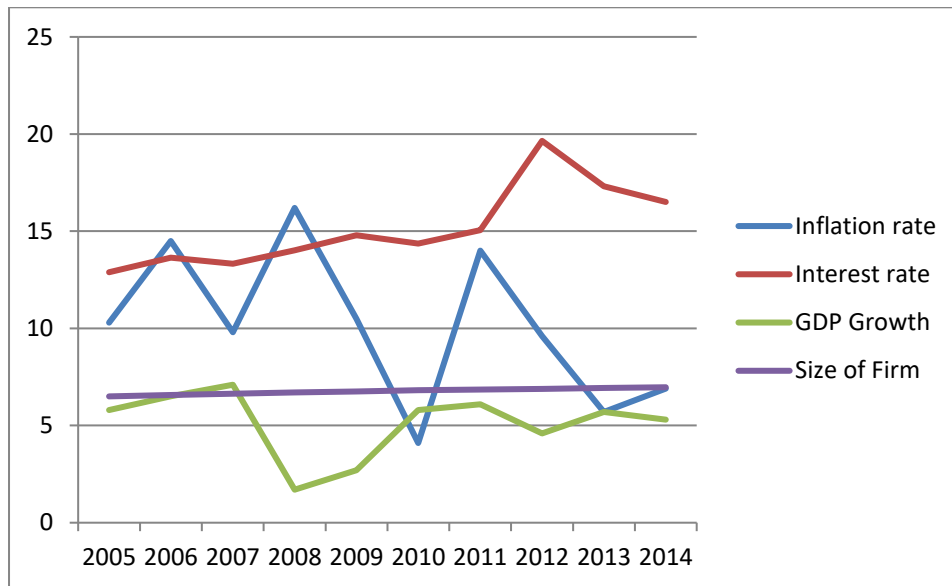
**TABLE 3**  
**Variable Analysis**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Mean
X	10.3	14.5	9.8	16.2	10.5	4.1	14	9.6	5.7	6.9	10.2
R	12.89	13.64	13.33	14.02	14.80	14.36	15.05	19.65	17.31	16.51	15.16
G	5.8	6.5	7.1	1.7	2.7	5.8	6.1	4.6	5.7	5.3	5.13
S	6.50	6.58	6.63	6.70	6.76	6.82	6.86	6.88	6.94	6.97	6.76
					Interest rate(R )		GDP Growth(G)			Size of Firm (S )	
Std Dev.			3.9		2.10		1.70			0.16	
Min			4.1		12.89		1.70			6.50	
Max			16.2		19.65		7.10			6.97	

*Source: Data Analysis from the Kenya National Bureau of Statistics*

The standard deviation of size of firm has a narrow range between the minimum and maximum scores at 0.16, GDP growth rate at 1.7. Interest rate and inflation rate however have a higher standard deviation at 2.1 and 3.9 respectively.

**FIGURE 2**  
**Trend Line on Independent Variables**



*Source: Author, 2015*

Inflation rate was high in the year 2008 at 16.2%. The inflation rate however declined in year 2009 -2010 but had an increase in the year 2011. This could be attributed to the 2007-2008 post-election violence at the time. The inflation rate was high in year 2014 but remained under a single digit and hence was not prevalent. Interest rate increased from the year 2005 with the highest rate in the year 2012 at a rate of 19.65% the highest rate in the period. In year a 2013 interest rate declined to 17.31% and to 16.51% in year 2014. Real lending rate was 15.16% in the period of study. The GDP growth rate increased from the year 2005 to 2007 but dipped to a low of 1.7% in year 2008 followed by an increase in year 2009 to 2011. The GDP growth rate declined in 2012 to 4.6%. The year 2014 saw a marginal drop of 7% to a GDP growth of 5.3%. Real GDP growth rate was 5.13%. Inflation rate was high in 2008 at 16.2%. The real consumer price index stood at 10.2%.

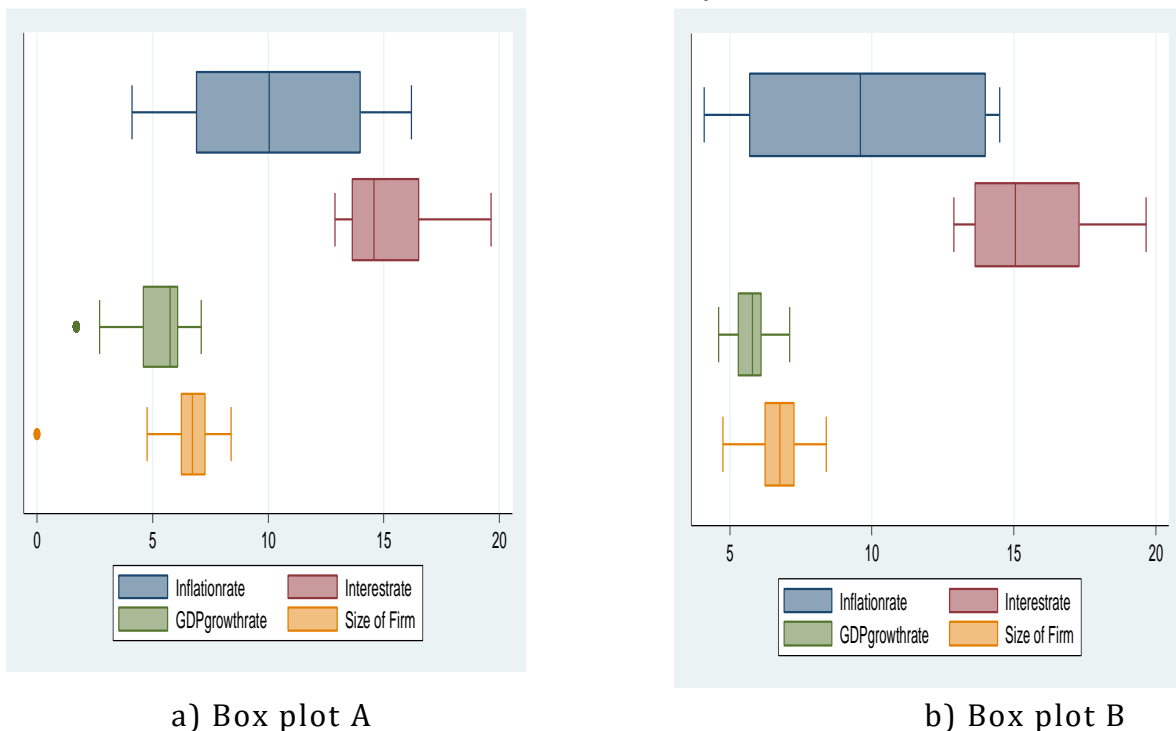
### 4.3 Normality and Correlation Tests

The distributional characteristic was determined using both the visual and empirical examination. The visual examination was done using the box plot while the empirical tests were done using the Skewness and Kurtosis test and Shapiro Francia test.

#### 4.3.1 Test for Outliers

The box plot test was done and the following findings collected.

**FIGURE 3**  
**Box Plot Normality Test**



a) Box plot A

b) Box plot B

*Source: Author, 2015*

Box plot A indicated presence of outliers on the size of firm and the GDP growth rate. The outliers on the size of firm i.e. variables  $<3$  (less than 3) and GDP growth variables  $<4$  (less than 4) were dropped. Box plot B provides the details of the normal data after correcting the presence of outliers in the analysis. Data on the debt equity ratio was transformed and the following tests were carried out.

**TABLE 4**  
**Skewness and kurtosis test adj Chi2 (2)**

Variable	Skewness	Kurtosis	Adj. Chi 2(2)	Prob>Chi2
Inflation	0.5717	0.0000		0.0000
Interest	0.0000	0.0025	23.37	0.0000
GDP growth	0.9355	0.2488	1.35	0.5098
Size of Firm	0.9155	0.2268	1.48	0.4762

*Source: Author, 2015*

Interest rate was found to have a normal distribution with a skew of zero while inflation rate, GDP growth rate and size of the firm had a skew to the right with the values 0.5717, 0.9355 and 0.9155. All the variables had a kurtosis less than 3 indicative of a platykurtic distribution where the values are widely spread around the mean. The probability on inflation rate and interest rate was 0.000 while that of the GDP growth rate and size of the firm were 0.5098 and 0.4762 not significant at 0.05 level of significance.

#### **4.3.2 Test for Normality**

**TABLE 5**  
**Shapiro-Francia W' test for normal data**

	W'	V'	Z'	Prob z
Inflation rate	0.955	9.21	4.670	0.0001
Interest rate	0.9240	15.597	5.780	0.0001
GDP growth rate	0.975	5.063	3.413	0.0003
Size of Firm	0.991	1.82	1.260	0.1038

*Source: Author, 2015*

The Shapiro and Francia (1972) test was carried out to test for normality. The test was selected as the sample size was greater than 50, a sample size of 262. The test statistic W' takes the values between 0 with the values to 1 indicating near normality with a probability of 0.000 on inflation rate, interest rate and the GDP growth rate.

**TABLE 6**  
**Correlation Analysis**

	DebEquity ratio(Y)	Inflation rate(X)	Interest rate(R)	GDP growth rate( G)	Size of Firm (S)
Y	1.000				
X	0.004	1.000			
Sig.	0.948				
R	0.309	-0.285	1.000		
Sig	0.000	0.000			
G	-0.284	0.354	-0.809	1.000	
Sig	0.000	0.000	0.000		
S	0.256	-0.108	0.176	-0.120	1.000
Sig.	0.000	0.082	0.004	0.0534	

*Source: Author, 2015*

To check correlation we measured the degree of association between debt equity ratio and the predictor variables inflation rate, interest rate, GDP growth rate and size of the firm. Findings revealed that inflation rate was positively and insignificantly associated with debt equity ratio ( $r = 0.004$ ,  $P=0.948$ ) having a 0.4% positive relationship. Interest rate was positively associated with debt equity ratio at ( $r = 0.309$ ,  $P=0.000$ ) a 30% positive significant relationship with debt equity ratio. GDP growth rate was negatively and significantly associated with debt equity ratio at ( $r = -0.284$ ,  $P =0.000$ ) indicating a 28.4% negative relationship with debt equity ratio. Size of the firm was positively and significantly associated with debt equity a 26% positive relationship with debt. A further test was carried out to ascertain the correlation using the residuals.

**TABLE 7**  
**Estimate of Correlation (Rho) using residuals**

Resid_t	Coef	Std. Error	t	P>
Resid_t_1	0.389	0.679	5.72	$\frac{ t }{0.000}$

*Source: Author, 2015*

A further test for correlation was done using the residuals. The slope of the model  $e_t = \rho e_{t-1}$  gave an estimate of  $\rho$  as 0.3888 with a probability of 0.000 indicating that autocorrelation does not exist.

#### 4.4 Multicollinearity and Heteroscedasticity tests

**TABLE 8**  
**Multicollinearity Test**

Model		Collinearity Statistics	
		Tolerance	VIF
1	Inflation rate	0.87	1.15
	Interest rate	0.34	2.95
	GDP growth rate	0.33	3.05
	Size of Firm	0.96	1.04
	Mean VIF	2.05	

*Source: Author, 2015*

We tested for the presence of multicollinearity. This was performed using the Variance Inflation Factor (VIF), which provided a VIF of 2.95 and 3.05 on the interest rate and GDP growth rate. The mean VIF of 2.05 was less than 5 and hence the variables were found to be uncorrelated.

**TABLE 9**  
**Breusch-Pagan/ Cook Weisberg test for Heteroskedasticity**

Model	Dependent Variable	Chi2(1)	Prob>Chi2
1	lnDebt Equity ratio	1.4	0.2366

*Source: Author, 2015*

The data was subjected to a test to test for homoscedasticity. This was done using the Breusch pagan/ cook Weisberg test for heteroskedasticity. The results of the Breusch pagan test presented in Table 9, The Chi square at 1 degree of freedom was 1.4 with a probability of 0.2366. The probability was greater than  $p=0.05$  thus not significant the model was therefore found to have no evidence of heteroskedasticity.

## 4.5 Stationarity Test

**TABLE 10**  
**Fisher-type Unit Root Test based on Augmented Dickey-Fuller tests**

	InDebtEquity ratio	Inflation rate	Interest rate	GDP growthrate	Size of Firm
<b>P</b>	187.51	231.24	126.68	107.33	107.81
p-value	0.000	0.000	0.000	0.000	0.0000
<b>Z</b>	-8.44	-10.79	-6.04	-4.89	-2.71
p-value	0.000	0.000	0.000	0.000	0.0034
<b>L*</b>	-8.44	-11.03	-5.59	-4.46	-2.73
p-value	0.000	0.000	0.000	0.000	0.0035

*Source: Author, 2015*

The variables contained in the regression model were tested for stationarity using the Fisher type unit root test based on Augmented Dickey fuller test. InDebtEquityratio, inflation rate, interest rate and size of firm had a p value less than 0.05 indicating that the panels have no unit root and are stationary.

## 4.6 Panel Data Analysis

Panel data analysis was deemed to have a better analysis compared to time series and cross-section analysis. Panel data regression model combine both the time series and cross-section observations. Gujarati (2003) states the advantages of panel data as, the model addresses a broader range of issues and tackles more complex problems, has less collinearity among variables and allows control for variables that cannot be observed or measured e.g. differences in operations of various companies. Panel data examines the relationship between the variables and their changes and has more degrees of freedom. To select the appropriate model, regression analysis was carried out using both the fixed effects regression model and the random effects regression model to analyze the data for the 33 firms listed at the NSE. The test was performed with the null hypothesis that random model was more appropriate and fit for the data as the variation across the companies were assumed to be random and uncorrelated. A Hausman test was carried out with results as indicated in Table 4.10. The test

was performed with the null hypothesis that random model is more appropriate and fit for the data as previous analysis had indicated no correlation with the variables.

**TABLE 11**  
**Hausman Test Results**

Model	Dependent Variable	Chi2(4)	Prob>Chi2
1	lnDebtEquity Ratio	2.79	0.5930

*Source: Author, 2015*

The results for the test were Chi2 of 2.79 at 4 degrees of freedom and a p-value of 0.5930. The calculated p-value was greater than  $p=0.05$  and the hypothesis that Random Effects (RE) model was more appropriate for the study accepted. All the independent variables were estimated to be individually highly significant. Tests to determine the effect of the variables on the dependent variable in the regression model was done using the approach of dropping one of the variables from the model. A regression analysis was carried out dropping off one variable at a time. The results of the 4 regression models as provided in table 4.11.

**TABLE 12**  
**Variable Effects Panel Regression on Debt Equity Ratio**

	A	B	C	D
Independent Variables				
Inflation		0.0329	0.0262	0.0293
Std Error		(0.1155)	(0.0112)	(0.112)
P-value		0.004	0.019	0.009
Interest Rate	0.0809		0.1252	0.0881
Std Error	(0.0303)		(0.0188)	(0.0286)
P-value	0.008		0.000	0.002
GDP Growth rate	-0.1309	-0.3741		-0.1793
Std Error	(0.0906)	(0.0582)		(0.0912)
P-value	0.0149	0.000		0.049
Size of firm	0.1100	0.2430	0.1394	
Std Error	(0.1179)	(0.1140)	(0.1184)	
P-value	0.351	0.033	0.239	
Constant	-1.2673	0.1898	-3.16	-0.6248
Std Error	(1.1382)	(0.9210)	(0.7927)	(0.9205)
P-value	0.266	0.837	0.000	0.497
Observations	262	262	262	262
R Squared	0.1302	0.1470	0.1421	0.1117

*Source: Author, 2015*

In column A the independent variable inflation was dropped. A 1% increase in the interest rate increased the debt equity ratio to 0.0809, holding all other variables constant. 1% increase in GDP growth rate decreased debt equity to 0.1309 holding all other variables constant. A unit increase in size of firm increased the debt equity ratio to 0.1100. The constant was at negative 1.267 and the model explained 13.02% of the debt equity ratio.

In column B the independent variable Interest rate was dropped. 1% increase in Inflation rate increased the debt equity ratio to 0.0329, holding all other variables constant. A 1% increase in GDP growth rate led to a debt equity decline of 0.3741, holding all other variables constant. .1 unit increase in firm size increased the debt equity to 0.2430 holding all other variables constant. The model explained 14.70% of the variations in the debt equity ratio. The constant was a positive value of 0.1898

In column C the variable GDP growth rate was dropped. A 1% increase in inflation rate increased the debt equity ratio to 0.0262 holding all other variables constant. 1% increase in interest rate increased the debt equity ratio to 0.1252 holding all other variables constant. A unit increase in firm size increased the debt equity ratio to 0.1394 holding all other variables constant. R squared was at 14.21% indicating that other variables not included in the model explained the 85.79% of the debt equity ratio.

In column D the variable Size of Firm was dropped. 1% increase in Inflation rate increased the debt equity ratio to 0.0293 holding all other variables constant. .1% increase in interest rate increased the debt equity ratio to 0.0881 holding all other variables constant. 1% increase in the GDP growth rate led to a decline in the debt equity ratio by 0.1793 holding all other variables constant. The constant was however low at a negative 0.6248. Inflation rate, Interest rate and GDP growth rate variables explained 11.17% of the debt equity ratio.

Size of the firm can be said to be significant in that the model that did not have size of the firm only explained 11.17% of the debt equity ratio. Column B after a drop in interest rate

showed a positive increase on the debt equity ratio. The constant was also on a positive 0.1898 indicating that the model explained 0.1898 of the debt equity ratio. The 4 models provided that Inflation rate; Interest rate and size of the firm were positively related to the debt equity ratio. GDP growth rate had a negative relation to the debt equity ratio.

**TABLE 13**  
**Random Effects Panel Regression on Debt Equity Ratio**

Dependent Variable: Capital Structure (lnDebt Equity ratio)				
Independent Variables	Coefficient	SE Coefficient	z-value	P-value
Inflation	0.0316	-0.0114	2.77	0.006
Interest Rate	0.0772	-0.0299	2.58	0.010
GDP Growth rate	-0.1893	-0.0918	-2.06	0.039
Size of firm	0.1584	-0.1185	1.34	0.181
Constant	-1.4934	-1.1284	-1.32	0.186
Observations	262			
R Squared	0.1525		P-value	0.0000

*Source: Author, 2015*

Regres

sion on all the variables was done and the findings from table 4.12 revealed that only 15.25% of overall variation explained the variation of the debt equity ratio as explained by, Inflation rate, Interest rate ,GDP growth rate and Size of firm ( $R^2 = 0.1525$ ). The results indicated that 84.75% of the change to the debt equity ratio is explained by other factors not considered in the model. The P-value was 0.0000 less than 0.05 hence statistically significant.

Debt Equity ratio=  $\alpha + \beta_1$  Inflation rate +  $\beta_2$  Interest rate +  $\beta_3$  GDP growth rate +  $\beta_4$  Size of Firm.

$$Y_{it} = \alpha_{it} + \beta_1 \chi_{it} + \beta_2 r_{it} + \beta_3 g_{it} + \beta_4 s_{it} \dots \dots \dots (ii)$$

$$Y_{it} = -1.4934 + 0.316x + 0.0772r - 0.1893g + 0.1584s$$

(1.1284) (0.0114) (0.0299) (0.0918) (0.1185)

## **4.7 Analysis of Results**

### ***4.7.1 Effect of Inflation on Capital Structure***

Findings revealed that inflation rate was positively and significantly associated with debt equity ratio at  $P > |z|$  of 0.006. The coefficient for the variable inflation was 0.0316. A one percentage increase in the inflation rate, increased the debt equity ratio by 0.0316 holding all other independent variables constant. The null hypothesis that inflation rate does not have an effect on the capital structure is therefore rejected. The results differ with the study by Hatzinikolaou et.al (2002) that inflation increases business risk as it refers to a more volatile operating income that causes uncertainty in the tax shield and concluded that inflation uncertainty reduces leverage. In column A on Table 4.11 when the variable inflation rate was dropped there was an increase in the effect of interest rate to debt equity ratio to 0.0809 from 0.077, GDP growth rate effect on debt equity reduced by 0.05 to 0.1309. The Size of the firm increases debt equity ratio to 0.1584 from 0.11.

### ***4.7.2 Effect of Interest rate on Capital Structure***

For every one percentage increase in the Interest rate ,debt equity increased by 0.077 holding all other independent variables constant. Interest rate was positively and significantly associated with debt equity ratio at  $P > |z|$  of 0.01 indicating a positive relationship with debt equity ratio. The results concurred with Muthama et.al (2013) who in their study on macroeconomic influences on corporate capital structure of firms in Kenya found that interest rates as measured by treasury bills have a positive influence on both long term and total debt ratios. The trade-off theory contribution to the study was relevant to the findings in that when there was increased interest rate a firm was expected to derive tax savings due to the interest tax shield. The study however does not hold a similar conclusion by Bartholdy and Mateus (2008) who found that interest was inversely related with leverage and debt maturities. They

held the view that when interest rates increased firms were less willing to finance new investments due to the increase in cost. A similar conclusion was held by Demirci and Maksimovic (1996) who found that when interest rates increased, firms were less willing to finance new investments due to increase in the cost of borrowings. In column B on Table 4.11 when the variable Interest rate is dropped there is an increase in the inflation rate to 0.0329 from 0.0316, GDP growth rate declines by 0.1848 to -0.3741. The Size of the firm increases to 0.2430 from 0.1584. The null hypothesis that interest rate does not have an effect on the capital structure of a firm was therefore rejected.

#### ***4.7.3 Effect of GDP growth rate on Capital Structure***

One percentage increase of the GDP growth rate led to a decline in the debt equity ratio by 0.1893 holding all other independent variables constant. GDP growth rate was negatively and significantly associated with debt/equity ratio at  $P > |z|$  of 0.039. The results were in agreement with the study by Muthama et.al (2013) and Campello et.al (2010) who drew a negative relation to leverage that firms would prefer to use internal financing as compared to taking on leverage. This however does not resonate with Booth et.al (2001) who found that an increase in GDP growth rate led to firms using long term debt. This was also in agreement with the market efficiency theory that investment decisions were based on the fundamental analysis of the environment. A favourable macroeconomic environment was therefore expected to foster confidence to take on more leverage. In column C on Table 4.11 when the variable GDP growth rate is dropped there is a decline in the effect of inflation rate to debt equity ratio to 0.0262 from 0.0316, interest rate effect on debt equity increases by 0.048 and increase to 0.1252. The Size of the firm reduces debt equity ratio to 0.1394 from 0.1584. The null hypothesis that the GDP growth rate does not have an effect on capital structure was therefore rejected.

#### ***4.7.4 Effect of Firm Size on Capital Structure***

The coefficient for the variable size of the firm was positive and a unit increase in size of the firm increased the debt equity ratio to 0.1584 holding all other independent variables constant. The results presented a positive relationship between firm size and leverage. The positive relationship between size and leverage was important in making a decision on raising capital for investment consistent with results of both Booth et.al (2001) and Dejong et.al,(2008) who argued that large companies can tolerate high levels of debt because large firms are more diversified comparable to small firms and therefore have lower chances of bankruptcy. The tradeoff theory predicts a positive relationship between size and leverage. The positive relationships between size and leverage of a firm followed the study by Rajan and Zingales (1995) who found that leverage was positively correlated with company size and suggested that as size of firm increased, the debt to equity ratio increased. We therefore reject the null hypothesis that firm size has no effect on the capital structure of a firm. Firms listed at the NSE are mostly large firms and hence are expected to take advantage of their size in acquiring debt due to their bargaining power to creditors. In column D on Table 4.11 the variable Size of Firm was dropped leading to a decline in the inflation rate to 0.0293 from 0.0316; interest rate increased to 0.0881 a minimal increase of 0.0109. The GDP growth rate was improved by a margin of 0.01 to -0.1793. The constant was however low at -0.6248 comparable to the other analysis. The Inflation rate, Interest rate and GDP growth rate 11.17% of the debt equity ratio.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

The study aimed at analyzing the relationship of Inflation rate, GDP growth rate, Interest rate and the Size of the firm on the Capital Structure of firms listed at the Nairobi Securities Exchange. The chapter provides a summary of the findings from the study, conclusions and recommendations based on the findings of the study. It also provides suggestions for further research on the effect of the macroeconomic variables on the capital structure of firms.

#### 5.2 Summary of the Findings

The debt equity ratio is critical in examining the creditworthiness of a company. An increase in the debt equity ratio indicates that a company is financed by creditors. The prevailing economic condition acts as an external determinant to the decision on capital structure i.e. whether to acquire leverage or to result to equity for financing. Most lenders and investors would prefer a low debt equity ratio as this would best serve their interests in case of a decline in business. In the descriptive analysis of the various economic sectors it was identified that the agricultural sector had the least debt equity ratio. It was however noted that there was an increase in the average debt equity ratio in the year 2012 at a mean ratio of 2.65:1. This related to a similar notable increase in interest rates which reflected an increase in the independent variable to an interest rate of 19.65%.

The study established that inflation has a significant effect on the capital structure and an increase or decrease in inflation would have a significant effect on the firm's capital structure. The positive coefficient for inflation suggests that an increase in inflation leads to an increase in leverage and when there is reduced inflation leverage declines. Most listed firms at the NSE can be classified as large firms and hence follow the trade-off theory that

advocates that large firms with large proportion of assets borrow more. Abaidoo and Kwenin (2013) argue that expected inflation positively influences corporate performance and profitability, Inflation will increase the profit margin due to the inflation differential on input and final output. Kirui et al (2014) however noted that high inflation affects business .Inflation raises the cost of living which results to a shift of resources from investment to consumption. The increase in consumption is further expected to fuel inflation. A high rate of consumption is expected to affect a company in that the company will be in no position to meet there operational costs and investment demand and to an extent explains the positive relationship of inflation and leverage. Inflation influences the price of the security in the market where the security price reflects the sensitivity to general changes in the market. The resultant decision to control the effects of inflation is to result to leverage to caution against the high costs.

The coefficient estimate for interest rate was positive suggesting that as interest rates increased the debt equity ratio increased. The companies therefore follow the trade-off theory of deriving tax savings due to the interest tax shield. Data analysis indicates that an increase of 1% on the interest rate leads to an increase in the debt equity ratio to 0.0772 with a prob  $|z|$  of 0.010. Interest rate therefore has a significant effect to the debt equity ratio. During periods of economic expansion and interest rates are rising profit motivated banks tend to increase the interest on loans (Abor, 2008).A volatile interest rates environment therefore affects portfolio valuations and is a risk to equity. Interest rates of firms with high levels of debt are expected to incur higher costs attributable to increase in interest rates. The same is expected to prevail when there is a decline in the interest rates. The company in most instances as a reaction to the market experiences a reduced growth and high spending due to the higher debt expense. Revenue in most instances declines and the firm has less funding to invest in capital expenditure and in most instances the company does not grow. Financial leverage is seen as a

signal to a firm's performance and most firms prefer to take minimal risk and are cautious of the amount of debt they are willing to contract in. Firms prefer to be financed by long term debt but as interest rate increases firms prefer short term debt and avoid long term debt financing (Osoro and Ogeto, 2014).

The coefficient estimate for GDP growth rate was negative suggesting that as GDP growth rate increased the debt equity ratio decreased. This follows the Pecking order theory, the Market timing strategy and efficient market hypothesis. According to the pecking order theory argument is that leverage declines during expansion as firms prefer to use internal financing comparable to debt. GDP growth rate has a negative but significant relationship with debt equity ratio ( $r = -0.284$ ) indicating a negative relationship with debt equity ratio. The 28.4% negative relation indicates that an increase in GDP would lead to a decline in the debt ratio. A decline in GDP would influence an increase in debt thereby having GDP growth rate and debt equity ratio to have an inverse relationship. GDP has a  $p|z|$  value of 0.039 indicating that GDP is significant at 0.05 level of significance.

Size of the firm had a positive and insignificant relationship with debt equity. The result of Size of a firm on the regression model was positive and an increase of 1 unit in size of the firm would result to an increase in 0.1584 of the debt ratio. The insignificant relationship could relate to the fact that most large firms are a composition of shareholders or owners and hence the ability to raise equity is easily realized. Large firms therefore can be said to have easy access to both leverage and equity. This however does not apply to small firms who have a small number of shareholders for equity and do not have easy access to credit.

### **5.3 Conclusion**

Inflation rate influences the debt equity ratio positively. Inflation rate changes have a significant effect in the purchasing power of money and the cost of production. Inflation

therefore affects aggregate demand, cost of production and increases the cost of borrowing decreasing the value of debt the reason for the positive influence on the debt equity ratio. The interest rate in the market links directly to a response to the market and demand of leverage required. The lending interest rate is hence influenced by the economic factors prevailing in the economy. Factors such as inflation and fluctuations of the exchange rate influence the cost of leverage and in most times leads to increased interest rates thus affecting the cost acquisition of leverage. A firm's growth could be linearly related to GDP growth with an assumption that individual firms have contributed to the general economic growth. GDP growth is achieved from the contribution of the various investment sectors in the economy. Firms in a growing economy would be expected to rely on internal financing and not leverage. This explains the negative relationship on the regression model. The size of a firm influences the capital structure of a firm. Most creditors have confidence in large firms and hence are willing to provide credit to them. The larger the size of the firm the greater the anticipated ratio of debt comparable to debt held by small firms.

Macroeconomic variables therefore can be said to influence capital structure and affect the investment cycle. Policy makers in the spirit to create a good environment for business should pay attention to the macroeconomic environment and institute measures to curb any effects likely to affect business. The policy makers are the government, shareholders and management. The government role is important and acts as a major determinant of the level at which the macroeconomic effects will influence the firm. The government institutes monetary policies and apply monetary instruments that control effects likely to affect the economy. In instances of volatility in the economy, monetary instruments have to be effective. If the instruments are not effective to keep down the exchange rate and interest rates, policy makers should define other strategies to arrest the changes in the economic environment. The government therefore has to continually monitor and ensure that the

economic state in the economy is stable for the growth and good performance of the firms. In conclusion management's capital structure decision should allow for adjustments to incorporate factors likely to affect the capital structure due to variations in the macroeconomic factors.

#### **5.4 Recommendation**

In the study period, the analysis indicated that GDP growth rate had a negative relationship indicating that when the economy is growing, firms are expected to have greater earnings resulting to more retained earnings. In a growing economy therefore firms should utilize retained earnings as a mode of financing other than resulting to debt.

Based on the uncertainty and unpredictability of the macroeconomic environment it is important that firm management make financial decisions that they can be in position to control. Management therefore should prefer to use internal financing other than leverage to shield from the macroeconomic effects.

In the empirical study we identified global effects as a catalyst of the macroeconomic effects and developed economies were most affected due their dependence on the developed economies. Future research should examine how the global interaction affects company structure.

A further research on the effect of the macroeconomic variables on the company's capital structure should be carried out on firms that are not listed on the Nairobi Securities exchange.

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## **APPENDICES**

### **APPENDIX I**

#### **Letter of Introduction**

Dear Sir/ Madam,

#### **REF: Research Information**

I am a Postgraduate student at the KCA University pursuing my MSc. Commerce Finance & Investment course. As part of the course requirements, am undertaking a research project to establish the Relationship of Macroeconomic Factors and Capital Structure of Non-Financial Firms Listed at The Nairobi Securities Exchange

To fulfill information requirements for the study, I intend to collect secondary data from your institution. The information being requested is purely for academic purposes and will be treated in strict confidence, and will not be used for any purposes other than for my research.

I would really appreciate if you would allow me to access all the relevant information for the research project. Any additional information you might consider useful for the study is most welcome.

Thank you.

Student

Ndirangu.Doris.

## APPENDIX II

### Listed Firms at the NSE 2005-2014

	Name of Firm	Targeted Years	No of Years	Cumulative Years	Remarks
	<b>AGRICULTURAL</b>				
	Eaagads Ltd Ord 1.25	2005-2014	10	9.00	Included
	Kapchorua Tea Co. Ltd OrdOrd 5.00	2005-2014	10	10	Included
	Kakuzi Ord.5.00	2005-2014	10	10	Included
	Limuru Tea Co. Ltd Ord 20.00	2005-2014	10	10	Included
	Rea Vipingo Plantations Ltd Ord 5.00	2005-2014	10	10	Included
	Sasini Ltd Ord 1.00	2005-2014	10	10	Included
	Williamson Tea Kenya Ltd Ord 5.00	2005-2014	10	10	Included
	<b>AUTOMOBILES AND ACCESSORIES</b>				
	Car and General (K) Ltd Ord 5.00	2005-2014	10	10	Included
	Sameer Africa Ltd Ord 5.00	2005-2014	10	10	Included
0	Marshalls (E.A.) Ltd Ord 5.00	2005-2014	10	10	Included
	<b>COMMERCIAL AND SERVICES</b>				
1	Express Ltd Ord 5.00	2005-2014	10	10	Included
2	Kenya Airways Ltd Ord 5.00	2005-2014	10	10	Included
3	Nation Media Group Ord. 2.50	2005-2014	10	10	Included
4	Standard Group Ltd Ord 5.00	2005-2014	10	10	Included
5	TPS Eastern Africa (Serena) Ltd Ord 1.00	2005-2014	10	10	Included
6	Scangroup Ltd Ord 1.00	2005-2014	10	10	Included
7	Uchumi Supermarket Ltd Ord 5.00 ***	2005-2014	10	3	Excluded
8	Hutchings Biemer Ltd Ord 5.00 ***	2005-2014	10	0	Excluded
9	Longhorn Kenya Ltd	2005-2014	10	2	Excluded
	<b>CONSTRUCTION AND ALLIED</b>				
0	Athi River Mining Ord 5.00	2005-2014	10	10	Included
1	Bamburi Cement Ltd Ord 5.00	2005-2014	10	10	Included
2	Crown Berger Ltd Ord 5.00	2005-2014	10	10	Included
3	E.A.Cables Ltd Ord 0.50	2005-2014	10	10	Included

4	E.A.Portland Cement Ltd Ord 5.00	2005-2014	10	10	Included
	<b>ENERGY AND PETROLEUM</b>				
5	KenolKobil Ltd Ord 0.05	2005-2014	10	10	Included
6	Total Kenya Ltd Ord 5.00	2005-2014	10	10	Included
7	KenGen Ltd Ord. 2.50	2005-2014	10	10	Included
8	Kenya Power & Lighting Co Ltd	2005-2014	10	10	Included
9	Umeme Ltd	2005-2014	10	2	Excluded
	<b>MANUFACTURING AND ALLIED</b>				
0	B.O.C Kenya Ltd Ord 5.00	2005-2014	10	10	Included
1	British American Tobacco Kenya Ltd Ord 10.00	2005-2014	10	10	Included
2	Carbacid Investments Ltd Ord 5.00	2005-2014	10	10	Included
3	East African Breweries Ltd Ord 2.00	2005-2014	10	10	Included
4	Mumias Sugar Co. Ltd Ord 2.00	2005-2014	10	10	Included
5	Unga Group Ltd Ord 5.00	2005-2014	10	10	Included
6	Eveready East Africa Ltd Ord.1.00	2005-2014	10	10	Included
7	Kenya Orchards Ltd Ord 5.00	2005-2014	10	6	Excluded
8	A.Baumann CO Ltd Ord 5.00 ***	2005-2014	10	0	Excluded
	<b>TELECOMMUNICATION AND TECHNOLOGY</b>				
9	Safaricom Ltd Ord 0.05	2005-2014	9	10	Included
	<b>GROWTH ENTERPRISE MARKET SEGMENT</b>				
0	Home Afrika Ltd Ord 1.00	2005-2014	10	1	Excluded
1	Flame Tree Group Holdings Ltd Ord 0.825	2005-2014	10	1	Excluded
2	Kurwitu Ventures	2005-2014	10	1	Excluded
3	Atlas Development and Support Services	2005-2014	10	1	Excluded

\* \*\*Delisted Firms

**APPENDIX III**  
**Break Down of Debt Equity Ratio from 2005 to 2014**

	005	006	007	008	009	010	011	012	013	014
<b>AGRICULTURE</b>										
Eaagads Ltd Ord 1.25	0.27	0.28	-	0.30	0.31	0.28	0.33	6.24	0.24	0.24
Kapchorua Tea Co. Ltd Ord 5.00	0.51	0.47	0.56	0.58	0.69	0.83	0.61	2.37	0.62	0.40
Kakuzi Ord.5.00	1.27	1.20	0.88	0.70	0.46	0.46	0.38	4.64	0.28	.29
Limuru Tea Co. Ltd Ord 20.00	0.56	0.45	0.53	0.60	0.52	0.33	0.28	4.11	0.32	.32
Rea Vipingo Plantations Ltd Ord 5.00	0.28	0.59	0.65	0.86	0.45	0.73	0.56	3.63	0.33	0.33
Sasini Ltd Ord 1.00	0.24	0.26	0.29	0.44	0.41	0.40	0.40	3.57	0.42	0.23
Williamson Tea Kenya Ltd Ord 5.00	0.38	0.36	0.41	0.46	0.49	0.54	0.41	3.15	0.30	0.30
<b>AUTOMOBILES</b>										
Car and General (K) Ltd Ord 5.00	0.92	0.95	1.30	1.44	1.46	1.49	1.90	1.60	1.76	1.88
Sameer Africa Ltd Ord 5.00	0.58	0.79	0.61	0.44	0.32	0.42	0.39	3.17	0.37	0.52
Marshalls (E.A.) Ltd Ord 5.00	2.43	2.26	1.71	4.02	2.00	7.50	1.67	3.24	0.83	1.16
<b>COMMERCIALSECTOR</b>										
Express Ltd Ord 5.00	1.44	1.37	0.85	2.06	2.16	2.49	3.94	1.67	1.42	1.65
Kenya Airways Ltd Ord 5.00	2.63	3.02	2.57	1.93	3.42	2.67	2.40	1.42	2.93	4.27
Nation Media Group Ord. 2.50	0.37	0.51	0.58	0.53	0.39	0.47	0.44	3.18	0.39	0.36
Standard Group Ltd Ord 5.00	1.71	1.27	1.78	1.69	1.38	0.70	1.12	2.11	1.05	0.86
TPS Eastern Africa (Serena) Ltd Ord 1.00	0.93	0.80	0.84	0.73	0.72	0.60	0.64	3.27	0.31	0.32
Scangroup Ltd Ord 1.00	3.25	1.63	1.90	0.81	0.66	1.19	0.87	2.31	0.57	0.56
<b>CONSTRUCTION</b>										
Athi River Mining Ord 5.00	2.43	1.94	1.48	1.25	0.97	2.57	2.36	1.36	2.61	2.92
Bamburi Cement Ltd Ord 5.00	0.36	0.35	0.37	0.70	0.53	0.54	0.39	3.53	0.37	0.41
Crown Berger Ltd Ord 5.00	0.95	0.99	0.95	1.42	0.99	1.19	1.11	2.09	1.16	1.86
E.A.Cables Ltd Ord 0.50	0.79	1.37	1.91	1.23	1.13	1.01	1.20	1.88	1.22	1.55
E.A.Portland Cement Ltd Ord 5.00	2.43	1.94	1.40	0.94	0.97	1.11	1.16	1.52	1.28	1.34
<b>ENERGY</b>										
KenolKobil Ltd Ord 0.05	1.09	1.86	1.66	1.54	1.73	1.54	2.95	1.25	3.22	2.26
Total Kenya Ltd Ord 5.00	1.33	2.29	1.63	1.90	2.52	2.17	2.83	1.76	1.53	0.91
KenGen Ltd Ord. 2.50	2.33	1.78	0.60	0.56	0.69	1.13	1.32	1.75	1.55	2.26
Kenya Power & Lighting Co Ltd	0.90	0.88	1.13	1.50	1.67	1.79	1.87	1.46	2.91	3.06
<b>MANUFACTURING</b>										
B.O.C Kenya Ltd Ord 5.00	0.27	0.34	0.41	0.32	0.35	0.33	0.37	3.72	0.27	0.32
British American Tobacco Kenya Ltd Ord 10.00	0.60	0.85	1.15	1.22	1.40	2.17	1.14	1.88	2.18	2.35
Carbacid Investments Ltd Ord 5.00	0.22	0.19	0.18	0.18	0.18	0.17	0.19	5.59	0.15	0.17
East African Breweries Ltd Ord 2.00	0.34	0.33	0.49	0.51	0.45	0.60	0.85	1.19	2.79	5.91
Mumias Sugar Co. Ltd Ord 2.00	0.56	0.54	0.43	0.57	0.74	0.67	0.60	2.35	1.04	1.21
Unga Group Ltd Ord 5.00										

	0.82	0.63	0.60	0.61	0.77	0.51	0.52	2.65	0.89	0.67
Eveready East Africa Ltd Ord.1.00	1.95	1.08	1.68	1.29	1.53	1.96	2.64	1.44	1.38	3.26
<b>TELECOMUNICATION</b>										
Safaricom Ltd Ord 0.05	-	0.72	0.85	0.74	0.79	0.67	0.69	2.45	0.61	0.48
<b>Mean</b>	<b>.06</b>	<b>.04</b>	<b>.98</b>	<b>.03</b>	<b>.01</b>	<b>.25</b>	<b>.17</b>	<b>.65</b>	<b>.13</b>	<b>.35</b>
<b>Std. Dev.</b>	<b>.86</b>	<b>.71</b>	<b>.62</b>	<b>.74</b>	<b>.73</b>	<b>.34</b>	<b>.95</b>	<b>.25</b>	<b>.92</b>	<b>.34</b>
<b>Min</b>	<b>.00</b>	<b>.19</b>	<b>.00</b>	<b>.18</b>	<b>.18</b>	<b>.17</b>	<b>.19</b>	<b>.19</b>	<b>.15</b>	<b>.17</b>
<b>Max</b>	<b>.25</b>	<b>.02</b>	<b>.57</b>	<b>.02</b>	<b>.42</b>	<b>.50</b>	<b>.94</b>	<b>.24</b>	<b>.22</b>	<b>.91</b>

#### Appendix IV: Analysis of Industry Debt Equity Ratio from 2005 to 2014

	Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>AGRICULTURAL</b>	Mean	0.50	0.52	0.47	0.56	0.48	0.51	0.42	3.96	0.36	0.30
	Std. Dev.	0.36	0.32	0.28	0.18	0.12	0.21	0.12	1.23	0.13	0.06
	Min	0.24	0.26	-	0.30	0.31	0.28	0.28	2.37	0.24	0.23
	Max	1.27	1.20	0.88	0.86	0.69	0.83	0.61	6.24	0.62	0.40
<b>AUTOMOBILES AND ACCESSORIES</b>	Mean	1.31	1.33	1.21	1.97	1.26	3.14	1.32	2.67	0.98	1.19
	Std. Dev.	0.98	0.80	0.56	1.85	0.86	3.81	0.81	0.93	0.71	0.68
	Min	0.58	0.79	0.61	0.44	0.32	0.42	0.39	1.60	0.37	0.52
	Max	2.43	2.26	1.71	4.02	2.00	7.50	1.90	3.24	1.76	1.88
<b>COMMERCIAL AND SERVICES</b>	Mean	1.72	1.43	1.42	1.29	1.46	1.35	1.57	2.33	1.11	1.33
	Std. Dev.	1.07	0.87	0.78	0.67	1.16	0.98	1.35	0.77	0.99	1.52
	Min	0.37	0.51	0.58	0.53	0.39	0.47	0.44	1.42	0.31	0.32
	Max	3.25	3.02	2.57	2.06	3.42	2.67	3.94	3.27	2.93	4.27
<b>CONSTRUCTION AND ALLIED</b>	Mean	1.39	1.32	1.22	1.11	0.92	1.28	1.24	2.08	1.33	1.62
	Std. Dev.	0.97	0.68	0.58	0.29	0.23	0.76	0.71	0.86	0.81	0.91
	Min	0.36	0.35	0.37	0.70	0.53	0.54	0.39	1.36	0.37	0.41
	Max	2.43	1.94	1.91	1.42	1.13	2.57	2.36	3.53	2.61	2.92
<b>ENERGY AND PETROLEUM</b>	Mean	1.41	1.70	1.26	1.38	1.65	1.66	2.24	1.55	2.30	2.12
	Std. Dev.	0.64	0.59	0.50	0.57	0.75	0.44	0.78	0.25	0.89	0.89
	Min	0.90	0.88	0.60	0.56	0.69	1.13	1.32	1.25	1.53	0.91
	Max	2.33	2.29	1.66	1.90	2.52	2.17	2.95	1.76	3.22	3.06
<b>MANUFACTURING AND ALLIED</b>	Mean	0.68	0.57	0.71	0.67	0.77	0.92	0.90	2.69	1.24	1.98
	Std. Dev.	0.60	0.31	0.52	0.43	0.52	0.81	0.83	1.53	0.97	2.06
	Min	0.22	0.19	0.18	0.18	0.18	0.17	0.19	1.19	0.15	0.17
	Max	1.95	1.08	1.68	1.29	1.53	2.17	2.64	5.59	2.79	5.91

## APPENDIX V

### Total Assets (Log of Total Assets) on Listed Firms at The NSE 2005-2014

<b>AGRICULTURAL</b>	005	006	007	008	009	010	011	012	013	014
Eaagads Ltd Ord 1.25	5.3	5.4	-	5.4	5.4	5.5	5.6	5.8	5.7	5.6
Kapchorua Tea Co. Ltd Ord 5.00	6.0	6.0	6.0	6.0	6.1	6.2	6.2	6.3	6.3	6.3
Kakuzi Ord.5.00	6.3	6.4	6.4	6.4	6.5	6.5	6.6	6.6	6.6	6.6
Limuru Tea Co. Ltd Ord 20.00	4.8	4.8	4.8	4.8	4.9	5.2	5.3	5.5	5.5	5.5
Rea Vipingo Plantations Ltd Ord 5.00	5.8	6.0	6.1	6.2	6.2	6.2	6.4	6.4	6.4	6.5
Sasini Ltd Ord 1.00	6.5	6.6	6.6	6.8	6.9	7.0	7.0	7.0	7.0	7.2
Williamson Tea Kenya Ltd Ord 5.00	6.5	6.5	6.6	6.6	6.6	6.7	6.8	6.9	6.9	6.9
<b>AUTOMOBILES AND ACCESSORIES</b>										
Car and General (K) Ltd Ord 5.00	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.8	6.9
Sameer Africa Ltd Ord 5.00	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.6	6.6
Marshalls (E.A.) Ltd Ord 5.00	6.0	6.0	6.1	6.1	6.2	6.1	6.0	5.8	5.7	5.8
<b>COMMERCIAL AND SERVICES</b>										
Express Ltd Ord 5.00	5.8	6.0	5.9	6.1	6.1	6.1	5.9	5.7	5.7	5.7
Kenya Airways Ltd Ord 5.00	7.7	7.8	7.9	7.9	7.9	7.9	7.9	7.9	8.1	8.2
Nation Media Group Ord. 2.50	6.6	6.7	6.8	6.8	6.8	6.9	6.9	7.0	7.1	7.1
Standard Group Ltd Ord 5.00	6.0	6.1	6.3	6.4	6.5	6.4	6.5	6.5	6.6	6.6
TPS Eastern Africa (Serena) Ltd Ord 1.00	6.4	6.8	6.8	6.8	6.8	7.1	7.1	7.1	7.1	7.1
Scangroup Ltd Ord 1.00	6.0	6.1	6.2	6.6	6.6	6.9	6.9	6.9	7.1	7.1
<b>CONSTRUCTION AND ALLIED</b>										
Athi River Mining Ord 5.00	6.9	7.0	7.0	7.0	7.1	7.2	7.3	7.4	7.5	7.6
Bamburi Cement Ltd Ord 5.00	7.2	7.3	7.3	7.5	7.5	7.5	7.5	7.6	7.6	7.6
Crown Berger Ltd Ord 5.00	6.1	6.2	6.2	6.3	6.3	6.3	6.3	6.4	6.5	6.6
E.A.Cables Ltd Ord 0.50	6.0	6.3	6.5	6.5	6.5	6.7	6.7	6.8	6.8	6.9
E.A.Portland Cement Ltd Ord 5.00	6.9	7.0	6.9	6.9	7.1	7.1	7.1	7.1	7.2	7.2
<b>ENERGY AND PETROLEUM</b>										
KenolKobil Ltd Ord 0.05	6.9	7.1	7.1	7.4	7.5	7.5	7.7	7.5	7.4	7.4
Total Kenya Ltd Ord 5.00	7.0	7.2	7.1	7.2	7.5	7.5	7.5	7.5	7.6	7.5
KenGen Ltd Ord. 2.50	8.0	8.0	8.0	8.0	8.1	8.2	8.2	8.2	8.3	8.4
Kenya Power & Lighting Co Ltd	7.6	7.6	7.7	7.8	7.9	7.9	8.1	8.1	8.3	8.3
<b>MANUFACTURING AND ALLIED</b>										
B.O.C Kenya Ltd Ord 5.00	6.2	6.2	6.3	6.3	6.3	6.3	6.3	6.3	6.4	6.4
British American Tobacco Kenya Ltd Ord 10.00	6.8	6.9	7.0	7.0	7.4	7.2	7.1	7.2	7.7	7.9
Carbacid Investments Ltd Ord 5.00	6.0	6.0	6.0	6.1	6.1	6.2	6.2	6.3	6.3	6.4
East African Breweries Ltd Ord 2.00	7.4	7.4	7.5	7.5	7.5	7.6	7.7	7.7	7.5	7.8
Mumias Sugar Co. Ltd Ord 2.00	7.0	7.1	7.1	7.2	7.2	7.3	7.4	7.4	7.4	7.4
Unga Group Ltd Ord 5.00	6.6	6.6	6.6	6.7	6.7	6.7	6.8	6.8	6.9	6.9

Eveready East Africa Ltd Ord.1.00	5.9	6.0	6.1	5.9	6.0	6.1	6.0	6.1	6.0	6.0
<b>TELECOMMUNICATION AND TECHNOLOGY</b>										
Safaricom Ltd Ord 0.05	-	7.8	7.6	7.9	8.0	8.0	8.1	8.1	8.1	8.1

## APPENDIX VI

### Research Budget

DESCRIPTION	Kshs.
Printing & Stationery	120,000.00
Travel Costs	5,000.00
Research Data Related Costs,( Internet and Library costs)	50,000.00
	175,000.00