

**CAPITAL STRUCTURE OF LISTED FIRMS IN KENYA: THE CASE  
OF NON FINANCIAL FIRMS**

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**DECLARATION**

This research paper is my original work and to the best of my knowledge has not been presented for the award of a degree in any other university.

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**APPROVAL**

This research paper has been submitted for examination with our approval as university supervisors

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## **DEDICATION**

To my late parents, Mr John Ayot and Mrs. Millicent Adhiambo, a gift from God, who diligently raised me up with a burning passion for knowledge and success.

## **ACKNOWLEDGEMENT**

The successful completion of this study was a daunting task whose credit cannot go to me alone rather it was accomplished through concerted effort by various individuals who are worth mentioning. First, I am grateful and most indebted to my first supervisor, Dr Seth Gor whose guidance and valuable comments helped enrich this study. His constructive criticism, expeditious and timely feedback despite busy schedule not only enabled me to write this paper but also do it in good time. Secondly, my gratitude extends to my second supervisor, Dr Martine Oleche who was also undoubtedly instrumental in giving me sound advice and suggestions.

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Last but not least, I extend my heartfelt appreciation to my dear wife and children for their immense encouragement, moral support, and prayers. Their remembrance in prayer renewed my strength which kept me going on and on with each passing day. The views expressed in this study are however mine and therefore I fully bear the responsibility for any errors and omissions.

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## **ABSTRACT**

This study investigates the capital structure of listed firms in Kenya with an intention of identifying the factors that determine their capital structure. In particular, the study seeks to determine both firm specific and macroeconomic factors as well as to assess the relevance of capital structure theories in Kenya. The study is conducted based on a sample of 29 non financial firms listed on the Nairobi Securities Exchange during the period 2004-2012 using panel data estimation technique. Both the fixed effects and random effects models are estimated and the results reveal that firm specific factors affecting the capital structure of listed firms in Kenya are asset tangibility, firm's profitability, size of the firm, firm's growth opportunities and finally liquidity of a firm's assets while the macroeconomic factors are economic growth and corporate tax rate. It is further established that the behaviour of Kenyan firms can best be explained by pecking order theory which is an indicator of asymmetry in the capital market. These results have important implications for policy and therefore the study provides a number of policy recommendations. First, the government should offer financial products targeting firms in the small and medium market segments since they are usually overshadowed by bigger ones when it comes to acquiring capital for investment. Second, policies that encourage economic growth and macroeconomic stability need to be implemented and finally, measures that minimize asymmetry of information in the capital market are highly encouraged.



## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background Information

The study of capital structure has received much attention in developed countries compared to developing countries. In the United States for instance, research on capital structure has mainly focused on understanding the forces behind corporate financing behaviour of large listed firms<sup>1</sup>. While firms in developed economies operate in close to similar economic environment, this is not the case with developing economies. There is therefore need for research on capital structure in developing countries in order to deepen knowledge on the subject. In Kenya, listed firms have a common characteristic in that they are more professionally managed, bigger in size with very high turnover and asset values as compared to unlisted firms. Further, they have more options when it comes to raising capital for their operations as compared to unlisted firms which makes their capital structure significantly different from one another and this exposes them to varying risks and returns. Another key aspect of listed firms is that being publicly owned subjects them to greater scrutiny by investors who have high expectations regarding maximization of their shareholding wealth.

The theoretical basis for this study derives from the static trade-off theory as advanced by Myers (1984). The theory assumes that firms face a trade-off of benefits and costs with debt financing. This theory was then extended to include the benefits and costs associated with agency conflicts. Another modern theory is the pecking order theory which asserts that asymmetry of information makes firms to prefer internally generated funds (retained earnings) to external financing such that given an option of external financing they would

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<sup>1</sup> A listed firm is a public firm whose shares are traded on a stock exchange market. It is the securities that are listed and not the company and for a firm to be listed it has to meet stringent financial and performance requirements.

choose debt to equity. Various empirical studies have been conducted in developed countries to investigate the determinants of capital structure on the basis of trade-off and pecking order theory but both have generated inconclusive and contradictory predictions. Nevertheless, it is necessary that empirical studies be directed at testing the determinants of capital structure in various contexts (Harris and Raviv, 1991).

The term capital structure refers to the composition of a firm's securities that are used to fund its investment activities. A firm's securities comprise of debt and equity capital. The debt security could be short term or long term, while equity security comprise of owners equity. Funds for firm's operation can either be generated internally or externally, with internally generated funds either taking the form of rights issue<sup>2</sup> or retained earnings (Rajan and Zingales, 1995). When funds are raised externally, firms may choose between debt and equity capital. The key concern in decision making process by a firm is the determination of an optimal mix of debt and equity. Various theories have been suggested to explain whether optimal mix of debt and equity can be achieved. A particular debt equity ratio is said to be optimal when it results in the lowest possible weighted average cost of capital<sup>3</sup> (WACC), and this optimal level is sometimes referred to as the target capital structure of the firm. Theories suggest that firms choose their capital structure depending on either costs or benefits associated with debt and equity financing. While debt provides benefits to the firm through tax advantage and management discipline, it exerts pressure on the firm's cash flows since interest and principal payments are obligations which must be met. Failure to meet these contractual obligations exposes a firm to the risk of financial distress. On the other hand equity financing exposes a firm to double taxation and dilution of ownership structure.

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<sup>2</sup> An offer which gives the current shareholder the opportunity to maintain a proportionate interest in the company before the shares are offered to the public.

<sup>3</sup> WACC is calculated by weighting the cost of each source of capital i.e. debt and equity, by its proportion in the total value of the firm.

Listed firms in Kenya are relatively small and less diversified as compared to those in developed economies. This exposes them to shocks emanating from uncertainty of policy and the macroeconomic environment. Government presence in the running of these firms is also evident through their large representation in the board of directors. Given the government's significant stake in these firms, its intervention in their operation sometimes becomes inevitable. Government directed credit programmes to preferred sectors intended to benefit firms under their control could significantly affect corporate financing patterns in the country. Extensive government presence in the financial sector is also noticeable and this creates a distinction between market based financing and bank based financing difficult.

The scenario described above points to the fact that the determinants of capital structure of listed firms in Kenya may not necessarily be the same as those in developed economies. It is therefore necessary to identify these factors in the context of Kenyan environment. Hermanns (2006) groups the determinants of capital structure into two broad categories; those arising from firm specific characteristics and those arising from external factors in which a firm operates represented by country specific economic conditions. Among external factors which explain the differences arising between firms capital structure include the macroeconomic conditions such as economic growth, average interest rate and inflation. On the other hand, firm-specific factors are represented by asset tangibility, firm size, profitability, financial distress costs and growth opportunities.

## **1.2 Overview of Listed Firms in Kenya**

There are sixty companies listed at the Nairobi Securities Exchange (NSE) in Kenya presently. These companies are grouped into three market segments; the Main Investment Market Segment (MIMS) which is the main quotation market; Alternative Investment Segment (AIMS) which provides alternative methods for raising capital to small, medium

sized and young companies and Fixed Income Market Segment (FIMS) which provides an independent market for fixed income securities such as treasury bonds, corporate bonds, preference shares and debenture stocks. The market segments are further classified into ten sectors, namely; agricultural, commercial and services, telecommunication and technology, automobiles and accessories, banking, insurance, investment, manufacturing and allied, construction and allied, energy and petroleum (NSE, 2012). Listed companies use the NSE platform to raise capital for expansion of their operations.

Table 1 shows the trend of additional capital raised through the NSE between years 2000 and 2009. Amount of additional capital raised increased from Kshs. 636 million in 2000 to over Kshs 60 billion in 2008, with equity capital accounting for over Ksh. 82 billion as compared to Ksh.18 billion of debt. The equity was raised mainly through the Initial Public Offer (IPO) and rights issue while debt was raised through corporate bond and commercial papers. A sharp increase in capital raised through equity instrument is evident from 2006 onwards. The year 2006 was a turning point in the fortunes of the NSE as the year saw a renewed interest in new listings through IPOs. In that year KenGen, Scangroup, Eveready EA ltd and Equity Bank ltd were all listed. The upward trend continued further into 2007 and 2008 with 2008 reporting the highest amount of Ksh. 60.8 billion as a result of Safaricom IPO which led to a further rise in market capitalization.

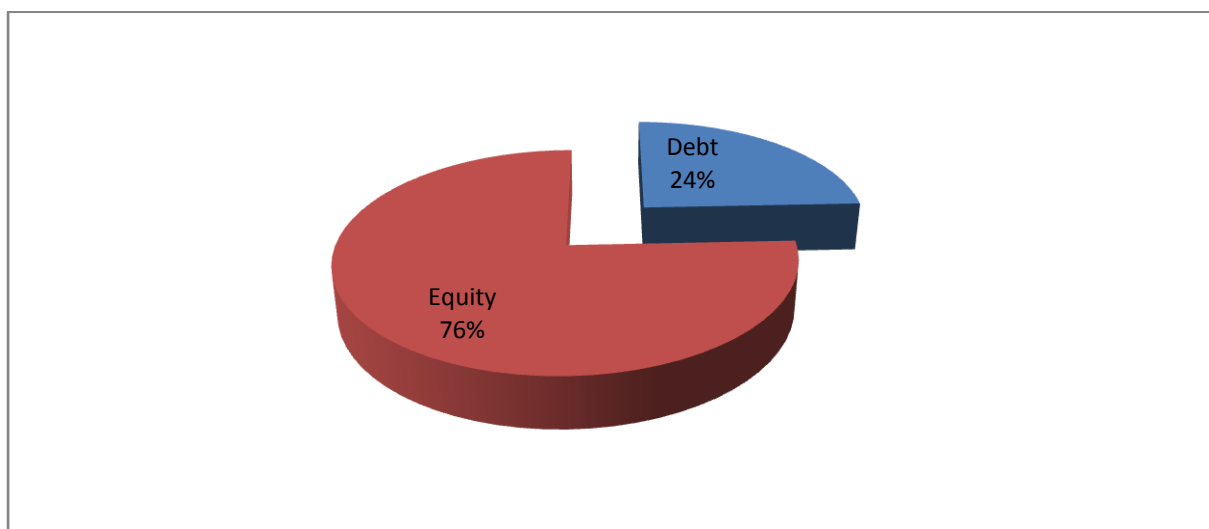
**Table 1: A Summary of Capital Raised by Listed NSE Firms (in Ksh millions)**

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Total</b>
<b>Debt</b>	0.0	4,146.0	38.6	2,050.0	1,400.0	1,986.0	200.0	6,284.0	2,300.0	18,404.6
<b>Equity</b>	636.0	3,444.1	0.0	178.0	2,450.0	2,004.0	9,713.1	5,101.0	58,506.4	82,032.6
<b>Total</b>	636.0	7,590.1	38.6	2,228.0	3,850.0	3,990.0	9,913.1	11,385.0	60,806.4	100,437.2

**Source: Nairobi Securities Exchange (2009)**

The renewed interest by firms in the NSE could be attributed to improved policy and institutional environment as well as a wide range of tax incentives. As an incentive to encourage more investors at the bourse, the newly listed companies were required to pay corporation tax at a reduced rate of 20% down from previous average of 30% for a period of 5 years, provided these firms offered at least 40% of their authorized share capital to the Kenyan public. Again the floatation cost for new listings was treated as a tax deductible expense. Further, listed firms were to get tax amnesty on their past omitted income, provided they made full disclosure of their assets and liabilities and undertook to pay all their outstanding taxes. The reforms also saw the abolition of stamp duty for share transfer transactions and capital gain tax on listed securities and a reduction of withholding tax at a rate of 5% down from 15% on dividend income paid to residents. This was aimed at reducing the incidence of double taxation on corporate income. Figure 1.0 shows that between the year 2008 and 2010, listed firms preferred equity to debt capital as a mode of raising additional funds for investment. This was evident given that the proportion of equity was 76% compared to 34% during the period.

**Figure 1.0: Debt Equity Proportions for Listed Firms in Kenya: 2008 -2010**



**Source: Own computation**

The picture emerging from Figure 1.0 is that the government's skewed incentives discussed above in favour of equity financing could have contributed to the above outcome.

### **1.3 Statement of the Problem**

The capital structure of a firm signals confidence to potential investors and also affects its value. The value of a firm is maximized when a firm chooses an optimal capital structure that minimizes its weighted average cost of capital. Most of firms in Kenya however do not have optimal capital structure since a bigger proportion of their activities are financed by equity securities as compared to debt. Between 2008 and 2010, listed firms in Kenya financed their operation with 76% of equity as compared to 24% of debt. Such a skewed structure can expose them to financial risks which could adversely affect their operations with the ultimate risk being financial distress which could further result into bankruptcy and yet firms play an important role in the economy as engines of growth and employment creation. In view of this problem, there is a need to identify the factors that determine a firm's capital structure as a first step to addressing it. Local studies which have attempted to address similar problem have focused on internal firm specific characteristics while ignoring external factors. This study seeks to fill that gap.

### **1.4 Research Questions**

This study seeks to answer the following questions:

- i) What is the relationship between firm specific characteristics and capital structure of listed firms in Kenya?
- ii) How do economic growth and other macroeconomic factors affect the capital structure of listed firms in Kenya?
- iii) Which theories of capital structure are applicable to listed firms in Kenya?

## **1.5 Objectives of the Study**

The main objective of the study is to identify the determinants of capital structure of listed firms in Kenya, while specific objectives include:

- i) To establish the effect of firm specific factors on capital structure of listed firms in Kenya.
- ii) To establish the effect of economic growth and other macroeconomic factors on capital structure of listed firms in Kenya
- iii) To establish the relevance of capital structure theories on listed firms in Kenya
- iv) To draw conclusion and make relevant policy recommendation based on the findings of (i), (ii) and (iii) above

## **1.6 Justification of the Study**

It is hoped that the study will suggest significant policy interventions through its recommendations which should help policy makers to come up with appropriate policies to address the challenges which firms often encounter as a result of making wrong financing choices. A study by Collier and Gunning (1999) established that most firms in Africa are still at an infancy stage and experiences slow growth. One factor which has been identified to contribute to this state is inappropriate capital choices.

A firm's capital structure decision is at the heart of many other decisions in the area of corporate finance. For instance, project financing, issue of long term debt, dividend policy, financing of mergers among others. This study is intended to act as a critical tool in decision making by the firm's management by providing knowledge to help in future projection of a firm's financial structure.

This study is also expected to make valuable contribution to knowledge in the field of financial economics, since previous studies in this field in Kenya (Gachoki, 2005; Kiogora,

2000; Nyangoro, 2003) majorly focused on the relationship between firm specific factors and capital structure while ignoring the possible implications of macroeconomic environment in which a firm operates. This study therefore seeks to control for possible implications of such factors in addition to firm specific factors.

### **1.7 The Scope and Organization of the Study**

This study focuses on the capital structure of listed non financial firms covering a period 2004 to 2012. Financial firms are omitted from the study due to their high regulation and distinct nature.

The remainder of the paper is organized as follows: Chapter two provides a review of literature in the area of study. Chapter three discusses the methodology to be employed and chapter four presents and discusses the empirical results while chapter five concludes the study and provides some policy implications based on the findings of the study.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter discusses both theoretical as well as empirical literature on capital structure followed by an overview of the reviewed literature.

#### **2.1. Review of Theoretical Literature**

##### **Traditional Theory of Capital Structure**

This theory asserts that optimal level of leverage is attained when the cost of capital is minimized. This has an implication of maximizing the value of the firm (Brealy and Myers, 1988). This happens since at lower levels of debt, increasing leverage does not raise the cost of debt and hence by replacing equity with debt, the firm value is improved. However, borrowing continues until a certain level beyond which the cost of debt begins to rise. It is at this turning point that the firm's value is at maximum and is considered to be the optimal capital structure. Alexander (1963) supports this view and maintains that WACC decreases with debt use. Pandey (1999) also support the view of traditional theory in terms of the existence of an optimal level of capital structure on two accounts; the tax deductibility of interest charges and market imperfections.

##### **Modigliani and Miller (MM) Proposition**

Modigliani and Miller (1958) seminal article demonstrates that firm's capital structure is irrelevant in determination of its value, thus the firm's WACC is also independent of its capital structure. The assumptions underlying this conclusion include; perfect capital market, borrowing and lending based on risk-free rate, absence of bankruptcy costs and agency costs. Modigliani and Miller's ideas were that if a firm can lower its average cost of capital, then the firm will be able to increase its profitability thereby increasing its value and shareholder's

wealth. This is because the cost of equity is greater than the cost of debt. Their notions were that the shareholder bears the financial risk and business risk of the company while the debt holders only bear default risk.

Modigliani and Miller (1963) however demonstrate that in a world with tax deductible interest payments, the firm's value and capital structure are positively related. This is because as a firm increases leverage it gets more and more tax relief and so it lowers its after tax cost of capital, which in turn increases profitability as well as its value. Therefore with tax deductible interest payment, the firm should utilize as much debt as possible if it wants to minimise the cost of capital, maximise its value as well as its shareholders' wealth. This would suggest that highly profitable firms would choose to have high levels of debt in order to obtain attractive tax shields. Miller (1977) however added personal taxes to the analysis and demonstrated that optimal debt usage occurs at a macro-level, but does not exist at a firm level. Moreover, DeAngelo and Masulis (1980) argued that interest tax shields may be unimportant to companies with other tax shields (non-debt tax shield) such as depreciation allowances and investment tax credits.

### **The Trade - off Theory of Capital Structure**

This theory draws extensively from earlier work of Modigliani and Miller. Myers (1984) argues that a firm behaves in such a way that it trades off the benefit of debt financing (favourable corporate tax treatment) against higher interest rates and bankruptcy cost. Therefore, an optimal capital structure results from balancing the value of interest tax shields against various costs of bankruptcy or financial distress.

The theory suggests the existence of target capital structure towards which firm managers tend to adjust their behaviour. The theory further argues that the speed of adjustment towards that target depends on adjustment cost (Hovakimian et al., 2001). Antoniou et al. (2008), on

the other hand suggest that a quick examination of the effect of lagged leverage for one period on current leverage should disclose whether firms have a target capital structure or not and if so, what their speed of adjustment is. A positive and below unity coefficient suggests that the firm has a target leverage ratio and that they revise their capital structure over time. A coefficient greater than one, would imply that the firm does not have a target capital structure. The trade off theory differ significantly from MM by implying that, in real world, firms rarely use 100 percent debt capital. This is because firms limit their use of debt to reduce the probability of financial distress (bankruptcy) and also that interest rate on debt becomes prohibitively high at high debt levels.

Two aspects of trade-off theory are discussed in the literature. First, the static trade-off theory which is a single period model which asserts that firms target their capital structures, such that if the actual leverage ratio differ from the optimal one, then the firm adapts its financing behaviour instantaneously to bring the leverage ratio back to the optimal level. Second is the dynamic trade-off theory which asserts that firm's adjust their behaviour over time to attain the target capital structure. This theory recognizes the role of time and other aspects which are ignored in a single period model particularly the role of expectations and adjustment costs. A dynamic model assumes that the correct financing decision depends on the financing margin expected in the next period. Some firms expect to make payment of funds while others expect to raise them in the next period. If funds are to be raised, they may take the form of debt or equity. More generally, a firm may undertake a combination of these actions.

### **Pecking Order Theory (Information Asymmetry Theory)**

Myers and Majluf (1984) gave this theory a rigorous theoretical foundation. According to Myers and Majluf, the theory advocates for an order in the choice of finance due to different degrees of asymmetry and agency costs present in various sources of finance. Accordingly,

retained earnings are considered first in the financing pecking order because they are cheaper and are rarely affected by asymmetry of information. Second, debt is considered next since it carries low asymmetry which serves as a monitoring device against wasteful spending by the management. Finally, external equity is used as a last option because of its adverse selection effect. The model also asserts that outside investors can rationally discount the firm's stock price when managers issue equity instead of riskless debt. This is because of the perception that a firm only issues equity when in financial trouble. In order to avoid this discount, managers avoid issuance of equity as much as possible. The implication of the pecking order approach is that firms do not have a target level of leverage and their actual level of debt essentially responds to the difference between investment and retained earnings (Benito, 2003).

### **Agency Cost Theory and Capital structure**

Jensen and Meckling (1976) are the pioneers of agency cost theory. Their model identifies two conflicts of interest; conflict between managers and shareholders and debt holders and shareholders. They suggest that since managers possess less than 100% residual claims on the company it can cause a conflict. On the other hand, conflict between debt holder and shareholder can arise when issuance of debt gives more incentive to shareholders as compared to debt holders. This is the case since debt investment is more likely to accrue benefits to shareholders than to debt-holders. On the other hand in the event that investment fails then shareholders escape unscathed with the only setback being bankruptcy while debt-holders bear most of consequences. Such conflicts of interest could create agency costs and requires some remedial measures. Jensen and Meckling distinguished among various costs that are likely to arise, these include; monitoring costs arising from monitoring of expenditures incurred by agents and bonding costs arising from drawing up contractual agreement between principal and agent. This act leaves the agent with little room to operate

which could prove costly to the firm. Grossman and Hart (1982) further support this view and maintain that usage of debt reduces conflict between managers and shareholders. Their model puts a spotlight on bankruptcy situation in a debt scenario. It shows that managers are torn between investing in projects with positive Net Present Value (NPV) and consuming perks, but since excessive consumption of perks is likely to bankrupt the firm and by extension job losses for managers, debt therefore creates an enticement for managers to make better investment decisions and consume less perks. This view is further supported by Harris and Raviv (1991) who agree that managers prefer to continue with current firm operations even if investors prefer otherwise.

### **The Market Timing Theory and Capital Structure**

The market timing theory is based on the argument that firms time when to issue equity stocks for subscription by the public. The theory argue that new stocks are only issued at such a time when they are perceived to be overvalued, and bought back when they are undervalued. As a consequence, the perception about the stock price affects the capital structure of the firm. There are two separate versions of market timing theory that have led to dynamics in capital structure;

First is the assumption that economic agents are rational (Myers and Majluf, 1984). Companies issue equity directly after a positive information release which reduces information asymmetry problem between the management of the firm and stockholders. Then the reduction in asymmetry coincides with a rise in the stock price. This triggers firms to create their own timing opportunities.

The second theory assumes irrationality of economic agents (Baker and Wurgler, 2002) which results into time varying mispricing of a firms stock. Therefore managers make new

equity issues when they perceive their costs to be irrationally low and repurchase them when their costs are irrationally high.

Baker and Wurgler provide supportive evidence that equity market timing has a persistent effect on the firm's capital structure. Their study defines a measure for market timing as a weighted average of external capital needs over a few past years, where the weights used are market to book values of the firm. Their finding was that changes in leverage are strongly and positively related to their market timing measure, so their conclusion was that a firm's capital structure was a cumulative outcome of attempts in the past to time the equity market.

### **Signaling Theory and Capital Structure**

This model asserts that financial decisions made by the firm are signals to potential investors meant to compensate for information asymmetry. These signals are therefore intended to enable investors to make informed decisions concerning company investment. Ross (1977) linked the notion of signalling to capital structure theory and argue that since the management have information on the correct distribution of the firm's returns while outsiders don't, the firm is likely to benefit if the firms securities are overvalued and the converse is true. They also argue that managers can use higher financial leverage to signal optimistic future for the company since debt capital involves a contractual commitment to pay back both principal and interests and failure to do so could result into bankruptcy which may further result into job losses. Hence, additional debt in the firm's capital structure may be interpreted as a positive signal about a firm's future.

In summary, the theories of capital structure discussed show lack of unanimity on capital structure determination and also suggesting lack of consensus on the debate. The MM proposition opens the debate with their capital irrelevance assertion, which they later modify to the reality of taxes and market imperfections. The trade-off theory while building on MM

preposition goes further to introduce the aspect of costs and benefits associated with debt financing, implying that the best strategy is to trade-off these benefits and costs. The trade-off theory therefore assumes the existence of a target leverage towards which firms adjust their behaviour. On the other hand, pecking order theory asserts that firms have an ordered preference when deciding on the choice of financing with internal funds preferred to external ones. This is the case because internal funds are not significantly affected by information asymmetry problems.

## **2.2. Review of Empirical Literature**

The recent empirical studies dwelt on testing the validity of existing theories of capital structure and a number of variables which are thought to affect a firm's capital structure decisions. The key variables which have come under consideration include; asset tangibility, liquidity, profitability, growth opportunities, size and effect of real GDP, among others. In this section, the empirical literature is reviewed based on three broad areas. Those that have looked at corporate financing patterns in developing economies; (Singh and Hamid, 1992; Singh, 1995; Glen and Pinto, 1994; Booth et al., 2001; Bastos et al., 2009 ; Jorgensen and Terra, 2002; Gurcharan, 2010), those that have done single-country analysis; China (Chen, 2004), South Africa (Negash, 2002), Zimbabwe, (Green and Mutenheri, 2002) Kenya, (Ngugi, 2008; Nyang'oro, 2003) and Ghana, (Abor and Biekpe, 2005) and finally, those that have looked at a number of developed economies together with African economies (De jong et al., 2008).

Singh and Hamid (1992) paper is considered to be one of the pioneering papers to analyze capital structure behaviour in developing economies. Their study was based on the following countries; India, Turkey, South Korea, Mexico, Pakistan, Thailand, Malaysia and Zimbabwe. Using descriptive analysis, their study found that the largest firms in these countries tended to use more external finance than those in the developed economies. They also found that they made more use of equity finance than firms in the developed economies. Singh (1995) carried out robustness check of these surprising results using longer time period between 1980 and 1990 and also including Brazil. The results corroborated those by Singh and Hamid

Glen and Pinto (1994) using the same descriptive analysis as Singh and Hamid looked at the nature of capital structure decisions in developing economies. They argued that just like firms in developed economies, those in emerging markets aim to minimize the cost of capital. They



also seek to retain control in the hands of existing shareholders. They suggest that the variation of debt-equity ratios between developed and emerging markets may be due to the macroeconomic environment and government interventions. For example, firms may favour debt if the interest rates are controlled by the government, and high levels of inflation and the associated uncertainty may cause firms in emerging markets to be biased against long-term debt (Glen and Pinto, 1994). So the difference in capital structures may not reflect differences in firm characteristics only but they may also reflect the different macroeconomic environments in which the different firms find themselves.

Booth et al. (2001) in their analysis of firm's capital structure determinants across ten countries in the developing world, namely; Pakistan, Thailand, Brazil, Zimbabwe, Mexico, South Korea among others used panel estimation technique. They found that similar factors affect the capital structure choices in developing and developed countries with the only difference being the manner in which debt ratios are affected by country specific factors. Their findings also showed that the total debt ratios decrease with tangibility of assets, average tax rate, and profitability but generally increased with size and market-to-book ratio. They also found that the business risk factor had ambiguous effect. The results of long-term book-debt ratios were found to be similar to those of the total debt ratios except for the tangibility, which had a positive coefficient. The long-term market debt ratio was negatively correlated with the tax rates, profitability and market-to-book ratio, but positively correlated with the asset tangibility and size. Business risks also had mixed effects on the market value leverage ratios.

Jorgensen and Terra (2002) investigated the determinants of capital structure in seven Latin American Countries. In their analysis, the effect of tangibility, size, profitability, growth opportunities, tax, and business risk were analyzed in each country. In addition, the effects of

macroeconomic (GDP growth, inflation, real interest rate, and real stock returns) and institutional factors were investigated using pooled regression. According to the country-by-country estimation results, tangibility, size, and the presence of tax shields varied across the targeted countries; only profitability showed a consistent negative behaviour, and limited support was found for business risk. In relation to growth opportunities, empirical evidence from their research offered more support for a positive relationship when book value leverages were used, but the sign of the relationship turned negative when market value leverage was used. The results of pooled country estimation also showed that only profitability was consistently negative across the different proxies of capital structure. The effect of real GDP growth and inflation were found to be negative, whereas their combined explanatory power was not remarkable. The most important finding of the study by Jorgensen and Terra was that the explanatory power of the firm specific factors outweighed the explanatory power of the institutional and macroeconomic factors

Bastos et al. (2009) conducted a study using panel data for a sample of 388 firms in a region covering five major economies in Latin America to assess the effect of country specific factors such as legal, institutional and macroeconomic environment on capital structure. The effect of current ratio, tangibility, profitability, growth opportunities, market-to-book ratio, tax rate, size, risk, GDP growth, GDP per capita, and inflation were also tested. The finding of country by country analysis indicated that tangibility, current ratio and return on assets, had a significant negative effect on the total accounting debt ratio as well as the total market value debt ratio. The effect of size and market-to-book ratios was positive on the total debt ratio, yet negative when the market value leverage ratio was used. According to the results of pooled regression, the return on assets had a negative effect while size had a positive one across different leverage ratios. The findings for institutional and macroeconomic factors were not significant except for GDP growth which was found to have a negative effect on the

total indebtedness at market value. The obtained results seemed consistent with the pecking order theory.

Gurcharan (2010) analyzed the determinants of capital structure in four selected ASEAN<sup>4</sup> countries, namely Malaysia, Indonesia, Philippine, and Thailand. The effect of non-debt tax shield, profitability, size and growth opportunities on capital structure decisions were examined in that work in addition to country-specific factors such as the stock market size, development of banking sector, GDP growth rate and inflation. The result for firm specific factors revealed that profitability and growth opportunities were negatively correlated with the market debt to total assets ratio in all countries, but was statistically significant for three of the countries. Non-debt tax shield negatively affected the stated leverage ratio, but was statistically significant in only one country. The signs of the size factor were significant and positive in two of the countries. The results of the country-specific effects analysis show that the stock market development and the GDP growth rate had a significant and negative effect on the market-debt to total assets ratio.

Green and Mutenheri (2002) in their assessment of the impact of economic reform programme on financing choices for listed firms in Zimbabwe came to the conclusion that Zimbabwean firms relied heavily on external short-term financing. While long-term bank loans were found to make little contribution to financing of the corporate sector, the stock market was found to contribute significantly. Asset tangibility, tax rate, growth opportunities, earnings volatility and bank liquidity were found to be significant determinants of capital structure. The study also found that economic reform programmes had little success in opening up the capital markets and improving transparency of financing behaviour of firms.

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<sup>4</sup> The Association of South East Asian countries comprising of ten countries with similar geo-political and economic organization

Ngugi (2008) studied capital financing behaviour of listed firms on the Nairobi Stock Exchange (NSE). The study used a sample of 22 firms for the period 1990 to 1999 and using modified static trade off and pecking order models, she found that the main determinants of capital financing behaviour of listed firms in Kenya are information asymmetry, non debt tax shields and local capital market infrastructure. However, a similar study conducted by Nyang'oro (2003) based on a sample of 20 listed non financial firms for the period 1993-2001 produced contradicting results. He found tax rate to be significant in determining leverage, but with a wrong negative sign. Non-debt tax shield was insignificant in explaining leverage. In addition, profitability, tangibility and growth opportunities were found to be significant in explaining the capital structure of the firms investigated.

Abor and Biekpe (2005) conducted a study on the determinants of capital structure of listed firms, large unlisted firms and small and medium enterprises (SME) in Ghana using panel data analysis for the period 1998-2003. They found that listed and large unlisted firms had higher debt ratios as compared to SMEs. The results further showed that total debt constituted more than 50% of the capital structure of the sampled firms. The study also found that profitability, age of the firm, size of the firm, asset structure and risk were significant in influencing decisions on capital structure in Ghana.

Negash (2002) undertook a study on the relationship between corporate tax and a firm's capital structure. He obtained a sample of 64 industrial sector firms listed on the Johannesburg Stock Exchange (JSE) for the period 1991- 1998 in South Africa. He ran an OLS on the leverage model and found a negative relationship between tax rate variables and extent of leverages. There was no relationship between investment related tax shields and debt related tax shield which is consistent with Titman and Wessels (1988) but a direct contradiction of proposition by De Angelo and Masulis (1980). Negash found the main

determinants of leverage to be its own lagged variable. Liquidity of assets, asset tangibility, size and actual taxes paid were also found to significantly explain leverage.

Chen (2004) conducted a preliminary study on capital structure determinants of listed firms in China using panel data regression. The findings of his study were generally different from those of developed countries due to institutional differences. His conclusion was that Chinese firms neither followed the pecking order nor the trade-off theory. He found that they instead tended to follow what he termed as “new pecking order” in which a firm’s preference for funds is retained earnings first, followed by equity and then long-term debt. He argued that while Western models tended to concentrate on firm characteristics as determinants of capital choice, models that sought to explain behaviour of determinants of capital structure in China needed to look at institutional factors as these also played a very important role.

De jong et al. (2008) analyzed the direct and indirect impacts of firm-specific and macroeconomic factors on capital structure for a number of firms from 42 developed and developing countries. They found that tangibility and firm’s size in half of the countries had a positive effect on long-term debt ratios at market value, whereas growth opportunities and profitability had a negative effect. With respect to the firm’s risk and tax ratios, no plausible results could be obtained. The bond market development and GDP growth rate had a positive impact, while creditor right protection had a negative impact on the long-term debt ratios at market value.

### **2.3. Overview of Literature**

According to reviewed literature, capital structure studies continue to draw mixed findings with different theories not reaching a consensus on capital structure determinants. Empirical studies also show no consensus since even studies conducted within the same locality arrive at different conclusions e.g. (Ngugi, 2008 and Nyangoro, 2003). The review considered comparative studies between developed and developing studies as well as country specific African studies. While previous research focussed mainly on firm specific factors, later studies have laid emphasis on institutional as well as macroeconomic environment to assess the effect of country specific factors. Another conclusion of the study is that capital structure measures remain the same across developed and developing countries. This implies that variables used in developed countries are also applicable in developing countries.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This chapter describes the methodology used in the study. The theoretical framework is described followed by model specification. Later on, estimation procedures, data type and sources as well as variable definition and measurements are discussed.

#### **3.1 Theoretical Framework**

The theoretical framework for this study is based on static trade-off theory as developed by Bradley et al. (1984). According to this model, a value maximizing firm chooses a target debt level that balances the benefits of debt against costs in a single period. The benefits of debt stem from the tax advantage enjoyed by firms because interest payments on debt are tax deductible while the cost that a firm is likely to experience with debt financing include bankruptcy costs which may lead to financial distress. Other studies have modelled this behaviour using pecking order theory where firms are believed to follow a certain hierarchy in making financing choices. Our study could not adopt the pecking order model because of its strong assumption of existence of perfect capital market.

In the static trade-off model, it is assumed that a firm faces a constant marginal tax rate on end-of-period wealth. The firm can deduct both principle and interest payments. However, the investor must pay taxes as they receive the payments. Non-debt tax shield exists but cannot be arbitrated across firms or states of nature. In the event that the firm is unable to make the promised debt payment, then it incurs deadweight financial distress costs.

## Description of Model Components

Let  $\tau_c$  be the constant marginal tax rate on corporate income,  $\tau_{pb}$  be the progressive tax rate on investor bond (debt) income,  $\tau_{ps}$  be the tax rate on investor equity income,  $X$  be the end-of-period value of the firm before taxes and debt payments,  $k$  be the fraction of end of-period value that is lost if the firm defaults on debt,  $B$  be the end-of-period payment promised to bondholders,  $\emptyset$  be the total after-tax value of non-debt tax shields if fully used,  $r_f$  be risk-free (tax-free rate of return),  $f(X)$  is the probability density of  $X$ , and  $F(\cdot)$  be the cumulative probability density function. Based on these assumptions, Table 2 describes the returns to stockholders and bondholders in various states defined by the level of corporate earnings.

**Table 2: Distribution of Returns to Bondholders and Stockholders under different States of Nature**

Total Earnings	State	Debt	Equity	Tax	Loss
$X$	$X < 0$	0	0	0	0
$X$	$0 < X < B$	$X(1 - k)$	0	0	$kX$
$X$	$B < X < B + \emptyset/\tau_c$	$B$	$X - B$	0	0
$X$	$X > B + \emptyset/\tau_c$	$B$	$X - B - \tau_c(X - B) + \emptyset$	$\tau_c(X - B) + \emptyset$	0

**Source: Bradley et al. (1984)**

From Table 2, if earnings are negative ( $X < 0$ ) then both debt and equity gives up their claims and therefore debt payment is forfeited. On the other hand, if earnings are positive but not enough to cover the pledged debt repayment ( $0 < X < B$ ) then equity defaults and debt takes charge and a deadweight loss of  $kX$  is used up in the process.

If on the other hand earnings are large enough for equity not to default, then there remains the question of whether the earnings are low enough that the non-debt tax shield is sufficient to cover the tax liability i.e.  $B < X < B + \emptyset/\tau_c$ . Thus, the last two ranges of states differ with respect to taxation. In the last range of states (high income) the firm is able to utilize fully the



non-debt tax shield ( $\emptyset$ ) and so equity-holders receive  $X - B - \tau_c(X - B) + \emptyset$ . In the penultimate range of states, income is not sufficiently high and non-debt tax shields are not fully utilized. As a result no tax is paid and equity-holders receive  $X - B$ . The dividing line occurs at the point where income is just sufficient to have  $X - B = X - B - \tau_c(X - B) + \emptyset$ . This can then be rearranged as  $X = B + \emptyset/\tau_c$  which defines the boundary as shown in Table 2. To find the market debt value, we integrate bond-holders' after tax returns across various states of nature as follows;

$$V_B = \left( \frac{1 - \tau_{pb}}{1 + r_f} \right) \left[ \int_B^\infty Bf(X)dX + \int_0^B X(1 - k)f(X)dX \right]. \quad (1)$$

The market value of equity can similarly be obtained by integrating the stock-holders' after-tax returns across different states of nature:

$$V_S = \left( \frac{1 - \tau_{ps}}{1 + r_f} \right) \left[ \int_{B+\emptyset/\tau_c}^\infty [(X - B)(1 - \tau_c) + \emptyset]f(X)dX + \int_B^{B+\emptyset/\tau_c} (X - B)f(X)dX \right]. \quad (2)$$

Adding together equation (1) and (2) gives an expression for firm value, i.e.  $V = V_B + V_S$

$$V = \left( \frac{1 - \tau_{pb}}{1 + r_f} \right) \left[ \int_B^\infty Bf(X)dX + \int_0^B X(1 - k)f(X)dX \right] + \left\{ \left( \frac{1 - \tau_{ps}}{1 + r_f} \right) \left[ \int_{B+\emptyset/\tau_c}^\infty [(X - B)(1 - \tau_c) + \emptyset]f(X)dX + \int_B^{B+\emptyset/\tau_c} (X - B)f(X)dX \right] \right\} \quad (3)$$

It is assumed that the firm's choice of its capital structure  $B$ , maximizes its value  $V$  and that the optimal value of  $B$  is found at an interior point such that the optimal solution is provided by first-order condition determined by differentiating  $V$  with respect to  $B$  and setting it equal to zero, i.e.,  $\partial V/\partial B = 0$ . From equation 3 we have,

$$\partial V/\partial B = \left( \frac{1 - \tau_{ps}}{1 + r_f} \right) \left\{ \underbrace{\left[ 1 - F(B) \right] \left[ 1 - \frac{(1 - \tau_c)(1 - \tau_{ps})}{1 - \tau_{pb}} \right]}_{\text{Marginal net tax benefit of debt } t} - \underbrace{\frac{(1 - \tau_{ps})\tau_c}{1 - \tau_{pb}} [F(B + \phi/\tau_c) - F(B)]}_{\text{increase in probability of wasting interest tax shield}} \right. \\ \left. - \underbrace{\frac{kBF(B)}{\text{marginal increase in distress cost}}}_{\text{marginal increase in distress cost}} \right\} \quad (4)$$

The first term in expression (4) represents the marginal net tax benefit of debt. The second term represents the increase in the probability of wasting interest tax shields when earnings are less than tax shields while the third term represents the marginal increase in expected costs of distress. The firm's decision involves trading off the marginal tax advantage of debt against the marginal leverage-related costs in the second and third term.

### The Model Predictions

When equation (4) is re-differentiated with respect to parameters of interest, then the model predictions will be as follows;

Differentiating equation (4) with respect to costs of financial distress ( $k$ ) reduces the optimal debt level i.e.  $\frac{\partial}{\partial k} \left( \frac{\partial V}{\partial B} \right) < 0$ , which implies that an increase in the costs of financial distress ( $k$ ) reduces the optimal debt level;

Differentiating equation (4) with respect to non-debt tax shields ( $\phi$ ) reduces the optimal debt level i.e.  $\frac{\partial}{\partial \phi} \left( \frac{\partial V}{\partial B} \right) < 0$ , which implies that an increase in non-debt tax shields ( $\phi$ ) reduces the optimal debt level;

Differentiating equation (4) with respect to personal tax rate on equity ( $\tau_{ps}$ ) increases the optimal debt level i.e.  $\frac{\partial}{\partial \tau_{ps}} \left( \frac{\partial V}{\partial B} \right) > 0$ , which implies that an increase in the personal tax rate on equity ( $\tau_{ps}$ ) increases the optimal debt level;

Differentiating equation (4) with respect to marginal bond-holder tax rate ( $\tau_{pb}$ ) decreases the optimal level of debt i.e.  $\frac{\partial}{\partial \tau_{pb}} \left( \frac{\partial V}{\partial B} \right) < 0$ , which implies that an increases in the marginal bond-holder tax rate ( $\tau_{pb}$ ) decreases the optimal level of debt;

Differentiating equation (4) with respect to marginal tax rate on corporate income  $\tau_c$  increases the optimal level of debt i.e.  $\frac{\partial}{\partial \tau_c} \left( \frac{\partial V}{\partial B} \right) > 0$ , which implies that an increases in the marginal tax rate on corporate income  $\tau_c$  increases the optimal level of debt;

Testing equation (4) faces the problem that its main elements are not directly observable instead proxies are used which means that only indirect testing is conducted.

### 3.2 Model Specification

The model of equation 4 can be specified using a standard panel data model as shown below for the purpose of empirical testing

$$D_{it} = \beta_1 + \sum_{j=2}^k \beta_j X_{jit} + \eta_t + \alpha_i + \varepsilon_{it}; \quad \varepsilon_{it} \sim iid(0, \sigma^2) \quad \forall i, t \quad (5)$$

Where:

$D_{it}$  is a measure of leverage ratio (Debt ratio) for firm  $i$  in year  $t$ ;

$X_j$  are observed explanatory variables,

$\eta_t$  represents time-specific effects which vary across time but are not firm specific.

$\alpha_i$  represents firm-specific unobserved effects

$\beta_1$  is the intercept;

$\beta_j$  are unknown parameters to be estimated.

$\varepsilon_{it}$  is the idiosyncratic disturbance term

### 3.3 Estimation Procedure

A number of econometric procedures have been applied in the analysis of capital financing behaviour including the Probit and Logit models (Mackie-Mason, 1990) as well as panel data estimation techniques (De Miguel and Pindado, 2001; Ozkan, 2001). Following the latter studies, this study shall adopt panel data estimation technique. The technique is used because this study's observations have two dimensions i.e. cross-section and time-series. Further, panel estimation method contains more degrees of freedom and less multicollinearity leading to more efficient estimates, (Baltagi, 1995 and Hsiao, 2005). It further allows for greater flexibility in modeling differences in behaviour across firms which enables us to control for unobserved heterogeneity (Wooldridge, 2002)..

The panel data analysis method has two main approaches, the fixed effects model<sup>5</sup> (FEM) and the random effects model<sup>6</sup> (REM). The difference between the two approaches is the assumption made about the likely correlation between the individual or cross-section specific error component and the regressors. If there are no firm specific effects, i.e.  $\alpha_i = 0$  and assuming that the classical linear regression assumptions hold, then the pooled ordinary least squares (OLS) approach would give unbiased estimators.

For the pooled OLS, equation (5) can be re-written as:

$$D_{it} = \beta_1 + \sum_{j=2}^k \beta_j X_{jit} + \eta_t + \varepsilon_{it}; \quad \varepsilon_{it} \sim iid(0, \sigma^2) \quad \forall i, t \quad (6)$$

If on the other hand, the unobserved effects are present so that  $\alpha_i \neq 0$  and they are correlated with the observed independent variables then the pooled OLS approach is inappropriate since there would be unobserved heterogeneity bias emanating from firms heterogeneity. The estimates obtained would also not only be biased but also inconsistent. Moreover, even if

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<sup>5</sup> Assumes that the omitted effects specific to cross sectional units are constant over time

<sup>6</sup> Assumes that the omitted effects are random variables

unobserved effect is uncorrelated with any of the explanatory variables, its presence would generally cause OLS to yield inefficient estimates and also invalid standard errors, hence, either FEM or REM can be used instead to fit the model.

The FEM can be used if it is assumed or expected that unobserved effects are correlated with observed explanatory variables. There are three versions of FEM; i.e first differences fixed effect, within-groups fixed effect, and Least squares dummy variables (LSDV) fixed effect<sup>7</sup>.

Based on within-group FEM, the mean values of variables in the observation of a given firm are calculated and subtracted from the data for that firm.

Equation (5) can therefore be transformed by averaging the observation for each firm over time to get;

$$\bar{D}_{it} = \beta_1 + \sum_{j=2}^k \beta_j \bar{X}_{ji} + \bar{\eta} + \alpha_i + \bar{\varepsilon}_i \quad (7)$$

By subtracting equation (7) from (5) one obtains

$$D_{it} - \bar{D}_{it} = \sum_{j=2}^k \beta_j (X_{jit} - \bar{X}_{ji}) + (\eta_t - \bar{\eta}) + (\varepsilon_{it} - \bar{\varepsilon}_i)$$

Or

$$\ddot{D}_{it} = \sum_{j=2}^k \beta_j \ddot{X}_{jit} + \ddot{\eta}_t + \ddot{\varepsilon}_{it}; \quad t = 1, 2, \dots, T \quad (8)$$

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<sup>7</sup> Within groups explains the variations about mean of the dependent variable in terms of the variations about the means of explanatory variables for the group of observations relating to a given individual, whereas First difference eliminates unobserved effect by subtracting the observation for the previous time period from the current time period for all time periods. On the other hand, LSDV explicitly brings the unobserved effect into the model and interact it with dummy variables so that the unobserved effect is treated as a coefficient of individual specific dummy variable.

Where  $\ddot{D}_{it} = D_{it} - \bar{D}_{it}$  is time-demeaned data on leverage ratio, and similarly for  $\ddot{X}_{jit} = X_{jit} - \bar{X}_{ji}$ ;  $\ddot{\eta}_t = (\eta_t - \bar{\eta})$ , and  $\ddot{\varepsilon}_{it} = (\varepsilon_{it} - \bar{\varepsilon}_i)$ .

With this transformation, the unobserved effects,  $\alpha_i$  disappears and this suggest that we can estimate equation (8) by pooled OLS. However, FEM is not without shortcomings. The intercept,  $\beta_0$  and any X variable that is time invariant will drop out. Besides, this estimation procedure tends to reduce the degrees of freedom.

The other method that can be used is the REM. Assuming that we transform equation (5) into the following error structure;

$$D_{it} = \beta_1 + \sum_{j=2}^k \beta_j X_{jit} + \eta_t + \mu_{it}; \quad \mu_{it} \sim iid(0, \sigma^2) \quad \forall i, t \quad (9)$$

Where  $\mu_{it}$  is the composite disturbance term of the of the following form;

$$\mu_{it} = \alpha_i + \varepsilon_{it}$$

The firm specific effect  $\alpha_i$  and  $\varepsilon_{it}$  are now subsumed into composite disturbance term  $\mu_{it}$

Equation (9) assumes that the unobserved effects  $\alpha_i$  are random and uncorrelated with independent variables,  $X_{jit}$

$$Cov(X_{jit}, \alpha_i) = 0; t = 1, 2, \dots, T; J = 1, 2, \dots, K$$

However if this assumption is violated  $\mu_{it}$ , will not be uncorrelated with the  $X_{k,it}$  variables, therefore the random effect estimates will be biased and inconsistent. Further, even if this assumption were to hold, there would still be a possible risk of serial autocorrelation, given that  $\mu_{it}$  are serially correlated across time due to the presence of  $\alpha_i$  in the composite error in each time period as shown below.

$$\text{Corr}(\mu_{it}, \mu_{is}) = \sigma_{\alpha}^2 / (\sigma_{\alpha}^2 + \sigma_{\mu}^2), t \neq s,$$

Where  $\sigma_{\alpha}^2 = \text{var}(\alpha_i)$  and  $\sigma_{\mu}^2 = \text{Var}(\mu_{it})$

The presence of autocorrelation is however common with macro panels and requires specialised estimation technique like generalised least squares method (GLS). The study then uses panel data estimation technique to estimate equation 8 and 9, while pooled OLS is used for equation 6 for comparison purposes.

### **Choice between Fixed Effect and Random Effect: Hausman Test**

Hausman (1978) suggests that the choice between REM and FEM can be decided by testing whether unique errors are correlated with regressors. The hypothesis can be formulated as follows; the null hypothesis is that the preferred model is random Vs the alternative hypothesis that the preferred model is fixed effects (Green, 2008).

### **Diagnostic Tests**

The study generates reliable estimates by conducting a number of tests in order to give the estimable model the proper functional and mathematical form. Some tests we have carried out include; descriptive data analysis and statistical tests. Descriptive data analysis has been undertaken to determine the statistical properties of the data used in the study. An analysis of skewness and kurtosis provides a picture of whether regression data are normally distributed or not. For variables to be normally distributed their skewness should be equal to zero while their kurtosis should be equal to three. Further, the study determines the spread of data, their mean values as well as variance covariance matrix.

The study does not test for heteroscedasticity since it is not considered a serious problem with panel data. Similarly, serial correlation and unit root tests are not conducted since we are

dealing with a micro panel i.e. a panel with few years (9 years). These tests would have been necessary with macro panels which have long time series covering over 20 to 30 years.

### **3.4 Data and Measurement of Variables**

#### ***Data Type and Sources***

The study makes use of secondary data drawn from the annual financial statements of non financial firms listed on the Nairobi securities Exchange (NSE) for the period 2004-2012. All listed non financial firms have initially been selected to construct a universal sample; thereafter firms with missing data of interest are dropped so as to achieve a more balanced panel, (see appendix A1 for more details). Financial firms<sup>8</sup> have been excluded for purposes of this study while for macroeconomic variables use is made of data from the World Bank dataset.

#### ***Definition and Measurement of Variables***

##### **Dependent Variable**

##### ***Leverage Ratio (LEV)***

The analysis uses the capital structure as the dependant variable and it is measured by leverage (debt) ratio. Leverage can be measured using a variety of ratios and the following four are the most popular: total liabilities to total assets (TA), total debt to TA, total debt to net assets and total debt to total equity (Rajan and Zingales, 1995). Other studies differentiate between book and market values but Titman and Wessels (1988) shows a significantly high correlation between the two measures. Empirical studies in developed and developing markets show no significant difference in proxies used; the choice is mainly dictated by the

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<sup>8</sup> Following previous studies, Ozkan (2001); Flanery & Rangan, (2006), all the firms in the financial and investment sector are excluded since their capital structures are incomparable to those of non financial sectors. Besides their capital structure are highly regulated. The firms are banks, investment and insurance companies.



availability of data. In this study, leverage is measured as the ratio of the book value of total debt to the book value of TA.

### **Independent Variables**

#### ***Relationship between Firm Specific Factors and Leverage Ratio***

##### *Tangibility (TANG)*

The asset structure of a firm plays an important role in determination of capital structure, and can be measured by how tangible an asset is. Harris and Raviv (1991) show that highly tangible assets are valuable to a firm in the event of liquidation. Further, tangible assets can be considered as collateral for debt capital (Jensen and Meckling, 1976) and therefore by pledging a firm's tangibles assets as collateral, the cost associated with moral hazard and adverse selection is minimized. We therefore expect a positive relationship between this variable and leverage ratio. Grossman and Hart (1982) on the other hand argue that monitoring costs associated with agency relationship are higher in firms with lower tangible assets because of managers' behaviour in consuming perks. In order to reduce opportunistic behaviour of managers, firms may prefer debt to be high. There is therefore a negative relationship between tangibility and leverage. Based on the aforementioned argument, the outcome of this variable on debt ratio is ambiguous. The study measures tangibility by ratio of fixed asset to total assets.

##### *Profitability (PROFS)*

The financial literature gives conflicting evidence on the relationship between leverage and profitability. According to Myers and Majluf (1984), firms follow a pecking order in their financing choice since retained earnings are more preferred to debt capital, therefore a negative relationship can be inferred between leverage and profitability. On the other hand,

more profitable firms can generally tolerate high debt levels since they can easily meet debt repayment obligations, therefore a positive relationship can be inferred (Petersen and Rajan, 1994). Our study measures firm's profitability using the ratio of earnings before interest and taxes (EBIT) to total assets.

#### *Size (SZ)*

The size of a firm is related to the risks and costs of bankruptcy. It is argued that large firms are more diversified and therefore are prone to lesser risk of bankruptcy and that their size creates less transparency and greater need for monitoring. The former argument suggests a positive relationship between size and leverage, the latter suggesting a negative relationship. Rajan and Zingales (1995) propose using either sales or assets as a measure of size. In this study, size is measured as a ratio of sales to total assets.

#### *Growth Opportunities (GR)*

The previous empirical results on the relationship between the expected growth and the capital structure are ambiguous. First, according to the pecking order theory, the relationship between growth opportunities and leverage is positive since higher growth opportunities imply a higher demand for funds through the preferred source of debt. On the other hand, Myers (1984) argues that due to the agency problems, companies investing in assets that may generate high growth opportunities in the future face difficulties in borrowing against such assets. Therefore, there is a negative relationship between the expected growth and leverage. Following Song (2005), we measure the expected growth by the percentage change in total assets. Alternatively, one could use the ratio of market-to book value to measure the expected growth but due to the lack data, we opt for percentage change in total assets.

### *Non-debt Tax Shields (NDTS)*

According to Modigliani and Miller (1963), the interest of debt is tax deductible, and by shielding firms from paying more taxes, it acts as an incentive to debt financing. However, besides debt, the fixed assets depreciation allowance and investment tax credits can act as a shield which may result into tax savings and literature refers to them as non-debt tax shields (NDTS). According to DeAngelo and Masulis (1980), NDTS could be regarded as substitutes for tax benefits of debt financing. As a result, firms with large NDTS are expected to use less of debt financing, hence a negative relationship between NDTS and leverage can be inferred. In this study, the ratio of non-debt tax shield is defined as depreciation divided by total assets.

### *Liquidity of Assets (LQT)*

Liquidity measures the ease with which an asset can be converted into cash. Liquidity enables a firm to meet its short term debt obligations when they fall due. This generally means that firms with more liquid assets tend to support more debt than firms without. Therefore a positive relationship can be inferred. On the other hand, according to pecking order theory, liquid assets can be used to finance investment opportunities instead of borrowing from external sources hence a negative relationship can be inferred. Another aspect of liquidity argument is that shareholders can manipulate liquid assets at the expense of the debt-holders, thus asset liquidity is used as a proxy for asset substitution (Ngugi, 2008). This study measures liquidity as a ratio of cash and cash equivalents to total assets.

## ***Relationship between Macroeconomic Factors and Leverage Ratio***

### ***Market Capitalization Ratio (MKTCAP)***

Stock markets provide information about firms, and this makes giving loans less risky for creditors. Again, in liquid stock markets, there are more incentives to inform the investors which makes monitoring activity easier (Wanzneried, 2002). Demirgüç-Kunt and Maksimoviç (1995) found that initial improvements in stock markets increase debt ratios, but in already-developed stock markets, further development results in firms using equity instead of debt. We expect positive relationships though between the stock market development indicators and the leverage ratios. The study uses market capitalization ratio (ratio of market capitalization to GDP) to proxy stock market development.

### ***Real GDP (RGDP)***

This study uses real GDP to proxy economic growth. If investment opportunities are related to one another in a given economy, the economic growth and a firm's growth will also be related (Demirgüç- Kunt and Maksimoviç, 1995). Relationship between economic growth and leverage is expected to follow the pecking order theory, in that an increase in real economic growth would also trickle down to firms and as such we expect companies to rely on internal financing when GDP grows. As such, a negative relationship between real GDP growth and leverage ratio is expected. This study measures real GDP by annual GDP growth rate

### ***Average Effective Tax Rate (AERT)***

This variable shall be used to proxy corporate tax rate which is a tax incentive of debt. Since interest payments are tax deductible, the trade-off theory expects a positive relationship between the corporate tax rate and the debt ratio. Based on this theory, the sign of the relationship is expected to be positive. This study adopts similar measure as used by Ngugi

(2008) i.e.  $AETR = (PBT - PAT) / PBT$ . Where PBT is profit before tax and PAT is profit after tax.

#### *Real Deposit Rate (RDEP)*

Since an interest rate is a direct cost of debt, the trade-off theory expects a negative relationship between the interest rate and the leverage ratio. Bernanke and Gertler (1995) state that an increase in interest rates can also decrease a firm's credit ratings since it reduces the value of the collaterals as well as final demand by firms. The study expects a negative relationship between interest rate and leverage ratio. This study measures real deposit rate by annual deposit rate.

## **CHAPTER FOUR**

### **EMPIRICAL RESULTS**

#### **4.0 Introduction**

This chapter reports on descriptive statistics of dependent and independent variables as used in the study, as well as empirical results of regression analysis and concludes by discussing the findings.

#### **4.1 Descriptive Statistics and Correlation Matrix**

The descriptive statistics to be considered include; the mean, standard deviation, minimum and maximum values, skewness and kurtosis as well as a correlation matrix. Table 3 shows the summary for pooled sample of firms listed in Kenya. The table indicates a strongly balanced panel with a sample of 261 observations. The table also indicates that on average a listed firm in Kenya finances its investment activities using 46% debt and 54% equity. As explained in the literature, tangibility and profitability plays an important role in determination of a firm's capital structure. On average about 56% of listed firm's asset structure is fixed or intangible. This enables them to have easy access to credit facilities because fixed assets have high collateral value. On the other hand the average profitability of firms is about 18% which is quite low by any given standards and this explains why they supplement their internal financing sources with external sources. The average tax rate for listed firms is about 30%. This is a debt incentive which encourages firms to increase debt financing. The real GDP growth rate stood at about 4.7% during the study period (see appendix A2 for more details).

**Table 3: Summary Statistics for Pooled Sample**

Variable	No of firms	Mean	Standard Deviation	Minimum Value	Maximum Value	Skewness	Kurtosis
LEV	261	0.463207	0.170278	0.144	1.000	0.245572	2.291664
TANG	261	0.556529	0.205135	0.127	0.978	-0.183220	1.955531
PROFS	261	0.176701	0.201986	-0.562	1.266	1.685570	9.553049
SZ	261	1.090920	0.858917	0.186	5.891	2.681534	11.78542
GR	261	0.163701	0.250255	-0.740	1.450	1.762325	8.99429
NDTS	261	0.031659	0.020870	0.000	0.168	2.168314	12.31699
LQT	261	0.055100	0.065239	0.000	0.371	2.376984	9.186062
AERT	261	0.295364	0.261209	-2.140	2.230	0.068230	-1.792021
RGDP	261	0.047778	0.016731	0.015	0.070	-0.652246	2.380586
MKTCAP	261	0.382111	0.082464	0.242	0.506	0.027637	1.996966
RDEP	261	0.056556	0.023168	0.024	0.116	1.563093	5.29526

**Source: Own computation**

Note: the variables are represented as follows; **LEV**: Leverage Ratio; **TANG**: Tangibility; **PROFS**: Profitability; **SZ**: Size; **GR**: Growth Opportunities; **NDTS**: Non-debt Tax Shields; **LQT**: Liquidity of assets; **MKTCAP**: Market Capitalization Ratio; **RGDP**: Real GDP; **AERT**: Average Effective Tax Rate; **RDEP**: Real Deposit Rate.

Table 3 further reports the tests for normality using skewness and kurtosis measures. Skewness measures the degree of asymmetry of the distribution while kurtosis measures the relative peakedness or flatness of the distribution relative to normal distribution. The results on Table 3 shows that normality test for all variables can be rejected with skewness and kurtosis measures deviating from expected normal distribution values. Two variables i.e tangibility and real GDP shows negative asymmetry while the rest are positively skewed. Again, kurtosis statistic indicates that leverage ratio, tangibility, average effective tax rate, real GDP and market capitalization ratio have a fairly flat peak while the rest are highly peaked hence a leptokurtotic distribution.

**Table 4: Correlation Matrix for Pooled Sample**

	LEV	TANG	PROFS	SZ	GR	NDTS	LQT	AERT	RGDP	MKTCAP	DEPR
<b>LEV</b>	1.00										
<b>TANG</b>	-0.11	1.00									
<b>PROFS</b>	-0.41	0.15	1.00								
<b>SZ</b>	0.37	-0.57	-0.32	1.00							
<b>GR</b>	0.10	-0.09	0.22	-0.04	1.00						
<b>NDTS</b>	0.11	0.27	-0.09	-0.06	-0.24	1.00					
<b>LQT</b>	-0.29	-0.19	0.13	0.18	0.01	-0.02	1.00				
<b>AERT</b>	0.04	0.04	0.00	0.00	-0.01	0.08	0.06	1.00			
<b>RGDP</b>	-0.05	-0.02	-0.05	0.04	-0.03	0.04	-0.01	0.04	1.00		
<b>MKTCAP</b>	-0.02	-0.02	-0.04	-0.04	0.01	-0.04	0.00	-0.04	0.46	1.00	
<b>DEPR</b>	0.03	0.03	0.09	-0.01	-0.05	-0.09	0.05	-0.10	-0.20	0.22	1.00

**Source: Own computation**

Note: the variables are represented as follows; **LEV**: Leverage Ratio; **TANG**: Tangibility; **PROFS**: Profitability; **SZ**: Size; **GR**: Growth Opportunities; **NDTS**: Non-debt Tax Shields; **LQT**: Liquidity of assets; **MKTCAP**: Market Capitalization Ratio; **RGDP**: Real GDP; **AERT**: Average Effective Tax Rate; **RDEP**: Real Deposit Rate.

An assessment of the extent of correlation among the variables used in the study has been done using a correlation matrix as shown in Table 4. The table shows that most cross correlation terms for the independent variables except tangibility and size (-0.57) are quite low, hence giving little cause for concern about multicollinearity problem. Again as expected most variables have expected sign of correlation with the dependent variable except tangibility, liquidity of assets, market capitalization and real deposit rate. The correlation between leverage ratio and profitability is negative suggesting that profitable firms in Kenya tend to borrow less. This could be because of available internal source of financing which is least affected by information asymmetry. Similarly, leverage ratio and real GDP are negatively correlated. On the other hand, leverage ratio and size, growth opportunities, non debt tax shield and average effective tax rate are positively correlated.



## 4.2 Empirical Results and Discussion

**Table 5: Regression Results for Empirical Models**

(Standard errors in parentheses)

<b>Dependent Variable:</b>	<b>Leverage ratio</b>		
<b>Independent Variables</b>	<b>Fixed effects</b>	<b>Random effects</b>	<b>Pooled OLS</b>
Tangibility	0.1657*** (0.0594)	0.1362** (0.0560)	0.0639 (0.0523)
Profitability	-0.0744** (0.0308)	-0.0916** (0.0310)	-0.2537*** (0.0461)
Size	0.0498*** (0.0146)	0.0608*** (0.0136)	0.0791*** (0.0126)
Growth opportunities	0.0488** (0.0239)	0.0636*** (0.0237)	0.1560*** (0.0354)
Non-debt tax shields	0.3615 (0.4731)	0.54595 (0.4502)	1.1053** (0.4318)
Liquidity of assets	-0.3584*** (0.1223)	-0.4371*** (0.1193)	-.8325*** (0.1336)
Average effective tax rate	0.0474** (0.0184)	0.0475** (0.0188)	0.0392 (.0322)
Real GDP	-0.6991** (0.3303)	-0.7363** (0.3367)	-0.7215 (0.6027)
Market capitalization ratio	0.0381 (0.0677)	0.0405 (0.0690)	0.0069 (0.1233)
Real deposit rate	0.3130 (.2231)	0.3648 (0.2271)	0.6863 (0.4013)
_Cons	0.3172*** (0.0506)	.3187*** (0.0532)	0.3530*** (0.0608)
<b>No of Observation</b>	261	261	261
<b>R - Squared</b>	0.3648	0.3542	0.4033
<b>F Statistic</b>	4.6800	-	16.9000
<b>Prob &gt; F</b>	0.0000	-	0.0000
<b>Wald chi2(10)</b>	-	60.5600	-
<b>Prob &gt; chi2</b>	-	0.0000	-
<b>RMSE</b>	0.0728	0.0743	0.1340

\*, \*\*, \*\*\* shows level of significance at 10%, 5%, and 1% respectively

Table 5 reports regression results based on three empirical models; fixed effects, random effects and the pooled OLS.

### **Empirical Results**

The estimation results reported in Table 5 indicate that the fixed effects model has a negligible statistical advantage over the other two models as far as root mean square error (RMSE) is concerned. The model has a RMSE of 0.0728 which is the least among the three. The R-square for the three models is below 50%, however their joint test shows high significance. The Wald joint test for the random effects model is significant even at 1% level. Similarly, the F test for fixed effects and pooled OLS regression is significant at 1% level respectively (see appendix A3, A4 and A6 for more details)

The Hausman test was also conducted to test the fixed effects versus the random effects model (see appendix A5 for more details). The value of the test statistic is 10.73 and asymptotically distributed as a chi-square with 10 degrees of freedom. The test result indicates that the null hypothesis that the random effects model is the preferred cannot be rejected at all conventional levels of significance.

The coefficients obtained from Table 5 further shows that tangibility, profitability, size, growth opportunities, average effective tax rate, liquidity of assets and real GDP are all significant with expected sign. This observation is confirmed by both fixed and random effects models. However, with pooled OLS regression, tangibility, average effective tax rate and real GDP losses their significance even though they maintain the expected sign. Equally worth noting, is the fact that profitability as well as non-debt tax shield gains the strength of significance in the pooled OLS regression. These findings however show that both random and fixed effects models offer better estimates than pooled OLS regression in the context of panel data estimation.

In summary, the regression results in Table 5 suggests that leverage ratio has a positive relationship with tangibility, size, growth opportunities and average effective tax rate while a negative relationship exist between leverage ratio and profitability, liquidity of assets, and real GDP.

### **Discussion of Empirical Results**

Generally, a number of theoretical postulations are confirmed by the above regression results. The result shows that there exists a positive relationship between tangibility and leverage. These findings confirm our earlier observation that asset structure plays a crucial role in enabling a firm to have easy access to loan facilities because tangible asset is considered as collateral and besides it helps to reduce moral hazard and adverse selection problems (Jensen and Meckling, 1976). According to transaction cost economics, tangible assets have minimal asset specificity problem which makes them appropriate for use as collateral. Therefore, asset tangibility is an important criterion in credit appraisal by banks.

A negative relationship between profitability and leverage in listed Kenyan firms is a vindication of pecking order theory i.e. more profitable firms prefer to finance their investment activities using retained earnings as opposed to external financing. A firm may opt for this policy in order to maintain its financial flexibility and to minimize the amount of information available to outsiders. According to Myers and Majluf (1984), firms follow a pecking order in their financing choice in order to minimise underinvestment problems and project mispricing.

All the three models estimated in the study seem to corroborate our theoretical prediction that a positive relationship between size and leverage exists in Kenya and a firm's size matters when it comes to decisions on raising capital for investment. This finding is consistent with

the results of Booth et al. (2001), Abor and Biekpe (2005), De Jong et al., (2008), Gurcharan (2010), who all argue that large companies can tolerate high level of debt. It can further be argued that a firm's size is related to risks of bankruptcy and therefore large firms being more diversified are prone to lesser risk of bankruptcy.

From the empirical results, a positive relationship can be inferred between growth opportunities and leverage in Kenya. This finding is consistent with the pecking order and signalling model assertion that firms with higher growth opportunities have higher demand for funds. This finding is also consistent with a study by Jorgensen and Terra (2002) but inconsistent with that by Gucharan (2010) and Kabir et al (2008).

The relationship between liquidity of assets and leverage is negative for listed firms in Kenya. This finding is consistent with our a priori expectation that firms with more liquid assets tend to use less debt and this finding further supports pecking order theory for Kenyan firms. This implies that a firm with lots of cash and cash equivalents at its disposal may use them to finance its investment activities before considering external financing. This finding is consistent with similar findings by Negash (2002).

The tax variable considered in the study is average effective tax rate which the empirical results indicate has a positive relationship with leverage. This implies that an increase in tax rate leads to increased borrowing activities by Kenyan firms, a result which is consistent with static trade-off theory. Increased tax rate triggers increased borrowing activities because of interest tax shield with debt financing i.e interest payment on borrowed fund is tax deductible. This finding is however inconsistent with that of previous studies in developing countries (Booth et al., 2001; Negash, 2002; Ngugi 2008).

This study sought also to establish the impact of macroeconomic characteristics on leverage and of all the variables considered, only real GDP and average effective tax rate were found to have a significant relationship with leverage. According to a study by Demirgüç-Kunt and Maksimović (1995), the growth of an economy and firms' growth are related, consequently, the relationship between economic growth and leverage is expected to follow pecking order theory and as such Kenyan firms rely on internal financing when GDP grows. The findings of this study are also consistent with Gucharan (2010) and Jorgensen and Terra (2002)

In summary, the findings of the study show that there are a number of internal and external factors which affect the financing choices of Kenyan firms. The identified firm specific factors are tangibility, size, growth opportunities, profitability, and liquidity of assets while macroeconomic factors are economic growth and corporate tax rate. This also shows that the explanatory power of internal firm specific factors by far outweighs macroeconomic factors on capital structure of listed firms in Kenya. Another finding is that the behaviour of Kenyan firms can best be explained using pecking order theory.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

#### 5.0 Introduction

This chapter covers the study summary, conclusion and policy implications. It also highlights the limitation of the study and suggests the area for further research.

#### 5.1 Summary

This study investigated the capital structure of listed non financial firms in Kenya. The study intended to identify the determinants of capital structure of listed firms since most Kenyan firms finance their investment activities through equity security. A firm that does not apply the correct mix of debt and equity faces the risk of financial distress which could result into bankruptcy. This study specifically sought to first determine the relationship between firm specific factors and capital structure; second, to determine the effect of economic growth and other macroeconomic factors on a firm's capital structure. Finally, the study sought to assess the relevance of capital structure theories in Kenya.

The study was conducted based on a sample of 29 non financial firms listed on the Nairobi Securities Exchange during the period 2004-2012 using panel data estimation technique. Both fixed effects and random effects models were estimated together with pooled OLS and based on the Hausman test, the random effects model emerged as the most preferred. The estimation results further revealed that firm specific factors with significant effect on capital structure of listed firms in Kenya are asset tangibility, firm's profitability, size of the firm, firm's growth opportunities and finally liquidity of a firm's assets while the macroeconomic factors are real GDP and tax rate. Asset tangibility, size and growth opportunities were found to have a direct relationship with capital structure while profitability and liquidity of firm's assets were found to have an inverse relationship. These findings are consistent with findings

in most of developed countries despite profound difference in institutions and macroeconomic environment.

Tangibility as had largely been expected was found to have a positive relationship with leverage because firms with tangible assets can use them as loan collateral. A negative relationship between profitability and leverage confirms our prediction that more profitable firms tend to borrow less as compared to more profitable ones and this also implies that Kenyan firms use retained earnings to finance their investment activities before opting for external borrowings. While this may confirm existence of pecking order in Kenya, there could be other reasons at play. Issues such as weak enforcement of contracts, lack of property rights and debt covenants may compel firms to rely on retained earnings rather than external debt. The size of a firm is also important in capital structure decision according to this study. Size has a positive relationship which confirms our prediction that large firms are more likely to secure debt as compared to small ones because probability of failure is lower with the former as compared to the latter since bigger firms are likely to be more diversified.

As regards the macroeconomic factors, economic growth and corporate tax rate were found to have a significant influence on a firm's decision in terms of choice of capital structure with real GDP having an indirect relationship and tax rate having a direct relationship. This finding implies that high economic growth discourages firms from using debt which means that growth of the economy can be equated to a firm's growth and by extension to a firm's profitability leading to minimum use of debt. This finding further confirms existence of pecking order theory in Kenya. The finding on tax rate on the other hand implies that firms in Kenya take advantage of tax deductibility of debt to borrow more whenever there is an increment in corporate tax rate.

Another major finding of the study is that Kenyan firms follow pecking order theory in their choice of finance for investment. They prefer internal sources as opposed to external sources whenever there is an investment opportunity. Firms are believed to behave this way in order to minimize information asymmetry problem that seem to be common in Kenya.

## **5.2 Conclusion and Policy Implications**

The study findings lead us to make conclusions and draw important policy implications. First, given that size of a firm is an important consideration in determining the ease with which firms can access funding in the capital market, and given that small firms are disadvantaged compared to big ones, the government should offer financial products which target firms in the small and medium market segments so that they can compete favourably with bigger ones. This will help to stimulate the growth of small firms. Perhaps the decision by the Capital Market Authority to approve the setting up of a small and medium enterprise segment on the NSE would be a welcome move.

The Kenyan capital market is characterised by heavy use of equity security as compared to debt. This could expose firms to high financial risk. The government through the Capital Market Authority should therefore institute measures which could encourage firms to balance their use of debt and equity as a way of cushioning them from risks of financial distress during difficult economic times.

The study also shows that the growth of the economy is critical to a firm's growth. Policies which promote growth of the economy such as predictable fiscal and monetary policy should be encouraged as well as stable macroeconomic environment.

The firms in Kenya seem to follow pecking order theory which is based on assumption of asymmetry of information. This being the case it then follows that the degree of asymmetry



in Kenya may be quite high, the government should therefore make a deliberate effort to minimise asymmetry in the country as this could cause market failure (Akerlof, 1970). In this regard the government can use various signalling devices to bring confidence into the market.

### **5.3 Limitations of the Study**

The study used static trade –off theory to model behaviour of listed firms in Kenya. This is a single period model which assumes that firms target their capital structures in such a way that if actual leverage ratio differs from the optimal one then they instantaneously adjust their behaviour to bring the leverage ratio back to the optimal level. The reality however differs since ordinarily firms adjust their behaviour over time to attain the target capital structure. Therefore a dynamic trade-off model would have been more appropriate in this study. A dynamic model recognizes the role of time and other aspects which are ignored in a single period model particularly the role of expectations and adjustment cost. A dynamic model also assumes that the correct financing decision depends on the financing margin expected in the next period. Some firms expect to make payment of funds while others could expect to raise them in the next period.

### **5.4 Areas for Further Research**

Based on the study limitations explained above, we recommend that future studies use dynamic trade-off model to study the capital structure. This is because practically, the factors affecting a firm's capital structure are likely to change over rather than being static. It is also important to conduct an analysis under dynamic setting so as to establish the speed of adjustment towards target leverage when firms are off target i.e not operating at optimal level.

## REFERENCES

- Abor, J. and Biekpe, N. (2005). What determines the capital structure of listed firms in Ghana?. *African Finance Journal*, 7, 37-48.
- Arkelof, G. A. (1970). The market for “lemons”: Quality, uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84, 488-500.
- Antoniou, A., Guney, Y., and Paudyal, K. (2008). The determinants of capital structure: Capital market oriented versus bank oriented. *Journal of Financial and Quantitative Analysis*, 43, 59-92.
- Baker, M. and Wurgler, J. (2002). Market Timing and Capital Structure. *The Journal of Finance*, 57(1), 1-32
- Baltagi, B. (2005). *Econometric analysis of panel data*. 3<sup>rd</sup> ed. Editura John Wiley & Sons. Anglia.
- Bastos, D. D., Nakamura, W. T., and Basso, L. F. C. (2009). Determinants of capital structure of publicly-traded companies in latin america: an empirical study considering macroeconomic and institutional factors. *RAM. Revista de Administração Mackenzie*, 10(6), 47-77.
- Bernanke, B. S.; M. Gertler. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *The Journal of Economic Perspectives*, 9, 27-48.
- Booth, L., Aivazian, V.A., Demirgüç-Kunt, A., and V. Maksimoviç. (2001). Capital Structure in developing countries, *Journal of finance*, 56, 87-130.
- Bradley, M., Jarell, G. A. and Kim, E. H. (1984). On the existence of an optimal capital structure: theory and evidence. *The Journal of Finance*, 39, 857-878.
- Brealey, R.A. and Myers, S.C. (1988). *Principles of Corporate Finance*. 3rd ed. McGraw-Hill Publishing Co., New York.
- Chen, J. (2004). Determinants of capital structure of Chinese-listed companies. *Journal of Business Research*, 57, 1341-1351.

- Capital markets Authority. (1999) Rules and Regulations on Listed companies. <http://www.nse.co.ke>.
- Chen, Weiyun and Zongyizhang. (2002). An Empirical Investigation into the Capital Structure Determinants of Publicly Listed Chinese Companies. *Journal of Business Research*, 57, 1341– 1351
- Collier, P. and Gunning, J. W. (1999). Explaining African economic performance. *Journal of Economic Literature*, 3, 64-111.
- DeAngelo, H. and Masulis, R.W. (1980). Optimal Capital Structure under Corporate and Personal Taxation. *Journal of Financial Economics*, 8, 3-29.
- De Jong, A., Kabir, R., and Nguyen, T. T. (2008). Capital structure around the world: The roles of firm-and country-specific determinants. *Journal of Banking & Finance*, 32(9), 1954-1969.
- De Miguel, A. and Pindado, J. (2001). Determinants of Capital Structure: New Evidence from Spanish Panel Data. *Journal of Corporate Finance*, 7, 77-99.
- Demirgüç-Kunt, A. and V. Maksimović. (1995). Stock Market Development and Firm Financing Choices. *The World Bank Economic Review*, 10(2), 1-48.
- Flannery, M. J. and Rangan, K. P. (2006). Partial adjustment toward target capital structures. *Journal of Financial Economics*, 79, 469-506.
- Gachoki, K. M. (2005). Capital structure choice; an empirical testing of the pecking order theory among firms quoted on the Nairobi Stock Exchange. *Unpublished Masters Research Project*. University of Nairobi, Nairobi, Kenya.
- Glen, J. and Pinto, B. (1994). Debt or equity? How firms in developing countries choose. *IFC Discussion Paper* Number 22.
- Green, C. J. and Mutenheri, E. (2002). Financial reform and financing decisions of listed firms in Zimbabwe. *Loughborough University Economic Research Paper* Number 02/5.
- Greene, W. H. (2003). *Econometric Analysis*. Prentice Hall, New Jersey

- Gurcharan, S. (2010). A Review of Optimal Capital Structure Determinant of Selected ASEAN Countries. *International Research Journal of Finance and Economics*, 47, 30-41.
- Harris, M. and Raviv, A. (1991). The theory of the capital structure. *Journal of Finance*, 45, 321-345.
- Hausman, Jerry A. (1978). Specification Tests in Econometrics. *Econometrica*, 46(6), 1251-1271
- Hermanns, J. (2006). *Optimale Kapitalstruktur und Market Timing*. Editura DUV. Germania.
- Hovakimian, A Opler, T. and Titman, S. (2001). The debt-equity choice. *Journal of Financial and Quantitative Analysis*, 36, 1-24.
- Hsiao, C. (2003). *Analysis of Panel Data*. 2<sup>nd</sup> Ed. Cambridge University Press.
- Jensen, M. C. and Meckling, W. H. (1976). Theory of the firm: managerial behaviour, agency costs and the ownership structure. *Journal of Financial Economics*, 3, 305-360.
- Jorgensen, Jan J.; Terra Paulo R.S. (2002). Determinants of capital structure in latin america: The role of firm specific and macroeconomic factors, *working paper*.
- Kiogora E. M. (2000). A study of capital structure of companies quoted at the Nairobi stock exchange an empirical Study. *Unpublished Masters Research Project*. University of Nairobi, Nairobi, Kenya.
- Levine, R. and Zervos, S (1998). Capital control and liberalization and stock market development. *World Development*, 26, 1169-1183.
- Mackie-Mason, J.K.(1990). Do taxes affect Corporate Financing decision? *The Journal of Finance*, 45(5), 1471-1493.
- Miller, M.H. (1977). Debt and Taxes. *The Journal of Finance*, 32(2), 261-275.
- Modigliani, F. and Miller, M. (1958). The cost of capital, corporation finance and the theory of investment. *American Economic Review*, 48, 361-297.
- Modgiliani, F. and Miller, M.H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. *The American Economic Review*. 53(3), 43 3-443

- Murinde, V. (2006). Capital markets: Roles and challenges. *Paper prepared for the International conference on “Accelerating Africa’s Development Five Years into the Twenty-First Century”*, Tunis, Tunisia
- Myers, S. C. and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, 187-221
- Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, 39, 575-592.
- Negash, M. (2002). Corporate Tax and Capital Structure: Some evidence & implication. *Investment Analysts Journal*, 56, 17-27.
- Nairobi Stock Exchange (2009). *Annual Report 2009*. Nairobi. NSE
- Nairobi Securities Exchange (2012). *NSE Handbook*. Nairobi. NSE
- Ngugi, R.W. (2008). Capital financing behaviour: evidence from firms listed on the Nairobi Stock Exchange. *The European Journal of Finance*, 14(7), 609-62
- Nyang’oro, O. (2003). Tax and Capital Structure: the Case of listed Firms in Kenya. *Unpublished Masters Research Project*. University of Nairobi, Nairobi, Kenya.
- Ozkan, A. (2001). Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data. *Journal of Business Finance & Accounting*, 28,175-198.
- Petersen, M. A. and Rajan, R. (1994). Trade credit: theory and evidence. *Review of Financial Studies*, 103, 661-691.
- Rajan, R. G. and Zingales, L. (1995). What do we know about capital structure? Some evidence from International Data. *Journal of Finance*, 50, 1421-1460.
- Ross, S. (1977). The determination of financial structures: An incentive signalling approach. *Bell Journal of Economics*, 8, 23-40.
- Shyam-Sunder, L. and Myers, S. C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, 51, 219-244.

- Singh, A. (1995). Corporate financial patterns in industrializing economies: A comparative international study. *IFC Technical paper No. 2.*
- Singh, A. and Hamid, J. (1992). Corporate financial structures in developing countries. *IFC Technical paper No. 1.*
- Titman, S. and Wessels, R. (1988). The Determinants of Capital Structure Choice. *The Journal of Finance*, 430, 1-19.
- Wooldridge, J. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MIT Press.
- Wanzenried, Gabrielle. ( 2002). Capital Structure Dynamics in UK and Continental Europe *Working Paper EFMA 2002 London Meetings.*

## APPENDICES

### Appendix A1: List of Non Financial Firms Quoted on the Nairobi Securities Exchange

No	Firm's Name	Years Targeted	No of Years Targeted	No of years available	Remarks
1	Eaagads	2004-2012	9	5	Excluded
2	Kakuzi	2004-2012	9	9	included
3	Kipchorua	2004-2012	9	9	included
4	Limuru Tea	2004-2012	9	9	included
5	Rea Vipingo Plantations	2004-2012	9	9	included
6	Sasini Ltd	2004-2012	9	9	included
7	Williamson Tea Kenya	2004-2012	9	9	included
8	Car & General	2004-2012	9	9	included
9	CMC Holdings	2004-2012	9	9	included
10	Marshalls (EA)	2004-2012	9	9	included
11	Sameer Africa	2004-2012	9	9	included
12	Express	2004-2012	9	9	included
13	Hutchings Biemer	2004-2012	9	5	Excluded
14	Kenya Airways	2004-2012	9	9	included
15	Longhorn Kenya	2004-2012	9	5	Excluded
16	Nation Media Group	2004-2012	9	9	included
17	ScanGroup	2004-2012	9	6	Excluded
18	Standard Group	2004-2012	9	9	included
19	TPS EA (Serena)	2004-2012	9	9	included
20	Uchumi Supermarket	2004-2012	9	5	Excluded
21	ARM Cement	2004-2012	9	9	included
22	Bamburi Cement	2004-2012	9	9	Included
23	Crown Paints Kenya	2004-2012	9	9	Included
24	E.A. Cables	2004-2012	9	9	Included
25	E.A. Portland Cement	2004-2012	9	9	Included
26	KenGen	2004-2012	9	7	Excluded
27	KenolKobil	2004-2012	9	9	Included
28	KP&LC	2004-2012	9	9	Included
29	Total Kenya	2004-2012	9	9	Included
30	A Baumann & Co	2004-2012	9	5	Excluded
31	B.O.C Kenya	2004-2012	9	9	Included
32	BAT Kenya Ltd	2004-2012	9	9	Included
33	Carbacid Investments	2004-2012	9	9	Included
34	East African Breweries	2004-2012	9	9	Included
35	Eveready EA	2004-2012	9	6	Excluded
36	Kenya Orchards	2004-2012	9	2	Excluded
37	Mumias Sugar Co	2004-2012	9	9	Included
38	Unga Group	2004-2012	9	9	Included
39	AccessKenya Group	2004-2012	9	6	Excluded
40	Safaricom Ltd	2004-2012	9	6	Excluded

## Appendix A2: Summary Statistics

```
. xtsum LEV TANG PROFS SZ GR NDTS LQT AERT RGDP MKTCAP DEPR
```

Variable		Mean	Std. Dev.	Min	Max	Observations
LEV	overall	<b>.4632069</b>	<b>.1702777</b>	<b>.144</b>	<b>1</b>	N = 261
	between	<b>.1557889</b>	<b>.1645556</b>	<b>.7202222</b>		n = 29
	within	<b>.0739668</b>	<b>.1716513</b>	<b>.9187624</b>		T = 9
TANG	overall	<b>.5565287</b>	<b>.2051349</b>	<b>.127</b>	<b>.978</b>	N = 261
	between	<b>.1879894</b>	<b>.1971111</b>	<b>.8634444</b>		n = 29
	within	<b>.0884744</b>	<b>.2164176</b>	<b>.8988621</b>		T = 9
PROFS	overall	<b>.1767011</b>	<b>.2019858</b>	<b>-.562</b>	<b>1.266</b>	N = 261
	between	<b>.1280621</b>	<b>.0233333</b>	<b>.6187778</b>		n = 29
	within	<b>.1578068</b>	<b>-.7238544</b>	<b>1.047257</b>		T = 9
SZ	overall	<b>1.09092</b>	<b>.8589173</b>	<b>.186</b>	<b>5.891</b>	N = 261
	between	<b>.7953899</b>	<b>.2822222</b>	<b>4.064333</b>		n = 29
	within	<b>.3529306</b>	<b>-.7404138</b>	<b>2.961031</b>		T = 9
GR	overall	<b>.1637011</b>	<b>.2502554</b>	<b>-.74</b>	<b>1.45</b>	N = 261
	between	<b>.0993114</b>	<b>.0388889</b>	<b>.4177778</b>		n = 29
	within	<b>.230366</b>	<b>-.78741</b>	<b>1.318146</b>		T = 9
NDTS	overall	<b>.031659</b>	<b>.0208696</b>	<b>0</b>	<b>.168</b>	N = 261
	between	<b>.017865</b>	<b>.0067778</b>	<b>.0923333</b>		n = 29
	within	<b>.0112341</b>	<b>-.0316743</b>	<b>.1073257</b>		T = 9
LQT	overall	<b>.0550996</b>	<b>.0652392</b>	<b>0</b>	<b>.371</b>	N = 261
	between	<b>.0530133</b>	<b>.0028889</b>	<b>.2765556</b>		n = 29
	within	<b>.0391435</b>	<b>-.0553448</b>	<b>.2422107</b>		T = 9
AERT	overall	<b>.295364</b>	<b>.2612094</b>	<b>-2.14</b>	<b>2.23</b>	N = 261
	between	<b>.0739483</b>	<b>.0522222</b>	<b>.4511111</b>		n = 29
	within	<b>.250859</b>	<b>-2.106858</b>	<b>2.263142</b>		T = 9
RGDP	overall	<b>.0477778</b>	<b>.0167306</b>	<b>.015</b>	<b>.07</b>	N = 261
	between	<b>0</b>	<b>.0477778</b>	<b>.0477778</b>		n = 29
	within	<b>.0167306</b>	<b>.015</b>	<b>.07</b>		T = 9
MKTCAP	overall	<b>.3821111</b>	<b>.0824644</b>	<b>.242</b>	<b>.506</b>	N = 261
	between	<b>0</b>	<b>.3821111</b>	<b>.3821111</b>		n = 29
	within	<b>.0824644</b>	<b>.242</b>	<b>.506</b>		T = 9
DEPR	overall	<b>.0565556</b>	<b>.0231678</b>	<b>.024</b>	<b>.116</b>	N = 261
	between	<b>0</b>	<b>.0565556</b>	<b>.0565556</b>		n = 29
	within	<b>.0231678</b>	<b>.024</b>	<b>.116</b>		T = 9



### Appendix A3: Fixed Effects Regression

. xtreg LEV TANG PROFS SZ GR NDTS LQT AERT RGDP MKTCAP DEPR, fe

```

Fixed-effects (within) regression      Number of obs      =      261
Group variable: idcode                Number of groups   =       29

R-sq:  within = 0.1740                Obs per group: min =       9
      between = 0.3648                    avg =      9.0
      overall  = 0.2979                    max =       9

corr(u_i, Xb) = 0.3083                F(10,222)         =      4.68
                                          Prob > F          =      0.0000
  
```

LEV	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TANG	.1657497	.0593585	2.79	0.006	.0487715	.2827279
PROFS	-.0744315	.0307769	-2.42	0.016	-.1350837	-.0137793
SZ	.0498369	.0146409	3.40	0.001	.020984	.0786898
GR	.0488253	.0239487	2.04	0.043	.0016295	.0960212
NDTS	.3614953	.4731322	0.76	0.446	-.5709099	1.293901
LQT	-.3583608	.1222649	-2.93	0.004	-.5993092	-.1174124
AERT	.0473651	.0184331	2.57	0.011	.0110388	.0836914
RGDP	-.6991195	.3302811	-2.12	0.035	-1.350007	-.0482322
MKTCAP	.038114	.0677078	0.56	0.574	-.0953182	.1715463
DEPR	.3129795	.2230977	1.40	0.162	-.1266809	.7526399
_cons	.3172026	.0506267	6.27	0.000	.2174321	.4169731
sigma_u	.13437602					
sigma_e	.07275024					
rho	.77333156	(fraction of variance due to u_i)				

F test that all u\_i=0: F(28, 222) = 22.42 Prob > F = 0.0000

. estimates store fixed

## Appendix A4: Random Effects Regression

```
. xtreg LEV TANG PROFS SZ GR NDTs LQT AERT RGDP MKTCAP DEPR, re
```

```
Random-effects GLS regression           Number of obs   =       261
Group variable: idcode                 Number of groups =        29

R-sq:  within = 0.1697                 Obs per group:  min =         9
        between = 0.4388                avg =       9.0
        overall = 0.3542                max =         9

Random effects u_i ~ Gaussian          Wald chi2(10)   =       60.56
corr(u_i, X) = 0 (assumed)            Prob > chi2     =       0.0000
```

LEV	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
TANG	.1362296	.0559754	2.43	0.015	.0265199 .2459393	
PROFS	-.091567	.0309642	-2.96	0.003	-.1522558 -.0308782	
SZ	.0607722	.0135772	4.48	0.000	.0341613 .087383	
GR	.0636042	.0237466	2.68	0.007	.0170617 .1101467	
NDTS	.5458553	.4502364	1.21	0.225	-.3365919 1.428302	
LQT	-.4370857	.119278	-3.66	0.000	-.6708663 -.203305	
AERT	.0474812	.0187566	2.53	0.011	.0107189 .0842435	
RGDP	-.736301	.3366755	-2.19	0.029	-1.396173 -.0764292	
MKTCAP	.0404802	.0690369	0.59	0.558	-.0948296 .17579	
DEPR	.3648413	.2270782	1.61	0.108	-.0802238 .8099064	
_cons	.3187164	.0531998	5.99	0.000	.2144467 .4229862	
sigma_u	.10799323					
sigma_e	.07275024					
rho	.68784696	(fraction of variance due to u_i)				

```
. estimates store random
```

## Appendix A5: The Hausman Test

. hausman fixed random

	Coefficients		(b-B) Difference	sqrt(diag(V <sub>b</sub> -V <sub>B</sub> )) S.E.
	(b) fixed	(B) random		
TANG	.1657497	.1362296	.0295201	.0197532
PROFS	-.0744315	-.091567	.0171356	.
SZ	.0498369	.0607722	-.0109353	.0054786
GR	.0488253	.0636042	-.0147789	.0031044
NDTS	.3614953	.5458553	-.18436	.1454004
LQT	-.3583608	-.4370857	.0787248	.0268601
AERT	.0473651	.0474812	-.0001161	.
RGDP	-.6991195	-.736301	.0371815	.
MKTCAP	.038114	.0404802	-.0023662	.
DEPR	.3129795	.3648413	-.0518618	.

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(10) = (b-B)' [(V<sub>b</sub>-V<sub>B</sub>)<sup>(-1)</sup>] (b-B)  
 = **10.73**  
 Prob>chi2 = **0.3791**  
 (V<sub>b</sub>-V<sub>B</sub> is not positive definite)

## Appendix A6: Pooled OLS Regression

. reg LEV TANG PROFS SZ GR NDTs LQT AERT RGDP MKTCAP DEPR

Source	SS	df	MS	Number of obs =	261
Model	3.04060184	10	.304060184	F( 10, 250) =	16.90
Residual	4.49797091	250	.017991884	Prob > F =	0.0000
				R-squared =	0.4033
				Adj R-squared =	0.3795
Total	7.53857276	260	.028994511	Root MSE =	.13413

LEV	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TANG	.0638762	.0523423	1.22	0.223	-.0392118	.1669642
PROFS	-.2537387	.0460782	-5.51	0.000	-.3444897	-.1629878
SZ	.0791051	.0125767	6.29	0.000	.0543353	.1038749
GR	.1560449	.0353515	4.41	0.000	.0864201	.2256696
NDTS	1.105273	.4318451	2.56	0.011	.2547549	1.955792
LQT	-.8325106	.1336139	-6.23	0.000	-1.095663	-.5693582
AERT	.0391917	.0322244	1.22	0.225	-.0242741	.1026575
RGDP	-.7214997	.6027361	-1.20	0.232	-1.908588	.4655881
MKTCAP	.0068926	.123347	0.06	0.955	-.236039	.2498242
DEPR	.6863407	.4012791	1.71	0.088	-.1039779	1.476659
_cons	.3529768	.060793	5.81	0.000	.233245	.4727085