THE RELATIONNSHIP BETWEEN BUSINESS RISK AND LEVERAGE

EMPIRICAL EVIDENCE FROM COMPANIES LISTED AT NAIROBI STOCK EXCHANGE

BY

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DECLARATION

This research project is my original work and has not been presented elsewhere for any other assessment or award of a degree in any University.

Signed .....

Date.....20/11/2009.....

Kaguri John njuku

This research project has been submitted for examination with my approval as a university supervisor.

Signed .....

Date.....21-11-2009.....

Mr. Lishenga

Dedication

I specifically dedicate this project work to my dear wife for her support and my dear parent for enduring responsibility of bringing me up to what I am today.

Acknowledgement

It is with profound appreciation that I acknowledge the personalities who I came in touch with while undertaking the study and for their invaluable contribution to the research project, without which the project would not have been successful.

I am deeply indebted to my supervisor Mr. Lishenga, who patiently and warmly guided me through this research by providing positive criticisms, suggestions and encouragement. His patience and perseverance is worth appreciating.

My indebtedness also extends to many whom I cannot mention individually but whose dedicated effort toward this project was profound.

To all of you, I say thank you.

Abstract

This paper studies the relationship between business risk and leverage of companies listed at Nairobi stock exchange (NSE). The main objective is to test whether there exist a relationship between business risk and leverage for companies trading at NSE. Even though the study aims at determining the relationship between business risk and leverage, in the empirical tests, we include additional variables to minimize possible misspecification errors owing to omitted variables. The variables are; Non-debt tax shields, Firm size, Research and development and Advertising expenditures, Profitability and Industrial classifications.

Using multiple regressions model and SPSS program as a tool of analysis, we analyze the relationship between business risk and leverage in sub-period 1998 to 2002 and 2003 to 2008.

Our model finds no evidence to support theoretical work that predicts that leverage ratios are related to firm's business risk and firm size in both sub-periods. The result of 'non-debt tax shield' and 'profitability are mixed. In the period 1998 to 2002, the result confirms the prediction of regression model that non-debt tax shield and profitability are negatively related to leverage ratio and the relation is significant for non-debt tax shield attribute and insignificant for profitability attribute. In the period 2003 to 2008, we found profitability and non-debt tax shield attributes to be positively related to leverage but only profitability was significantly related to leverage ratio.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The sources of funds available to firms are numerous. In the main, they are either borrowed money or equity funds. Financing choices are some of the most important decisions that corporate manager have to make on behalf of their companies. Given the low cost of borrowing relative to equity, corporations usually prefer to issue debts.

Ferri and Jones (1979) observes that business risk should substantially determines the amount of debt the capital markets provides and that markets set interest rates and maximal debt loads by reference to the volatility of a firm's income stream. Alaganar (2004) notes that, issuing more debt increases the financial risk of the company. Financial risk in turn increases volatility of shareholders' earnings, caused by the presence of fixed obligation (interest payment). In extreme case, financial risk represent likely bankruptcy of the company when it fails to service its debt due to inadequate cash flows. Management has incentive to minimize the bankruptcy risk of the firm.

Demsetz and Strahan (1995), identify leverage as one of basic factors affecting risk and return. Leverage plays a direct role in the risk/return trade-off since it simultaneously magnifies both return and risk, and can be controlled directly by management.

Adams (1995) argues that firms which engage in risky business are likely to have uncertain future net cash flows. The selected leverage at which a company chooses to operate has a significant influence on both the level and variability of reported total return. According to Demsetz and Strahan (1995), apart from product or geographical diversification, returns cannot be increased by raising leverage without also increasing variability. Similarly variability cannot be reduced without also reducing returns.
Jaffee, Ross and Westerfield observe that debt provides tax benefits to the firm. However, debt put pressure on the firm because interest and principal payments are

obligations. If these obligations are not met, the firm may risk some sort of financial distress. The ultimate distress is bankruptcy, where ownership of the firms' assets is transferred from the shareholders to the bondholders. The possibility of bankruptcy has a negative effect on the value of the firm. However, it is not the risk of bankruptcy itself that lowers value rather it is the cost associated with bankruptcy that lowers value.

To a point use of leverage may lower the cost of capital for the firm and presumably for the economy. Nevertheless, past a certain point, the financial structure of the system could become vulnerable to short term shock from a downturn in real output. According to traditional net income theory, the cost of capital falls and then rises with use of debt. Counter to this argument, Modigliani and Miller (1958) claimed that the cost of capital is constant for all capital structures before taxes and falls on an after tax basis, with the use of leverage. Buell and Schwartz (1981), found out that by the increased use of leverage, American corporations have been able to maintain the nominal rate of return on equity in spite of a decline in the rate of return on total assets. The desire of the companies to maintain stability of apparent profitability in spite of the fall in the rate of gross return provides, perhaps, one reason for the increasing use of debt financing.

Titman and Wessel's (1988), observes that a number of theories have been proposed to explain the variation in debt ratios across firms. The theories suggest that the firms select capital structure depending on attributes that determine the various costs and benefits associated with debt and equity financing. In their land mark paper, Modigliani and miller demonstrate that under certain assumptions the market value of a firm is independent of its capital structure. These assumptions include absence of taxes, transaction costs and bankruptcy costs. Miller (1977) has argued the introduction of corporate and personal taxes does not alter the capital structure irrelevance result in the absences of bankruptcy costs. He assumes that debt is risk less. The inclusion of bankruptcy costs, considered together with the tax deductibility of interest payments, led Catania's (1983) to conclude that capital structure will affect the value of the firm.
The ability of the business firm to "tolerate" leverage depends on the variance of net operating earnings. Baxter (1967) observes, businesses with relatively stable income

streams (such as utilities) are less subject to the possibilities of ruin and may find desirable to rely relatively heavily on debt financing. Firms with risky income streams, on the other hand, are less able to assume fixed charges in the form of debt interest and may well find that the average cost of capital begins to increase even when reliance on debt is moderate.

The risk that debt imposes on a firm is recognized by creditors, shareholders and management. Creditors respond by adjusting the interest rates on firms as leverage increases or by refusing to lend to firms that are too highly leveraged. In addition, creditors often imposes restrictions on debts that prevent them from issuing additional debt above some well-defined limit, from subordinating their credit to that of others, from making certain investment decision and from paying dividend.

Kale, Noe and Ramirez (1991) notes that although there is consensus that business risk is one of the primary determinants of a firm's capital structure, existing empirical and theoretical research does provide ambiguous answer to the question of whether an increase in a firm's business risk should lead it to lower the level of debts in its capital structure.

Business risk can be thought of as the risk of a destructive shift in the assumptions, parameters and targets that underpin a business initiative. Reilly (1997) defines business risk as the uncertainties of income-flows caused by the nature of a firm's business. Accordingly, Ndegwa (2001) equate business risk as a function of the operating conditions faced by a firm and the variability that these operating conditions inject into the operating income and expected dividends. Business risk is largely associated with the efficiency with which a firm conducts its operations and environmental factors that it must deal with. Bault (2008) identify the following as key factors that affects business risk namely; demand fluctuations (business cycle), new product launch, brand valuations, asset prices, residual assets and liabilities, patent risks, political and weather risk, macro-economic shifts and business expansion strategy.

A company with debt is termed as leveraged or geared company. According to Alaganar (2004), gearing is expected to be more prevalent in periods where the economy is booming and / or in low interest rate environment. Capital structure represents the proportionate relationship between debt and equity. Thus the capital structure of a firm will include only long-term interest bearing debt and common stock, excluding short-term liabilities. The capital structure decision is significant managerial decisions as it influence the shareholders' return and risk. According to Copeland and Weston (1991), capital structure is the permanent financing represented by long-term debt, preferred stock and shareholder equity. It is further contrasted from financial structure, which includes short-term debt in additional to the component of capital structure.

1.2 Problem statement

Various researches carried out at different stock exchanges, to establish the relationship between business risk and company leverage have arrived at differing and sometimes contradicting conclusions.

Gosh, Cai and Wenhui (2000) found out that the relationship between business risk and leverage was quadratic -first increasing and then decreasing, This conforms to the traditional theory which suggests that when risk is low, higher will be the debt level, but with higher risk, debt level should be lower. However, the problem of omitted variable remains, as the known determinants 'explains' a very small percentage of the variation in capital structure.

Kale, Neo and Ramirez (1991) found the relationship between business risk and leverage to be quadratic –first decreasing and then increasing. Their tests support the predicted U-shaped model for the relation between business risk and optimal debt level. However, they noted that while they have derived the theoretical correct functional form for the relation between the optimal debt level and one of its important determinants, business risk, not all potential sources for misspecification were eliminated.

Bradley, Jarrell and Kim (1984) found that firm leverage ratios are related inversely to earnings volatility (measure of business risk). Jaffe and Westerfield (1987) prove that given the appropriate choice of parameters, optimal debt level will be an increasing function of business risk. In addition, a shift in the distribution of earnings increases the probability of bankruptcy that induce a firm to hold less debt in its capital structure (Catania's, 1983).

Alaganar (2004), Ferri and Jones (1979), Flath & Knoeber (1980), and Titman and Wessel's (1988) observes that there was no significant relationship between corporate leverage and business risk. On the other hand Scott (1976) finds that the relationship between changes in earning variance and leverage being ambiguous.

Bradley, Jarrell and Kim (1984), Kale, Neo and Ramirez (1991), Ferri and Jones (1979), Flath and Knoeber (1980), Catania's (1983), Gosh, Cai and Wenhui (2000) used cross-sectional, firm specific data to test for the existence of an optimal capital structure. These studies, however, have generally proceeded by specifying a linear optimal debt level-business risk relationship. Catania's (1983), Bradley, Jarrell and Kim (1984) studies were based on a trade-off between corporate taxes and default costs while, Kale, Neo and Ramirez (1991) study was based on trade-off between personal and corporate taxes. These authors reach quite different conclusion on the existence of an optimal capital structure. This lack of consensus reflects the fact that these authors used different methodologies and samples.

Kiogora (2000) study on variations of capital structures of companies quoted at the NSE based on sectors, point out that, there are differences in capital structure among industry grouping and those firms within a given sector tend to cluster toward some target equity/ total asset ratios. Similarly Catania's (1983) argues that firms strive to maintain leverage level of other firms in the same industry, and the average leverage level of the industry is the results of historical chance.

As observed, these studies on the relationship between business risk and leverage have arrived at differing conclusions and were carried out in the developed economies notably

the United State of America. Very little is documented about the emerging market particularly NSE considering firms that trade in this market are fairly small in size compared to those of USA stock exchanges. This leaves a question as to what causes this differing results given most studies were preceded by specifying a linear optimal debt level-business risk relationship whereas assuming a trade-off between taxes and default costs and what would be the probable result if such a study was carried out at the NSE. This study will seek to provide this explanation.

The purpose of this study is to extend on research carried elsewhere in order to find out whether the relationship between business risk and leverage is negative, quadratic or no relationship at all. A local study done six years ago by Ondinga using local data available at NSE from 1989 to 2001 concluded that profitability and non-debt tax shield are most significant variables in determining leverage. He also found out that, the relationship between business risk and leverage was positive, however, t-statistics shows the relationship was not significant.

The study takes into account two periods characterized by different economic environment of low growth rate almost zero (1997 to 2002) and increased growth rate (2003 to 2008) unlike one period study by Ondinga. In addition Ondinga study proxies leverage ratio as; total debt divided by total debt plus equity and business risk as the variance of operating income. The current study proxies; leverage as a ratio of long term debt divided by total assets averaged over five year period for the variable's ability to reflect total reliance on borrowed funds and business risk as the standard deviation of the first difference in cash flow (adjusted EBIT for depreciation, amortizations and exception items), scaled by the average total asset over the two sub-periods of five years. This does not suffer from statistical problems associated with alternative measure of firm volatility. Another reason for this study is appreciating dynamism of business world. Many changes have taken place since 2001. In my view, it is important to conduct a current research that will depict the current situation in this country based on trade- off theory.

The firm's level of business risk affects the type of financing that should be used. The study is based on the premise that, the greater the business risk, the less desirable debt financing relative to common stock financing. The study infers inverse relationship between leverage and business risk.

1.3 Objective of the study

To test whether there is a relationship between business risk and leverage for companies trading at NSE.

1.4 Importance of the study

1.4.1 Investors

Investors will benefit from the study by learning how if a company issues debt could affect their immediate and future return on investment both positively and adversely. More so, empirical evidence linking leverage to firm-specific factors (business risk), could enable shareholders to make better informed decisions.

1.4.2 Academicians

Although there is consensus that business risk is one of the primary determinants of a firm's capital structure, existing empirical and theoretical research does provide ambiguous answer to the question of whether an increase in a firm's business risk should lead it to lower the level of debts in its capital structure. The study will be important for academicians and researchers who want to carry further studies on the relationship between business risk and leverage on various market and firms characteristics.

1.4.3 Fund managers

Investors sometimes entrust the investment decision to fund managers. The fund managers attempt to select individual constituent stocks by predicting future income streams on leveraged companies. The study will benefit fund managers in constructing portfolios that would maximize investor's return while minimizing risk exposure.

1.5.4 Regulators

The capital market authority is charged with the role of regulating stock market. An understanding of the relationships between business risk and leverage will be beneficial to the authorities in regulating and formulating policies geared toward developing the market. Business risk – the uncertainty of future income streams- should substantially determine the amount of debt the capital markets provide.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

One avenue for corporate wealth creation is to secure inexpensive sources of financing. Given the low cost of borrowing relative to equity, corporations usually prefer to issue debt. A company with debt is termed as leveraged or geared company. According to Weston and Copeland (1991), debt is a two-edged sword – it increases shareholders returns when the firm has high operating income, but makes them worse than they otherwise would be when the firm has low operating income. Demsetz and Strahan, (1995), identify leverage as one of basic factors affecting risk and return. Leverage plays a direct role in the risk/return trade-off since it simultaneously magnifies both return and risk, and can be controlled directly by management.

According to Alaganar, (2004), gearing is expected to be more prevalent in periods where the economy is booming and / or in low interest rate environment. Demsetz and Strahan (1995), observes that the selected leverage at which a company chooses to operate has a significant influence on both the level and variability of reported total returns. Apart from product or geographic diversification, returns cannot be increased by raising leverage without also increasing variability. Similarly variability cannot be reduced without also reducing returns. Alaganar, (2004) argue that, issuing more debt increases the financial risk of the company. Financial risk in turn increases volatility of shareholders' earnings, caused by the presence of fixed obligation (interest payment). In the extreme case, financial risk represents likely bankruptcy of the company when it fails to service its debt due to inadequate cash flows.

To a point use of leverage (gearing) may lower the cost of capital for the firm. Nevertheless, Buell and Schwartz (1981) observes that past a certain point, the financial

structure of the system could become vulnerable to short term shock from a downturn in real output. Modigliani and Miller (1958) argue that the cost of capital is constant for all capital structures before taxes and falls on an after tax basis, with the use of leverage while Schwartz (1959) maintain that, the cost of capital falls and then rises with use of debt. Buell and Schwartz (1981) found out that by the increased use of leverage, American corporations have been able to maintain the nominal rate of return on equity in spite of a decline in the rate of return on total assets. The desire of the companies to maintain stability of apparent profitability in spite of the fall in the rate of gross return provides, perhaps, one reason for the increasing use of debt financing.

Baxter (1967) observes, businesses with relatively stable income streams (such as utilities) are less subject to the possibilities of ruin and may find desirable to rely relatively heavily on debt financing. Firms with risky income streams, on the other hand, are less able to assume fixed charges in the form of debt interest and may well find that the average cost of capital begins to increase even when reliance on debt is moderate.

According to Buell and Schwartz (1981), two important factors encourages the use of debt, first, an attempt by some management to shield the rate of return on equity from falling rate of return on total assets by employing more and more borrowed fund and second, the growth of business confidence in government's ability to stabilize the economy and to prevent recessions of significant depth and duration. A belief in the efficacy of government fiscal and monetary policies leads to a reduced fear of poor times and of consequently being unable to meet debt service charges.

Uncertainties lie at the heart of business decision making in many kinds of corporations. Given that each industry will be characterized by the same business uncertainty, one would expect firms in the same industry to attempt to adopt a capital structure suited to their business risk. Adams (1995), argue that firms which engage in risky business are likely to have uncertain future net cash flows. Bault, (2008) identify the following as key factors that affects business risk namely; demand fluctuations, new product launch, brand

valuations, asset prices, residual assets and liabilities, patent risks, political and weather risk, macro-economic shifts and business expansion strategy.

Scott (1972), and Buell, & Schwartz (1981) concluded that industries have developed optimum financial structures conditioned by their inherent business risks. The findings suggest a conscious policy on the part of financial decision makers to adjust the composition of their sources of funds to the business risk to which the firms are exposed. Kale, Noe and Ramirez (1991) notes that although there is consensus that business risk is one of the primary determinants of a firm's capital structure, existing empirical and theoretical research does provide ambiguous answer to the question of whether an increase in a firm's business risk should lead it to lower the level of debts in its capital structure.

Moreover, the ability of the business firm to "tolerate" leverage will depend on the variance of net operating earnings. Since businesses with relatively stable income streams (such as utilities) are less subject to the possibility of ruin, they may find it desirable to rely relatively heavily on debt financing. Firms with risky income streams, on the other hand, are less able to assume fixed charges in the form of debt interest and may well find that the average cost of capital begins to increase with leverage even when reliance on debt is moderate.

A high degree of leverage increases the probability of bankruptcy and therefore increases the riskiness of the overall earnings stream. There are real costs associated with bankruptcy, other things being equal, excess leverage reduces the total value of firm.
The effect of risk of ruin is not likely to be linear with the reliance on debt (Baxter, 1967). When leverage is very low, an increase in the reliance on debt is not likely to exert a significant effect on the probability of bankruptcy. When there is considerable debt in the capital structure, however, any increase in leverage is likely to have a much greater effect on the cost of capital. The risk of ruin thus becomes significantly important as the degree of financial leverage increases. Therefore, the interest rate on debt is low,

but the interest rate may begin to rise very sharply, as the capital structure becomes more risky.

The inclusion of bankruptcy costs, generally considered in conjunction with the tax deductibility of interest payments, has led others Baxter (1967), Scott (1976), DeAngelo and Masulis (1980), and Kraus and Litzenberger (1973)) to conclude that capital structure will affect the value of the firm. Value maximizing firms may choose optimal structures consisting of both debt and equity. The firm's optimal capital structure will involve the tradeoff between the tax advantage of debt and various leverage-related costs. The upshot of these extensions of miller's model is the recognition that the existence of an optimal capital structure is essentially an empirical issue as to whether or not the various leverage-related costs are economically significant enough to influence the costs of corporate borrowing.

A number of theories have been proposed to explain the variation in debt ratios across firms. The theories suggest that the firms select capital structure depending on attributes that determine the various costs and benefits associated with debt and equity financing. Empirical work in this area has lagged behind the theoretical research, perhaps because the relevant firm attribute are expressed in terms of fairly abstract concepts that are not directly observable, Titman and Wessel (1988).

2.2 Theories of optimal capital structure

This is one of the most studied in area of corporate finance, going back to the celebrated MM theorem in Modigliani and Miller (1958).

2.2.1 The traditional theory

The term "traditional view" is used to refer to the views of finance theorist before 1958, when seminal article by Modigliani and miller challenged these view. According to this theory, an optimum point or rage does exist. The traditional view holds that a firm can substitute debt for equity in lower ranges of debt to equity to lower the firm's cost of capital. It assumes (other thing being equal) that the market value of a firm will rise with

an increase in leverage in its financial structure. Beyond a certain point, any increase in financial leverage will either keep the market value constant or cause it to decline. This indicates that the cost of capital is increasing. They view the cost of capital curve to be U shaped and therefore suggesting a range of optimum debt level.

2.2.2 Modigliani and miller view

They refute traditional theory. In their well known article of 1958, Modigliani and Miller argued that "the average cost of capital to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class." This proposition is based on the assumptions of no corporate income taxes, perfect capital markets, no transactions costs and independence between the anticipated stream of net operating earnings and the capital structure of the firm. Thus, financial leverage has no effect on the cost of capital. Arbitrage, they argued, would ensure that an individuals' exposure to risk would not change because of home-made leverage was as good as corporate leverage.

In correction to their original propositions, MM (1963) recognized that the value of the firm was dependent on the after tax net cash flows. Therefore where taxes discriminates between returns on debt and equity in favor of debt, an optimal capital structure exists and a firm should use close to 100% debt. This correction by appreciating the tax advantage of debt reduced the difference in the perceived effects of leverage between the traditional view and MM's original proposition. However, MM's were quick to warn against a temptation to maximize debt in the capital structure. Other sources of finance like retained earnings may be cheaper when personal income taxes are considered. Increasing cost of debt financing as well as limitations imposed by lenders may check the amount of debt that a firm can carry. MM (1963) have shown that , assuming the firm earns its debt obligation with certainty, the firm's market value would be a linear function of the amount of debt used in its capital structure.

2.2.3 The trade–off theory

The trade-off theory predicts that target debt ratio will vary from firm to firm. Companies with safe, tangible assets and plenty of taxable income to shield ought to have high target ratio. Unprofitable companies with risky, intangible assets ought to rely primarily on equity financing. The trade-off theory of capital structure avoids extreme prediction and rationalizes moderate debt ratio. The trade –off theory explains many industry differences in capital structure, for example high-tech growth companies, whose assets are risky and mostly intangible, normally use relatively little debt. Utilities or retailers can and do borrow heavily because their assets are tangible and relatively safe.

However there are things that trade-off theory cannot explain. The most profitable companies generally borrow the least. Here the trade-off theory fails, for it predict exactly the reverse. Under the trade-off theory, high profit should mean more debt-servicing capacity and more taxable income to shield and therefore should give a higher debt ratio.

2.2.4 Pecking order theory

This theory is based on asymmetric information – managers know more than outside investors about profitability and prospects of the firm. According to this theory, firms prefer internal finance, since these funds are raised without sending any adverse signals that may lower the stock price. If external finance is required, firms issue debt first and issue equity only as a last resort. This pecking order arises because debt is less likely than equity issue to be interpreted by investors as a bad news.

The pecking order explains why most profitable firms generally borrow less, it is not because they have low target ratios but because they don't need outside money. Less profitable firms issue debt because they do not have sufficient internal funds for their capital investment program and because debt is first in the pecking order of external financing.

2.2.5 Subsequent development

Miller (1977) has argued the introduction of corporate and personal taxes does not alter the capital structure irrelevance result in the absences of bankruptcy costs. He assumes that debt is risk less.

According to the agency model of firm espoused by Jensen and Meckling (1976), high leverage could engender agency costs (monitoring expenditures) because it provides incentive for residual claimants in the entity to increase the value of their claim while simultaneously reducing the value of the debt.

Kraus and Litzenberger (1977) observe that the existence of bankruptcy costs and taxation of corporate profits are market imperfections central to a positive theory of the effect of capital structure valuation. The optimization of the firm's financial structure involves a trade-off between tax advantage of debt and bankruptcy cost. A tax advantage to debt financing arises since interest charges are tax deductible. If a firm earns its debt obligation, financial leverage decreases the firm's corporate tax liabilities and increases its after tax operating earnings. However if a firm cannot meet its debt obligation, it is forced into bankruptcy and incur the associated penalties. They also point out that, if the firm's market value is not necessarily a concave function of its debt obligation assumed by traditional net income theory.

Catania's (1983) indicate that the Tax Shelter- Bankruptcy Cost (TS-BC) theory of optimal capital structure determines a firm's optimal leverage as a function of the distribution of future earnings, business risk, default costs, and taxes. The TS-BC theory predict that a shift in earnings profitability distribution that implies an increase in the probability of failure (relative to the level of leverage prior to the earning distribution shift) simultaneously raises the expected marginal default costs and lowers the expected marginal tax savings. Consequently, leverage becomes less attractive on the margin and optimal leverage is reduced until marginal expected savings again equals marginal expected defaults cost. A basic single period, risk neutral TS-BC model was derived. The basic model analyses two testable cross-sectional predictions: the bankruptcy probability to leverage and the business risk to leverage relationships. The TS-BC theory predicts that, if the inverse relationship exists, it is more likely to be evident in firms with relatively high business risk and marginal bankruptcy costs. Businesses that tend to have "high" failure rate tend to have less debt in their capital structures and default costs are

large enough to induce the typical firm to hold an optimum mix of debt and equity. If smaller firms have relatively greater business risk and marginal bankruptcy costs, then tests based on samples including relatively more small firms should be relatively more likely to provide evidence of an inverse relationship than earlier studies.

The free cash flow hypothesis (Jensen,1986) postulates that as a firm move closer to the leverage constraints in its debt contracts, higher cash flows generated from invested assets enable claimants to grant managers, as well as to reduce agency and other costs of contracting (like bankruptcy costs).

In the DeAngelo and Masulis (1980) framework, through corporate taxation, the cash flow to the government either equal to a fraction of the firm's cash flow in excess of debt plus non-debt tax shields, or is equal to zero when the cash flows are insufficient to cover these obligations. Thus, the government's claim is a European call option on the firm's cash flows with an exercise price equal to the sum of debt and the non-debt tax shields. The value-maximizing firm minimizes the value of the government's option portfolio which is long in the corporate tax option and short in the personal tax option. At the optimal debt level, the firm equates the tax-rate-weighted marginal effects of the debt level on the two options. The effect of a change in business risk and optimal debt level, therefore, depend upon the relative magnitudes of the changes in the values of the two option induce by this change. They demonstrate that, it is a firm's marginal tax rate that affects the firms leverage decisions and marginal rate varies depending on depreciation and investment tax credit options available to the firm.

The principal difference between MI and TS-BC theory disappear, however in the world where interest expense is tax deductible and market imperfections operate to restrict the amount of fixed-income obligation a firm can issue. Both schools of thought do in fact subscribe to the optimum financial structure concepts under conditions approximating the actual business environment.

2.3 Determinant of capital structure

According to Weston and Copeland (1991), wide variations in asset structure proportions are observed in practice. Wide rages in leverage ratio are observed among different industries and even among individual companies within a given industry. These large differences, in turn, reflect a wide range of historical, management and other factors influencing financial leverage decisions.

Several studies shed light on the specific characteristic of firms and industries that determines leverage ratios, Catania's (1983), Titman and Wessel (1988). These studies generally agree that leverage increases with fixed assets, non-debt tax shields, growth opportunities, and firm size and decreases with volatility, development expenditure, bankruptcy probability, profitability and uniqueness of the product. The following are attribute that different theories of capital structure suggest may affect the firm's debt-equity choice.

2.3.1 Non-Debt tax shields

DeAngelo and Masulis (1980) present a model of optimal capital structure that incorporate the impact of corporate taxes, personal taxes, and non-debt related corporate tax shields. They argue that tax deductions for depreciation and investment tax credits are substitute for the tax benefits of debt financing. As a result, firms with large non-debt tax shields relative to their expected cash flow include less debt in their capital structure. Indicators of non-debt tax shields include the ratio of investment tax credits over total assets (ITC/TA), depreciation over total assets (D/TA), and a direct estimate of non-debt tax shield over total assets (NDT/TA).

2.3.2 Growth

Equity-controlled firms have a tendency to invest sub-optimally to expropriate wealth from the firm's bondholders. The cost associated with this agency relationship is likely to be higher for firms in growing industries, which have

more flexibility in their choice of future investments. Expected future growth should thus be negatively related to long-term debt levels. Growth opportunities are capital assets that add value to a firm but cannot be collateralized and do not generate current taxable income. This suggests a negative relation between debt and growth opportunities. Indicators of growth include capital expenditures over total assets (CE/TA) and growth of total assets measured by the percentage change in total assets (GTA). Since firms engage in research and development to generate future investments, research and development over sales RD/S) also serves as an indicator of growth attribute.

2.3.3 Volatility

Many authors have suggested that a firm's optimal debt level is a decreasing function of the volatility of earnings. Counter-examples to this basic hypothesis have been demonstrated by Bradley, Jarrell and Kim (1984). Weston and Copeland (1991), point out that cash flow stability and debt ratio are directly related. With greater stability in sales and operating income, a firm can incur the fixed charges of debt with less risk than when its sales and earnings are subject to substantial declines. Only one indicator of volatility was included which cannot be directly affected by the firm's debt level. It is the standard deviation of the percentage change in operating income.

2.3.4 Profitability

Debt-servicing ability is dependent on the profitability. Myers (1984) suggest that a firms prefer raising capital, first from retained earnings, second from debt, and third from issuing new equity. He suggest that this behavior maybe due to the costs of issuing new equity. Thus the past profitability and hence the amount of earnings available to be retained are important determinant of firm's capital structure. Operating income over sales (OI/S) and operating income over total assets (OI/TA) are used as indicators of profitability.

2.3.5 Size

A number of authors have suggested that leverage ratios may be related to firm size. Direct bankruptcy costs appear to constitute a larger proportion of a firm's value as that value decreases. Also relatively large firms tend to be more diversified and less prone to bankruptcy. These arguments suggest that large firms should be more leveraged. The cost of issuing debt and equity securities is also related to firm size. In particular, small firms pay much more than large firms to issue new equity and somewhat more to issue long-term debt. This suggest that small firms may be more leveraged than large firms and prefer to borrow short term (through bank loan) rather than issue long-term debt because of lower fixed costs associated with this alternative. Natural logarithm of sales (In S) and quit rates (QR) are used as indicators of size.

2.3.6 Industry classification

Titman (1984) suggest that firms that make products requiring the availability of specialized servicing and spare parts will find liquidation especially costly. This indicates that firms manufacturing machines and equipment should be financed with relatively less debt.

2.3.7 Uniqueness

Titman presents a model in which a firm's liquidation decision is casually linked to its bankruptcy status. As a result the costs that firms can potentially impose on their customers, suppliers, and workers by liquidating are relevant to their capital structure decisions. Customers, workers and suppliers of firms that produce unique or specialized products probably suffer relatively high cost in the event of liquidate. Their workers and suppliers probably have job-specific skills and capital, and their customers may find difficult to find alternative servicing for their relatively unique products. For these reasons, uniqueness is expected to be negatively related to debt ratios. Indicators of uniqueness include expenditure on research and development over sales (RD/S), selling expenses over sales (SE/S).

It is postulated that RD/S measures uniqueness because firms that sell product with close substitute are likely to do less research and development since their innovations can be more easily duplicated. In addition, successful research and development projects lead to new products that differ from those existing in the market.

2.4 Studies done on the relationship between business risk and Leverage

Titman and Wessel (1988), studied firm's attributes such as asset structure, non-debt tax shields, growth, uniqueness, industry classification, size, earning volatility and profitability in relation to capital structure. The variables were analyzed over 1974 through 1982 time period from compustat files. Firms that did not have complete record for all variables were excluded from the sample. He found that only uniqueness (characterized by the firm's expenditure on research and development, selling expenses and rate at which employees voluntarily leave their jobs) was highly significant and that the firms with unique or specialized products have relatively low debt ratios. Also he found that the smaller firms tend to use significantly more short-term debt than larger firms. The study found no evidence to support theoretical work that predicts that debt ratios are related to a firm's expected growth, non-debt tax shields, volatility(measure of business risk), or the collateral value of its asset.

Kale Neo and Ramirez (1991) took non-debt tax shields, firm size and business risk (volatility of cash flows) as the cross-sectional determinants of capital structure. They obtained data from compustat tapes and tested two years, 1985 and 1984. For both years, 19-year period was used in estimating the standard deviation of cash flows used in calculating co-efficient of variation. Only those firms with complete history of cash flow for this period were selected. All other variables were realized current year values but restricted to those firms that do not have missing values in the current year. Also utilities, financial and real estate firms were excluded from the sample. They found that non-debt tax shields and firm size had positive signs but business risk was decreasing first and then increasing with the optimal debt level. However they were quick to warn that, while the

theoretical correct function form of the relation between the optimal debt and business risk was derived, not all potential sources of misspecification were eliminated. They include: i) errors in variables caused by omission of relevant indicators or the noisy measurement of the variables included. ii) Nonlinearities in the functional relations of optimal debt level with other determinants besides business risk. iii) Quadratic approximation of the U-shaped of the relation with business risk.

Gosh, Cai and Wenhui (2000) considered asset size, growth of assets, non-debt tax shields, fixed asset ratio, profit margin, research and development expenditure advertising expenditure, selling expenses and the co-efficient of variation of cash flows as business risk (volatility). The sample was composed of 362 firms divided into 19 industries and selected 1982 and 1992 for cross-sectional studies from compustat files. They found that the relationship between business risk and leverage being quadratic, first increasing and then decreasing and contradict the result obtained by Kale Neo and Ramirez (1991). However, they point out that the problem of omitted variables remains as the know determinants 'explain' a very small percentages of the variation in capital structure.

Ferri and Jones (1979) investigated the relationship between a firm's financial structure and its industrial class, size, variability of income and operating leverage. Data used were gathered from compustat files for two five years time spans from 1969 to 1974 and from 1971 to 1976. A sample of 233 firms' was used based on consistency of fiscal year and availability of data. Multi-period variables (average sales, co-efficient of variation in operating income) were calculated on the basis of data from each year in the five years spans. Single period variables (debt to total assets, current sales) were computed on the basis of data from the terminal year in the sales. The results indicates that industry class is linked to a firm's leverage, but in a less pronounced and direct manner; a firm's use of debt is related to its size, but the relationship does not conform to the positive linear scheme suggested by others; variation in income measured in several ways, could not be shown to be associated with a firm's leverage; and operating leverage does influence the

percentage of debt in a firm's financial structure and the relationship between the two types of leverage is quite similar to the negative lines form suggested by financial theory.

Scott (1976) comparative statistic analysis yielded three results. The optimal level of debt (as measured by the interest payments per period) was an increasing function of the liquidation value of the firm's asset, the corporate tax rate, and the size of the firm. Sharp results were not obtainable with respect to changes in the mean and / or the variance of earnings before interest and taxes and in default free rate of interest.

Bradley, Jarrel and Kim (1984) under took a cross-sectional in firm leverage ratios to establish if they are related to; i) the through-time volatility of firms earnings; ii) the relative amount of non-debt tax shields (depreciation and tax credits) and iii) the intensity of research and development and advertising expenditures. The study focused on a 20-year average debt-to-value-measure for 851 firms covering 25 industries from compustat files. They found that average firm leverage ratios are strongly related to industry classification, and that this relation remains strong even after excluding regulated firms. More importantly they found that firm leverage ratios are related inversely to earning volatility. The intensity of research and development and advertising expenditure is also related inversely to leverage. They also found a strong direct relation between firm leverage and the amount of non-debt tax shields.

Kiagora (2000) using regression analysis, tested for variations based on sector in capital structure of companies quoted at the NSE for the period 1991 to 1998 using 51 firms. Result indicates that there are differences in capital structure among industry groupings and those firms within a given sector tend to cluster towards some target equity/total assets ratio. They inferred that the results are consistent with the trade-off theory of capital structure and also in line with theoretical prediction regarding sector variations in firms' capital structure.

Harris and Raviv (1991) point out that the consensus among the financial economist is that leverage increases with fixed costs, non-debt tax shields, investments opportunities and firm size, and decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability and uniqueness of the product.

Alaganar (2004) pointed out that the absence of significant correlation between leverage and volatility of US companies may be due to numerous factors such as financial innovations (derivate markets) that affect firm specific volatility, and this may lead to decoupling of leverage and volatility.

Catania's (1983) examines a more general cross-sectional prediction of the TS-BC hypothesis. Cross-sectional tests generally focus on the business risk-leverage relationship implied by the TS-BC model. When sufficiently strong earnings distribution and bankruptcy costs assumption are made, the TS-BC model predicts an inverse cross-sectional relationship between business risk and leverage.

Bradley, Jarrell and Kim (1984), Kale, Neo and Ramirez (1991), Ferri and Jones (1979), Flath and Knoeber (1980), Catania's (1983), Gosh, Cai and Wenhui (2000) used cross-sectional, firm specific data to test for the existence of an optimal capital structure. These studies, however, have generally proceeded by specifying a linear ODL-BR relationship. Catania's (1983), Bradley, Jarrell and Kim (1984) studies were based on a trade-off between corporate taxes and default costs while, Kale, Neo and Ramirez study was based on trade-off between personal and corporate taxes. These authors reach quite different conclusion on the existence of an optimal capital structure.

The cross-sectional tests are based on the assertion that bankruptcy costs may tend to induce firms with greater "business risk' to include less debt in their capital structures. The study is a cross-sectional, eliminating the announcement and redistribution effect problem.

The main contribution of this study is to derive the functional form of the ODL-BR relation within corporate taxation framework of optimal capital structure for companies listed in the NSE.

2.5 Conclusion from the literature review

Leverage plays a direct role in the risk/ returns trade-off since it simultaneously magnifies both return and risk, and can be controlled directly by management. According to Alaganar, (2004), gearing is expected to be more prevalent in periods where the economy is booming and / or in low interest rate environment. Demsetz and Strahan (1995), observes that the selected leverage at which a company chooses to operate has a significant influence on both the level and variability of reported total returns.

The test of whether there exist a relationship between business risk and leverage, various research findings arrived at different conclusions. Ghosh, Cai and Wenhui (2000) found out that the relationship between business risk and leverage was quadratic -first increasing and then decreasing while Kale, Neo and Ramirez (1991) found the opposite. Bradley, Jarrell and Kim (1984) found that firm leverage ratios are related inversely to earnings volatility (measure of business risk). Ondinga (2003), Alaganar (2004), Ferri and Jones (1979), Flath & Knoeber (1980), and Titman and Wessels (1988) observes that there was no significant relationship between corporate leverage and business risk. On the other hand Scott (1976) finds that the relationship between changes in earning variance and leverage being ambiguous.

Bradley, Jarrell and Kim (1984), Kale, Neo and Ramirez (1991), Ferri and Jones (1979), Flath and Knoeber (1980), Castania's (1983), Ghosh, Cai and Wenhui (2000) used cross-sectional, firm specific data to test for the existence of an optimal capital structure. These studies, however, have generally proceeded by specifying a linear optimal debt level-business risk relationship. Catania's (1983), Bradley, Jarrell and Kim (1984) studies were based on a trade-off between corporate taxes and default costs while, Kale, Neo and Ramirez (1991) study was based on trade-off between personal and corporate taxes.

This study seeks to test whether there exist a relationship between leverage and business risk (earning volatility) of the firms listed at the NSE. This study differs from the ones reviewed in the sense that the current study is carried out in developing country while the others were carried out in developed countries.

Ondinga (2003) study was on determinant of capital structure of companies listed at NSE from 1989 to 2001 concluded that profitability and non-debt tax shield are most significant variables in determining leverage and, the relationship between business risk and leverage was positive, however, not significant. The study takes into account two periods characterized by different economic environment of low growth rate almost zero (1998 to 2002) and increased growth rate (2003 to 2007) unlike one period study by Ondinga. In addition Ondinga study proxies leverage ratio as; total debt divided by total debt plus equity and business risk as the variance of operating income. The current study proxies; leverage as a ratio of long term debt divided by total assets averaged over five year period for the variable's ability to reflect total reliance on borrowed funds and business risk as the standard deviation of the first difference in cash flow (adjusted EBIT for depreciation, amortizations and exception items), scaled by the average total assets over the two sub-periods of five years.

Assumption of the analysis

Three underlying assumptions are utilized. First, the capital structures of firms are influenced by the basic business risk to which the firms are exposed. Second, different degrees of business risk can be approximated by different industry groupings. Third, the firms grouped into the various sector as per the NSE listing experiences similar levels of business risk. If financial structure is an important consideration in the valuation of the enterprise, the firms in a given industry should seek an optimal range of leverage.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research design

The research design is an empirical study that evaluates the relationship between business risk and leverage and also whether on average, financial leverage vary from industry to industry on all firms trading at NSE.

3.2 Population

The population of the study will be made up of all the firms listed at the NSE during the period of study ***(Appendix A)***.

3.3 Sample

The sample consists of companies that were continuously listed from 1997 to 2008, divided into two sub-periods of 1998 to 2002 and 2003 to 2007. Also only those companies with complete record on variables will be considered. Due to their nature of accepting deposits, banks were excluded from the sample.

During these sub-periods, the Kenyan economy experienced low growth rate in the first sub-period presuming high business risk and low leverage and enhanced growth rate in the second sub-period.

3.4 Data collection

The study uses secondary data consisting of annual audited financial reports, which are quantitative in nature from the NSE library for the period 1997 to 2007. Data on the following variables will be obtained from annual financial report namely; long term debt, total assets, cash flow (adjusted EBIT for depreciation, amortization and exceptional items), depreciation, total sales, advertising expenses, R & D expenses, earning after tax and equity book value ***(Appendix B)***. Cross-sectional tests for the two sub-periods will

be done. Each period is intended to span a time sufficient to measure accurately expected target values of the variables, but short enough to pertain to a relatively stable tax and risk environment.

3.5 Model specification

To come up with valid empirical evidence to the issue of capital structure (leverage) – business risk relationship, an inverse relationship is predicted.

The following are the variables:

3.5.1 Dependent variable

Bradley, Jarrell and Kim (1984) employed the ratio of 20-year sum of annual book value of long-term debt divided by the sum of long-term debt and the market value of equity. Ferri and Jones (1979) and Gosh, Cai and Wenhui (2000) and Catania's (1983) measured leverage as a ratio of total debt to total assets (D/TA). In the present study, leverage will be measured as the ratio of long term debt divided by total assets averaged over the two five-year periods for reasons of conceptual simplicity and the variable's ability to more completely reflect total reliance on borrowed funds.

3.5.2 Independent variables

3.5.2.1 Business risk

Business risk- the expected variability in future income- will be represented by a variable that measure the historical volatility in a firm's cash flow (adjusted EBIT for depreciation, amortizations and exception items). Following Ferri and Jones (1979), Bradley, Jarrell and Kim (1984) and Titman and Wessel (1988), the study measure business risk with the standard deviation of the first difference in cash flow(adjusted EBIT), scaled by the average total assets over the two sub-periods of five-years. Bradley, Jarrell and Kim (1984) cited the work of Chaplinsky that this kind of volatility measure does not suffer from statistical problems associated with alternative measure of firm volatility. The scaling down of standard deviation with average total assets over the two sub-periods was meant to adjust variability from size effect. The standard deviation of the first difference in cash flow is calculated from the current and preceding five years.

Even though the study aims at determining the relationship between business risk and leverage, in the empirical tests which follows, we include additional variables to minimize possible misspecification errors owing to omitted variables. Titman and Wessel (1988) suggests the following empirical proxies which include; non-debt tax shields, firm size, R&D expenditure, advertising expenditure, profitability and industry classification.

3.5.2.2 Non-debt tax shields

Non-debt tax shields is measured by the sum of annual depreciation allowance(charges) multi plied by tax rate and investment tax credits scaled by mean annual earnings, that is

NDTS=(30%*Depreciation + ITC)/μ(mean annual earning)

3.5.2.3 Firm size

Kale, Neo and Ramirez (1991) and Titman and Wessel (1988) peroxide firm size with the use of the natural log of the firm's sales in a single period. Following Ferri and Jones (1979), the study uses the average level of sales μ (SA) over five years. Average measure was considered to reflect a truer indication of firm size than single period measure.

3.5.2.4 Research and development and Advertising expenditures

Investments in R&D and advertising can be expensed fully in the year they are incurred; firms engaged heavily in these activities are expected to issue less debt, ceteris paribus (Bradley, Jarrell and Kim, 1984). Advertising and R&D create assets that may be viewed as options, which will be exercised or not depending on the firm's financial well-being. The intensity of advertising and R&D expenses is expected to be inversely related with leverage ratio. Following Titman and Wessel (1988) and Bradley, Jarrell and Kim (1984), the studies measures R&D and advertising expenditure as the sum of annual respective expenses divided by the sum of sales.

3.5.2.5 Profitability

Pecking order theory state that firms prefer raising capital, first from retained earnings, second debt, and third using new equity. Past profitability of a firm and hence the amount of earnings available to be retained becomes a major important determinant of its current capital structure.

The study uses average net profit margin = $\frac{\text{Average earning after tax}}{\text{Average total sales}}$

3.6 Data analysis

The empirical study tests the relationship between determinant of capital structure and leverage using multi-linear regression equation for the two sub-periods. The model equation is:

$Y = \beta_0 + \beta_1 CV + \beta_2 SA + \beta_3 NDTS + \beta_4 NPM + \beta_5 RD + \beta_6 ADV + \varepsilon_i$

Where

Y	= Leverage ratio to be predicted (dependent)
β_0	=coefficient of regression
CV	= represent business risk as a standard deviation (δ) of 1st difference in adjusted EBIT scaled by mean (μ) of total asset
SA	= represent firm size being Average sales
NDTS	= Non-debt tax shields
RD	= research & Development expenditure (%)
ADV	=advertising expenditure (%)
NPM	= Net Profit Margin (%)

β_1, β_2, $\beta 3$, $\beta 4$, $\beta 5$, and β_6 represent the marginal effect of variables CV, SA, NDTS, NPM, RD, and ADV respectively on leverage holding other variables constant.

For reasons mentioned earlier, other variables are included in the cross-sectional analysis.

Hypothesis

H_0: The six independent variables will not significantly explain the variance in leverage.

H_1: The six independent variables will significantly explain the variance in leverage.

If bankruptcy costs contain a fixed component, larger firms will have higher optimal debt level implying that the coefficient of the size proxy, β_3, is positive. With regard to non-debt tax shields, the D-M framework suggests that β_4 should be positive. Since investments in research and development and advertising capital can be expensed (100% depreciated) in the year incurred, firms engaged heavily in these activities are expected to issue less debt. The intensity of advertising and R & D expenses is expected to be inversely related to leverage. Net profit margin is expected to be inversely related with leverage.

To control for multi-co linearity among independent variables we compute the mean of each independent variable, and then replace each value with the difference between it and the mean.

The study will also run test without business risk to see the change of signs and robustness of test results.

CHAPTER FOUR

4.0 DATA ANALYSIS

4.1 Introduction

The objective of the study was to test whether there is a relationship between business risk and leverage for companies trading at NSE. In the empirical tests, additional variables were included that is; firm size, NDTS, Net Profit Margin (%), research & Development expenditure (%) and advertising expenditure (%) to minimize possible misspecification errors owing to omitted variables. This was achieved through multiple regression analysis of equation;

$Y= \beta_0+ \beta_1 CV+ \beta_2 SA +\beta_3 NDTS + \beta_4 NPM + \beta_5 RD+ \beta_6 ADV+ \varepsilon_i$, to test whether a relationship exist between leverage and business risk.

4.2 Descriptive and Statistical Analysis

4.2.1 Estimation of results of the regression equation

The data of research & Development expenditure (%) and advertising expenditure (%) were not available and thus could not be factored in the regression model.

To address the research objective, a multiple regression analysis of above equation through SPSS program between firm size, business risk, non-debt tax shield, net profit margin as independent variables and leverage as dependent variable was performed for the two sub-period of 1998 to 2002 and 2003 to 2008.

4.2.2 FINDINGS

Table 1.0: Sub-period 1998 to 2002

Table 1.1.0

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.861(a)	.742	.613	.18815	2.441

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.814	4	.203	5.748	.018(a)
	Residual	.283	8	.035		
	Total	1.097	12			

a Predictors: (Constant), firm size, ndts, profitability, business risk
b Dependent Variable: leverage

Table 1.1.1 (Coefficients)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
	(Constant)	.295	.138		2.145	.064					
	business risk	-1.352	1.467	-.228	-.921	.384	.416	-.310	-.165	.525	1.904
	ndts	-.525	.129	-1.047	-4.057	.004	-.787	-.820	-.729	.484	2.064
	profitability	-1.713	1.084	-.327	-1.580	.153	.044	-.488	-.284	.753	1.328
	firm size	.000	.000	.235	1.275	.238	.114	.411	.229	.949	1.054

a Dependent Variable: leverage

Table 1.2.0: Sub-period 1998 to 2002 (without business risk predictor)

Table 1.2.0

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.845(a)	.714	.619	.18656	2.435

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.784	3	.261	7.507	.008(a)
	Residual	.313	9	.035		
	Total	1.097	12			

a Predictors: (Constant), firm size, ndts, profitability
b Dependent Variable: leverage

Table 1.2.1 (Coefficients)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.189	.074		2.554	.031					
	ndts	-.444	.095	-.886	-4.700	.001	-.787	-.843	-.837	.892	1.121
	profitability	-1.337	.996	-.255	-1.342	.213	.044	-.408	-.239	.878	1.139
	firm size	.000	.000	.243	1.333	.215	.114	.406	.237	.951	1.052

a Dependent Variable: leverage

Table 1.0 reports the result of the cross-sectional regression of firm leverage ratio on hypothesized determinants.

The result of table 1.1.0 shows $R^2 = 0.742$ with F value of 5.748 and a significance level P= 0.018 in which case $p< 0.05$. Thus 74.2% of the variation in leverage (dependent) has been significantly by the set of predictor (business risk, non-debt tax shield, firm size and profitability). Therefore we reject the null hypothesis and accept the alternative hypothesis that the four independent variables will significantly explain variance in leverage.

Table 1.1.1 reports the coefficient estimates of predictors (independent variables) to leverage (dependents) and their significance. The Coefficients estimates for the 'business risk' and 'profitability' attributes in relation to leverage ratio were of the predicted sign. However, the t-statistics of the estimated coefficients for 'profitability' and 'business risk' are fairly small in magnitude and are insignificant. Thus 'business risk' and 'profitability' do not appear to be related to various measure of leverage. The negative coefficient estimate of 'profitability' suggest that increase in the book value of equity due to increase in operating income, are not completely offset by an increase in firm's borrowing. The result is consistent with pecking order theory. Additional evidence

relating to the importance of transaction costs is provided by the negative relation between measure of profitability scaled by book value of equity and leverage ratio.

The coefficient estimates for the 'non-debt tax shield' attribute is significant and negatively related to leverage ratio. This conforms with the prediction model of DeAngelo and Masulis (1980) framework that non-debt tax shield, being substitute for the tax benefits for debt financing is inversely relate to leverage.

Table 1.1.2 reports collinearity statistics (tolerance and VIF) indicates that the independent variables do not suffer multi-collinearity as the highest VIF is 2.064 which is good enough. Less than value five for VIF indicates no multi-collinearity exist between the independent variables.

Table 1.1.1 reports Durbin-Watson measure of residual auto-correlation being 2.441 which falls within the allowable limit of not being more than three or less than one.

Results without business risk as predictor of leverage are shown in table 1.2.0.

$R^2 = 0.714$ with value of 7.507 and a significance level of $P< 0.05$. Thus 71.4% of the variation in leverage (dependent) has been explained significantly by the set of predictors (profitability, non debt tax shield and firm size). We reject null hypothesis and accept the alternative hypothesis that the three independent variables will significantly explain variance in leverage.

The exclusion of 'business risk' attribute in the regression model resulted to R^2 decreasing marginally from 74.2% to 71.4%. This indicates that 'business risk' attribute

as proxied by standard deviation of first difference in adjusted EBIT is not relate to leverage for the firms analyzed at NSE similar to conclusion by Ondinga (2003), Alganaar (2004), Ferri and Jones (1979), Flath and Knoeber(1980) and Titman and Wessels (1988).

The relation between non debt tax shield and leverage remains significantly negative as shown by coefficient of estimate, table 1.2.1. The coefficient of 'profitability' is negatively related to leverage though not significant.

Table 2.0: Sub-period 2003 to 2008

Table 2.1.0

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.629(a)	.396	.210	.11027	2.727

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.104	4	.026	2.131	.135(a)
	Residual	.158	13	.012		
	Total	.262	17			

a Predictors: (Constant), firm size, profitability, Business Risk, NDTS
b Dependent Variable: Leverage

Table 2.1.1 (Coefficients)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.286	.375		-.763	.459					
	Business Risk	-.249	.179	-.314	-1.386	.189	-.309	-.359	-.299	.902	1.108
	NDTS	.765	.670	.291	1.140	.275	-.101	.302	.246	.713	1.402
	profitability	1.298	.561	.555	2.315	.038	.459	.540	.499	.809	1.235
	firm size	.025	.022	.256	1.121	.282	.287	.297	.242	.889	1.125

a Dependent Variable: Leverage

Table 2.0 reports the result of cross sectional regression of firm leverage and their hypothesized determinant for sub-period 2003 to 2008.

The result of table 2.1.0 shows R^2=0.396 with F value of 2.131 and a significance level o P=0.135 in which case P> 0.05. Therefore 39.6% of the variation in leverage (dependent) has been explained though not significantly by the set of predictors (business risk, non debt tax shield, firm size and profitability). Thus we fail to reject the null hypothesis that the four independent variables will not significantly explain the variance in leverage.

Table 2.1.1 reports the coefficient estimates of predictors (independent) to leverage (dependent) and their significance.

The Coefficients estimate for the 'business risk' in relation to leverage ratio was of the predicted sign. However, the t-statistics of the estimated coefficient for 'business risk' is fairly small in magnitude and insignificant.

The Coefficients estimates for the 'non debt tax shield' and 'profitability' attributes in relation to leverage ratio were of the opposite predicted sign. The t-statistics of the estimated coefficients for 'non debt tax shield' is fairly small in magnitude and insignificant while the -statistics of the estimated coefficients for 'profitability' was positive and significantly relate to leverage. The result also shows insignificant relationship between firm size and related leverage ratio.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMEDATION

5.1 Summary and Conclusion

In this paper, we derived the functional relationship between business risk and leverage in the DeAngelo and Masulis (1980) framework. We test whether business risk is inversely related to leverage ratios. Additional variables were included to minimize possible misspecification owing to the omitted variables. They were non-debt tax shield, firm size and profitability. We utilize the multiple regression models to test the relationship between business risk and leverage on a cross section of firms in sub-periods 1998 to 2002 and 2003 to 2008.

The findings from these tests support no relation between business risk and leverage. In period 1998 to 2002, even though the regression result was statistically significant that is the predictors (business risk non-debt tax shield, firm size and profitability) significantly explained the variance in leverage, the t-statistics of business risk was insignificant and negatively related to leverage ratio.

Tests without business risk as a predictor showed R^2 decreasing marginally from 74.2% to 71.4% highlighting the lack of importance of business risk in determination of leverage levels.

In the period 2003 to 2008, the regression results were not statistically significant, thus we failed to reject the null hypothesis that the four independent variables will not significantly explain the variance in leverage.

The result for 'non debt tax shield' attribute is mixed in the two periods. In the period 1998 to 2002, the result confirms the prediction of regression model that NDTS is negatively related to leverage and the relation is significant. A somewhat puzzling result is the weak positive relation between leverage and non-debt tax shield in the period 2003 to 2008. This contradicts the theory that focuses on the substitutability between non-debt and debt tax shields. A possible explanation is that the government did not borrow heavily from the local market as opposed to period 1998 to 2003 in which government relied heavily on local borrowing due to limited donor support. Thus low and favorable interest rates were offered on borrowed funds.

The result for 'profitability' attribute is mixed in the two periods. In the period 1998 to 2002, the result confirms the prediction of regression model that profitability is negatively related to leverage and the relation is not significant. This is consistent with pecking order theory. In the period 2003 to 2008, the relationship between profitability and leverage was positive and significant although the general regression model was insignificant. This contradicts 'pecking order theory. Possible explanation is that conducive business environment and high demand of goods and services, profitable firms will borrow more long term debt to expand their line of business and meet customers' expectations.

5.2 Limitation of the study

Some of firms analyzed had erratic EBIT data for EBIT from one year to the other. An instable market insulates firms from taking long term debt and result to firm employing

overdrafts and short term borrowing. Debt was considered to be long term if the repayment period was more than one year as it was the only available data. This impacted on result of the study.

Heavy borrowing by the government and high interest rates charged by commercial banks restricted borrowing capacities of the firms impacting on study results.

The tests carried out may have not eliminated all potential sources for misspecification due to errors in variables caused by omission of key indicators or the noisy measurement of the variable included.

The major conceptual limitation of all regression technique is that one can only ascertain relationships, but never be sure about underlying casual mechanism.

A fundamental problem with the crass-sectional regression is misspecification, which suggests a "missing variables" explanation for the mixed results of 'non-debt tax shield' and 'profitability'. The danger is that the excluded variables are correlated with included variables, which can cause misleading inferences to be drawn from the regression results.

5.3 Suggestions for further study

The study having reported no relationship between business risk and leverage, a study could be carried out to evaluate whether a relationship exist between earning volatility and issue of short term debt combined with overdraft.

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APPENDICES

APPENDIX A: POPULATION

AGRICULTURAL SECTOR SEGMENT
Unilever tea ltd
Kakuzi ltd
Rea Vipingo ltd
Sasini ltd
COMMERCIAL AND SERVICES SECTOR
Access Kenya group ltd
Car & General
CMC HOLDINGS
Hutching Biemer ltd
Marshalls ltd
Nation media group
Safaricom ltd
Scan group ltd
Standard group ltd
Tps Eastern Africa(Serena)
Uchumi supermarkets ltd
Express ltd
Kenya Airways
FINANCE AND INVESTMENT SECTOR
Barclays Bank
Centum investment company ltd
Cfc stanbic holding ltd
Diamond Trust Bank Kenya ltd
Equity Bank ltd
Housing Finance Co ltd
Jubilee Holdings ltd
Kenya Commercial Bank ltd
Kenya Re-insurance Corporation ltd
National Bank of Kenya
NIC Bank
Olympia Capital Holdings
pan Africa insurance Holdings Ltd
Standard Chartered Bank ltd
Co-operative Bank of Kenya ltd

INDUSTRIAL AND ALLIED SECTOR
Athi river mining ltd
BOC ltd
Bamburi cement ltd
BAT
Carbacid ltd
Crown Berger ltd
East African cables ltd
East aAfrican portland
East Africa breweries ltd
Everready East Africa ltd
Kenya oil ltd
Mumias sugar company
Kenya power and lighting ltd
Kengen ltd
Sameer Africa ltd
Total ltd
Unga ltd
ALTERNATIVE INVESTMENT SEGMENT
Eaagads
Williamson tea ltd
Kapchora ltd
Limuru tea
Bauman ltd
Kenya Orchards ltd

APPENDIX B

Data collection sheet

Firm	long term debt	total assets	Adjusted EBDIT	Depreciation	investment tax credit	Total Sales/ Turn over	R &D expense	Advertising cost	Earning After Tax	Equity BK Value
Unilever tea ltd										
Kakuzi ltd										
Rea Vipingo ltd										
Sasini ltd										
Eaagads										
Williamson tea ltd										
Kapchora ltd										
Limuru tea										
Access Kenya group ltd										
Car & General										
CMC HOLDINGS										
Hutching Biemer ltd										
Marshalls ltd										
Nation media group										
Safaricom ltd										
Scan group ltd										
Standard group ltd										
Tps Eastern Africa(Serena)										
Uchumi supermarkets ltd										
Express ltd										
Kenya Airways										
Athi river mining ltd										
BOC ltd										
Bamburi cement ltd										
BAT										
Carbacid ltd										
Crown Berger ltd										
East African cables ltd										
East aAfrican portland										
East Africa breweries ltd										
Everready East Africa ltd										
Kenya oil ltd										
Mumias sugar company										
Olympia Capital Holdings										
Sameer Africa ltd										
Total ltd										
Unga ltd										
Bauman ltd										
Kenya Orchards ltd										