TAX AND CAPITAL STRUCTURE: THE CASE OF LISTED COMPANIES IN KENYA.

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DECLARATION

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

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DEDICATION

To my parents Zadock and Grace, and the entire family.

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However, the views expressed in this paper are my own and do not bear the views of the named persons or institution. I bear the responsibility for any errors and/or omissions.

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Abstract

This paper looks at the impact of tax on the capital structure of companies listed on the Nairobi Stock Exchange (NSE). The study adopts the static trade-off theory (STO) of capital structure given that this theory incorporates the impact of taxes on capital structure. The main motivation for the study is the Modigliani-Miller (M-M) argument that in the presence of corporate taxes, the firm's value is positively related to its debt. Hence it addresses the question of whether the capital structure of companies change following a change in the tax rate.

Panel data analysis of a sample of 20 listed non-financial companies is used to determine the impact of tax on capital structure covering the period 1993 to 2001. The main proxies for the tax effect considered include the marginal effective tax rate, and non-debt tax shields as depreciation and the tax loss carryforward. The marginal tax rate is proxied using the average effective tax rate. We include variables likely to determine the capital structure of firms such as liquidity, tangibility, growth opportunities, profitability, dividend yield and size of the firm to control for their effects. We use the Hausman test to identify the best model and the fixed effects model is found to be the best in estimating this situation.

The results show that the tax rate is significant in determining the leverage of firms but shows unexpected (negative) sign. Non-debt tax shield variable is found to be insignificant in determining the leverage of these firms. Profitability, tangibility and growth opportunities are found to be significant in explaining the capital structure of these firms. The firms are also found to adjust their leverage to the target debt ratio while in the process incurring positive adjustment costs. This implies that the firms will not at any time fully adjust to the target debt level due to the presence of the adjustment costs. Other factors found to be relevant in determining the capital structure in the study are tangibility, growth and profitability.

CHAPTER ONE

1.0 INTRODUCTION

The capital structure question involves a firm's decision on how it finances itself. The theory of capital structure revolves around two main propositions to explain the actual capital-financing behavior. First, is the static trade-off theory that is based on firms' observation of a target debt[1] ratio with the assumption that firms use debt to tap the tax benefits and equity to minimize costs of financial distress (Ngugi, 2002). Second, is the pecking order hypothesis that is based on asymmetric information as the influence of financing behavior; with firms preferring internal to external financing and debt to equity so as to minimize the information asymmetry costs, while debt is used to fill the internal financing gap.

The Modigliani and Miller (1958, 1963) seminal papers advanced the capital structure theory by considering capital structure without taxes and with taxes. The Modigliani-Miller (M-M) theory argues that at equilibrium, the value of the firm must be independent of its capital structure. In a world without taxes, therefore, the value of the levered[2] firm is the same as the value of the unlevered firm. The expected return on equity is also positively related to leverage since the risk to equity holders increases with leverage. Thus the firm's overall cost of capital cannot be reduced as debt is substituted for equity.

In the presence of corporate taxes, the firm's value is positively related to its debt. But since corporations deduct interest payments but not dividend payments, corporate leverage lowers tax payments. The cost of equity thus rises with leverage because the risk to equity rises with leverage.

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[1] Debt is considered to consist of both bonds and loans acquired by firms.
[2] Leverage is the extent to which a firm uses debt to finance its activities.

In spite of the tax advantage of debt other forms of financing like retained earnings may in some circumstances be cheaper even when the tax status of investors under personal income tax is taken into account. Hence corporations should not at all times seek to use the maximum amount of debt in their capital structure.

Firms search for the lowest-cost financial structures to finance their business activities depending on the costs and risks involved in the various financing strategies. They therefore select capital structures depending on attributes that determine the various costs and benefits associated with debt and equity financing (Titman and Wessels, 1988). New investment can be financed either by issuing new equity, issuing bonds, borrowing from the financial institutions, or by employing retained earnings. New equity issue does not commit a firm to any specific level of payment but makes it liable for future dividend payments. Bonds, on the other hand, involve a fixed commitment to pay interest and eventually to redeem the bonds. This puts pressure on the firm because the payments are obligations which, if failed to be met, the firm may risk being bankrupt with ownership of firms' assets legally transferred to debt holders (Ross et al, 1999). The desired amount of retained earnings is also affected, among other factors, by the opportunity cost in terms of after-tax dividends paid to stockholders.

Countries, on the other hand, raise revenue through taxation, with corporate tax being one of the many forms of taxation. Corporate tax involves taxation of a company's income after deducting interest payments. The taxation of income from capital tends to reduce the size of a country's capital stock and hence to lower the level of real wages (Boskin and McLure, 1990). Corporation tax is justified on the grounds that incorporation carries legal and economic privileges and that the corporation tax is a tax upon the gains enjoyed from the benefits of these privileges, for instance, limited liability enjoyed by shareholders in the event of bankruptcy. Dividend income and interest payments from debt are also taxed at the personal income tax rate.

The objective of tax policy is to minimize the interference by the tax system in the allocation process of the market, subject to revenue and distribution requirements (Tanzi and Zee, 2000). Taxation can have a variety of effects on economic agents and may make them alter their behavior to minimize their welfare loss in response to a tax by seeking to minimize tax incidence. Since interest on borrowing may be tax deductible, this leads to an incentive to borrow rather than issue equity. The equity holders of the firm on the other hand may experience capital gains[3] and this will be taxed but at a lower rate than dividends. Furthermore, dividends may be taxed twice, once as profit to the firm and then as income for a shareholder (Myles, 1995), though in the Kenyan case dividend income has a final withholding tax implying that equity holders are not directly taxed on the dividends received. Non-debt tax shields such as investment tax credits and depreciation allowance also affects the capital structure of firms, with firms having non-debt tax shields having lower taxable profit since non-debt tax shields are deductible.

This study uses the static trade-off theory (STO) in capturing the impact of taxes on capital structure of listed companies in Kenya, given that this theory has embedded in it the role of taxes in capital financing behavior.

[3] Capital gains tax was abolished in Kenya in 1985. This study will not look at the impact of this tax on capital structure since it was used before the study period.

1.2 Taxation Policy in Kenya

The Kenyan tax system comprises of the direct and indirect tax system. The direct tax system is covered under the Income Tax Act Cap. 470 of the laws of Kenya and include corporation tax, individual tax, Pay As You Earn (PAYE), withholding tax and advance tax.

The individual income is currently taxed at rates graduated from 10% up to 30%, with the top tax bracket starting at annual incomes of Kshs.444, 480 (Karingi et al, 2003). The top personal tax rate has been declining from 1980s to early 2000s from high levels of 50% to 30% as shown in Table 1 below. This decline in the top tax rate follows tax reforms adopted by the government in mid 1980s with the direct tax reforms intended to enhance revenue

Table 1: Trend of Tax Rate in Kenya (1988-2003)

Year	Corporate Tax Rate	Top Personal Tax Rate
1988	45	50
1989	42.5	45
1990	40	45
1991	37.5	45
1992	35	40
1993	35	40
1994	35	40
1995	35	37.5
1996	35	35
1997	32.5	35
1998	32.5	32.5
1999	30	32.5
2000	30	30
2001	30	30
2002	30	30
2003	30	30

Source: Employers' Guide to P.A.Y.E. in Kenya and Budget Speeches (various issues) through broadening of the tax base while reducing the maximum rate, to simplify the tax system and to promote investment (Ajumbo et al, 2003).

The corporate tax of a company is reached at after deducting from before-tax corporate income the wage payments, interest payments and depreciation of assets. The tax law has rules that indicate for each type of asset what proportion of its acquisition value can be depreciated each year and over how many years depreciation can be taken, i.e. the tax life of the asset.

The corporate tax rate of Kenya has also been generally experiencing a downward trend over the years following the reforms though it remained constant over a long period of time. In the early 1970s, the corporate tax rate was 40% and 47.5% for local and foreign companies respectively. The rate was increased in 1974/75 to 45% and 52.5% respectively with the main reason being to place greater restraint on profits (Budget Speech, 1974/75). The rate remained stable at that level for a period of almost 15 years after which it started falling considerably. The reduction in the corporate tax rate may have led to reduction in the use of debt with more internal funds being available for investment for profitable firms.

In 1994/95, corporate tax rate was 35% and 42.5% for local and foreign companies respectively plus a drought levy on income of 2.5% for period ending 1/6/1994 and 30/6/95 (Budget Speech, 1994/95). This levy raised the amount of tax on income for this period and is expected to have had a considerable effect on company incomes. The tax rate was reduced by 2.5% in 1997/98 and subsequently in 1999/2000 to a final level of 30%. The aim was "promoting capital market and to boost business investments and activities, and harmonize the top tax rate with other East African Community countries" (Budget Speech, 1997/98 and 1999/2000). This reduction brought the corporate tax level at par with the top personal income tax level, hence harmonizing the tax system.

A provision was also made for newly listed companies to be taxed at reduced corporation tax rate of 27% as compared to the standard rate of 30% in the budget year 2001/02 for 3 years following the date of listing. This was on the condition that such companies should offer at least 20% of their share capital to the public. Further, a tax concession of 5% was introduced for newly listed companies for 5 years post listing, provided the firm lists a minimum of 30% of its fully issued and authorized share capital on the Nairobi Stock Exchange. This meant that newly listed companies pay a corporate tax of 25% compared to 30% for unlisted firms. These were meant to encourage listing in the local stock market.

Tax incentives[4] are also in use in Kenya and they are intended to alter the level, timing, type and configuration of investment expenditures in the country. The types of incentives in Kenya include, first, Investment Deduction Allowance (IDA) which was started in 1991 and is calculated as a percentage of the total cost of the qualifying capital investment. It was initially granted at different rates depending on the location of the investment but was harmonized in 1995 with the rate in early 2003 being 70%. This value was further revised to 100% allowance following this year's Budget Speech. Secondly, the Industrial Building Allowance (IBA) that is granted at a straight-line rate of 2.5% and 4% in industrial and hotel buildings respectively. Lastly, Wear and Tear Allowance (WTA) which is granted on the cost of all other long-term business assets other than building and it is calculated on a reducing balance basis. It is categorized into four classes, i.e. I, II, III, IV with applicable rates being 37.5%, 30%, 25%, and 12.5% respectively.

[4] Tax incentive is a special tax provision granted to qualified investment projects that lowers the effective tax burden on the projects, relative to the effective tax burden that would be borne by the investors in the absence of the provision.

The reforms also saw the abolition of stamp duty payable for retail share transfer transaction on quoted securities and the withholding tax rate of 15% on dividend income paid to residents made a final tax in 1990/91. This was aimed at reducing the incidence of double taxation on corporate dividends and income to individuals arising from investment in securities. Dividend income was taxed at 15% while interest income tax rate was 10%. In 1992/93 withholding tax on dividend income was reduced to 10% from 15%. In 1996/97, withholding tax on dividend income was further reduced to 5% for locals and to 7.5% for non-residents. Withholding tax on interest income was raised to 15% from 10%, while withholding tax on bearer instruments was raised to 20% from 10% (Munyaka et al, 2003)

1.3 Statement of the Problem

Corporate tax is argued to favor the use of debt over equity since debt interest is deducted before tax calculations, hence firms' leverage is expected to vary with changes in the corporate tax rate. Dividends are not deductible from corporation income and are therefore subject to the corporation income tax. At the same time, stockholders who receive dividends treat them as ordinary income with the personal income tax having been paid as a final withholding tax. Debt interest on the other hand is only taxed at the personal tax rate at the individual level. Companies view tax on their incomes as cost and this tends to influence their capital-financing behavior.

From the trade-off theory of capital structure, firms attain an optimal capital structure by balancing the corporate tax benefits of debt against the costs associated with debt. Firm value therefore increases with leverage due to the tax deductibility of interest payments at the corporate level. The after tax profits are also reduced by the tax, this in turn reduces corporate savings by lowering retained earnings. Since income generated by capital gains is not subjected to taxation, the tax system thus creates incentives for firms to retain earnings rather than pay them out as dividends. Investors, through their arbitraging abilities following a tax change, will invest in either debt or equity or a combination of both that enables them to realize the highest return.

Given that tax incentives are deducted from profits before tax computation, this reduces the taxable profits to firms. Debt interest is also deductible before taxation and thus acts as a tax-shield. But since debt interest is taxable at the personal tax rate, this affects the level of debt held by the firm, and ultimately the capital structure. Hence the main issue we are trying to address is whether the capital structure of companies change following a change in the tax rate, and in such a situation what proportion of debt and equity firms prefer to hold.

The tax debate in Kenya today is mainly based on the urge for the government to reduce the corporate tax rate. This is because the firms see the corporate tax rate as high and thus making them incur high business costs. Due to this view, it is of importance to establish whether the reduction of the corporate tax will do any good to the businesses in terms of increasing their value thus relying more on internal finance than external finance. The value-added tax (VAT) also has some aspects of influence on the capital structure of firms. This is because this tax is based on the market demand on goods and services produced thus it affects the profitability aspect by increasing the production costs. Thus the ability of firms to repay their borrowings reduces leading to high possibilities of bankruptcy costs.

1.4 Objectives of the Study

The main objective of the study is to establish the link between tax and capital structure of firms and how this impacts on the way the firms determine the optimal leverage. The specific objectives are:

(i) To establish the determinants of capital structure of listed companies in Kenya.

(ii) To determine how tax affects the capital structure of listed companies in Kenya.

(iii) To establish whether non-debt tax shields have impacts on the capital structure.

(iv) Draw policy recommendations based on these findings.

1.5 Hypothesis

(i) Increase in the corporate tax rate will lead firms to use more debt in their financing.

(ii) Firms with lower non-debt tax shields will employ greater debt in their capital structure.

1.6 Significance of the Study

A country's tax policy is evaluated by how well it achieves the optimal allocation of factors and on how successfully it expands its revenue base, hence it is in a country's interest to attract taxable income to its jurisdiction (Boskin and McLure, 1990). Firms view tax on their equity income as costs and may therefore be induced to shield their income from tax by use of debt thus reducing the taxable income. Individuals on the other hand will choose to invest on either debt or equity given the gains they expect from the tax differential of these financing instruments. Thus individual investor decisions also affect the capital structure of firms.

In this regard, it is of importance to establish how the corporate capital structure would change due to a change in the tax structure. This is because, by affecting the capital structure, the tax rates will affect the cost of investment.

No known study has been done to capture the impact of policy change in the tax rates on the capital structure of firms in Kenya. Only one study considered the determination of capital structure of firms listed on the Nairobi Stock Exchange, but it did not cover exhaustively the impact of tax on capital structure (see Ngugi, 2002). This study aims at filling this gap by determining how tax affects the capital structure and to establish the determinants of capital structure of firms given the tax rates.

The rest of the paper is organized as follows. Chapter 2 presents a review of selected literature on capital structure. Methodology adopted and the estimation procedure is in Chapter 3. In Chapter 4 we report the findings of the paper and discussions. In this chapter, we first present the results of the tax variables only, and then we check for the general impact when other determinants of capital structure are controlled for. The last chapter, i.e. Chapter 5, gives the conclusions and the policy implications of the study.

CHAPTER TWO

2.0 LITERATURE REVIEW

The corporate tax can be viewed to be either a tax on corporate capital or a tax on profits. The view of being a tax on corporate capital is because the opportunity cost of capital supplied by shareholders is included in the tax base; hence it acts as a tax on capital used in the corporate sector. The view as a tax on economic profits is based on the observation that the tax base is determined by subtracting costs of production from gross corporate incomes thus leaving only "profits"(Rosen, 1995). Modeling the corporation tax as a simple tax on economic profits is argued to be wrong because the base of the tax includes elements other than economic profits. But it has been shown that under certain circumstances, as long as the corporation is allowed to d educt i nterest p ayments m ade t o i ts c reditors, t he c orporation t ax a mounts t o a t ax o n profits (Stiglitz, 1973 as cited in Rosen, 1995).

2.1 Theoretical Literature

2.1.1 Theories on Corporate Capital Structure

The Traditional View (TV)

This is based on the firm's working average cost of capital (WACC), which can be presented by r_a, i.e. weighted sum of debt and equity costs or the minimum overall return that is required on existing operations to satisfy the demands of all stakeholders. The traditional view observes that debt is generally cheaper than equity as a source of investment finance, hence a firm can lower its average cost of capital by increasing its leverage provided the firm's cost of debt remain constant.

Higher levels of debt increase the likelihood of default resulting in both the debt holders and shareholders demanding greater returns on their capital, leading to the cost of debt and equity both rising at an increasing rate as bankruptcy risk increases. The optimal leverage is therefore obtained where r_a is minimized and the value of the firm is maximized (Prasad et al, 2001).

The Modigliani-Miller (M-M) Theory

The M-M theory derives three propositions relating to the value of the firm, the behavior of the equity cost of capital, and the cut-off rate of new investment, using a simple arbitrage mechanism while assuming a perfect capital market. M-M's proposition I state that the market value of the firm is independent of its capital structure, thus the firm's average cost of capital is also independent of its capital structure. Hence it does not have an optimal market-value maximizing debt-equity ratio. This is argued to be a consequence of the perfect capital markets assumption, which implies that both the r_a and the market value schedules are horizontal when plotted against leverage (Prasad et al, 2001). M-M's proposition II states that the rate of return required by shareholders rises linearly as the firm's debt-equity ratio increases, hence the cost of equity rises so as to offset exactly any benefits accrued by the use of cheap debt. This is based on the assumption that the firm does not face financial distress costs, which rise as the level of leverage rises, and that the marginal rate of return that debt holders require remains constant. But market imperfections such as taxes and financial distress affect the firm's capital structure. M-M's proposition III states that a firm will only undertake investments whose returns are at least equal to r_a.

The TV and M-M differ in their conclusions since under TV, the firm's value and cost of capital are related to its capital structure whereas M-M's proposition I states that they are independent of capital structure. M-M's proposition II shows that the management can maximize shareholder returns by fully leveraging the firm, but this can lead to bankruptcy.

Though, the proposition does imply a linear relationship between shareholders' rate of return and firm leverage. Hence at low levels of debt the cost of equity rises faster under M-M than under TV, but at higher levels of debt, the risk of default increases and the cost of equity rises faster under TV than under M-M's proposition II (Prasad et al, 2001).

2.1.2 Theories of the Impact of Taxation on Capital Structure

The theoretical literature has examined two main aspects of the impact of tax on the firm's capital structure. The first aspect concentrates on aspects of the corporate tax deductibility of debt, while the second looks at the way in which taxes influence the decisions of the firm's security holders, and hence their willingness to hold the firm's securities.

Debt offers a tax shelter since interest is deducted before taxing profits, hence in the presence of corporate taxes, Modigliani and Miller (1963) showed that the value of the firm as a whole rises as the level of leverage increases. Thus suggesting that firms have no constraints on the incentive to issue debt other than the direct threat of bankruptcy. Shareholders and debt holders are also subject to tax on their security income, thus affecting their after-tax returns. Though debt interest is deducted for firms, it is taxed as income in the hands of debt holders. Dividends paid on the other hand are affected by the amount of corporate tax paid while at the same time the amount of dividend paid incur a final withholding tax.

Miller (1977), in his seminal paper, argues that situations in which the owners of corporations could increase their wealth by substituting debt for equity (or vice versa) would be incompatible with market equilibrium. He argues that marginal income tax rates are heterogeneous as shareholders typically include a combination of taxable and tax-exempt entities. Thus the firm will issue debt until at the margin, the corporate tax savings are equal to the personal tax loss, that is, until the marginal corporate tax rate is equal to the investor's personal tax rate. Since the firm cannot control these two rates, at equilibrium, the tax structure determines the aggregate level of debt, but not the amount issued by a single firm. In this sense therefore, Miller's analysis implies that leverage is determinate, but still irrelevant for the individual firm. However, it is observed that any individual firm has pre-existing non-debt tax shield and will face an increasing probability of distress as debt increases (Prasad et al, 2001).

DeAngelo and Masulis (1980) extend the Miller's analysis by incorporating into the analysis non-debt tax shields such as depreciation and investment tax credits. They argue that the existence of non-debt corporate tax shields is sufficient to overturn the Miller's irrelevancy theorem with no need for bankruptcy, agency, or any other leverage-related costs. In their model, these tax codes imply a unique interior optimum leverage decision for each firm in the market equilibrium after all supply side adjustments are taken into account, with or without the presence of leverage-related costs.

Their model predicts that firms will select a level of debt that is negatively related to the level of available tax shield substitutes for debt. Thus, they argue that firms with large non-debt tax shields relative to their cash flow will have less debt in their capital structure because non-debt tax-sheltered expenditures effectively exhaust the firm's tax-saving capacity. Hence there is a direct negative relationship between the value of the marginal corporate tax saving and the amount of debt issued with the optimum level of debt occurring when the marginal corporate tax benefits of debt is equal to its marginal personal tax disadvantage.

Schneller (1980) in their paper argue that when individuals differ in the tax rates imposed on their interest income, value maximization is a meaningless dictum. They examine the impact of taxation on the optimal capital structure of the firm when all investors belong to the same tax brackets. Their study shows that when taxes are introduced, increased compensation to bondholders may actually benefit stockholders. The study shows that for the dividend-paying firm, interior solutions for the capital structure decision is possible due to the disparity between the capital gains and dividend income tax rates and the possibility of illiquidity. For the earning-retaining firm without bankruptcy the optimal capital structure is always a corner solution, with interior solution possible when bond default is allowed.

Myers (1984) points out that in the static trade-off theory, firms attain the optimal capital structure by balancing at the margin the tax advantage to borrowing by costs of financial distress.

The static trade-off framework is represented as the case where the firm sets a target debt-to-value ratio and gradually moves towards it. The firm's optimal debt ratio is viewed as determined by a tradeoff of the costs and benefits of borrowing, holding the firm's assets and investment plans constant. The firm therefore substitutes debt for equity or equity for debt until the value of the firm is maximized. But since there are costs in adjustment, there are lags in adjusting to the optimum resulting into cross-sectional dispersion of actual debt ratios across a sample of firms having the same target ratio.

In their article, Berens and Cunny (1995) recognize that firm value typically reflects a growing stream of earnings, while current debt reflects a non-growing stream of interest payments. Due to this, they argue that debt to value is a distorted measure of corporate tax shielding. Hence even with very small debt-related costs, this may explain the observed magnitude and cross-sectional variation of debt ratios. And since this variation may be independent of tax shielding, debt ratios therefore provide an inappropriate framework for empirically examining the trade-off theory of capital structure.

Their article shows that once nominal growth is recognized in firm valuation, the debt ratio becomes a badly distorted measure of tax shielding. This is because future values of a firm's cash flow are reflected in the equity value but not the debt value thus having a significant impact on firms' debt ratios. Hence tests that use the debt ratio as their leverage measure do not accurately test the trade-off theory of capital structure.

In a static setting, the trade-off theory of capital structure argues that firms balance the corporate tax benefit of debt against the various costs. Thus theory yields an intuitive interior optimum for firms and gives a rationale for cross-sectional variation in corporate debt ratios; firms with different types of assets will have different bankruptcy and agency costs and different optimal debt ratios. Also, firms with different amounts of alternative tax shields will have different marginal tax benefits of debt, thus implying different levels of optimal debt ratios. They recognize that an apparently serious problem with the trade-off theory is that the debt ratios predicted by theory are significantly higher than the observed. Myers (1984) also argues that the trade-off theory also fails to predict the wide degree of c ross-sectional and time variation of observed debt ratios.

They thus propose a study of capital structure in a dynamic setting, They argue that a properly executed trade-off theory of capital structure should try to explain the magnitude of tax payments in terms of bankruptcy costs, agency costs, asymmetric information, product/input market interactions, corporate control considerations, or other reasons.

Other studies relax the Modigliani-Miller framework by incorporating the bankruptcy costs in studying the c apital structure on the observation that increased u se of debt by the firms may lead to high bankruptcy costs. For instance, Brennan and Schwartz (1978) study the impacts of corporate income taxes and bankruptcy on the relationship between capital structure and valuation. They argue that the issue of additional debt can either affect the value of the firm by increasing the tax saving as long as the firm survives, or it reduces the probability of survival. Depending on which is the stronger of the two, the value of the firm might rise or fall as a result of a debt issue. The optimum value of debt is that at which the marginal tax benefits associated with one extra unit of debt is equal to the expected marginal cost of default, which rises as the firm's gearing increases.

They suppose a priori that as additional debt is issued from a small base the survival probabilities of the firm will not be substantially affected and the value of the firm will increase. But at high initial levels of debt, further increments of debt may affect the survival probabilities and the value of the firm will actually decrease. If such is the case, then an optimal capital structure may exist even without the existence of bankruptcy costs.

They thus find that firm value increases the most following a debt issue for firms that have the least business risk; that as the maturity of debt increases, the optimal leverage ratio falls; and that an increase in earnings risk also reduces the optimal leverage ratio.

2.2 Empirical Literature

Ferri and Jones (1979) looked at a new methodological approach in establishing the determinants of financial structure by investigating the relationships between a firm's financial structure and its industrial class, size, variability of income, and operating leverage. They developed a taxonomy of firms that is based on the firms' actual financial behavior, so as to avoid measurement difficulties, as a basis for carrying out the investigation. They hypothesize the relationship of each of these four determinants to financial structure.

Using a sample of 233 firms with data gathered for two five-year time spans from 1969 to 1974 and from 1971 to 1976. The dependent variable, financial structure, was measured by the ratio of total debt to total assets at book value (D/TA) with the main reason being the ability of the variable to more completely reflect a firm's total reliance on borrowed funds. The independent variables were industry, size, business risk and operating leverage.

They find that industry class is linked to a firm's leverage but in a less pronounced and direct manner than has been previously suggested. A firm's use of debt is related to its size but the relationship does not conform to the positive linear scheme that has been indicated in other work. Also, the variation in income could not be shown to be associated with a firm's leverage; and operating leverage influence the percentage of debt in a firm's financial structure and the relationship between these two types of leverage is quite similar to the negative, linear form which theory would suggest.

Flath and Knoeber (1980), test the M-M proposition that although taxes and costs of failure do not affect the average cost of capital, they do affect expected income and so imply an optimal capital structure. Using a sample of 38 major industries, they construct measures of the tax advantage to debt and the costs of failure, and attempt to relate these variables to cross-sectional and temporal variation in industry capital structure for the period 1957 to 1972. In developing their model, they assume that the real investments of the firm are independent of the financial decisions and that there are no clientele effects.

They calculated the tax subsidy to debt by considering the effect of changes in industry debt on personal as well as corporate tax liability. The dependent variable is the log of capital structure variable, with this variable calculated from real value of interest deductions and real value of income before taxes. The independent variables include marginal annual tax advantage to interest payments, costs of failure, operating risk and a dummy for regulation. They found that on the margin, taking account of both corporate and personal taxes, the annual tax advantage to one dollar of interest generally ranged cross-sectionally between $0.14 and $0.16 for the 1957–1964 period and between $0.23 and $0.26 for the

1965–1972 period. The increase in the tax advantage between the two periods was explained by increase in personal tax rates occurring in 1964. Following an inferential approach to measure both the direct and indirect failure costs, they find an approximately unitary elasticity between failure costs and income (EBIT)[5], which is significant with theory since variation in capital structure ought not to be related to proportionate variation in failure costs and income. They also find that cross-sectional variation in capital structure was best explained by differences in operating risk including that related to the regulatory process and not by inter-industry differences in the tax advantage to interest, which were quite small.

MacKie-Mason (1990) used discrete choice analysis to study tax effects on the choice between issuing debt or equity. They argue that tax shields should matter only when they affect the marginal tax rate on interest deductions, and that marginal rate is lowered only if the tax shields cause the firm to have no taxable income and thus face a zero marginal rate on interest deductions (tax exhaustion). Thus the paper considers mainly the relationship between tax shields and the effective marginal tax rate. The method of analysis used is argued to overcome the problem of low power for effects at the margin and specification bias experienced by tests based on debt/equity ratios by using incremental decisions and relying on weak revealed preference condition for the form of the choice model respectively. The incremental debt for the firm is defined as a function of potential tax shields, a measure of how close the firm is to tax exhaustion, and other variables to control for financial distress costs, costs of moral hazard-induced investment inefficiencies, and signaling costs of equity issues. These factors include variances of changes in net income, ratio of plant and equipment

[5] EBIT stands for earnings before interest and taxes. The higher the EBIT the higher is the tax cost for firms given the statutory tax rate.

to total assets, advertising and research expenditures, dummy for dividend paying firms to capture signaling costs, and industry and year dummies.

They select a sample of 1747 registrations based on 1977-1987 primary seasoned offerings for firms from SEC Registered Offering Statistics based on a defined criteria, and COMPUSTAT for data on firm characteristics. Using two tax variables, tax loss carry forwards and investment tax credits, they find that firms with high tax loss carry forwards are much less likely to use debt, which is as per theory since these firms are unlikely to use interest deductions. They also find that, on average, investment tax credit does not reduce the probability of a debt issue and that firms with investment tax credits are profitable and pay taxes.

Givoly et al (1992) study the response of U.S. firms to the Tax Reform Act of 1986 (TRA) by testing the relationship between leverage and certain tax-related variables for a large sample of companies in the years surrounding the enactment of the TRA. The TRA changed the tax regime in which firms and investors operate by abolishing some non-debt tax shields available to firms thus making the tax shield provided by interest more attractive. The period of study was from 1984 to 1987 so as to capture the period before and after enactment of the TRA with 1984 and 1985 added as control years.

They carry out a cross-sectional analysis of firms' reaction to the TRA by focusing on leverage changes, thus analyzing the derivative of the optimal capital structure decision, while controlling for firm-specific, non-tax factors affecting leverage. They consider the effect of three of the more prominent corporate provisions – the elimination of the investment tax credit, the reduction in the statutory tax rate, and the change in depreciation allowances.

They regress the firm's change in leverage on the changes in tax-related firm attributes hypothesized to affect the leverage decision. The explanatory variables are: (i) an estimate of the firm's marginal effective tax rate, which proxies for the change in this rate; (ii) an estimate of the amount of non-debt tax shields lost as a result of the TRA, which captures the substitution effect; and (iii) the firm's dividend yield, which proxies for the change in personal tax advantage of equity income relative to debt income of the marginal investor.

To control for non-tax factors, they introduce additional independent variables like the firm size, business risk, and bankruptcy cost or collateral value. They find a positive association between changes in leverage and changes in corporate tax rates, thus supporting the tax-based theories of capital structure. The findings indicate that there exists a substitution effect between debt and non-debt tax shields, and that both corporate and personal tax rates affect leverage decisions.

Booth et al (2001) did a study to look at whether the capital structure theory is portable across countries with different institutional structures by analyzing capital structure choices of firms in developing countries. They use data from the International Finance Corporation (IFC) which comprises abbreviated balance sheets and income statements for the largest companies in each country from 1980 to 1990. They calculate a firm's total book-debt ratio as its total liabilities divided by total liabilities and net worth.

Leverage is measured using total debt ratio, long-term book-debt ratio and long-term market-debt ratio. The impact of taxes is measured using the marginal tax rate. They use the average effective tax rate to proxy for the marginal value of the tax shield and argue that the advantage of the average tax rate is that it includes the impact of tax loss carryforwards and the use of corporations as a conduit for income flows. The agency costs and financial distress is proxied using business risk and tangibility. The probability of financial distress is estimated as the variability of the return on assets over the available time period, calculated as the earnings before interest and tax divided by total assets. This variable is used to proxy the business risks. Tangibility of the firms' assets is defined as total assets minus current assets divided by total assets. The return on assets, used to proxy profitability, is measured as the earnings before tax divided by total assets. Other variables included are size, measured by the natural logarithm of sales, and market-to-book ratio. They found evidence that capital structure decisions are affected by the same variables as in the developed countries.

They estimate a cross-sectional regression of the three different measures of firm's debt ratio against the firm's tax rate, the standard deviation of its return on assets, tangibility of assets, the natural logarithm of sales, its return on assets, an its market-to-book ratio. They found that the more tangible the firm's assets, the greater its ability to issue secured debt and the less information revealed about future profits. The tax variable is found to be generally negative but turns positive for three countries when the fixed effects are introduced. On the other hand, the sign of tangibility varies between the different estimation techniques and they deduce that this is an indication that it is highly correlated with the fixed effects. They find the coefficient of profitability for the fixed effects model to be generally around –0.6. Business risk is found to have opposite sign than was expected for the sampled firms.

Banerjee et al (2000) used a dynamic adjustment model and panel data methodology on a sample of 122 U.K. firms observed during 1990-1996, and 438 U.S. firms observed during 1989-1996 to specifically establish the determinants of a time-varying optimal capital structure. Their model allows for the possibility that at any point in time firms' observed leverage may not be optimal, and that firms differ in their speed of adjustment towards the optimal capital structure[6], which itself may be changing over time for the same firm. They distinguish between the observed debt ratios and estimates of the implied optimal levels thus

[6] This is consistent with Myers and Majluf, 1984.

they attempt to empirically determine the factors that affect the optimal debt levels as well as capture the dynamics of capital structure adjustments.

In their model, the optimal leverage ratio is specified as a function of the optimal leverage, firm-specific and time-specific effects. This is to allow the optimal leverage to vary across firms and over time. They use both book and market values to measure leverage. Independent variables used include income variability, tangibility, expected growth, size, profitability, non-debt tax shields, uniqueness and industry dummy. No tax rate variable is used in this analysis though tax shields variables used can capture some of the tax effects. An adjustment parameter is also specified to capture the extent of adjustment of firms to the optimal leverage. Using a nonlinear procedure to estimate the capital structure adjustment model, they test for multicollinearity by looking at the matrix of correlation coefficients between the dependent and independent variables, whereby they find most cross-correlation terms to be fairly small. Using likelihood ratio test, they find that the adjustment parameter is not constant.

The effects of various factors determining the optimal leverage are generally as expected in the UK. In the USA expected growth is found to have a strong positive effect on leverage indicating that debt is available to finance growth at a much greater extent in the USA. Using market values for leverage they find that tangibility of assets, size of the firm, and expected growth as measured by the ratio of the market to book value of a firm affects the optimal leverage positively, while profitability and the variability of operating profits influence it negatively. They also find that firms' observed leverage is frequently different from their target leverage and that the speed of adjustment is lower for bigger firms.

Ngugi (2002) study the determinants of capital structure behavior for firms listed on the Nairobi Stock Exchange. Using a sample of 22 firms and covering the period 1991-1999, the study use panel data estimation technique to estimate reduced form equations derived from the static trade-off model and the pecking order hypothesis.

The dependent variable, leverage, is measured in this study as the ratio of book value of total debt to book value of total assets. The independent variables include tax advantage measured using average tax and depreciation which captures the non-debt tax shield, liquidity of assets, size of the firm, tangibility, growth opportunities, business risk and profitability.

From the study, both static trade-off and the pecking order hypothesis cannot be rejected. The use of debt is found to be mainly due to the internal financing gap. The non-debt tax shield is found to have a significant impact on debt financing. Tax exhaustion proxy is also significant and has the expected sign. The results show that firms do not need to use debt to take advantage of interest expenses that are deductible but it is the non-debt tax shields that influence the demand for debt. Firms are also found to minimize their costs by observing a target debt ratio, thus supporting the static trade-off theory. The capital financing behavior of firms is determined by capital market imperfections. A negative and significant relationship is found for profitability that supports the hierarchical financing behavior, and size of the firm is also negatively related to leverage. The study identifies the main determinants of capital structure behavior to be internal financing gap, information asymmetry, non-debt tax shields, investment returns, and the adequacy of the capital market infrastructure.

Titman and Wessels (1988) study analyzes the explanatory power of some of the theories of capital structure. They use linear structural modeling, a technique that is an extension of factor-analytic approach to measuring unobserved or latent variables that explicitly recognizes and mitigates the measurement problems associated with using proxies for the unobservable theoretical attributes. The study covered the period between 1974 through to 1982 with a sample of 469 firms. The sampling period was divided into three sub periods of three years each over which sample averages of the variables were calculated, with averaging meant to reduce the measurement error due to random year-to-year fluctuations in the variables.

They estimate a factor analytic model consisting of a measurement model and a structural model. In the measurement model, unobservable firm-specific attributes are measured by relating them to observable variables; while in the structural model measured debt ratios are specified as functions of the attributes defined in the measurement model. The parameters of the model are then estimated by fitting the covariance of observable variables implied by the specification of the model to the covariance matrix of these variables observed from the sample. The fitting function is derived from maximum-likelihood procedures and assumes that the observed variables are conditionally multinormially distributed.

They use six measures of financial leverage, these are, long-term, short-term, and convertible debt divided by market and by book values of equity. They measure debt in terms of book values rather than market values. The independent variables used are collateral value of assets, non-debt tax shields, growth opportunities, size, volatility and profitability.

Their analysis suggests that firms with unique or specialized products have relatively low debt ratios. They categorize uniqueness by the firms' expenditures on research and development, selling expenses, and the rate at which employees voluntarily leave their jobs. Smaller firms are found to tend to use significantly more short-term debt than larger firms do, and that profitable firms have relatively less debt relative to the market value of their equity.

Warner (1977), in his study, argues that assumptions about the magnitude of bankruptcy costs would have a considerable bearing on the issue of how much debt is optimal for the firm to have in its capital structure. They carried out an empirical test based on a number of railroad firms that were in bankruptcy proceedings under Section 77 of the

Bankruptcy Act between 1933 and 1955 to determine the bankruptcy costs. They found that the ratio of direct bankruptcy costs to the market value of the firm appears to fall as the value of the firm increases. He observes that only the direct costs are measurable and hence some of the omitted indirect costs may be substantial.

2.3 Overview of literature

The capital structure question has advanced over the period with more insights pointing to the inclusion of various variables as determinants that were not in use before, for instance, the term level of debt. The literature also shows that studies of capital structure should be in a dynamic setting since firms tend to vary their capital structure relative to the previous level while observing the adjustment costs that exist. It is also pointed out that studies on the effects of tax on capital structure should include other determinants of capital structure as well and to include the impacts of different taxes, e.g. tax on interest income and on dividend, since these have different impacts on capital structure. Non-debt tax shields, like investment tax credits and depreciation allowances also have a major role in determining capital structure since they are not equal across all firms. Debts have also been shown to either lead to the increase in the value of the firm or to reduce it depending on the bankruptcy position of the firm.

Taxes, on the other hand, have been found to differ in their impacts on capital structure of firms. Taxes on dividend and on debt interest payments leads to substitution between debt and equity use by the investors, hence affecting the composition of capital held by firms. Corporate tax on the other hand is directly applicable on the income of corporations hence influence their use of debt as a tax shield, thereby also leading to the change in their capital structure.

The variables of measurement have been shown to have similar results especially on the signs of the relationships both for the developed and the developing countries following studies by Booth et al (2001), Rajan and Zingales (1995) and Prasad et al (2001). This means the variables that have been used in developed countries can be applied in studying the capital structure in developing countries.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Conceptual Framework

The capital of firms consists of debt and equity, with debt being a combination of bonds and loans. Debt can either be borrowed on short-term or long-term basis. Equity, on the other hand, can be either internal or external. The change in the value of the firm is therefore modeled as the change in both equity and debt.

Given that firms' preference for short-term and long-term debt differs, the choice of the type of debt, given the tax rate, is therefore expected to vary in the firms' capital structure. Here we consider the effect of tax on the overall debt level rather than giving consideration of the debt period. This is by considering the debt as a ratio of total capital (or firm value) as a function of optimal leverage and time dummies. The use of either short-term or long-term debt can be inferred from the relationship between growth opportunities and leverage with short-term debt exhibiting positive relationship while long-term debt exhibiting negative relationship (see Titman and Wessels, 1988). The estimation model is based on the static trade-off theory in which firms observe a target debt ratio.

The study follows closely studies by Banerjee et al (2000) and Givoly et al (1992) in capturing the impact of taxes on capital structure. The study by Banerjee et al (2000) considers the determinants of capital structure in a dynamic setting so it captures the way the capital structure of companies has been changing over time. The study by Givoly et al (1992) on the other hand considers how the firm's change in leverage is affected by changes in tax-related firm attributes hypothesized to affect the leverage decision. Hence, adoption of both studies in developing the methodology helps in drawing out clearly the way capital structure of firms has been affected over time by the changes in the tax rates.

3.2 Model Specification

The value of the firm (V) can be expressed as the sum of debt (D) and equity (E) as follows (Ngugi, 2002):

$$V = D + E \qquad (1)$$

where $E = E_1 + E_2$; E_1 is internal equity and E_2 is external equity, and

$D = D_1 + D_2$; D_1 is short-term borrowing and D_2 is long-term borrowing.

The change in firm value reflect changes in both debt and equity financing:

$$\Delta V = \Delta D_1 + \Delta D_2 + \Delta E_1 + \Delta E_2$$

Therefore, the debt ratio is defined as

$$\omega = \Delta D / (\Delta D + \Delta E) \qquad (2)$$

We define the optimal leverage ratio (debt to total capital) D^*_{it}, for firm i at time t, as:

$$D^*_{it} = F(X_{it}, V_t) \qquad (3)$$

where X_{it} represents the determinants of the optimal leverage, and V_t represents time specific dummies. We define D_{it} as the actual leverage ratio for firm i at time t. Hence, by assuming lagged adjustment, actual debt (D_{it}) can be expressed as a fraction of the target debt level D^*_{it};

$D_{it} = \rho(D^*_{it})$ where $0 < \rho < 1$. Then we can infer presence of adjustment costs when $\rho < 1$, with a frictionless market implied when $\rho = 1$ while $\rho = 0$ implies high costs of adjustment. Assuming a perfect situation, it is expected that changes in actual leverage from previous to current period should be exactly equal to the change required for the firm to be at the optimal at time t, that is,

$$D_{it} - D_{it-1} = D^*_{it} - D_{it-1} \qquad (4)$$

In the presence of adjustment costs, firms may not find it optimal to adjust fully, or they would adjust partially. Hence a simple-form partial adjustment model can be used to proxy the adjustment process. This is represented as:

$$D_{it} - D_{it-1} = \alpha (D^{*}_{it} - D_{it-1}) \qquad (5)$$

$$0 < \alpha < 1$$

where α is the adjustment parameter and $\alpha > 0$ implies adjustment to the target; and $\alpha < 1$, implies presence of positive adjustment costs.

The optimal leverage ratio is unobservable and is estimated using regression analysis as:

$$D^{*}_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 V_t + \varepsilon_{it} \qquad (6)$$

where ε_{it} is identically and independently distribute with constant mean and constant variance, and X_{it} is a vector of exogenous variables that influence the target leverage ratio including tax advantages, financial distress costs, agency costs and market conditions. The tax advantages are proxied by average effective tax rate (*AETR*), non-debt tax shields as depreciation (*NDEP*), tax exhaustion (*NTEX*), and tax loss carryforwards (*NTLCF*). Financial distress is proxied by tangibility (*TANG*), growth opportunities (*GROW*), profitability (*CPROF*) and business risk (*BRISK*). Agency costs is proxied by size of the firm (*SIZE*), dividend yield (*DYLD*) and proportion of liquid assets (*LQT*).

From equation (5), the actual leverage ratio can be expressed as:

$$D_{it} = \alpha D^{*}_{it} + (1 - \alpha) D_{it-1} \qquad (7)$$

Substituting for D^{*}_{it} in equation (7), the actual debt ratio can be represented as:

$$D_{it} = \alpha\beta_0 + (1 - \alpha) D_{it-1} + \alpha\beta_1 X_{it} + \alpha\beta_2 V_t + \alpha\varepsilon_{it} \qquad (8)$$

Equation (8) defines the present value of debt ratio in terms of the target debt level and past period debt ratio. This gives us the estimation equation.

3.3 Estimation Procedure

The estimation of capital structure has been carried out before using Probit and Logit models (e.g. Flath and Knoeber, 1980 and MacKie-Mason, 1990), linear structural estimation technique (e.g. Titman and Wessels, 1988) and panel data estimation techniques (e.g. Banerjee et al., 2000).

This study adopts panel data estimation techniques in capturing the impacts of taxes on capital structure. This is because panel data consists of both cross-sectional and time series data thus it is expected that this will improve the efficiency of the estimates.

In estimating the optimal leverage, we use both the simple pooling method and the fixed-effects model. In the simple pooling method, leverage is estimated with pooled data, in which case there is one fixed intercept. However, in this case the capital structure model is not fully specified since a simple pooling might not result in either efficient or unbiased parameter estimates (Booth et al, 2001). Hence a fixed-effects model that allows us to use all the data while the intercept is allowed to vary across firms and/or time is also estimated. This allows the effects of omitted explanatory variables to be captured in the changing company intercept (Booth et al, 2001). But in the presence of measurement error the fixed effects model can produce more biased estimators than simple pooling, hence both the pooled and fixed effects model are also estimated (see Hsiao (1986) as pointed out in Booth et al (2001)).

Estimation of equation (8) can be done using a pooled data, random estimation or fixed effect estimation. For the pooled data, equation (8) can be generalized as

$$D_{it} = \alpha + \beta X_{it} + \epsilon_{it}, \text{ where } \epsilon_{it} \sim \text{iid } (0,\delta^2)\ \forall\ i,t \qquad (9)$$

That is, for a given individual, observations are serially uncorrelated but across individuals and time, the errors are homoscedastic. The assumptions correspond to the classical linear model and hence the pooled data is estimated using OLS. This gives MODEL 1.

We can expand equation (9) by separating the unit specific residuals in the error term. Hence from

$$D_{it} = \alpha + \beta X_{it} + \epsilon_{it},$$

whereby in a typical case the number of individuals is large and the number of time periods small, the error structure for the disturbance term can be specified as,

$$\epsilon_{it} = \omega_i + \eta_{it}$$

where we assume η_{it} is uncorrelated with X_{it}. ω_i is the individual effect and varies across individuals or the cross-sectional unit but is constant across time, and may or may not be correlated with the explanatory variables. η_{it} varies unsystematically (i.e. independently) across time and individuals. The assumptions made about the individual effects determine whether a random or a fixed effects model is used. For the random effects, ω_i is uncorrelated with X_{it}, but for the fixed effects, ω_i is assumed to be correlated with X_{it}.

Therefore expanding the error term we present the model as:

$$D_i = \alpha + \beta X_i + \omega_i + \eta_i, \qquad (10)$$

Given that this is the case, we can also present it as

$$\overline{D}_i = \alpha + \beta \overline{X}_i + \omega_i + \overline{\eta}_i \qquad (11)$$

where $\overline{D}_i$, $\overline{X}_i$ and $\overline{\eta}_i$ are means of the respective variables with respect to time.

Subtracting (11) from (10), we get

$$(D_{it} - \overline{D}_i) = (X_{it} - \overline{X}_i)\beta + (\eta_{it} - \overline{\eta}_i) \qquad (12)$$

From the three equations, the fixed effects estimator (within estimator) amounts to using OLS to estimate equation (12). This presents MODEL 2. Between estimator amounts to using OLS to estimate equation (11). This presents MODEL 3. The random effects estimator is a weighted average of the estimates produced by the between and within estimators, and is equivalent to estimating equation (13) shown below;

$$(D_{it} - \tau \bar{D}_i) = (1-\tau)\alpha + (X_{it} - \tau \bar{X}_i)\beta + \{(1-\tau)\omega_i + (\eta_{it} - \bar{\eta}_i)\} \qquad (13)$$

Random effect model is one way to deal with the fact that **T** observations on **n** individuals are not the same as observations on **nT** different individuals. This gives MODEL 4.

After estimating the optimal leverage ratio, the actual leverage ratio is estimated using a partial adjustment model. This is estimated by regressing the present value of the debt ratio by the actual leverage from previous period, optimal leverage and the time dummies.

3.4 Data Source and Measurements

The study uses the tax components of the determinants of capital structure as well as using the main variables found by Ngugi (2002) to be the main determinants of capital structure behavior of firms listed on the Nairobi Stock Exchange. This is to control for these variables while analyzing the impacts of taxes on the capital structure.

The study uses secondary d ata collected from company annual reports covering the period 1993-2001. The data set was obtained from the Nairobi Stock Exchange and Kenya Revenue Authority publications. The sample comprises 20 non-financial companies listed on the Nairobi Stock Exchange. The sample size was reached at after firms with missing data points were dropped so as to make the panel balanced.

Dependent variable

Leverage (*LEV*)

Leverage is measured using such ratios as; total liabilities to total assets; total debt to net assets; and total debt to total equity (see Rajan and Zingales, 1995). Other studies disaggregate debt into short-term and long-term debt, but because the measurement error of the dependent variable is subsumed in the disturbance term such that the regression coefficient is unbiased, aggregate debt is also a suitable proxy. Empirical studies in developed and developing markets show no significant difference in proxies used.

Leverage is defined in this study as the ratio of the value of debt to the sum of the value of debt and equity. In this study, we use the book value measure of leverage. This is because in the use of market value, a change in leverage can be experienced whenever share prices change and do not necessarily reflect intentional changes by management. Hence the interest is to capture intentional changes in leverage brought by new issues of equity or bonds, stock repurchases, and calls of a previously issued debt using a book-based leverage measure (Givoly et al, 1992). Also, as documented in Titman and Wessels (1988), Bowman (1980) demonstrated that the cross-sectional correlation between the book value and market value of debt is very large; hence the use of book value measure has a probably small misspecification.

Independent variables

The independent variables can be categorized into proxies for tax effect and control variables. Proxies for tax effect include average effective tax rate, depreciation, tax exhaustion and tax loss carryforwards. The control variables include liquidity, tangibility, growth opportunities, business risk, profitability and size.

(a) Proxies for Tax Effect

Average effective tax rate (*AETR*)

A firm's marginal effective tax rate on interest deductions depends on the non-debt tax shields and different firms face the same statutory marginal rate but different probabilities of paying zero taxes (DeAngelo and Masulis, 1980). Following Booth et al (2001) we use the average effective tax rate to proxy for the marginal effective tax rate. The average tax rate is calculated from earnings before tax (*EBT*) and earnings after tax (*EAT*) by estimating it as:

$$AETR = \frac{(EBT) - (EAT)}{(EBT)}$$

Firms with a higher marginal effective tax rate will change their capital more than firms with a lower marginal effective tax rate in response to a given change in the statutory tax rate. Hence a positive relationship is expected between the effective tax rate and leverage.

Amount of depreciation (*NDEP*)

The expected amount of depreciation as a result of a change in the tax system depends on the level of capital expenditures. Following Givoly et al (1992), we assume that future asset acquisitions are correlated with past asset acquisitions and hence we base the estimate on the balance and composition of assets in place. We measure amount of depreciation as depreciation (*DEP*) over the total firm value (*TA*).

$$NDEP = \frac{DEP}{TA}$$

A negative relationship is expected between this variable and leverage.

Tax Exhaustion (*NTEX*)

This variable is estimated based on the argument that tax shields only matter to the extent that they affect the marginal tax rate on interest deductions. Thus tax shields lower the marginal tax rate if they cause the firm to have no taxable income and thus face a zero marginal tax rate (MacKie-Mason, 1990). Following Ngugi (2002), we measure amount of tax exhaustion as depreciation (*DEP*) less average effective tax rate (*AETR*) normalized by the total firm value (*TA*).

$$NTEX = (DEP - AETR)/\ TA$$

A negative relationship is expected between this variable and leverage.

Amount of tax loss carryforwards (*NTLCF*)

Tax loss carryforwards affect the tax rate on interest payments by crowding out interest deductions. We use the book value of tax loss carryforward (*TLCF*) over the total firm value (*TA*) to measure *NTLCF*.

$$NTLCF = \frac{TLCF}{TA}$$

Since firms with high *TLCF* are less likely to use debt, a negative relationship is expected between this variable and leverage.

(b) Control Variables

Liquidity of assets (*LQT*)

Liquid assets support a relatively higher debt ratio with the ability to meet short-term obligations when they fall; liquid assets could also be used to finance investments so that a negative relationship is indicated with the leverage measure. However, shareholders also manipulate liquid assets at the expense of the bondholders. Thus, asset liquidity is used as a proxy for asset substitution (Ngugi, 2002). Liquidity of the firm assets is measured as the ratio of cash and firm value. A positive relationship is expected between liquidity of assets and leverage.

Tangibility (*TANG*)

This is viewed as the tangibility of assets in the balance sheet. Tangibility measures the proportion of firm's fixed assets. Booth et al (2001) use the ratio of the difference between total assets and current assets to total assets while Banerjee et al (2000) and Rajan and Zingales (1995) both use the ratio of fixed assets to total assets to measure tangibility. Tangible assets, which retain high liquidation value, serve as debt security. However, if tangible assets are illiquid, firms have a lower debt capacity. In this study we use the ratio of book value of fixed assets to total firm value. We expect a positive relationship between this variable and a firm's optimal debt ratio. This is expected because intangible assets are more likely to disappear in the face of a probable bankruptcy thus diminishing the net worth of a firm. Hence firms with a greater percentage of their total assets composed of tangible assets are more likely to have a higher capacity to raise debt.

Growth opportunities (*GROW*)

Growth opportunities are proxied using the ratio of market to book value of assets and also the ratio of expenditure on research and development to total sales or total assets. The liquidation or collateral value of the firm's assets has been suggested to be a determinant of the optimal capital structure. Rajan and Zingales (1995) proxy growth opportunities using a ratio of book value of assets minus book value of equity plus market value of equity to the book value of assets. Booth et al (2001) use a ratio of market value of assets to book value of assets. Following Givoly et al (1992), we use the market value of equity normalized by the total firm value to proxy for this determinant. This ratio corresponds to Tobin's Q ratio thus it also proxies for bankruptcy costs. We expect a negative relationship between growth and leverage.

Business risk (*BRISK*)

Business risk is defined as variability of expected income. The greater the volatility of earnings, the higher is the probability of bankruptcy arising from default on payment of interest. Booth et al (2001) used the standard deviation of the ratio of earning before tax to the total assets. Ngugi (2002) used the standard deviation of the expected profits from the mean value of the period scaled by total assets. Following Banerjee et al (2000), we use the variance of operating income to total firm value with a higher value of variability leading to lower optimal leverage.

Profitability (*CPROF*)

Profitability is measured as the return on assets, the ratio of operating income to total sales or the ratio of operating income to total assets. Booth et al (2001) use the return on assets defined by the earnings before tax while Rajan and Zingales (1995) use earnings before interest, taxes, and depreciation. A positive relationship is expected between optimal leverage and profitability. We use the ratio of earnings before tax to total firm value to measure profitability. *CPROF* is calculated by adding a constant value of Kshs.4.2 billion to earnings before tax of all the companies to remove the negative value from the profitability variable. This leaves the magnitude of this variable the same while at the same time making the relationship of this variable to leverage interpretable.

Dividend yield (*DYLD*)

Dividend yield is used to proxy the agency cost of debt. Firms with a high dividend yield will increase their leverage much less than firms with a low dividend yield in response to a decrease in the personal tax advantage of equity income. Hence a negative relationship is expected between dividend yield and leverage.

$$DYLD = \frac{\text{Dividend per share}}{\text{Price per share}}$$

Size (*SIZE*)

Firm size can be measured using total assets, total assets to book value, the average level of total assets and average level of sales (see Ferri and Jones, 1979). If there are returns to scale in the costs of issuing securities, larger firms might change their leverage more readily than smaller firms. The size variable is introduced to control for this potential effect. The amount of turnover normalized by firm value is used to measure the effect of firm size on the optimal debt level, and a negative relationship is expected between size and optimal leverage.

$$SIZE = \text{Operating Income}/(\text{Total firm value})$$

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Summary Statistics

In this section, we give a summary of the main variables that have been used in estimation of the model (as shown in Table 2 below) and the correlation. Some of the variables used have observations (N value) of less than the total sample size. This may be attributed to either missing observations in the primary variables used to calculate the variable of estimation or getting a value that is unexplainable in calculation of the variable itself. *DYLD* also has four variables less since we missed prices for some of the companies that had not been listed by the beginning of the sample period. *AETR, BRISK* and *CPROF* have negative minimum values while *LEV, NTLCF, GROW, DYLD* and *SIZE* have zero minimum values.

Table 2: Summary of the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
LEV	180	0.486788	0.362585	0	0.992076	-0.27241	-1.63438
AETR	180	0.30709	0.476512	-4.23443	2.038782	-5.04084	52.13513
NDEP	180	0.257679	0.273454	0.008453	1.626	2.201604	8.850029
NTLCF	180	0.037017	0.102209	0	0.563277	3.401105	14.87316
LQT	180	1.081824	2.595227	0.000351	24.19664	6.050048	48.58176
TANG	180	2.917047	2.964281	0.291616	15.30267	2.013948	7.666529
GROW	180	4.870559	7.051515	0	49.95103	3.800406	22.40653
BRISK	180	1.021215	1.830682	-0.64116	11.69658	4.001272	20.4335
CPROF	180	0.980318	1.87125	-0.97681	11.83203	3.908711	20.73098
DYLD	176	0.056894	0.047724	0	0.346154	1.765315	10.05695
SIZE	180	9.382801	14.42543	0	113.8156	4.540804	28.11743
NTEX	180	0.257679	0.273454	0.008453	1.626	2.201604	8.85003

Note: The variables are described as follows: *LEV* = book value of debt over the sum of book value of debt and equity. *AETR* = earnings before tax less earnings after tax divided by earnings before tax. *NDEP* = depreciation over firm value. *NTLCF* = book value of tax loss carry forward over the total firm value. *LQT* = the ratio of the book value of cash and bank balance to firm value. *TANG* = book value of fixed assets over firm value. *GROW* = market equity over firm value. BRISK = operating income over firm value. *CPROF* = book value of earnings before tax (*EBT*) over firm value. *DYLD* = dividend per share over price per share. *SIZE* = turnover over firm value. *NTEX*=(Depreciation – *AETR*) / Firm value.

From the table, the size variable has a maximum value of about 113.8 implying that turnover is higher than firm value by this ratio. This may be attributed to the fact that firms may acquire trade credit which is payable after sales. Since this type of credit is not measured as part of firm value, the turnover as a ratio of firm value is expected to be higher.

This table also reports the tests for normality of the variables using skewness and kurtosis. Skewness characterizes the degree of asymmetry of a distribution around its mean with positive skewness indicating a distribution with an asymmetric tail extending towards more positive values and negative skewness indicating a distribution with an asymmetric tail extending toward more negative values. Kurtosis, on the other hand, indicates the relative peakedness or flatness of a distribution compared with the normal distribution. Positive kurtosis indicates a relatively peaked distribution and negative kurtosis indicates a relatively flat distribution.

The results show skewness and kurtosis statistics deviating from their expected values with normal distribution. Only two variables, i.e. *LEV* and *AETR* depict negative asymmetry with other variables showing positive asymmetry. The kurtosis statistics shows most of the variables to be relatively peaked hence are lepkurtostically distributed while its only *LEV* that has a flat distribution.

4.2 Correlation Results

Table 3 reports the correlation results of the variables. The correlation matrix shows that most of the variables depict high correlation between them. High levels of correlation can be seen between *LQT* and *GROW*, *LQT* and *BRISK*, *LQT* and *CPROF*, and *LQT* and *SIZE*. This is expected since as the firm becomes more liquid, it develops high growth opportunities which will make its market equity to rise thus implying high risk due to high return expectations.

Table 3: Correlation of the Variables

	LEV	*AETR*	*NDEP*	*NTLCF*	*LQT*	*TANG*	*GROW*	*BRISK*	*CPROF*	*DYLD*	*SIZE*	*NTEX*
LEV	1.0000											
AETR	-0.0853	1.0000										
NDEP	-0.4610	0.0745	1.0000									
NTLCF	0.2276	-0.0320	-0.0613	1.0000								
LQT	-0.4077	0.0389	0.5542	-0.1085	1.0000							
TANG	-0.4365	0.0336	0.7541	-0.0983	0.5078	1.0000						
GROW	-0.5259	0.0247	0.5477	-0.2039	0.6084	0.5228	1.0000					
BRISK	-0.3851	0.0780	0.4656	-0.1990	0.6092	0.4458	0.6259	1.0000				
CPROF	-04466	0.0601	0.5766	-0.2206	0.7485	0.5240	0.7451	0.8846	1.0000			
DYLD	-0.2809	0.1198	0.0151	-0.2735	0.1376	-0.0038	-0.0029	0.2287	0.2451	1.0000		
SIZE	-0.1813	0.0691	0.3125	-0.0834	0.5892	0.4680	0.3156	0.6604	0.6909	0.2221	1.0000	
NTEX	-0.4610	0.0745	1.0000	-0.0613	0.5542	0.7541	0.5477	0.4656	0.5766	0.0151	0.3125	1.0000

Note: The variables are described as follows: *LEV* = book value of debt over the sum of book value of debt and equity. *AETR* = earnings before tax less earnings after tax divided by earnings before tax. *NDEP* = depreciation over firm value. *NTLCF* = book value of tax loss carry forward over the total firm value. *LQT* = the ratio of the book value of cash and bank balance to firm value. *TANG* = book value of fixed assets over firm value. *GROW* = market equity over firm value. *BRISK* = operating income over firm value. *CPROF* = book value of earnings before tax (*EBT*) over firm value. *DYLD* = dividend per share over price per share. *SIZE* = turnover over firm value. *NTEX*=(Depreciation – *AETR*) / Firm value.

High liquidity can only be experienced for profitable firms, and this is expected much from larger than for smaller firms. High values of correlation of over 60% can also be seen between *SIZE* and *BRISK*, *CPROF* and *BRISK*, *CPROF* and *GROW*, and *TANG* and *NDEP*. *LQT* is correlated with *NDEP* at 0.5542.

Generally, liquidity, growth and depreciation are highly correlated with most of the other determining variables. The high correlation values of the variables can be attributed to the way in which the variables were measured. This is because all the variables are normalized using firm value and these three variables are components of firm value, either directly or indirectly. A high correlation of 1.00 is seen between *NDEP* and *NTEX*. This may be because of the fact that both variables are calculated from depreciation values that are high compared to the *AETR* used in the calculation of *NTEX*.

Most of the variables have the expected sign of correlation with *LEV*. The variables with unexpected signs include *AETR*, *NTLCF*, *TANG*, *CPROF* and *SIZE*. *NTLCF* shows a positive relationship with *LEV*, which should not be the case. This may be depicting the case that firms do not benefit much from interest deductions and thus continue to borrow even in the presence of loss carryforwards, or that the capital outlay of these firms is low such that they have to continue borrowing so as to be in operation. The sign of *TANG* on the other hand can be explained by the fact that the economy might be more market based than bank based (see Rajan and Zingales, 1995). *CPROF* has a negative relationship with *LEV*. This may reflect the case that most of the firms prefer internal to external financing. Rajan and Zingales (1995) argue that in the short-run when dividends and investments are fixed debt financing is the dominant mode of external financing and changes in profitability will be negatively correlated with changes in leverage. That for small firms, profitability proxies for both the amount of internally generated funds and the quality of investment opportunities thus it has opposing effects on the demand for debt.

SIZE also shows a negative relationship with the dependent variable, and this may proxy for the amount of information with the outsiders. This may be the case in this study since the sample consists of listed companies that are most likely to issue informationally sensitive securities like equity and therefore have lower debt. *GROW* is negatively correlated with *LEV* as expected. This may be explained by the fact that as the firms grow, they may prefer using internal finance to external finance thus firms with high growth opportunities prefer less debt. It may also be the case that growing firms attract more investors who are out to maximize on their return, thus their equity trades more in the market.

The covariance matrix is used to show the average of the product of deviations of data points from their respective means, thus it measures the relationship between two ranges of data. Hence we can infer from this measure whether two ranges of data move together. That is whether large values of one set are associated with large values of the other (positive covariance), whether small values of one set are associated with large values of the other (negative covariance) or whether values in both sets are unrelated (covariance near zero).

4.3 Empirical Results

Testing the Tax Effect on Leverage

In the study, the effect of tax on leverage is tested by first drawing out the relationship between the *AETR* and leverage ratio, and then other variables, i.e. the non-debt tax shield (NDTS) variables, are included to see the effect of all captured tax variables on leverage ratio. The results are presented in the Appendix.

Table A1 shows the results for the test of tax effect using the tax variables. This estimation tests the irrelevancy theory that in a world without taxes, the value of the firm is independent of its debt-equity mix, but if corporate income is taxed and interest payments are tax deductible, then leverage has a tax advantage and companies would go for debt financing. Model 1 gives results for the pooled sample. When *AETR* is used alone with no adjustment, the variable depicts a negative relationship to leverage with a coefficient of –0.076, and is significant at 1% level. But becomes insignificant and the sign changes when the lag of the dependent variable is included in the model with a coefficient is 0.004.

When other tax variables are included in the model, i.e. the non-debt tax shield (NDTS) as *NDE*P and *NTLCF*, with no adjustment, *AETR* still show the unexpected sign of a negative value of –0.071, which is slightly higher than in the case where this variable was used alone. This may be explained by the fact that the NDTS leads to a reduction in the amount of debt used to shield for an eventual increase in the tax rate; though the sign of *AETR* is unexpected. The NDTS variables have the expected signs and are significant at 1% except *NTLCF*. The inclusion of a lag in this case makes *NDEP* significant at 1% level but the sign of *AETR* becomes as expected while that of *NTLCF* turns to positive. The use of NDTS variables alone shows that the variables have the expected sign except for the between estimate case, and when the lag of the dependent variable is included, *NTLCF* looses its sign in the pooled case. In both cases, *NTLCF* becomes insignificant in most of the cases and Model 3 shows a high level of insignificance for most of the variables.

Estimation of the fixed effects (within estimator) model (Model 2) gives significant results when the tax variable is used alone both in the no adjustment and the adjustment case, though the level of significance falls from 1% to 10%. The sign of the coefficient of *AETR* is negative (unexpected). When NDTS are included, all the variables become significant except *NTLCF* in the lag case. The negative sign of *NTLCF* supports the case that firms with loss carryforwards use less debt since they are unlikely to be able to use interest deductions. *AETR* depicts unexpected sign in both cases while NDTS variables have the expected signs. On checking at the model fit, we find that the value of adjusted R^2 improves from a low level of -0.061 to 0.141 when a lag is included with the tax variables.

Model 3 shows estimation using the between estimator. In this case the use of *AETR* variable alone in testing for leverage gives a coefficient with unexpected sign though its significant. The inclusion of the lag of the dependent variable leads to both the coefficient of *AETR* and the constant term having unexpected signs and all becoming insignificant. The negative sign of the constant term in this case gives an implication that firms start operation at a point where they hold excess (unemployed) funds. From this point, as *AETR* rises from the initial level, the firms are more likely to issue new equity than borrow to compensate for the perceived increase in expenses in the form of increased taxes. The lag of the dependent variable (i.e. *LEV_1*) has a coefficient of 1.007 implying that the adjustment parameter has a negative sign with a value of –0.007 (since the coefficient of the lagged variable is given by

(1 - α)), which is not as per the theory. The adjusted R^2 value also changes from a negative value to 0.993. When other tax variables, i.e. the NDTS, are included in the no lag case the significance of the variables improves with only one variable, *AETR*, becoming insignificant but both *AETR* and *NTLCF* have unexpected signs. The inclusion of a lag of the dependent variable in this model improves the results by making all the variables have the expected signs, but making them become insignificant except the lag which still has a coefficient greater than 1. Adjusted R^2 value also improves from 0.471 to 0.993 with the inclusion of a lag.

For the random effects estimator case (Model 4), *AETR* when used in the no adjustment case without inclusion of other tax variables is significant but has unexpected sign. When the lag of the dependent variable is included in the model, *AETR* becomes insignificant though it has the expected sign. The constant term now becomes significant at 10% from the 1% level, while R^2 improves from a low level of 0.007 to 0.788. When NDTS variables are included, the no adjustment case shows that all the variables have the expected sign except *NTLCF*. The inclusion of adjustment changes the sign of *AETR* variable to the expected while *NTLCF* has unexpected sign. All the variables in this case become insignificant except the lag of the dependent variable. The fit of the model, i.e. R^2, also improves from 0.153 to 0.808.

From the Hausman test, the best model to use varies depending on whether adjustment is allowed or not and on whether the NDTS is included or not. In the case where *AETR* is used without adjustment, the fixed effects model (Model 2) is preferred, while allowing for adjustment calls for the use of a random effects model (Model 4). When the NDTS variables are included as part of the explanatory variables, the no adjustment case calls for the use of random effects model (Model 4) while the adjustment case calls for the use of a fixed effects model (Model 2).

The impact of the non-debt tax shields on leverage was also tested to establish the impact of these variables. These variables are tested for both the cases where adjustment is allowed for and in the case of no adjustment. The general results show that *NDEP* is significant and has expected sign in most of the cases, while *NTLCF* is generally insignificant and looses sign when adjustment is allowed. The Hausman test shows that we should use the fixed effects model (Model 2) where all the NDTS have the expected signs though *NTLCF* is insignificant.

Tax exhaustion variable (*NTEX*) was also tested to see its impact in the model. When this variable was included together with the other NDTS, one of the variables (either *NDEP* or *NTEX*) had to be dropped. This is because *NDEP* and *NTEX* are highly correlated (to a value of 1), and hence both could not be used together in the model. *NTEX* is automatically dropped for Models 1,2 and 4, while *NDEP* is dropped in Model 3. The test on the difference between *NDEP* and *NTEX* is also done when all the variables are included as in Table A4. No tangible difference in the results could be established either in the sign of the coefficients or the significance of the variables.

In testing for the tax effect on leverage ratio, we can conclude that tax variables are important in explaining the leverage ratio of firms. In most of the cases, a rise in the NDTS leads to leverage ratio falling and the NDTS are significant, thus supporting our hypothesis concerning the use of non-debt variables to shield for debt. From this analysis, we see that when partial adjustment is allowed for, the results of the tax effects improves in most of the cases giving an implication that firms adjust their actual leverage to the optimal level while also taking into consideration the changes in tax rates.

The Effect of Non-Tax Variables On Leverage

In testing whether the non-tax variables have any impact in the determination of leverage, we run a model of non-tax explanatory variables to the leverage ratio as the dependent variable while assuming the tax variables to be of no significance. This regression is done both for the case where firms do not adjust to observed leverage and for the case where adjustment takes place. The results for this regression are presented as Table A2.

The first part involves an assumption of a common intercept for all the firms using a pooled sample (i.e. Model 1). In the case of no adjustment, most of the variables have the expected sign except *TANG* and *SIZE*. The sign of the coefficient of *SIZE* can be interpreted as an indication of the amount of information available with the outsiders thus supporting the Pecking Order Hypothesis (POH). In this case only two variables are significant, i.e. *TANG* (at 1%) and *CPROF* (at 5%). When adjustment is allowed for by the inclusion of a lag, *BRISK* coefficient turns out with unexpected sign but the significance of the variables improves with *GROW* (at 1%), *CPROF* (at 1%), and *DYLD* (at 1%). The overall model also shows an improvement as per the value of the chi-square. The coefficient of the variable *SIZE* now has the expected sign though it is insignificant.

The results for the fixed effects estimator are represented as Model 2 in the table. In the case of no adjustment, all the variables have the expected signs except *TANG, BRISK* and *SIZE*, but the significant variables are only *TANG* (at 1%) and *CPROF* (at 5%). When adjustment is allowed in the model, *TANG* and *SIZE* still has the unexpected signs though are significant. The only insignificant variables are now *LQT, BRISK* and *DYLD*. A look at the model fit shows the value of adjusted R^2 improving, as the lag is included in the model, from 0.2700 to 0.3587.

Model 3 reports the between estimator results. In the between case, *LQT* has a negative sign, which can be explained by the fact that firms may be concerned more by financing investment. Only *GROW, CPROF* and *DYLD* are significant in this case. When adjustment is introduced, *TANG* and *BRISK* looses the expected signs. Only *GROW* and *DYLD* are significant. Adjusted R^2 also improves from 0.7695 to 0.9952 thus an improvement in the model fit.

Model 4 gives the results of the random effects case. In this case, regression with no adjustment leads to *LQT* having a negative sign, while *TANG* and *SIZE* have unexpected signs. With the inclusion of a lag, *LQT* now has a positive sign though still insignificant. The variables with unexpected signs are *TANG, BRISK*, and *SIZE*. The only significant variables in this case are *GROW, CPROF* and *DYLD*. The chi-square value increases and the R^2 value also improves from 0.2614 to 0.8418.

In general, *BRISK* changes sign of its coefficient from the expected (i.e. negative) when adjustment is not allowed to the unexpected (i.e. positive) when adjustment is allowed. Since the partial adjustment case can be viewed as a case where firms correct their position following their last observed leverage level, we find that when the ability to repay monthly fixed payments (as measured by *BRISK*) rises the leverage ratio also rises. This can be interpreted in this case as depicting high demand for finances by the firms and therefore as ability to repay monthly fixed payments rises, firms are obliged to borrow more than before.

From the Hausman test, we find that the no adjustment case calls for the use of random effects (Model 4) while the case of adjustment calls for the use of fixed effects (Model 2). This is in line with the case where the NDTS are used to test for the tax effect.

The Results of the General Model

The impact of either tax factors or the non-tax factors on leverage cannot be looked at in isolation. This is because both the tax and non-tax factors jointly affect leverage and hence are considered together in analyzing the impact of tax on leverage by controlling for the non-tax factors. The result for this analysis is presented in Table A3 in the Appendix. Table A3 gives a summary of the results when both *NDEP* and *NTEX* variables are used alone, and therefore it also serves as a platform for comparing the impacts of these two variables which are highly correlated as shown in the correlation of Table 2. A general comparison shows that *NDEP* and *NTEX* have the same results for both the coefficients of the variables, the significance and the model fit. The only difference that can be picked out is in the sign of *GROW* in Model 3 (i.e. the between estimator) in the case where firms are assumed not to be adjusting their leverage based on last period actual value. The use of *NDEP* leads to unexpected sign for this variable while when *NTEX* is used, *GROW* has the expected sign. This difference can be explained by the fact that though firms use depreciation as a shield on tax liabilities, they may have exhausted their internal financing opportunities and therefore are forced to follow the Pecking Order Hypothesis in demanding more external financing (through borrowing) to fill the financial deficit.

In the pooled data case (Model 1) with no adjustment, most variables have the expected signs except *AETR*, *TANG* and *SIZE*. Most of the variables are insignificant in this case except *AETR*, *NTLCF*, *TANG*, *CPROF* and *DYLD*. When adjustment is assumed to exist, the tax variables loose their expected signs and become insignificant except *NTLCF* that retains the expected sign and significance. The *AETR* now has the expected sign but insignificant. *TANG* also becomes insignificant and has unexpected sign. *GROW* now has the expected sign and is significant. This shows that when a common intercept is assumed for all the firms, *AETR* is important in explaining leverage but only when firms do not adjust to their observed leverage level though it has unexpected sign. *NTLCF* is the only significant tax shield in both the adjustment and the no adjustment case.

In Model 2 (the fixed effects case), the case of no adjustment gives the same results as the pooled case, except that *DYLD* now becomes insignificant though it has the expected sign. With the inclusion of adjustment *AETR* has unexpected sign and is significant. All the non-debt tax shields loose their expected signs and they are still insignificant except *NTLCF* that has the expected sign and is significant. This is also the case for the dividend yield variable, *DYLD*. The variable *SIZE* has both the unexpected sign and is insignificant. The fit of the model improves with the inclusion of a lag from adjusted R^2 value of 0.3254 to 0.4056.

In the between estimates (Model 3), all the variables have the expected signs in the no adjustment case except *NTLCF* and *GROW* which has unexpected sign when *NDEP* is used but has expected sign when *NTEX* is used instead. The variation in this variable was explained earlier above in this section. The significance of the variables also reduces with only *GROW* and *DYLD* being significant. When adjustment is allowed for, *NTLCF* has the expected sign but *AETR* remains insignificant and has unexpected sign. *TANG* and other non-debt tax shields depict unexpected signs though are significant. Generally, the significance of the variables improves with *SIZE* and *BRISK* still remaining insignificant even though they have the expected signs. The model fit also improves from adjusted R^2 value of 0.7372 to 0.9973 when adjustment is allowed.

In the random effects estimation (Model 4), the no adjustment case shows that most variables have the expected signs except *AETR*, *TANG* and *SIZE*. *LQT* now shows a negative relationship with leverage from the consistent positive sign it has been showing in other models and is also insignificant. Of the tax variables, only *AETR* is significant. Other insignificant variables are *SIZE* and *TANG*. The inclusion of adjustment improves the results making *AETR* to gain its expected sign but *BRISK* to loose the expected sign. *LQT* now has a positive sign as before though still insignificant. *TANG* and *SIZE* show unexpected signs and are insignificant. All the tax variables are insignificant with only *GROW*, *CPROF* and *DYLD* being significant. The R^2 value also improves from 0.2427 in the no lag case to 0.8438 in the lag case.

The choice of the best model is done using the Hausman (1978) specification test reported as H-test in the table. This is because the model tests shows that the models are correctly specified and from this point we have to identify the model that best estimates our case. When adjustment is not allowed for the Hausman test gives insignificant results, indicating that the random effects and the regressors are not correlated hence random effects model (Model 4) gives the best estimate. With adjustment, the Hausman test shows significant results, an indication of correlation between the random effects and the regressors. In this case the fixed effects estimator (Model 2) gives the best estimate. This is in line with the other two previous sections.

4.4 Further Discussions of the Results

The empirical results reported above highlights some of the important issues concerning the capital structure of developing countries. Though we cannot assume rational behavior per se, firms are expected to adjust their leverage ratio based on the last observed leverage ratio. Due to this, the case of adjustment is assumed to reflect the actual behavior of the firms. In spite of this, we first look at the case where firms are assumed not to adjust their leverage and then compare this with the case where adjustment is allowed.

In the case of no adjustment, the test for efficient model shows that random effects model is the most efficient and thus explains our case better. The model shows *AETR* has a coefficient of –0.0446 and is significant at 10%. This implies that a unit increase in this variable reduces the leverage ratio by 0.0446%. The non-debt tax shields have the expected signs though all of them are insignificant. This explains the fact that even though firms are said to use non-debt shields against interest payments on debt, when decisions on debt financing are not based on past debt levels, the non-debt shields are not important in shielding interest payments on debt. This may be because the firms only observe the current debt ratios and thus do not form expectations. Given that the profitability variable has the expected sign and is highly significant, this may reflect the fact that the firms are committed to paying their monthly fixed payments so as to avoid the possibility of bankruptcy. Though this is the case, we can infer from the business risk variable that even though firms borrow based on their ability to repay fixed payments, a rise in the risk does not hinder them from borrowing.

This outcome may also be explained by the fact that the liquidity variable has a negative sign, which can be explained by the static trade-off theory that debt is used to finance investment. This is because these firms have high growth opportunities and thus as they grow, their size increases thus reducing the bankruptcy costs.

When adjustment is taken into consideration, the fixed effects estimator becomes the most efficient. This is represented by Model 2. In this case, the *AETR* is negatively related to leverage with a value of –0.0408, which does not vary much from the case of no adjustment, and is significant at 10%. The non-debt tax shields i.e. *NDEP* and *NTEX* are both positively correlated to leverage and are insignificant. The *NTLCF* is the only non-debt shield variable that has the expected sign and is significant at 1%. This shows the fact that most firms use loss carryforward to shield on debt interest rather than rely on depreciation and tax exhaustion. This may be because of the fact that the firms do not have high valued tangible assets that can have high depreciation allowance to shield for debt. This can be inferred from the insignificance of the size variable, since size and value of the firm are positively related as shown by the correlation of the size variable and the tangibility variable. The sign of the size variable may also show that small firms use more short-term finance than larger firms (see Titman and Wessels, 1988)

In spite of this, tangibility is negatively varied to leverage though its significant. The unexpected sign of tangibility can be explained by the fact that the agency costs of managers consuming more than the optimal level of perquisites increases for firms that have low levels of assets used as collateral (Grossman and Hart (1982) as shown in Prasad et al (2001)). Also, as found in studies by Booth et al (2001), tangibility tends to be associated with decreases in the debt ratio when total-debt ratio is used as the dependent variable but is associated with increases in debt ratio when long-term debt-ratio is used. This implies that a firm with more tangible assets will use more long-term debt but overall its debt ratio goes down and is consistent with the observation that less can be borrowed against long-term assets than from short-term assets. Hence, they argue that this result is consistent with static trade-off model in terms of distress costs.

Profitability is also found to be more important in explaining the leverage ratio of firms as in the no adjustment case. The positive sign of this variable to leverage may be a pointer that the market for corporate control is effective and thus firms are forced to commit to paying out cash by levering up (see Rajan and Zingales, 1995). *DYLD* has the expected sign but is insignificant in explaining leverage. This shows that dividend yield does not determine the type of financing adopted by firms hence this negates the agency cost of debt.

This may be because the firms may not necessarily act on the shareholders interest but on meeting the obligations of the firm.

Business risk is negatively related to leverage as expected, with increase in risk leading to firms reducing their borrowings by 1.18%, but this variable is not significant in determining the leverage level of the firms. This may be because of the absence of loss carrybacks that reduces the tax advantage of debt financing for a high risky firm as noted by Booth et al (2001).

Liquidity is found to have the expected sign and in most of the cases being positive indicating the fact that either debt may be used to meet short run objectives when they fall due or to eliminate the free cashflow problem. However, this variable does not have a significant impact in determining the leverage of these firms. These results are consistent with those found by MacKie-Mason (1990), and Chiarella et al (1992), Chatrath (1994) as documented in Prasad et al (2001).

The coefficient of the previous period's observed leverage, i.e. the lag of the dependent variable, is 0.1175. This implies that the adjustment parameter α is equal to 0.8825. Since $\alpha > 0$ we can conclude that the firms adjust to the target based on their observed leverage ratio. But being that $\alpha < 1$, firms therefore incur positive adjustment costs when moving to the target leverage ratio. However, the positive relation between past leverage ratios and optimal leverage implies that the adjustments that take place increase with time indicating a diverging capital structure path. This outcome can be explained more by the macroeconomic conditions than by the determinants of capital structure.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The tax variables are found to have significant effect on leverage though the tax rate has unexpected sign and is significant at 10%, while the loss carryforward is highly significant. The low significance of the tax rate variable may be due to the fact that during the study period, the statutory tax rate did not change much. The rate fell from a level of 35.5% to 30% over the same period but remaining constant in most of the periods, with the rate being changed only three times. Due to this, the response of firms in the change of the statutory corporate tax rate could not be established. This may also be due to the fact that personal taxes was not considered in the analysis, but as shown by Miller (1977) and Rajan and Zingales (1995), the impact of corporate tax cannot be isolated alone from that of the personal tax. Though unexpected, the sign of the tax rate variable can be explained by prior studies. Booth et al (2001), in studying capital structure of developing countries, found the same results and argued that firms pay taxes when they make profits but do not get a refund when they make losses. Hence the tax rate seems to be a proxy for profitability rather than for tax shield and thus the tax variable, like the profitability variable, varies inversely with the amount of debt financing. This answers the second objective of the study.

The fixed effects model is found to be best explaining our situation even though loss carryforward is the only non-debt shield found to be of importance. Other determinants of capital structure are *CPROF, TANG* and *GROW*. The coefficient for profitability is positive and highly significant though has a small effect on leverage. This may reflect the fact that the firms are more risk averse such that they borrow only an insignificant proportion of the increase in their profitability so as to avoid the possibilities of financial distress. Only one non-debt tax shield, i.e. *NTLCF*, has impact on the capital structure. This responds to the first and third objective.

Looking at the hypothesis, only the second hypothesis is accepted though not fully. The first hypothesis that increasing corporate tax rate leads to the use of more debt is not accepted since the results show that tax rate reduces borrowing. Hence increase in the average effective tax rate leads to leverage falling due to the decrease in debt. The second hypothesis that firms with lower non-debt tax shields use more debt is met by the *NTLCF*.

The firms are also found to partially adjust their actual leverage to the target leverage with the adjustment parameter α being equal to 0.8825 and that they face positive adjustment costs in the process. As noted by Banerjee et al (2000), the adjustment factor may depend on factors such as the size of the firm and growth opportunities.

The factors that influence capital structure choice are the same as in other studies though the signs of some of the coefficients are not as expected. One explanation given for this is the fact that firms in developing countries depend much on short-term debt and trade credit which have different determinants than long-term debt used in developed countries (Booth et al, 2001).

5.2 Policy Implications

From the study we find that changes in the tax rate influence the capital structure of firms, though the tax rate has been seen to act more as a measure of profitability. This shows that increasing the corporate tax rate will reduce the level of borrowing by the firms rather than to increase it. Hence the credit market will be negatively affected by raising the corporate tax rate. But this can also mean that to finance their operations, the firms will have to use internal financing in the form of retained profits if they are profit making or use equity. Hence the implication is that a rise in the tax rate may make the firms to be more financially disciplined. Hence tax rate increase can be used to improve the operations of the equity market. In spite of the perceived financial discipline, the use of internal financing will mean that the firms may not grow. The perceived high costs of borrowing due to high corporate taxes will lead to firms opting for more internal to external financing, and since internal financing is constrained by the profitability of a firm and the authorized equity, there may be little or no room for expansion of these firms.

Tax loss carryforward is significant in determining the leverage of firms. Tax loss carryforward will lead to firms going for less debt since they are unlikely to be able to use interest deductions. This may mean that the use of tax loss carryforward will lead to firms going for equity financing thus improving the activity of the equity market.

5.3 Limitations

(i) The main limitation experienced was the availability of consistent data. This is because of the varying ways in which firms prepare their financial disclosures. Hence some of the variables of interest had to be estimated from the available data and this may have affected the accuracy of the analysis. The problem of data also led to the omission of investment tax credit and personal income tax in the estimation. But studies show that investment tax credit does not have a significant effect on the tax rate on interest deductions and only important when firms are near tax exhaustion (see MacKie-Mason, 1990). Hence we do not think the omission of investment tax credit has affected the results much.

(ii) The use of static tradeoff theory in modeling capital structure assumes perfect capital markets. Capital market imperfection has been found to determine the availability and accessibility of capital and thus affect the financing choice of firms.

(iii) The study did not look into the financing of firms but this may also explain the type of capital used by the firms. Also not taken into consideration are the macroeconomic variables, which may have considerable influence on capital structure choice.

5.4 Recommendations for Further Study

A study on capital structure needs a consideration of the macroeconomic conditions since these may make firms to deviate from their target leverage levels. This is because the macroeconomic variables affect the operations of the market and since the assumption of perfect markets also does not hold, the level of imperfection in the market structure also has to be considered. Due to this we recommend that future studies on capital structure should incorporate the macroeconomic variables. We also recommend a study of the financing side to establish whether firms in this market really base their capital choice on set targets or they are constrained by the availability of financing options. These studies therefore will shed more light into the capital structure of the listed companies in Kenya. An extension of the study can also be carried out to include unlisted companies so as to establish the determinants of firms' capital structure for this economy.

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APPENDIX

Table A1: Testing For Tax Effect

Variable	MODEL 1						MODEL 2						MODEL 3						MODEL 4					
LEV_1		0.983 *0.019*^{c}		0.932 *0.0274*^{c}		0.930 *0.027*^{c}		0.332 *0.083*^{c}		0.347 *0.076*^{c}		0.305 *0.079*^{c}		1.007 *0.019*		1.019 *0.029*^{c}		1.019 *0.030*^{c}		0.899 *0.037*^{c}		0.835 *0.040*^{c}		0.835 *0.040*^{c}
AETR	-0.076 *0.028*^{c}	0.004 *0.022*			-0.0714 *0.0263*^{c}	0.010 *0.023*	-0.076 *0.027*^{c}	-0.047 *0.028*^{a}			-0.073 *0.025*^{c}	-0.045 *0.026*^{a}	0.009 *0.409*	-0.009 *0.030*			-0.039 *0.298*	0.001 *0.031*	-0.076 *0.027*^{c}	0.006 *0.027*			-0.071 *0.026*^{c}	0.010 *0.026*
NDEP			-0.317 *0.063*^{c}	-0.1131 *0.0373*^{c}	-0.3066 *0.0627*^{c}	-0.116 *0.038*^{c}			-0.299 *0.063*^{c}	-0.280 *0.063*^{c}	-0.289 *0.062*^{c}	-0.275 *0.063*^{c}			-0.754 *0.260*^{c}	-0.016 *0.037*	-0.748 *0.271*^{b}	-0.016 *0.039*			-0.327 *0.063*^{c}	-0.202 *0.051*^{c}	-0.315 *0.062*^{c}	-0.203 *0.051*
NTLCF			-0.157 *0.132*	0.0443 *0.1082*	-0.1883 *0.1309*	0.044 *0.110*			-0.194 *0.129*	-0.136 *0.127*	-0.225 *0.127*^{a}	-0.167 *0.127*			3.354 *1.013*^{c}	-0.155 *0.136*	3.381 *1.062*^{c}	-0.156 *0.144*			-0.137 *0.133*	0.078 *0.124*	-0.171 *0.130*	0.078 *0.124*
Const.	0.510 *0.074*^{c}	0.0076 *0.0132*	0.574 *0.071*^{c}	0.0609 *0.0201*^{c}	0.5947 *0.0715*^{c}	0.060 *0.022*^{c}	0.510 *0.014*^{c}	0.340 *0.046*^{c}	0.571 *0.021*^{c}	0.397 *0.044*^{c}	0.592 *0.021*^{c}	0.431 *0.048*^{c}	0.484 *0.148*^{c}	-0.001 *0.015*	0.557 *0.096*^{c}	0.002 *0.020*	0.567 *0.123*^{c}	0.001 *0.022*	0.510 *0.078*^{c}	0.048 *0.025*^{a}	0.576 *0.058*^{c}	0.130 *0.030*^{c}	0.596 *0.060*^{c}	0.127 *0.031*
Chi-sq.	7.66 *0.006*	2673.02 *0.000*	25.92 *0.000*	1995.48 *0.000*	33.83 *0.000*	1920.42 *0.000*													8.02 *0.0046*	582.64 *0.000*	27.16 *0.000*	654.4 *0.000*	35.33 *0.000*	650.95 *0.000*
R^2							0.048	0.154	0.133	0.249	0.177	0.265	0.000	0.994	0.554	0.994	0.555	0.994	0.007	0.788	0.168	0.808	0.153	0.808
Adj. R^2							-0.072	0.025	0.018	0.128	0.061	0.141	-0.056	0.993	0.502	0.993	0.471	0.993						
Corr							-0.019	0.864	0.185	0.736	0.135	0.694												
F-stat							8.01 *0.005*	12.53 *0.000*	12.11 *0.000*	15.12 *0.000*	11.22 *0.000*	12.26 *0.000*	12.53 *0.000*	1381.92 *0.000*	10.56 *0.001*	954.18 *0.000*	6.64 *0.004*	670.96 *0.000*						
F-test							41.00 *0.000*	3.16 *0.000*	32.61 *0.000*	3.36 *0.000*	34.45 *0.000*	3.55 *0.000*												
H-test																			57.85 *0.000*	0.02 *0.890*	0.000 *1.000*	69.8 *0.000*	0.000 *1.000*	74.37 *0.000*

NOTE: *LEV* = book value of debt/(debt and equity). *AETR* = earnings before tax less earnings after tax divided by earnings before tax. *NTLCF* = book value of tax loss carry forward/firm value. *NDEP* = depreciation/firm value. The standard errors of the variables and the probability values of the tests are presented in italics.
Significance levels are: ^{a} 10%, ^{b} 5%, and ^{c} 1%

Table A2: Testing Significance Of Non-Tax Variables

Variable	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
LEV_1		0.8201 *0.0319****		0.1929 *0.0707****		0.91175 *0.0408****		0.7013 *0.0453****
LQT	0.0009 *0.0071*	0.0057 *0.0061*	0.0027 *0.0065*	0.0064 *0.0067*	-0.0328 *0.0605*	0.0094 *0.0102*	-0.002 *0.0072*	0.0021 *0.007*
TANG	-0.0393 *0.0083****	-0.0010 *0.0039*	-0.0384 *0.0078****	-0.0251 *0.009****	0.0336 *0.0282*	-0.0041 *0.0043*	-0.0401 *0.008****	-0.0018 *0.0063*
GROW	-0.0042 *0.0029*	-0.0177 *0.0037****	-0.0034 *0.0026*	-0.0185 *0.006****	-0.0712 *0.0184****	-0.0101 *0.0046***	-0.0056 *0.003**	-0.0249 *0.0054****
BRISK	-0.0094 *0.0120*	0.0073 *0.0199*	-0.0072 *0.0109*	0.0132 *0.0285*	-0.0928 *0.1281*	0.0055 *0.0266*	-0.0131 *0.0123*	0.0128 *0.0273*
CPROF	0.0002 *0.0001***	0.0002 *0.0001****	0.0002 *0.0001***	0.0005 *0.0001****	0.0011 *0.0004***	0.0001 *0.0001*	0.0002 *0.0001****	0.0004 *0.0001****
DYLD	-0.2696 *0.2969*	-0.9060 *0.2228****	-0.1806 *0.2728*	-0.2364 *0.3083*	-4.3084 *1.5971***	-0.7189 *0.2690***	-0.4315 *0.3013*	-0.8548 *0.3032****
SIZE	-0.0022 *0.0021*	0.0001 *0.0011*	-0.0031 *0.0020*	-0.0055 *0.0028**	0.0100 *0.0063*	0.0004 *0.0013*	-0.0009 *0.002*	-0.0012 *0.0018*
Const	0.6581 *0.0720****	0.1984 *0.0326****	0.6516 *0.0251****	0.5775 *0.0487****	0.9551 *0.1067****	0.1183 *0.0421***	0.6697 *0.0482****	0.2948 *0.0434****
Chi-sq.	78.88 *0.000*	3520.30 *0.000*					82.49 *0.000*	792.98 *0.000*
R^2			0.3784	0.4690	0.8544	0.9972	0.2614	0.8418
Adj.R^2			0.27	0.3587	0.7695	0.9952		
Corr			0.0207	0.2979				
F-stat			12.96 *0.000*	14.23 *0.000*	10.06 *0.0003*	490.10 *0.000*		
F-test			33.52 *0.000*	5.25 *0.000*				
H-test							0.000 *1.000*	133.24 *0.000*

LEV = book value of debt/(debt and equity). *LQT* =(cash and bank balance)/ firm value. *TANG* = fixed assets/firm value. *GROW* = market equity/firm value. BRISK= operating income/firm value. *CPROF* =earnings before tax (EBT)/firm value. *DYLD* = dividend per share/price per share. *SIZE* = turnover/firm value.

The standard errors of the variables and the probability values of the tests are presented in italics. Significance levels are: * 10%,** 5%, and *** 1%

Table A3. Testing The Model With All Variables Included

Variable	MODEL 1				MODEL 2				MODEL 3				MODEL 4			
LEV_1			0.8399 0.0305***	0.8399 0.0305***			0.1175 0.0719	0.1175 0.0719			0.9454 0.0331***	0.9454 0.0331***			0.704 0.0457**	0.7040 0.0457***
AETR	-0.0465 0.0242*	-0.0465 0.0242*	0.0139 0.0219	0.0139 0.0219	-0.0481 0.0213**	-0.0481 0.0213**	-0.0408 0.0216*	-0.0408 0.0216*	0.0925 0.3052	0.0925 0.3051	-0.0290 0.0305	-0.0290 0.0305	-0.0446 0.0236*	-0.0446 0.0236*	0.0069 0.0244	0.0068 0.0244
NDEP	-0.0716 0.0808		0.0361 0.0610		-0.0581 0.0713		0.0162 0.0717		-0.7633 0.6792		0.1763 0.0721**		-0.0871 0.0779		-0.0069 0.0777	
NTEX		-0.0716 0.0808		0.0361 0.0610		-0.0580 0.0713		0.0162 0.0717		-0.7633 0.6792		0.1763 0.0721**		-0.0871 0.0779		-0.0069 0.0777
NTLCF	-0.3428 0.1270***	-0.3428 0.1270***	-0.1759 0.0987*	-0.1759 0.0987*	-0.3570 0.1114***	-0.3570 0.1114***	-0.3839 0.1163***	-0.3839 0.1163***	0.5894 0.9902	0.5894 0.9902	-0.2481 0.0998**	-0.2481 0.0998**	-0.3235 0.1234***	-0.3235 0.1234***	-0.1676 0.1268	-0.1676 0.1268
LQT	0.0013 0.0072	0.0013 0.0072	0.0063 0.0065	0.0063 0.0065	0.0030 0.0063	0.0029 0.0063	0.0051 0.0065	0.0051 0.0065	0.0217 0.0828	0.0217 0.0828	0.0009 0.0099	0.0009 0.0099	-0.0007 0.0069	-0.0007 0.0069	0.0028 0.0072	0.0028 0.0072
TANG	-0.0345 0.0092***	-0.0345 0.0092***	-0.0012 0.0050	-0.0012 0.0050	-0.0342 0.0082***	-0.0342 0.0082***	-0.0250 0.0090***	-0.0250 0.0090***	0.0757 0.0537	0.0757 0.0537	-0.0130 0.0060*	-0.0130 0.0060*	-0.0344 0.0087***	-0.0344 0.0087***	-0.0001 0.0074	-0.0001 0.0074
GROW	-0.0045 0.0029	-0.0045 0.0029	-0.0178 0.0036***	-0.0178 0.0036***	-0.0038 0.0026	-0.0038 0.0026	-0.0196 0.0058***	-0.0196 0.0058***	0.0720 0.0250**	-0.0720 0.0250**	-0.0105 0.0036**	-0.0105 0.0036**	-0.0055 0.0029*	-0.0055 0.0029*	-0.0259 0.0055***	-0.0259 0.0055***
BRISK	-0.0140 0.0121	-0.014 0.0121	-0.0072 0.0205	-0.0072 0.0205	-0.0119 0.0107	-0.0119 0.0107	-0.0118 0.0287	-0.0118 0.0287	-0.0550 0.1431	-0.055 0.1431	-0.0023 0.0231	-0.0023 0.0231	-0.0165 0.0118	-0.0165 0.0118	0.0044 0.0289	0.0044 0.0289
CPROF	0.003 0.000***	0.0003 0.0001***	0.0002 0.0001***	0.0002 0.0001***	0.0002 0.0001***	0.0002 0.0001***	0.0006 0.0001***	0.0006 0.0001***	0.0009 0.0005	0.0009 0.0005	0.0002 0.000*	0.0002 0.0001*	0.0003 0.000***	0.0003 0.0001***	0.0004 0.0001***	0.0004 0.0001***
DYLD	-0.5348 0.3164*	-0.5348 0.3164*	-0.9542 0.2153***	-0.9542 0.2153***	-0.4570 0.2790	-0.4570 0.2790	-0.4687 0.3095	-0.4687 0.3095	-4.2342 1.8315**	-0.42342 1.8315**	-0.6828 0.2211**	-0.6828 0.2211**	-0.6393 0.3051**	-0.6393 0.3051**	-0.9468 0.3117***	-0.9468 0.3117***
SIZE	-0.0020 0.0021	-0.002 0.0021	0.0090 0.0012	0.0009 0.0012	-0.0029 0.0019	-0.0029 0.0019	-0.0038 0.0027	-0.0038 0.0027	0.0030 0.0090	0.0030 0.0090	0.0016 0.0011	0.0016 0.0011	-0.0010 0.0019	-0.0010 0.0019	-0.0009 0.0020	-0.0009 0.0020
Const	0.7054 0.0747***	0.7054 0.0747***	0.1891 0.0316***	0.1891 0.0316***	0.6997 0.0281***	0.6997 0.0281***	0.6577 0.0525***	0.6577 0.0525***	0.9580 0.1434***	0.9580 0.1434***	0.1026 0.0325**	0.1026 0.0325**	0.7134 0.0518***	0.7134 0.0518***	0.3058 0.0457***	0.3058 0.0457***
Chi-sq.	89.62 0.000	89.62 0.000	4305.87 0.000	4305.87 0.000									99.80 0.000	99.80 0.000	788.99 0.000	788.99 0.000
R^2					0.4372	0.4372	0.5192	0.5192	0.8755	0.8755	0.9989	0.9989	0.2427	0.2427	0.8438	0.8438
Adj.R^2					0.3254	0.3254	0.4056	0.4056	0.7372	0.7372	0.9973	0.9973				
Corr					-0.0085	-0.0085	0.2031	0.2031								
F-stat					11.34 0.000	11.34 0.000	12.47 0.000	12.47 0.000	6.33 0.0053	6.33 0.0053	635.51 0.000	635.51 0.000				
F-test					36.19 0.000	36.19 0.000	6.19 0.000	6.19 0.000								
H-test													0.000 1.000	0.000 1.000	141.23 0.000	141.23 0.000

NOTE: *LEV* = book value of debt/(debt and equity). *AETR* = (EBT-EAT)/EBT. *NTEX* = (depreciation-*AETR*)/firm value. *NTLCF* = book value of tax loss carry forward/firm value. *LQT* =(cash and bank balance)/ firm value. *TANG* = fixed assets/firm value. *GROW* = market equity/firm value. *BRISK*= operating income/firm value. *CPROF* =earnings before tax (EBT)/firm value. *DYLD* = dividend per share/price per share. *SIZE* = turnover/firm value. The standard errors of the variables and the probability values of the tests are presented in italics. Significance levels are: *10%, **5%, and *** 1%

Variable	MODEL 1				MODEL 2				MODEL 3				MODEL 4			
LEV_1		0.9302 *0.0279******		0.9302 *0.0279******		0.3049 *0.0790******		0.3049 *0.0790******		1.0187 *0.0295******		1.0187 *0.0295******		0.8350 *0.0399******		0.836 *0.0399******
AETR	-0.0714 *0.0263******	0.0097 *0.0233*	-0.0714 *0.0263******	0.0097 *0.0233*	-0.0732 *0.0254******	-0.0453 *0.0262****	-0.0732 *0.0254******	-0.0453 *0.0262****	-0.0394 *0.2978*	0.0011 *0.0314*	-0.0394 *0.2978*	0.0011 *0.0314*	-0.0706 *0.0262******	0.0098 *0.0259*	-0.0706 *0.0262******	0.0098 *0.0259*
NDEP	-0.3066 *0.0627******	-0.1163 *0.0378******	-0.3066 *0.0627******	-0.1163 *0.0378******	-0.2888 *0.0615******	-0.2746 *0.0625******	-0.2888 *0.0615******	-0.2746 *0.0625******	-0.7481 *0.2711*****	-0.0159 *0.0385*	-0.7481 *0.2711*****	Dropped	-0.3146 *0.0621******	-0.2028 *0.0510*	-0.3146 *0.0621******	-0.2028 *0.0510******
NTLCF	-0.1883 *0.1309*	0.0435 *0.1095*	-0.1883 *0.1309*	0.0435 *0.1095*	-0.2245 *0.1268****	-0.1666 *0.1270*	-0.2245 *0.1268****	-0.1666 *0.127*	3.3805 *1.0624******	-0.1563 *0.1435*	3.3805 *1.0624******	-0.1563 *0.1435*	-0.1713 *0.1303*	0.0778 *0.1241*	-0.1713 *0.1303*	0.0778 *0.1241*
NTEX			Dropped	Dropped			Dropped	Dropped			Dropped	*-0.0159* *0.0385*			Dropped	Dropped
Cons	0.5947 *0.0715******	0.0596 *0.0215******	0.5947 *0.0715******	0.5958 *0.0215******	0.592 *0.0213******	0.4314 *0.0477******	0.592 *0.0213******	0.4314 *0.0477******	0.5665 *0.1225******	0.0012 *0.0220*	0.5665 *0.1225******	0.0012 *0.0220*	0.5959 *0.0596******	0.1266 *0.0309*	0.5959 *0.0596******	0.1266 *0.0309******
Chi-sq.	33.83 *0.000*	1920.42 *0.000*	33.83 *0.000*	1920.42 *0.000*									35.33 *0.000*	650.95 *0.000*	35.33 *0.000*	
R^2					0.1765	0.265	0.1765	0.265	0.5546	0.9944	0.5546	0.9944	0.1528	0.8077	0.1528	0.8077
Adj.R^2					0.0611	0.1406	0.0611	0.1406	0.4711	0.993	0.4711	0.993				
Corr					0.1348	0.6936	0.1348	0.6936								
F-stat					11.22 *0.000*	12.26 *0.000*	11.22 *0.000*	12.26 *0.000*	6.64 *0.004*	670.96 *0.000*	6.64 *0.004*	670.96 *0.000*				
F-test					34.45 *0.000*	3.55 *0.000*	34.45 *0.000*	3.55 *0.000*								
H-test													0.000 *1.000*	74.37 *0.000*	0.000 *1.000*	74.37 *0.000*

LEV = book value of debt/(debt and equity). *AETR* = earnings before tax less earnings after tax divided by earnings before tax.
NTLCF = book value of tax loss carry forward/firm value. *NDEP* = depreciation/firm value. *NTEX* = (depreciation-*AETR*)/firm value
The standard errors of the variables and the probability values of the tests are presented in italics.
Significance levels are: * 10%, ** 5%, and *** 1%