Impact of Tax on the Capital Structure of Listed Firms in Kenya

Final Report

By

Owen Nyang`oro

School of Economics,

University of Nairobi

P.O. Box 30197 - 00100,

Nairobi, Kenya

owennyangoro@yahoo.com

Tel: + 254-0722 978226

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Abstract

Financing is among the important decisions that firms have to make, not limited to the source but also the cost of financing. The study looks at the determinants of capital structure of firms listed on the Nairobi Securities Exchange (NSE) from 2003 to 2012. The main motivation is to establish how firms respond to the effect of tax in their capital structure decisions. Conditional quantile regression is used in analysing the distributional differences of debt ratios across firms in different quantiles. Firm response to tax rate is proxied using average effective tax rate while controlling for the standard variables that have been established in the literature to determine capital structure together with non-debt tax shield.

The results show that some of the main variables for capital structure decision are important for capital structure decision. Also, the term structure of debt is important in leverage decisions and depends on the size of the firm, profitability and whether a firm has non-debt tax shield. Increase in size of the firm leads to firms shifting from long term to short term debt, while asset tangibility leads to a shift from short term to long term debt by the firm. Profitable firms at higher debt levels will reduce the use of debt in their capital structure. The effect of tax on capital structure is only significant at lower quantiles and only for total debt ratios. Firms at higher debt quantiles use non-debt tax shields other than tax rate to determine their capital structure. Also, non-debt tax measure leads to different outcomes on short term and long term debt. Non-debt tax shield will lead to reduction in use of long term debt but increase in total debt.

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1. Introduction

One of the major issues of concern to firms is how to raise enough capital to sustain their operations. A more pertinent issue is the availability and the inherent cost of capital. The performance of companies is therefore, in most cases, based on the strength and strategy of financing for their operations. While the basis of financing is dependent on a firm's decision (either through shareholders' or board of directors' approval), there are a number of underlying conditions or constraints that determine the ability of firms to raise such capital. Firms therefore search for the lowest-cost financial structures depending on the costs and risks involved in the various financing strategies (Titman and Wessels, 1988). The capital structure question involves a firm's decision on how it finances itself with the theory of capital structure revolving around three main propositions to explain the actual capital-financing behaviour; the static trade-off theory which is based on firms' observation of a target debt[1] ratio, the pecking order hypothesis which is based on asymmetric information as the influence of financing behaviour and the agency theory which considers the costs to the shareholders and managers of a firm for holding debt.

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[1] Debt is considered to consist of both bonds and loans acquired by firms.

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 in a perfect capital market, the value of the firm is independent of its capital structure. Hence, the value of the levered firm is the same as the value of the unlevered firm in a world without taxes, and the expected return on equity is 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.

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, thus have a bankruptcy risk due to payment obligations (Ross et al, 1999). The desired amount of retained earnings is also affected, among other factors, by the opportunity cost in terms of the after-tax dividends paid to stockholders.

In the presence of corporate taxes[2], 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. In spite of the tax advantage of debt, other forms of financing like retained earnings are in some instances 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.

Earlier studies estimated determinants of capital structure in a linear form assuming the effect of distribution of debt ratios. Recent studies have however established that nonlinearities exist in the capital structure of firms (e.g. Fattouh et al., 2005). Hence, it is important to establish whether the distributional effects of debt among firms affect their financing choices. The study sets out to establish whether listed firms in Kenya take into consideration the effect of tax in deciding whether to finance through debt or equity, and secondly, to establish whether the nonlinearities established in the capital structure in other regions exist in Kenya. The study of capital structure in Kenya is important for two reasons; first, the pace of financial development in Kenya, especially the banking sector, has been high since the financial liberalization of 1996 which might have affected the financing of firms while the bond market has remained underdeveloped, which might have an effect on firm leverage. Secondly, there have been arguments by industry players that the current tax rate is high and has resulted into the firms being uncompetitive. Despite these arguments, the corporate tax rate has not changed from 30 per cent of profits for some time; hence it is important to establish the financing

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[2] Corporate tax can be viewed as either a tax on corporate capital (as the opportunity cost of capital supplied by shareholders is included in the tax base) or as a tax on profits (as the tax base is determined by subtracting costs of production from gross corporate incomes thus leaving only "profits") (Rosen, 1995).

decisions of firms given the tax rate. This will help in addressing the issue of tax that has always been raised by the industry.

The Kenyan economy is characterised by a more developed banking system, considerable growth in equity market but a bonds market that is not well developed. This has led to constraint to access to bond financing for listed firms. Hence, for the firms to access credit, they either have to borrow from the commercial banks or externally to meet the financing needs. Some of the local firms which are subsidiaries of multinationals also access financing from their parent companies.

1.1 Theories of the impact of taxation on capital structure

The literature has examined two main aspects of the impact of tax on the firm's capital structure; corporate tax deductibility of debt and the influence of taxes on the decisions of the firm's security holders, and hence their willingness to hold the firm's securities (Prasad et al., 2001).

Taxation can have a variety of effects on economic agents and may make them alter their behaviour to minimize 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 to issue equity. The equity holders on the other hand may experience capital gains 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). Non-debt tax shields such as investment tax credits and depreciation allowance also affects the capital structure of firms, with firms having higher non-debt tax shields having lower taxable profit since non-debt tax shields are deductible.

Debt offers a tax shelter since interest is deducted before taxing profits, hence in the presence of corporate taxes, firms have no constraints on the incentive to issue debt other than the direct threat of bankruptcy (Modigliani and Miller, 1963). Though debt interest is deducted for firms, it is taxed as income in the hands of debt holders. Dividend paid on the other hand is affected by the amount of corporate tax paid while at the same time incurring a final withholding tax.

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, and firms will issue debt until the marginal corporate tax rate is equal to the investor's personal tax rate (Miller 1977). Hence at equilibrium, the tax structure determines the aggregate level of debt implying that leverage is determinate but 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) and that the issue of debt can either raise or reduce the value of the firm, with the firm value increasing the most following a debt issue for firms that have the least business risk (Brennan and Schwartz, 1978).

The Miller's analysis is extended by incorporating non-debt tax shields (e.g. DeAngelo and Masulis, 1980) where it is established that firms select a level of debt that is negatively related to the level of available tax shield substitutes for debt, therefore the optimum level of debt occur when the marginal

corporate tax benefits of debt is equal to its marginal personal tax disadvantage. Schneller (1980), however, argues that when individuals differ in the tax rates imposed on their interest income, value maximization is meaningless and increased compensation to bondholders may benefit stockholders when all investors belong to the same tax bracket.

The optimal capital structure is attained by balancing the tax advantage to borrowing by costs of financial distress (Myers, 1984). 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. 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 (see also Fischer et al., 1989).

1.2 Taxation policy and tax revenue in Kenya

The Kenyan tax system comprises of the direct and indirect taxes. 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[3]. Income tax is charged on gains or profits from a business, employment or services rendered, dividends or interest, pension, charge or annuity and on withdrawals from registered home ownership savings plan. The Income Tax Act 2012 reviews the parent Act by introducing a number of amendments. The Act takes into consideration foreign exchange gains or losses in computing the amount of revenue reserves.

Individual income is currently taxed at rates graduated from 10% up to 30%, with the top tax bracket starting at annual income 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%. The corporate tax rate has also been generally declining over the years following tax reforms, though it has 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 increased need for investment and intensified competition for investment funds led to reforms in the tax system, resulting into reduction of tax rates. 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). The tax rate was reduced by 2.5% in 1997/98 and subsequently in 1999/2000 to a final level of 30% for local companies and 37.5% for foreign companies. This was aimed at promoting capital market, boosting business investments, and to 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.

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[3] Capital gains tax was abolished in Kenya in 1985.

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 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 (implying they pay a corporate tax of 25%), provided the firm lists a minimum of 30% of its fully issued and authorized share capital, and 20% corporate tax rate for 5 years if they issue 40% of share capital. These were meant to encourage listing in the local stock market. Turnover tax was introduced effective 1st January 2007 on businesses whose annual incomes do not exceeding 5 million shillings. However, this does not apply to rental income, management or professional fees, incomes of incorporated companies, or any income subject withholding tax.

There are also tax regulations which affect dividends and hence shareholders. Taxation on dividend income of Kenyan residents is limited to the withholding tax deducted from payments of such dividends, but dividends received by a resident company from another resident company of which it controls 12.5% or more of the voting power is not subject to tax. Previously there was no limit for carry forward of tax losses but this was changed from 1 January 2010 allowing firms to carry tax losses for four years otherwise they are lost if not utilised. The period can however be extended following an application with evidence of inability to extinguish the deficit and approval received from the Minister of Finance.

Other tax incentives available are tax holiday for ten years given to companies wishing to invest in Kenya for export, especially those firms located at the Export Processing Zone (EPZs). Firms outside the EPZs are allowed to deduct 20 per cent of the costs of investment in plant and equipment up front (equivalent to a 6 per cent investment tax credit) and to amortize the remaining investment cost following specified depreciation formulae. Deductions allowed under the Tax Act include bad debts incurred in the production directly related to the gains or profits, capital expenditure deductions, stamp duty related to acquisition of lease of a business premises, expenditure incurred by a business before commencing the business which would have been deductible, entrance fee or annual subscription to a trade association, capital expenditure on scientific research for the business, capital expenditure on rating for the purpose of listing, and interest paid on borrowings provided the borrowing is used in production of investment income.

To effectively administer tax, the Kenya Revenue Authority formed the Large Taxpayers Office (LTO) as an operations unit in 1998, and later promoted it to a fully-fledged department in 2006, with the sole purpose of administering domestic tax matters affecting large taxpayers. LTO covers all companies and state corporations with annual turnover in excess of Kshs.750 million, all banks and insurance companies, manufacturers of wines and spirits, head office operations of central government ministries and departments, local authorities with city status, and individuals of high net worth. Most of the listed companies fall under the LTO. As of September 2010, the large taxpayer population was approximately 1100 institutions contributing about 75% of domestic taxes revenue. To

cater for medium tax payers, the Medium Taxpayers Office (MTO) commenced operations on 1st November 2010 to serve taxpayers whose turnovers shall fall between Kshs. 300 million and Kshs. 750 million.

Tax revenue collection has grown substantially over the period, mainly following growth in domestic sources of revenue, with total tax revenue collection increasing from Kshs. 219.2 billion in 2003/04 to Kshs.866.4 billion in 2012/13, a growth of about 295 per cent in 10 years. Over the same period, revenue generated from income taxes from corporations recorded a growth of over 400 per cent from Kshs.35.8 billion in Kshs.187.6 billion. The significance of taxes on income and profits has increased over time, growing to 46.6 per cent in 2012/13 from 35.3 per cent in 2003/4, with the contribution of income tax from corporations increasing by 5.4 per cent over that period (Table 1).

Table 1:   Ratio of taxes on income and profits to total tax revenue 2003/4 to 2011/12

	2003/ 04	2004/ 05	2005/ 06	2006/ 07	2007/ 08	2008/ 09	2009/ 10	2010/ 11	2011/ 12	2012/ 13
Tax receipts, Ksh billion										
Taxes on income and profits	77.4	99.3	114.6	130.7	165.1	194.2	219.5	272.3	330.0	403.6
Income Tax (P.A.Y.E)	41.6	52.9	60.5	69.6	86.0	110.2	121.5	144.3	177.0	216.0
Income Tax from corporations	35.8	46.4	54.1	61.1	79.1	84.0	98.0	128.0	153.0	187.6
Other taxes	141.7	165.5	174.0	217.7	243.4	274.0	304.1	354.4	373.5	462.7
Total Tax Revenue	219.2	264.8	288.7	348.4	408.5	468.2	523.6	626.7	703.5	866.3
Ratio of total tax revenue										
Taxes on income and profits	35.3	37.5	39.7	37.5	40.4	41.5	41.9	43.4	46.9	46.6
Income Tax (P.A.Y.E)	19.0	20.0	21.0	20.0	21.0	23.5	23.2	23.0	25.2	24.9
Income Tax from corporations	16.3	17.5	18.8	17.6	19.4	17.9	18.7	20.4	21.8	21.7

Source: Calculated from Economic Surveys, KNBS.

1.3 Firm financing and taxation in Kenya

Listing in the stock market has always been encouraged as a way of accessing long term capital. Evidence on listed firms in Kenya shows that the level of equity and debt ratios increased in the period following listing, from 0.284 to 0.385 for equity (profit before tax) and 0.260 to 0.452 for debt respectively (Ngugi and Njiru, 2005), implying that listed firms are able to diversify their financing to debt. After the initial period however, equity ratio declined while debt ratio increased. Earnings per share also increased from 3.66 to 4.99 following listing. This may reflect that listed firms are able to access more financing, both equity and debt, and increase in value. The debt ratio (to total assets) in Kenyan firms is however still low declining from 0.09 to 0.02 between the first and the second halves of the 1990s, with a mean of 0.05 from 1990-1999 (Ngugi, 2008). The mean debt-equity ratio for listed firms from 1997 to 2006 was 2.05 with a range of 0.07 to 10.89 (Abor et al., 2011).

The average tax rate has also been declining as the statutory corporate tax rate goes down (Ngugi, 2008). However, the tax rate still tops the major constraints for manufacturing firms in Kenya, though

the perception has fallen from 68 per cent in 2003 to 57 per cent in 2007 compared to that for access to finance which has fallen from 75 per cent to 36 per cent over the same period (Iarossi, 2009). According to World Bank *Doing Business 2011*, Kenyan firms pay about half (49.6 per cent) of their profits in tax. However, policy reforms such as tax incentives that have been put in place over time has not attracted firms to list and this may be because firms find other listing costs more substantial than those related to taxation (Ngugi and Njiru, 2005). In terms of financing, Green et al. (2007) using 1999 survey of 2000 MSEs in Kenya, found that only 4 per cent micro and small-scale enterprise (MSEs) raised initial capital by borrowing. Low borrowing by MSEs may reflect the credit market conditions other than the fact that they do not require external financing.

Table 2 compares the aggregate total debt to total assets of listed firms from 2003 to 2012 at different quantiles[4]. Firms in the 95th quantile and above are on average the largest either by sales or asset size, followed by firms in the 75th to 95th quantiles. The earnings ratio as measured by profitability and non-debt tax shield measured by depreciation of assets is quite similar irrespective of the distribution of leverage, except for highly levered firms. However, asset tangibility, as measured by the ratio of fixed assets to total assets, is high for highly levered firms than those with low leverage and increases at higher quantiles. This may point to the role of assets as security for acquisition of loans by firms in developing countries like Kenya. However, the growth of firms, either by asset or sales, is high for firms in the 50th to 75th quantiles. Firms at the highest quantile, those at 95th quantile and above, have negative average growth in sales, depicting constraints these firms face in generating revenue hence difficulties in financing their operations. The average tax rate is relatively the same for firms at all quantiles except for those in 95th quantile and above which has the highest average tax rate. The high tax rate is due to payment of tax arrears by some firms in certain years resulting into higher tax remitted compared to profits made in that period.

Table 2:   Aggregate firm characteristics at different parts of total debt to asset distribution

Variable	<10%	10 – 25%	25 – 50%	50 – 75%	75 – 95%	>95%	Overall mean
AETR	0.307	0.343	0.336	0.340	0.349	0.959	0.375
SIZE1	881	1,812	2,618	3,214	3,939	5,238	4,012
SIZE2	2,110	3,181	3,590	4,116	4,612	4,435	4,629
PROF	0.116	0.171	0.209	0.179	0.165	0.018	0.158
TANG	0.336	0.347	0.387	0.401	0.403	0.493	0.409
NDS	0.073	0.053	0.052	0.048	0.051	0.104	0.053
INTCOST	0.012	0.015	0.018	0.031	0.047	0.076	0.048
GROWTH1	0.081	0.092	0.122	0.134	0.127	0.081	0.124
GROWTH2	0.109	0.070	0.109	0.121	0.116	-0.080	0.107

AETR is the ratio of the difference between earnings before tax and earnings after tax to earnings before tax; SIZE1 is total sales in Kshs millions; SIZE2 is total assets in Kshs millions; PROF is earnings before tax divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is non-debt tax shield measured as the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; GROWTH1 is growth in total assets; and GROWTH2 is growth in sales.

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[4] This is a distribution of 32 firms listed in the NSE, excluding financial firms, of which data was available for the period.

1.4 Statement of the problem

Companies view tax on their incomes as cost and this tends to influence their capital-financing behaviour. Corporate tax favours 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 personal tax rate at the individual level.

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 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.

The tax debate in Kenya today is based on the premise that firms consider corporate tax rate to be high which in turn makes them incur high business costs, rendering them uncompetitive. This is despite the number of tax incentives and rebates that have been put in place to among other things encourage firm establishment, growth and listing. The overall goal of the incentives is to improve firm performance. An appropriate tax policy is important for improving the investment climate as the country implements its development agenda of being a middle income country by 2030. If firms view tax rates to be very high, then an increase in the tax rate will most likely lead to firms adjusting their capital structure to cover the increased tax rates. However, this response depends on the market conditions, especially the costs of financing debt.

If firms opt for more debt to cover increase in corporate taxes, then the credit market will be constrained as demand for debt financing will go up. However, if the costs of debt are so high, then firms will factor in increased taxes and thus face reduction in after tax profits especially if revenue is not growing at an equal rate. A negative effect of tax on company performance may also lead to a reduction in overall company tax revenue generation. Despite this, the corporate tax rate has been maintained at its current level for over a decade. This means that firms that are not able to use debt to shield their earnings from taxes have to cover the tax rate thus facing high business costs.

This study establishes the response of firms to the tax rate based on their choice to use either debt or equity in their capital structure. The main objective of the study is therefore to establish the determinants of capital structure of listed firms in Kenya and how the firms have responded to the tax rate in making leverage decisions. The study also establishes whether the term structure of debt is an

important factor in the capital structure and also on whether the determinants of capital structure are equally significant at different levels of leverage ratios.

1.7 Significance of the study

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, a change in the tax structure will affect the capital structure as firms choose the best financing mode and thus the cost of investment.

The impact of policy change in the tax rates on the capital structure of firms in Kenya has not been given much consideration before. Ngugi (2008) considered the determinants of capital structure of firms listed on the Nairobi Stock Exchange, focusing on whether the firms target their capital structure or follow a hierarchical behaviour, but with no specific focus on the impact of tax on capital structure. Their finding that firms observe a target debt ratio to minimise the costs of debt also provides a possibility that these firms may also be exploiting the tax benefits in their financing decisions. The study did not find any significant effect of tax on capital structure on Kenyan firms. This study differs with previous studies on capital structure in Kenya (e.g., Ngugi, 2008) by considering nonlinearities that exist in determining the choice of capital, that is, on the proportion of debt held. We also estimate determinants of capital structure by for different term structures of debt to establish whether there are any variations in the results. This is important since firms are likely to adjust their financing ratios differently depending on whether they hold more short term or long term debt in their capital structures. Hence, the response will vary both by the level of debt held and the proportions of different terms of debt in the capital structure.

2. Literature review

A number of studies have looked at the financial structure of firms, focusing on determinants and testing the various theories of financial structure. Flath and Knoeber (1980), for instance, find that on the margin the annual tax advantage to one dollar of interest differed cross-sectionally between $0.14 and $0.16 and between $0.23 and $0.26 for the two periods they investigated, and that there is an approximately unitary elasticity between failure costs and income (EBIT)[5]. Ferri and Jones (1979) find that industry class is linked to a firm's leverage but in a less pronounced and direct manner. This is supported further by Flath and Knoeber (1980) who find cross-sectional variation in capital

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[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.

structure to be 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.

The amount of debt has also been linked to the kind of products offered with Titman and Wessels (1988) finding that firms with unique or specialized products have relatively low debt ratios and that smaller firms 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. Givoly et al (1992) find a positive association between changes in leverage and changes in corporate tax rates across US firms in the period around enactment of the Tax Reform Act of 1986 and conclude that there exists a substitution effect between debt and non-debt tax shields, and that both corporate and personal tax rates affect leverage decisions. A recent study by Pfaffermayr et al (2013) also established that debt ratio is associated positively with the corporate tax rate and negatively with firm age and that tax-induced advantage of debt is more important for older firms than for younger ones. Age of a firm in this case determines the level of leverage with older firms likely to have lower debt ratios by the fact that they have accumulated enough resources over time and hence can easily finance their operations. A study by Ko and Yoon (2011), for instance, established that Korean firms that held low debt levels following the Asian financial crisis lost significant tax savings compared to their counterparts that held high debt levels.

Different firms allow the actual leverage ratio to deviate from the target ratio by different amounts (Fischer et al., 1989) and firms do target a long run capital structure with a typical firm converging toward its long run target at a rate of more than 30% per year (Flannery and Rangan, 2006). Byoun (2008) finds that most adjustment occur when firms have above-target (below-target) debt with a financing surplus (deficit), suggesting that firms move toward the target capital structure when they face a financial deficit/surplus. Studies find the debt ratio of firms to be affected by a number of factors and that even small recapitalization costs lead to wide swings in a firm's debt ratio (Fischer et al., 1989). Hovakiman et al. (2002) find profitable companies to be more likely to issue debt rather than equity and more likely to repurchase equity rather than debt. They find that debt overhang can act as an impediment to overleveraged companies that might otherwise move towards a target debt ratio by issuing equity. Klapper and Tzioumis (2008) find smaller and more profitable companies to be more likely to reduce their debt levels following lower taxes.

Kayhan and Titman (2007) found that firm histories are also important in influencing capital structure changes but only on a short horizon as over time firm capital structures tend to move toward target debt ratios. They find leverage deficit effect to be driven by survival bias for overlevered firms, unlike for underlevered firms which tend to increase their leverage hence showing no signs of survival bias.

Other studies have also considered how multinational companies (MNCs) adjust their capital structure in the presence of tax. For instance, Panteghini (2009) show that MNCs can shift a proportion of their income by means of intrafirm borrowing and lending so as to avoid taxation, as long as the costs of income shifting is low, as this raises the tax benefit of debt financing. The amount shifted, however,

depends on tax rate differential income (Panteghini, 2009; Egger et al., 2010). Hence, financial choices are affected by tax shifting activities, and the equilibrium tax rate depends on how costly it is to shift income (Panteghini, 2009). However, Schindler and Schjelderup (2012) find that affiliates with minority owners have a less tax-efficient financing structure since costs and benefits of debt shifting are shared asymmetrically between minority and majority owners. Taking the mode of ownership as endogenous, foreign-owned firms have higher debt ratio on average compared to domestically-owned firms in the host country, which increases with host country's statutory corporate tax rate (Egger et al., 2010). This implies that foreign-owned firms tend to leverage more in the face of higher taxes so as to take advantage of tax benefits compared to domestically-owned firms.

Studies focusing on non-debt tax shields include MacKie-Mason (1990) who finds firms with high tax loss carry forwards to be much less likely to use debt, which is as per theory since these firms are unlikely to use interest deductions. They find that investment tax credit does not reduce the probability of a debt issue and firms with investment tax credits are profitable and pay taxes.

It has also been established that capital structure decisions are affected by the same variables in developing as in the developed countries. For instance, Booth et al (2001), while analysing the capital structure choices of firms in developing countries, find 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 same factors were also established to be important by Frank and Goyal (2009), and in determining capital structure of tax-exempt institutions (e.g., Smith, 2010).

Use of debt in financing has increased in emerging markets as well. Mitton (2007), for instance, attributes increase in debt ratios in emerging markets to changes in the characteristics of emerging market firms. For these firms, they find the most prominent determinants of capital structure to be size, profitability, asset tangibility, and growth opportunities, which lead to higher optimal debt levels. Ngugi (2008) find the use of debt for a sample of listed firms in Kenya to be mainly due to the internal financing gap and that the demand for debt is influenced by non-debt tax shields. Firms are found to minimize their costs by observing a target debt ratio and that capital financing behaviour of firms is determined by capital market imperfections. This finding is supported by Abor et al. (2011) who find that corporate borrowing decisions of firms in Ghana, Nigeria, Kenya, and South Africa are not influenced by the corporate tax rate. However, these findings may be limited to the leverage measure and the tax ratio used (Green and Murinde, 2008).

Banerjee et al (2000), building on earlier work by Myers and Majluf (1984), use a dynamic adjustment model and establish that the effects of various factors determining the optimal leverage was as expected in the UK. In the USA, however, they find expected growth to have a strong positive effect on leverage indicating that debt is available to finance growth at a much greater extent in the USA. They find tangibility of assets, size of the firm, and expected growth as measured by the ratio of the market to book value of a firm to affect the optimal leverage positively, while profitability and the variability of operating profits influence it negatively. Firms' observed leverage is found to be

different from their target leverage and that the speed of adjustment is lower for bigger firms, which support Ferri and Jones (1979) findings that a firm's use of debt is related to its size but the variation in income could not be shown to be associated with a firm's leverage; while operating leverage influence the percentage of debt in a firm's financial structure.

Another dominant approach in the literature on capital structure choices is the principal-agent problem (commonly referred to as the agency cost models) advanced by Jensen and Meckling (1976) in their seminal paper, and later by Jensen (1986). The theory considers the social and private costs incurred due to the decisions of an agent, which are influenced by individual interests. The owners of the firms (the principals) put in some incentives and monitoring mechanisms to limit the actions of the agents, while the agents incur some bonding costs so to safeguard their interests. The presence of agency costs has an effect on the choice of financing by the firms as well. Use of increased debt reduces the agency costs of free cash flow but increases the agency costs of debt including bankruptcy costs (Jensen, 1986). Highly levered firms are highly monitored externally hence have decreased levels of agency costs (Jensen and Meckling, 1976; Ang et al., 2000). In this case, bankruptcy costs have to be considered in making leverage decisions. Warner (1977), for instance, 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. In their study, they find that the ratio of direct bankruptcy costs to the market value of the firm appears to fall as the value of the firm increases and observe that since only the direct costs are measurable some of the omitted indirect costs may be substantial.

In a different study covering small firms, Ang et al (2000) test the relationship between agency costs and ownership structure and find that agency costs are higher when a firm is managed by an outsider and that they decrease as the ownership becomes more concentrated. At the same time, agency costs increase as the equity share of the owner-manager declines for owner-managed firms. The determinants of capital structure established in the literature hold even when nonlinearity is taken into consideration but the effect differs depending on the quantiles the firms are in. For instance, Fattouh et al. (2005) using a nonlinear estimation find the standard determinants of capital structure to hold among South Korean firms from 1992-2001 but with differing effects which include change in signs and magnitude of the effects in certain instances.

The literature underlines the importance of firm financing as a strategic decision that firms have to make over their life time. Standard determinants of capital structure have been established both in developed and developing countries, however, the effect of these factors vary in certain instances making it difficult to establish a priori the direction of the effect. It has also emerged from the literature that the factors that determine capital structure are nonlinear across firms depending on the leverage level of the firms. Most of the literature does not consider nonlinear distribution of debt, more so studies on Kenya which consider debt distribution to be linear. Taking nonlinearity into account may give more promising results on the determinants of capital structure. The differential

impact of the term structure of debt may also result into new insights on the effect of corporate tax on debt.

3. 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[6]. The change in the value of the firm is therefore modelled as the change in both equity and debt. Given that firms' preference for short-term and long-term debt differs, the proportion of these debts will vary in the firms' capital structure. 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 asymmetric information framework where firms incur certain costs by holding debt which they have to balance against the benefits derived from debt financing. But given the distribution of debt ratios held, a quantile regression approach is taken to establish the determinants of capital structure at various quantiles. Quantile regression, developed by Koenker and Bassett (1978), addresses the presence of outliers in the data and is more preferable when the shape of the distribution is not certain, in which case OLS estimates will be biased and inefficient. It is estimated by minimizing an asymmetrically weighted sum of absolute errors, where the weights are functions of the quantile of interest. Conditional quantile regressions in estimations of determinants of capital structure accounts for heterogeneity of firms by considering the distributional characteristics of the firms leverage (Fattouh et al., 2005).

While a number of variables have been identified in the literature as determinants of capital structure among firms, the variables which have been established to influence capital structure uniformly both in developing and developed markets are the size of the firm, asset tangibility, the rate of growth of the firm, profitability and non-debt tax shields (e.g., Rajan and Zingales, 1995; Banerjee et al. 2000; Booth et al. 2001; Fattouh et al., 2005). Non-debt tax shields capture ways other than debt that firms use to shield themselves from the effect of taxes which are seen as costs. The other variables proxy for agency costs of debt and other asymmetric information costs (Fattouh et al., 2005).

3.2 Model specification

The value of the firm (V) can be expressed as the sum of debt (D) and equity (E) (Ngugi, 2008):

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

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

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[6] Internal equity refers to financing through sources such as retained earnings while external equity is financing through instances like issuing shares in the market.

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

The change in firm value reflects 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

$$\varphi = \Delta D / (\Delta D + \Delta E) \tag{2}$$

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

$$D_{it}^* = F(X_{it}) \tag{3}$$

where X_{it} represents the determinants of the optimal leverage. 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,

$$D_{it} - D_{it-1} = D_{it}^* - D_{it-1} \tag{4}$$

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:

$$D_{it} - D_{it-1} = \alpha (D_{it}^* - D_{it-1}), \qquad 0 < \alpha < 1 \tag{5}$$

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

The equation expressing the target debt level (D_{it}^*) is assumed to follow a linear relationship and can therefore be expressed as a function of a vector of variables that determine the target debt level as:

$$D_{it}^* = \beta_0 + \beta_1 X_{it} + e_{it} \tag{6}$$

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

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

Substituting (6) into (7) and simplifying;

$$D_{it} = \alpha \beta_0 + (1-\alpha)D_{it-1} + \alpha \beta_1 X_{it} + \alpha e_{it} \tag{8}$$

Equation (8) defines the present value of debt ratio in terms of the target debt level, past period debt ratio and the tax factors and the control factors that determine debt levels.

Equation (8) can therefore be expressed in a reduced form as:

$$D_{it} = \gamma_0 + \gamma_1 D_{it-1} + \gamma_2 X_{it} + \varepsilon_{it} \qquad (9)$$

where $\gamma_0 = \alpha\beta_0$, $\gamma_1 = (1-\alpha)$, $\gamma_2 = \alpha\beta_1$, and $\varepsilon_{it} = \alpha e_{it}$. ε_{it} is identically and independently distributed (iid) with zero mean and constant variance. Since we are not focusing on dynamic adjustment of firms to target capital, the lagged debt ratio is not included in our model. 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 advantage is proxied by non-debt tax shield, that is, depreciation (*DEP*). Financial distress and agency costs is proxied by tangibility (*TANG*), growth opportunities (*GROW*), profitability (*PROF*) and size of the firm (*SIZE*).

3.3 Estimation procedure

A panel data model is expressed as:

$$y_{it} = x_{it}^{'}\beta + \alpha_i + u_{it}, \ i = 1,\dots, N, \ t = 1,\dots, T \qquad (10)$$

where α_i are unobservable individual specific effects and where $u_{it} \sim$ iid $(0,\delta^2) \ \forall$ i,t.

That is, for a given individual, observations are serially uncorrelated but across individuals and time, the errors are homoscedastic. The model in this form is estimated around the mean.

The panel model can be transformed into a conditional quantile model of the form (Koenker, 2004; Lamarche, 2010),

$$Q_{Y_{it}}(\theta \mid x_{it}, \alpha_i) = x_{it}^{'}\beta(\theta_j) + \alpha_i \qquad (11)$$

$$y_{it} = x_{it}^{'}\beta(\theta) + \alpha_i + u_{it,\theta}$$

for all the quantiles θ_j in the interval (0,1). The error term has a continuously differentiable function *F*, which is unknown. The error term is assumed to satisfy the quantile restriction (Buchinsky, 1998)

$$Q_{u_{it,\theta}}(\theta \mid x_{it}) = 0 \qquad (12)$$

The individual fixed effects α_i does not depend on θ, hence from equation (11), the individual effects represents a pure location shift effect on the conditional quantiles of the response (Koenker, 2004).

Estimation of equation (11) amounts to estimation of the θ_j quantiles ($0<\theta<1$) of *y* by solving a minimization problem;

$$\min_{\beta,\alpha} \sum_{j=1}^{J}\sum_{t=1}^{T}\sum_{i=1}^{N} \omega_j \rho_{\theta_j}\left(y_{it} - x_{it}^{'}\beta(\theta_j) - \alpha_i\right) \qquad (13)$$

where $\rho_{\theta_j}(u) = u(\theta_j - I(u < 0))$ is the quantile loss function and the weights ω_j control the relative influence of the quantiles on the estimation of the parameters of individual fixed effects (Koenker, 2004; Lamarche, 2010).

The minimization problem is solved by linear programming techniques (Koenker and Basset, 1978). Estimates of the standard errors of the coefficients are obtained using bootstrap method and

percentiles method used to construct the confidence intervals for the parameters (Buchinsky, 1998; Fattouh et al., 2005).

The estimated model is therefore represented as;

$$Q_{Y_{it}}(\theta \mid x_{it}, \alpha_i) = x_{it}^{'}\beta(\theta_j) + \eta^{'}z_t + \alpha_i \qquad (14)$$

where y_{it} is the dependent variable at quantile θ.

3.4 Data source and measurements

Secondary data of a sample of non-financial firms was collected from company financial statements and annual reports covering the period 2003-2012 with additional information from the Nairobi Securities Exchange (NSE). There are 63 firms listed at the NSE, 17 of which are financial firms. Financial companies are not considered as they are providers of credit and thus their company annual reports may not give a proper reflection of the capital structure and any other factors that may affect company financing. Firms which listed after 2003 and those with several data gaps were excluded resulting in a final sample of 32 firms.

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. Booth et al. (2001) in a study of 10 developing countries measure leverage as the total liabilities divided by total liabilities and net worth; and long-term liabilities divided long-term liabilities plus net worth. Leverage related costs of short term and long term debt may be different resulting in different leverage policies adopted by firms (Cheng and Green, 2008). At the same time, in a market where credit market is not well developed, accessing long term financing may be difficult and thus put strain on short term sources of finance. Green and Murinde (2008), note that the exact measure of leverage used determines in part some qualitative predictions of the theories of leverage, thus it is appropriate to use different measures of leverage. The leverage ratios that we use therefore distinguish between total debt, long-term debt and short-term debt. This is because leverage related costs of short-term and long-term debt are different (Cheng and Green, 2008).

Three measures of leverage are used, LEV1 defined as the ratio of long-term debt to total assets, LEV2 defined as the ratio of short term debt to total assets and LEV3 defined as the ratio of total debt to total assets. The book value measure of leverage is used rather than market value where 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).

The independent variables can be categorized into proxies for tax effect and control variables capturing the agency costs of debt. The tax effect is proxied using average effective tax rate, while non-debt tax shield is measured using finance cost and depreciation. The control variables include tangibility, growth opportunities, profitability and size.

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, which has the advantage of including the impact of tax loss carryforwards and the use of corporations as a conduit for income flows (Booth et al., 2001). Byoun (2008) measures the marginal tax rate as the statutory tax rate if the firm reports no net operating loss carryforwards with a positive pretax return and zero otherwise, which is more of a binary measure. *AETR* is calculated as earnings before tax (*EBT*) minus earnings after tax (*EAT*) divided by earnings before tax if positive but is equal to 0 if *EBT* is zero. A positive relationship is expected between the average effective tax rate and leverage.

Non-debt tax shield (NDS): Non-debt tax shield is measured by depreciation over total assets. Firms with high non-debt tax shields may end up using more debt in their capital structure compared to those with no non-debt tax shield. However, non-debt tax shields may also lead to firms using less debt given the substitutability between depreciation and interest bearing debt (DeAngelo and Masulis, 1980). 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), it is assumed that future asset acquisitions are correlated with past asset acquisitions and hence the estimate is based on the balance and composition of assets in place. The sign is therefore indeterminate.

Tangibility (TANG): This is viewed as the tangibility of assets in the balance sheet and measures the proportion of firm's fixed assets. Tangible assets, which retain high liquidation value, serve as debt security. However, if tangible assets are illiquid, firms have a lower debt capacity. Banerjee et al (2000) and Rajan and Zingales (1995) measure asset tangibility as the ratio of book value of fixed assets to total firm value. We measure tangibility as fixed assets to total assets (Fattouh et al. 2005) and expect a positive relationship as firms with a greater percentage of total assets composed of tangible assets are more likely to have a higher capacity to raise debt.

Growth opportunities (*GROW*): Firms with substantial growth opportunities are likely to use less debt so as to mitigate agency problems and since high leverage may make them forego profitable investment opportunities, they will therefore prefer lower leverage ratios (Cheng and Green 2008; Green and Murinde, 2008). The liquidation or collateral value of the firm's assets has been suggested to be a determinant of the optimal capital structure. However, a highly growing firm may need more funds to finance its activities, thus resulting into increased use of debt. We use two different measures of growth, the growth in total assets (*GROWTH1*) and the growth in sales (*GROWTH2*). The relationship between growth and leverage is indeterminate.

Profitability (*PROF*): Profitable firms have lower expected costs of financial distress and thus have easy access to the debt market. However, more profitable firms may also use more internal funds than external resulting into reduction in use of debt by these firms (Frank and Goyal, 2009). 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. We use the ratio of earnings before tax to total assets and the relationship between leverage and profitability is indeterminate.

Size (*SIZE*): Firm size defines the extent to which firms can access credit markets to get loans. Firm size can be measured using total assets, total assets to book value, 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. Two measures have been used to capture size: the natural logarithm of total sales (*SIZE1*) and the natural logarithm of total assets (*SIZE2*). A positive relationship is expected between size and leverage.

Finance cost (INTCOST): The cost to be incurred by a firm in servicing debt affects the amount of debt that the firm can hold. Barry et al. (2008), for instance, find that firms issue more debt compared to equity when interest rates are low compared to historical rates. Interest charge on debt varies across firms and also by duration of debt. At the same time, interest payments are affected by exchange rate changes especially if a firm borrows in the international debt market. To capture the cost of borrowing, this variable is measured as the ratio of interest payments by a firm to a firm's fixed assets. It is expected that as the cost of financing goes up relative to a firm's asset, the level of leverage will fall.

4. Empirical results

Descriptive statistics

Table 3 presents the descriptive statistics of the variables used in estimation. The mean of leverage measures shows that debt levels are well below the value of total assets of the firms. However, there are firms with high debt levels which are more than the value of assets the firms have, as is evident from the maximum values, while others do not hold any debt in their capital structure. The median leverage ratio lies below the mean leverage showing that most firms have low leverage levels. The median firm also holds more short term debt on average compared to long term debt.

The average tax rate is 37.5 per cent, which is above the corporate tax rate of 30 per cent for domestic firms. There are also firms that have minimum tax payments of zero, and these may be those firms that incur losses in a given period. There is also a marked difference in the size of the firms, measured by total assets and total sales respectively, as shown by the high standard deviations of SIZE1 and SIZE2. Some firms made losses during the period resulting to negative profitability ratios, however, the average profitability ratio is positive though it forms a small proportion of firm assets. The maximum profit recorded was however more than the total assets of the firm. The poor performance

of some firms is also depicted in the negative growth in assets and sales (GROWTH1 and GROWTH2 respectively). The average growth for the firms stands at about 11 per cent annually.

Table 3: Descriptive statistics of the variables

Variable	N	Mean	Median	Minimum	Maximum	Standard Deviation
LEV1	315	0.177	0.140	0.000	0.930	0.153
LEV2	315	0.295	0.270	0.030	1.290	0.190
LEV3	315	0.472	0.460	0.100	1.290	0.189
AETR	315	0.375	0.310	0.000	9.270	0.569
SIZE1	315	15.205	15.060	10.520	19.220	1.661
SIZE2	315	15.348	15.210	10.750	18.900	1.585
PROF	315	0.158	0.110	-0.220	1.070	0.186
TANG	315	0.409	0.370	0.020	0.870	0.207
NDS	315	0.053	0.030	0.000	0.570	0.078
INTCOST	315	0.048	0.020	-0.150	0.640	0.081
GROWTH1	315	0.124	0.100	-0.790	1.170	0.210
GROWTH2	315	0.107	0.110	-2.170	2.490	0.284

LEV1 is the ratio of long term debt to total assets; LEV2 is the ratio of short term debt to total assets; LEV3 is the ratio of total debt to total assets, AETR is the ratio of the difference between earnings before tax and earnings after tax to earnings before tax; SIZE1 is the logarithm of total sales; SIZE2 is logarithm of total assets; PROF is earnings before tax divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; GROWTH1 is growth in total assets; and GROWTH2 is growth in sales.

Table 4 presents the correlation matrix of the variables. Long term and short term debt variables are negatively correlated, which may depict substitution of debt based on the term of debt. High correlation is evident between variables used for the same measure, e.g., between LEV2 and LEV3; and between SIZE1 and SIZE2, but not between the two measures of growth. There is also high correlation between LEV1 and TANG, showing that increase in asset tangibility most likely leads to increased use of long term debt but not short term debt. However, short term debt has high correlation to interest cost of the firm. There is negative correlation between the leverage measures to profitability, showing that firms with increasing profits will be lowering the amount of debt over time. However, measures of size and tangibility are positively correlated to long term leverage but negatively correlated to short term leverage. The tax variable is positively correlated to all the leverage measures, depicting the role of debt as a tax shield.

Table 4: Correlation matrix of the variables

	LEV1	LEV2	LEV3	AETR	SIZE1	SIZE2	PROF	TANG	NDS	INTCOST	GROWTH1	GROWTH2
LEV1	1.000											
LEV2	-0.406	1.000										
LEV3	0.399	0.676	1.000									
AETR	0.003	0.107	0.109	1.000								
SIZE1	0.078	0.277	0.342	-0.055	1.000							
SIZE2	0.303	-0.046	0.199	-0.090	0.897	1.000						
PROF	-0.113	-0.118	-0.210	-0.032	0.037	-0.007	1.000					
TANG	0.563	-0.282	0.173	-0.034	0.302	0.470	-0.015	1.000				
NDS	-0.006	0.087	0.081	0.242	-0.179	-0.214	-0.115	0.175	1.000			
INTCOST	-0.199	0.556	0.398	-0.023	0.128	-0.001	-0.119	-0.334	-0.087	1.000		
GROWTH1	-0.013	0.019	0.010	-0.099	-0.003	-0.051	0.109	0.076	-0.044	-0.020	1.000	
GROWTH2	0.016	-0.071	-0.056	-0.044	0.010	0.066	0.019	-0.028	-0.153	-0.110	0.255	1.000

LEV1 is the ratio of long term debt to total assets; LEV2 is the ratio of short term debt to total assets; LEV3 is the ratio of total debt to total assets, AETR is the ratio of the difference between earnings before tax and earnings after tax to earnings before tax; SIZE1 is the logarithm of total sales; SIZE2 is logarithm of total assets; PROF is earnings before taxes divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; GROWTH1 is growth in total assets; and GROWTH2 is growth in sales.

Regression results

Determinants of capital structure have been estimated at four quantiles, 25th, 50th, 75th, and 95th quantiles using the total debt ratio as the dependent variable[7]. The results are reported in Table 5 using the ratio of total debt to total assets as the dependent variable. The first column reports results of OLS regression using the same variables. The results suggest that the average effective tax rate, size of the firm and cost of finance are associated to higher debt to asset ratios, while profitability of a firm is associated to lower debt ratios. However, asset tangibility, non-debt tax shields and growth opportunities are not significant.

Given the limitations of OLS of focusing only at the central tendency of the distribution (Fattouh et al. 2005), the results for conditional quantile estimates are also reported in Table 5 (columns 2-4). At very low levels of total debt ratios, i.e. at 25th quantile, the average tax rate, size of the firm, asset tangibility and finance cost positively and significantly determine total leverage. Significance and magnitude of the coefficients change as higher quantiles are considered. The difference in the quantiles is therefore reflected in significance of the variables and magnitude of the coefficients; however, the signs do not change as higher quantiles are considered.

The tax variable does not determine leverage at higher quantiles, implying that use of debt to shield against tax only happens when firms have low debt ratios. The size of the firm positively determine leverage at all levels of leverage, meaning that bigger firms have an incentive to hold more debt compared to smaller firms. Profitability is significant determinant of capital structure at the 50th and 75th quantiles leading to less total debt ratios, while growth opportunities as measured by total assets and non-debt tax shield as measured by deprecation ratio remains insignificant at all quantiles. Firms with tangible assets will increase their debt holdings and the magnitude is greater for highly levered firms who are at the 95th quantile. This may reflect the role of fixed assets held by a firm being used as collateral against debt and those as long as firms have tangible assets, they can still acquire more debt even if they are higher quantiles of debt. On the other hand, finance cost leads to more debt in the capital structure. While it may be expected that as the cost of finance goes up firms reduce their debt holdings, increase in cost of finance may be an indicator of increased demand for financing by firms, thus the amount of debt holding will still go up in anticipation of higher costs of financing in future in a credit constrained environment The profitability of a firm (PROF) has a negative and significant coefficient at higher levels of leverage and the magnitude also tends to be higher at higher levels of leverage. More profitable firms are most likely to avoid agency costs of debt by using retained earnings to finance their operations. Hence, more profitable firms are most likely to reduce by a larger magnitude the use of debt in their financing structure. Except for the size of the firm, the magnitude of the variables is higher compared to those of the OLS. The coefficients of the time dummies were

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[7] Estimations at lower quantiles did not yield any different results hence have not been reported in the table of results.

statistically insignificant at 5 per cent level, pointing to the fact that the effects of macroeconomic variables did not vary over time. nt.

Table 5: Regression results for total debt to asset ratio, 2003-2012

LEV3	(1) OLS	(2) 25th Quant	(3) 50th Quant	(4) 75th Quant	(4) 95th Quant
AETR	**0.022(0.005)**	**0.063(0.025)**	0.038(0.027)	0.022(0.031)	-0.004(0.041)
SIZE1	**0.040(0.016)**	**0.030(0.008)**	**0.026(0.011)**	**0.020(0.009)**	**0.025(0.012)**
PROF	**-0.084(0.042)**	-0.073(0.052)	**-0.162(0.054)**	**-0.199(0.057)**	-0.158(0.098)
TANG	0.107(0.093)	**0.186(0.079)**	**0.265(0.088)**	**0.250(0.081)**	**0.311(0.105)**
NDS	-0.038(0.151)	-0.084(0.255)	0.274(0.254)	0.317(0.196)	0.122(0.315)
INTCOST	**0.457(0.120)**	**1.109(0.237)**	**1.286(0.299)**	**1.174(0.347)**	**1.102(0.319)**
GROWTH1	-0.004(0.023)	0.087(0.067)	0.052(0.082)	-0.001(0.084)	0.042(0.155)
D2004	-0.018(0.016)	-0.033(0.051)	-0.052(0.066)	-0.047(0.106)	-0.037(0.133)
D2005	-0.003(0.039)	0.031(0.054)	0.013(0.063)	-0.047(0.104)	-0.156(0.160)
D2006	-0.006(0.046)	0.038(0.054)	-0.008(0.072)	-0.002(0.100)	-0.176(0.167)
D2007	-0.032(0.043)	-0.000(0.049)	-0.031(0.066)	-0.023(0.099)	**-0.246(0.111)**
D2008	-0.046(0.041)	-0.011(0.047)	-0.031(0.064)	-0.041(0.104)	**-0.224(0.111)**
D2009	-0.013(0.046)	0.002(0.048)	-0.000(0.062)	-0.031(0.099)	-0.102(0.147)
D2010	-0.048(0.038)	-0.004(0.047)	-0.031(0.066)	-0.073(0.096)	**-0.279(0.111)**
D2011	-0.050(0.041)	-0.019(0.047)	-0.071(0.061)	-0.105(0.100)	-0.206(0.117)
D2012	-0.066(0.041)	-0.007(0.050)	-0.063(0.058)	-0.085(0.093)	**-0.328(0.117)**
Constant	-0.167(0.285)	-0.231(0.122)	-0.075(0.168)	0.152(0.155)	0.352(0.206)
F-test time dummies	18.72	0.32	0.70	0.79	1.77

AETR is the average effective tax rate; SIZE1 is the logarithm of total sales; PROF is EBITDA divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; and GROWTH1 is growth in total assets.
Standard errors are reported in the parentheses. Robust standard errors are reported for the OLS regression while bootstrap standard errors obtained using 1000 bootstrap replications are reported for quantile regression. Bold figures indicate significance at 5% or less.

Figure 1 plots the estimated coefficients against the various quantiles of debt ratios, showing the 95 per cent confidence interval constructed using the percentile method with 1000 bootstrap replications. The trends show the relationship between the variables and the debt ratios at conditional levels of leverage. The main variable of concern, the tax rate variable, shows that the coefficient declines as higher debt quantiles are considered. The coefficient of the tax measure moves from a positive to a negative coefficient from lower to higher quantiles. This shows that an increase in the tax rate will lead to firms increasing their debt levels if they are at lower debt quantiles but to decrease their debt levels if they are at higher debt quantiles. The use of debt as a tax shield is only effective at lower quantiles as the coefficient of the tax measure becomes insignificant at higher quantiles. The coefficient of asset tangibility on the other hand increases over the quantiles while that for size and finance cost are stable across the quantiles. Finance cost tends to have relatively higher and significant coefficients compared to the other determinants.
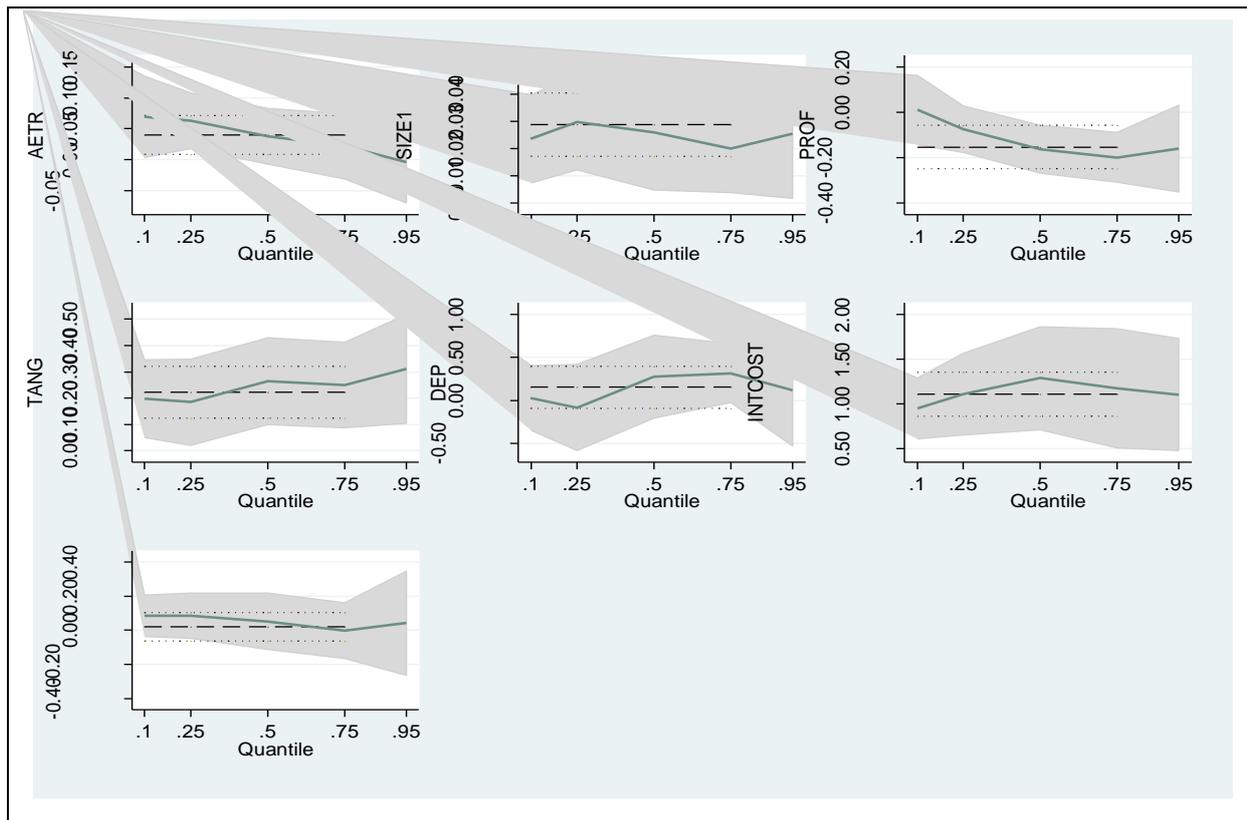
Figure 1: Estimated coefficients and 95% confidence interval

Given the mixed results with total debt, we test if there are likely to be different factors that determine use of long term and short term debt. Long term debt have been established to encourage investments across firms and are in most cases borrowed at negotiated interest rates which tend to be lower than short term debt. It is therefore expected that the term of the debt will be influenced differently by the dependent variables. The results using long term debt ratios are presented in Table 6. Just like in the case when total debt is considered, the tax measure is not significant all through. The size of the firm is significant all across the quantiles, however, it now leads to reduction in long term debt ratio. This means that larger firms in terms of sales reduce the amount of long term debt they have in their capital structure while increasing the overall debt levels as established previously. This may be informed by the fact that large firms have enough capital for investment but may need short term credit for inventory, hence they are likely to use short term debt rather than long term debt. Tangibility of assets increases the use of long term debt, with high magnitude of increase at higher quantiles. Compared to the case where total debt was considered, the magnitudes tend to be much higher for the case of long term debt. This implies that relatively more long term debt will be used in the capital structure for firms with increasing asset tangibility. However, profitability is only significant at 95th quantile and it leads to reduction of long term debt ratio.

Table 6: Regression results for long term debt ratios, 2003-2012

	25th Quant	50th Quant	75th Quant	95th Quant
AETR	0.014(0.030)	0.029(0.027)	0.024(0.027)	0.021(0.031)
SIZE1	**-0.010(0.005)**	**-0.025(0.006)**	**-0.024(0.007)**	**-0.025(0.010)**
PROF	-0.058(0.062)	-0.028(0.040)	-0.038(0.051)	**-0.106(0.052)**
TANG	**0.321(0.046)**	**0.350(0.046)**	**0.532(0.054)**	**0.793(0.109)**
NDS	-0.218(0.132)	-0.199(0.121)	**-0.262(0.123)**	**-0.717(0.185)**
INTCOST	0.056(0.063)	-0.053(0.092)	-0.153(0.101)	0.019(0.170)
GROWTH1	0.019(0.026)	-0.012(0.030)	-0.008(0.042)	0.041(0.063)
Constant	0.097(0.080)	**0.356(0.088)**	**0.355(0.130)**	**0.554(0.163)**

AETR is the average effective tax rate; SIZE1 is the logarithm of total sales; PROF is EBITDA divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; and GROWTH1 is growth in total assets.
Bootstrap standard errors obtained using 1000 bootstrap replications are reported in the parentheses. Bold figures indicate significance at 5% or less.

Non-debt tax shield significantly leads to reduction in use of long term debt ratio at the 75th and 95th quantiles though it was insignificant for the case of total debt. This shows that firms which face higher depreciation of their long term assets are likely to reduce holding of long term debt over especially if they hold higher debt levels. One reason may be the fact that assets are mainly used as collateral in credit constrained countries such as Kenya, hence, high depreciation of assets results means a faster fall in the value of collateral and thus the assets cannot be accepted to secure long term debt. This argument is supported by the positive significance of tangibility for the case of long term debt ratio. It shows that firms with tangible assets will increase their long term debt ratios to finance long term investments as the assets will act as collateral for credit, and at the same time such firms are less likely expected to default. From the foregoing, the coefficients of the variables increase at higher quantiles, except those for size of the firm which is relatively the same at all quantiles. Figure 2 presents the graph of coefficients of the variables. The change in magnitude is evident in graphs showing coefficients of tangibility and non-debt tax shield.
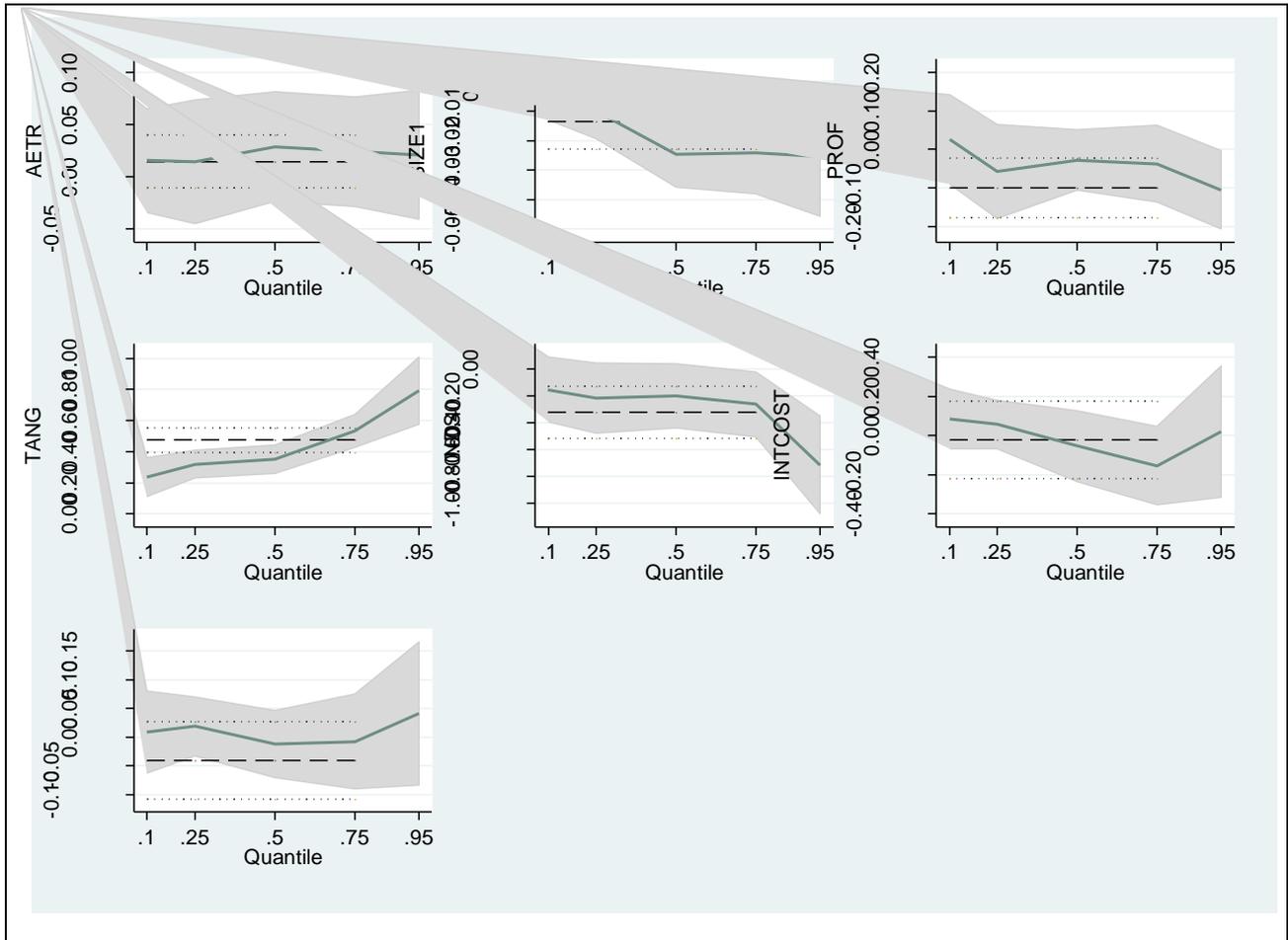
Figure 2: Estimated coefficients and 95% confidence interval for long term debt

The results using short term debt ratios are presented in Table 7. The results obtained using short term debt as the dependent variable has some variance with those for long term debt. The tax measure is still not significant for short term debt only as well. The size of the firm is significant all across the quantiles, however, it leads to increase in long term debt ratio, meaning firms increase the amount of short term debt they hold as their sales grow while reducing their holdings of long term debt as established in Table 6. The rate at which firms increase short term debt is greater than the rate at which they reduce long term debt resulting to an overall positive effect on total debt. This shows that as firms increase in size, they shift their usage of debt to short term debt. Tangibility of assets reduces the use of short term debt, with the magnitude of the decrease increasing at higher quantiles. Given the positive overall effect of tangibility on total debt, it gain implies that firms use long term debt than they reduce the use of short term debt as tangibility of assets increase. However, profitability is only significant at 75th quantile and it leads to reduction of short term debt ratio.

Table 7: Regression results for short term debt ratios, 2003-2012

	25th Quant	50th Quant	75th Quant	95th Quant
AETR	0.052(0.034)	0.028(0.035)	0.020(0.045)	-0.019(0.067)
SIZE1	**0.049(0.008)**	**0.047(0.006)**	**0.030(0.008)**	**0.028(0.013)**
PROF	0.015(0.037)	*-0.068(0.038)*	**-0.096(0.045)**	-0.082(0.104)
TANG	**-0.225(0.076)**	**-0.348(0.058)**	**-0.357(0.059)**	**-0.387(0.095)**
NDS	0.157(0.338)	**0.609(0.244)**	**0.655(0.252)**	**1.034(0.333)**
INTCOST	**0.918(0.190)**	**0.913(0.235)**	**1.220(0.261)**	**1.794(0.462)**
GROWTH1	0.083(0.073)	0.079(0.065)	0.066(0.078)	0.040(0.162)
Cons	**-0.469(0.114)**	**-0.308(0.092)**	-0.003(0.130)	0.290(0.190)

AETR is the average effective tax rate; SIZE1 is the logarithm of total sales; PROF is EBITDA divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; and GROWTH1 is growth in total assets.
Bootstrap standard errors obtained using 1000 bootstrap replications are reported in the parentheses. Bold figures indicate significance at 5% or less.

For the short term debt, non-debt tax shield and finance cost are now significant. Non-debt tax shield leads to increased use of short term debt in the capital structure from the 50th quantile and above. The magnitude increases to more than 1 per cent at the 95th quantile. Finance cost also leads to use of short term debt ratio increasing at high levels irrespective of the level of debt in the firm's capital structure. This reflects the high cost of short term debt and demand for such financing given the fact that despite the increased costs, the use of short term debt increases by more than increase in finance cost. The magnitude of the increase is high for firms at higher debt quantiles. The figure depicting movement of the variables is presented in Figure 3. For the significant variables, that is, size of the firm, asset tangibility, finance cost, and non-debt tax shield, the graphs show the change in coefficients across the various quantiles. For instance, while coefficients of size are generally the same, those for profitability and asset tangibility decline while those for non-debt tax shield and finance cost increase as higher quantiles are considered in the case of short term debt.
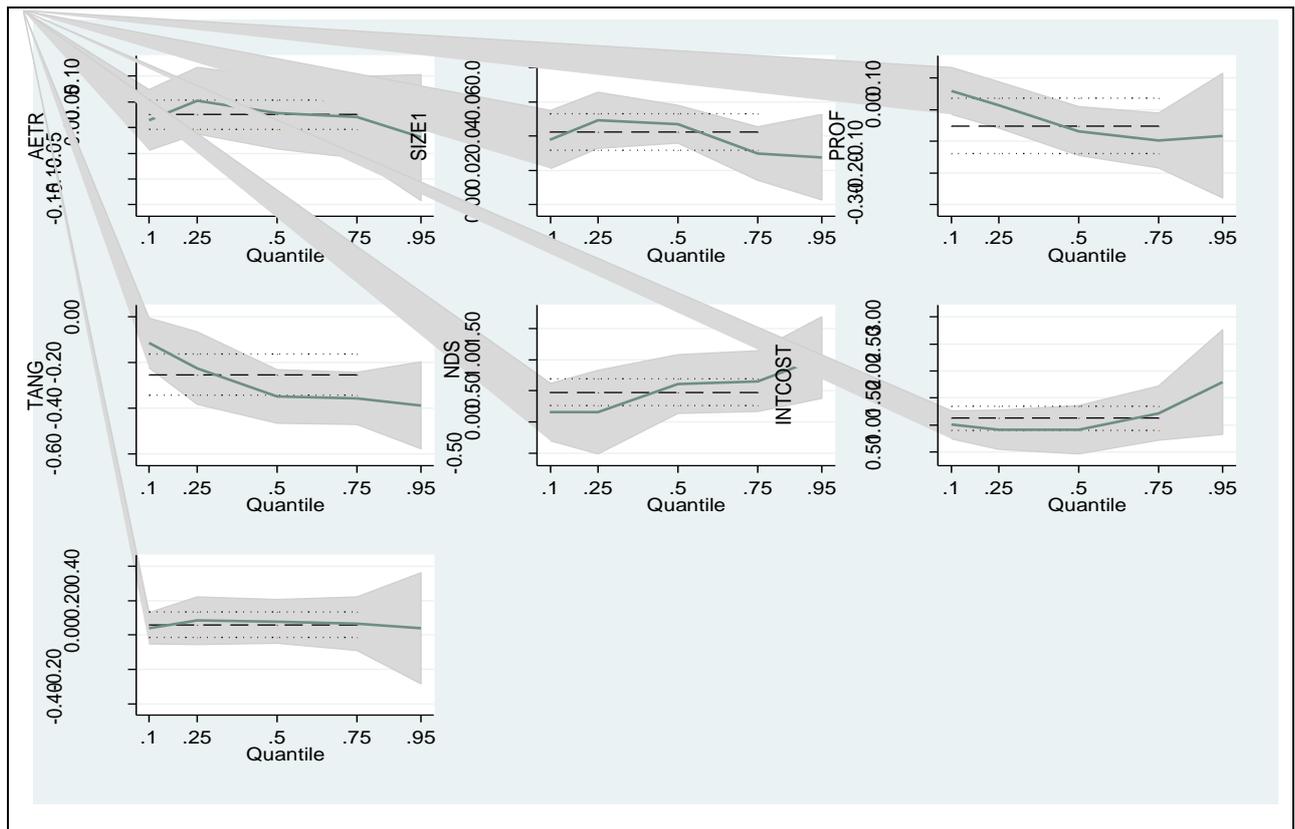
Figure 3: Estimated coefficients and 95% confidence interval for short term debt

Robustness of the results

In this section, we test whether the results established above holds when different measures of size of the firm and growth opportunities are used. Size of the firm (SIZE2) is measured as the logarithm of total assets while growth opportunity (GROWTH2) is measured as growth in sales within periods. The results for these regressions are presented in Tables 8-10. The results of the regression using total debt ratio (Table 8) show that the tax measure is significant only at low quantile with a unit increase in the average tax rate leading to total debt ratio increasing by 0.07 units.

Table 8: Regression of total debt ratio

	25th Quant	50th Quant	75th Quant	95th Quant
AETR	**0.065(0.023)**	0.046(0.029)	0.022(0.033)	-0.006(0.038)
SIZE2	0.010(0.013)	-0.001(0.011)	0.005(0.010)	**0.023(0.012)**
PROF	-0.049(0.043)	**-0.166(0.046)**	**-0.224(0.056)**	*-0.168(0.092)*
TANG	**0.273(0.090)**	**0.314(0.085)**	**0.303(0.084)**	**0.241(0.113)**
NDS	-0.068(0.233)	-0.022(0.246)	0.215(0.204)	0.002(0.334)
INTCOST	**1.214(0.259)**	**1.341(0.243)**	**1.338(0.261)**	**1.142(0.314)**
GROWTH2	0.040(0.050)	0.067(0.049)	0.018(0.050)	-0.039(0.066)
Constant	-0.002(0.182)	0.290(0.164)	**0.377(0.164)**	**0.476(0.199)**

AETR is the average effective tax rate; SIZE2 is the logarithm of total assets; PROF is EBITDA divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; and GROWTH2 is growth in total sales.

Bootstrap standard errors obtained using 1000 bootstrap replications are reported in the parentheses. Bold figures indicate significance at 5% or less.

Firm profitability leads to reduction in total debt ratio at the 50th and 75th quantiles, while asset tangibility and cost of financing have significant positive effect on total debt ratio. Size of the firm is only significant at higher quantiles, that is, 95th quantile, and has a positive relation to total debt ratio. The results are not different from those obtained using different measures of size and growth, other than the coefficient of size which is not significant at lower quantiles as established previously.

For long term debt, the size of the firm is also significant at the highest quantile only but maintains the same sign and magnitude as before (Table 9). Asset tangibility is positive and significant at all quantiles with no significant change in the magnitude, while profitability and non-debt shield are negative and significant to long term debt at higher levels of debt ratios. Cost of finance is now significant, but only at 75th quantile. Regressions for short term debt ratio also yield similar results (Table 9). Asset tangibility has a positive and significant impact on short term debt ratio, while profitability, non-debt tax shield and cost of finance significantly leads to reduction of the short term debt ratio at higher quantiles. Difference in the results is evident for sales and cost of finance which are not significant at all quantiles as before but only at higher quantiles. The results re therefore generally the same as those obtained using different measures of size and growth opportunities.

Table 9: Regression of long term debt ratio

	25th Quant	50th Quant	75th Quant	95th Quant
AETR	0.012(0.033)	0.007(0.034)	0.021(0.030)	0.011(0.029)
SIZE2	-0.003(0.005)	*-0.015(0.008)*	-0.014(0.010)	**-0.028(0.013)**
PROF	-0.068(0.070)	-0.070(0.055)	-0.076(0.061)	**-0.122(0.057)**
TANG	**0.324(0.045)**	**0.353(0.055)**	**0.512(0.053)**	**0.785(0.114)**
NDS	-0.150(0.135)	-0.108(0.146)	**-0.268(0.126)**	**-0.641(0.198)**
INTCOST	0.043(0.068)	-0.096(0.116)	**-0.251(0.073)**	0.000(0.160)
GROWTH2	0.002(0.016)	-0.024(0.030)	-0.007(0.043)	0.043(0.061)
Constant	-0.005(0.081)	0.196(0.124)	0.214(0.157)	**0.571(0.194)**

AETR is the average effective tax rate; SIZE2 is the logarithm of total assets; PROF is EBITDA divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; and GROWTH2 is growth in total sales.
Bootstrap standard errors obtained using 1000 bootstrap replications are reported in the parentheses. Bold figures indicate significance at 5% or less.

Table 9: Regression of short term debt ratio

	25th Quant	50th Quant	75th Quant	95th Quant
AETR	0.058(0.047)	0.028(0.052)	0.012(0.045)	-0.004(0.067)
SIZE2	0.012(0.012)	**0.023(0.011)**	0.007(0.008)	0.013(0.012)
PROF	*0.070(0.041)*	-0.028(0.040)	**-0.088(0.044)**	0.008(0.141)
TANG	-0.028(0.094)	**-0.326(0.106)**	**-0.272(0.074)**	**-0.351(0.114)**
NDS	0.135(0.329)	*0.575(0.303)*	**0.759(0.245)**	*0.687(0.396)*
INTCOST	**1.266(0.262)**	**1.089(0.244)**	**1.499(0.257)**	**1.942(0.435)**
GROWTH2	0.064(0.054)	0.022(0.056)	0.025(0.046)	-0.077(0.048)
Cons	-0.066(0.157)	0.038(0.143)	**0.330(0.128)**	**0.459(0.189)**

AETR is the average effective tax rate; SIZE2 is the logarithm of total assets; PROF is EBITDA divided by total assets; TANG is the ratio of fixed assets to total assets; NDS is the ratio of depreciation expenses to total assets; INTCOST is the ratio of finance cost to fixed assets; and GROWTH2 is growth in total sales.
Bootstrap standard errors obtained using 1000 bootstrap replications are reported in the parentheses. Bold figures indicate significance at 5% or less.

Discussion

The estimation results show that the effect of tax on the capital structure is only important at lower quantiles and only when total debt is considered. This means that firms consider total debt in using debt as tax shield rather than the term of the debt. At the same time, only firms with low total debt ratio significantly use debt to shield against tax payments. This response of firms may be due to the fact that firms with no or small debt in their capital structure face no or little cost of financial distress, and thus can afford to shield tax payments by marginally increasing their debt levels. However, at higher levels of debt, the costs of debt outweigh the benefits of using debt to shield against tax and thus firms are better off using non-debt tax shield to shield against tax payments. These results are an improvement to Ngugi (2008) findings that the tax rate has no effect on leverage. The difference may be because of the consideration of nonlinearity in debt ratios hence different effects on firms depending on the ratio of debt they hold.

Size of the firm and tangibility are consistently significant irrespective of the type of debt used, with both leading to increase in total debt ratio. However, there is a change in sign depending on whether long term or short term debt is considered. While size of the firm leads to increase in short term debt ratio but a decline in long term debt ratio, asset tangibility has the opposite effect. The implication of this is that firms substitute between long term debt and short term debt depending on whether they have grown in size or in asset tangibility, but the overall effect is increase in total debt ratio. Highly profitable firms reduce their holdings of debt, both short term and long term, but only if they are at debt quantiles.

The effect of profitability is therefore to move to internal financing sources and reduce exposure to debt. The cost of finance, on the other hand, is only significant for short term debt ratios and it increases the debt ratios. While it is expected that as finance cost goes up firms will eventually reduce their holdings of debt, the reverse happens. This may be because of the increased demand of short term debt over time to meet short term liquidity constraints; hence firms may have no option despite the high costs of financing. On the other hand, firms with more non-debt tax shields reduce their holdings of long term debt ratios but increase their holdings of short term debt ratios, but with no significant effect on total debt. Non-debt tax shields are therefore used to balance the proportion of short term and long term debt held by a firm.

5. Conclusions and policy implications

The study analyses the capital structure of listed firms in Kenya from 2003 to 2012. The study is motivated by two main issues: first, is the need to establish the determinants of capital structure and specifically how firms respond to the effect of tax in their capital structure decisions, and secondly, to establish whether the determinants of capital structure varies with the type of debt or the loan term.

Conditional quantile regression is used in analysing the distribution of debt across firms. The results show that the main variables that have been used to capture agency cost models hold but at higher debt ratios or higher quantiles. The size of the firm, asset tangibility and profitability has significant effect on leverage. However, growth opportunities of firms have been to be insignificant at all levels. The difference in the effects are found to be more prominent when short term and long term debt ratios are considered separately. For instance, size of the firm leads to increase in short term debt but reduction in long term debt levels, while asset tangibility increases the use of long term debt but reduction in the use of short term debt. The main variable in the study is the effect of tax on the capital structure of the firms. The results show that debt ratios will rise for firms at the lower debt quantiles following an increase in the tax rate. The implication of this finding is that a change in the tax rate, though a cost to firms, will not provide any incentive on the firms to hold more debt. This may be due to the inherent costs of debt which might outweigh its benefits especially in a credit constrained market such as Kenya. At the same time, most of the firms, other than those in the financial sector which have not been considered, are not very large whether by revenue generated or by assets held. The sampled firms have an average size of about Kshs.4 billion. This makes the cost of financial distress due to increased borrowing high and may outweigh the benefit of covering against tax payments. The firms therefore use non-debt shields in most cases and only increase total debt ratio with an increase in the tax rate if they are at lower debt quantiles.

The findings suggest that the choice of the kind of debt to hold is determined by certain firm characteristics especially in a credit constrained country such as Kenya. In this case, the conventional firm characteristics like size of the firm increase the use of debt, but this involves using more short term for long term debt in their capital structure. Asset tangibility, however, has the opposite effect on long term and short term asset. At the same time, cost of finance leads to more use of short term debt but has no effect on long term debt. This reflects on the financing challenges faced in the country. For instance, only few firms have been able to issue bonds in the stock market to finance their activities and use of this type of financing is challenged by liquidity issues as the secondary market for bonds is not active. Hence, reforming the bonds market and improving activity in this case as has happened with the equity market in Kenya will ease access to long term loans for firms. Also, non-debt tax shields are only used to balance between long term and short term debt.

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