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Abstract

This paper investigates the relationship between leverage and the financial performance of listed firm in Kenya. We use annual data for the period 2002 – 2011. Using various panel procedures, our study finds reasonably strong evidence that leverage significantly, and negatively, affects the profitability of listed firms in Kenya. However, leverage has no effect on Tobin's Q, our proxy for firm value. Our results are robust to alternative panel specifications and hold for both small-size and large-size firms. Second, because the performance of firms depends on other things than just their capital structure, we control for the effects of those other variables by including them in our models. In this respect, our findings suggest that asset tangibility, sales growth and firm size are important determinants of profitability. Surprisingly, asset tangibility consistently has a negative relationship with profitability. For small firms, our results indicate that sales growth and firm size are important factors driving firm value (Tobin's Q). Yet, the same variables do not appear to drive the value of large firms.

Key words: Capital structure, leverage, firm value, profitability, Kenya

JEL Classification: G21; G28; G32; G34

1.0 INTRODUCTION

Corporate Finance literature offers two schools of thought that explain firms' capital structure choices. The first school of thought is the trade-off theory, which argues for the existence of an optimal capital structure, by incorporating various imperfections to capital markets ignored by the Modigliani and Miller (1958) hypotheses, but retaining the assumptions of market efficiency and symmetric information. Thus, although increasing leverage might enable a firm to increase its value by profiting from tax shields on debt (Modigliani and Miller, 1963), higher leverage might lead to higher expected direct and indirect financial distress costs, which decrease the firm's value (Ross et al., 2002). According to the trade-off theory, therefore, the optimum financing mix coincides with the level of leverage at which the benefits and costs of debt financing are exactly balanced. The second school of thought explaining firms' capital structure choice is the pecking order hypothesis. Invoking agency theory, signaling hypothesis and information asymmetry, the pecking order hypothesis argues that firms have a preference order for different types of finance, reflecting their ease of availability or relative costs (Myers and Majluf, 1984). The pecking order hypothesis does not emphasize target leverage; rather, current leverage reflects firms' historical profitability and the need for additional investment funds at some point in time.

At the empirical level, the relationship between capital structure and the financial performance of firms has been the subject of several studies since the seminal work of Jensen and Meckling (1976). However, the evidence on these relationships has been mixed. Some researchers find a positive relationship between debt level and firms' financial performance (among them, Taub, 1975; Roden and Lewellen, 1999; Champion, 1999; Ghosh and Jain, 2000; Hadlock and James, 2002 and Berger and di Patti, 2006). These researchers generally argue that financial leverage has a positive effect on a firm's returns on equity provided that the firm's earnings power exceeds its interest cost of debt (Hutchinson, 1995) and that the level of leverage a firm should commit itself to depends on the flexibility with which the firm can adjust its debt usage should earnings power fall below its average interest cost (Hadlock and James, 2002). In an interesting study of the banking sector, Berger and di Patti (2006) demonstrate that high leverage ratio is related to higher profit efficiency. The preponderance of findings, however, is that a negative relationship exists between leverage and financial performance (Majumdar and Chhiber, 1999; Gleason et al., 2000; and Simerly and Li, 2000; Hammes, 2003; de Mesquita and Lara, 2003; Zeitun and Tian, 2007).

In the debate on the importance of capital structure to financial performance, some researchers also emphasize the importance of distinguishing between long- and short-term debt: in a study of the capital structure of Ghanaian banks, Amidu (2007) finds that the overall leverage of banks is negatively related to operating assets; however, long-term debt is positively and statistically related to operating assets and

performance. On the same note, Diamond and Rajan (2000b) argue, from the perspective of bank financing, that the possibility of premature liquidation of short-term debt may act as an incentive to managers to pursue value maximizing decisions that may enhance firm performance.

Although most of the extant capital structure studies have been carried out in developed financial markets, some studies have examined the relationship between capital structure and financial performance of firms in developing countries. Hung et al. (2002) find that while high gearing is positively related to assets, it's negatively related to profit margins in Hong Kong's property markets. Kyereboah-Coleman (2007) finds that a high debt level is positively related to performance of micro-finance institutions in sub-Saharan Africa. Contrarily, country-specific studies in Africa appear to consistently report a negative relationship between capital structure and firm value (Abor (2005) for Ghana, Abor (2007) for South Africa and Ghana, Amidu (2007) for Ghana, and Onaolapo and Kajola (2010) for Nigeria). However, Ebaid (2009) finds a weak-to-no-effect of capital structure on firm performance for Egypt.

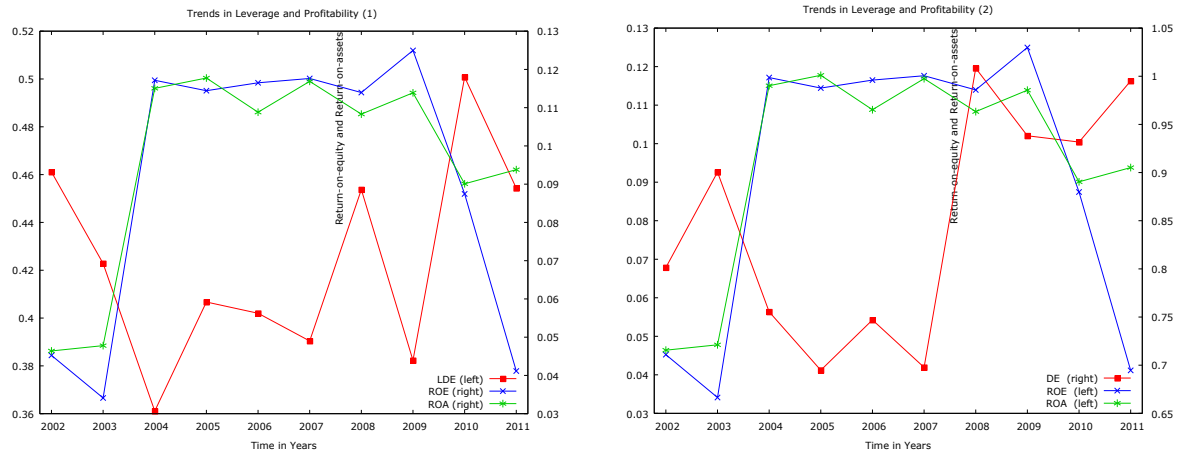

Figure 1: Trends in Profitability and Leverage

A study using Kenyan data by Kiogora (2000) also reports a negative relationship between returns of firms and their levels of financial leverage. This observation appears to be confirmed by our data, gathered after 2000, which shows an apparent negative relationship between key leverage variables and profitability measures (see Figure 1). Additionally, available information shows that 68 Treasury bonds issued by the Republic of Kenya, 10 corporate bonds issued by seven companies and 60 companies' equities were listed on the Nairobi Securities Exchange, Kenya, as of December 2012. Further, the listed companies had floated over 5.1 billion shares valued at approximately KES 868 billion while the listed bonds were worth approximately KES 92.48 billion as of end of 2012. Thus, although leverage ratios

have generally increased at firm level (Figure 1), debt financing through bonds appears not to be popular among listed firms in Kenya. This presents the possibility that businesses rely heavily on bank, and other more expensive forms, of debt financing that adversely impact their profitability, causing the visually observed negative relationship between debt usage and profitability.[1] In this respect, the current research interest in Kenya stems from the fact that the World Economic Forum (2013) ranks Kenya's financial markets as the second deepest in Africa, after South Africa. If the markets are adequately deep, the cost of debt financing should not be so high as to adversely and significantly affect firms' financial performance.

The foregoing anecdotal evidence raises a fundamental question: is debt financing associated with poor firm performance in Kenya? Our research is an attempt to seek answers to this question. We attempt to establish if there is a clear linkage between capital structure choice and the performance of firms listed on the Nairobi Securities Exchange. We measure performance both in terms of profitability (return on equity and return on assets) and firm value (Tobin's Q) and use a panel empirical strategy. We report results for both fixed effects and random effects specifications. Our findings support the view that capital structure has a significant (negative) impact on profitability of firms listed in Kenya but not on their value. Our results are robust to panels of large-size and small-size firms. The control variables included in the analysis also present interesting results.

2.0 METHODOLOGY

We define the relationship between the performance of a firm (i) and the factors determining it at time t, thus:

$$y_{it} = \alpha + \delta z_{it} + \boldsymbol{\theta}'\boldsymbol{x} + \epsilon_{it} \qquad (i = 1, \dots, N;\ t = 1, \dots, T) \tag{1}$$

where y is a measure of performance (profit or value) – return on equity, return on assets and Tobin's Q; z is the capital structure or leverage metric – debt equity ratio (DE_{it}), the total debt to asset ratio (DA_{it}), and long-term debt to equity (LDE_{it}) entering the equation alternately; $\boldsymbol{x}$ is a vector of control variables, consisting of several factors traditionally believed to determine firm performance – opportunities for growth in the economy ($Grow$) proxied by the rate of change in GDP; the asset tangibility ratio ($Tang_{it}$); the size of the firm (SZE_{it}), measured as the natural logarithm of total assets; and the rate of growth in sales (SG_{it}). Because these control variables are expected to be correlated with performance measures

[1] Gwatidzo and Ojah (2014) find that firms run by highly educated managers do not prefer non-bank debts, and attribute this finding to the typical forms non-bank debts take in Africa's capital markets – trade credits and leases – "which are contract types that are not competitive against bank debts in terms of size and maturity structure."

(dependent variables), their exclusion from the tests may bias estimates. α, δ and $\boldsymbol{\theta}$ are the coefficients to be estimated.

Firm's size and growth may influence performance since larger firms tend to enjoy economies of scale, which may positively influence financial results (Jermias 2008). Therefore, a positive relationship between firm's size and financial performance is expected. Asset tangibility, proxied by the ratio of fixed assets to total assets, is also considered as an important determinant of performance. The importance of asset tangibility in a firm's operations is emphasized by Akintoye (2009) who argues that a firm will have smaller costs of financial distress if they retain large investments in tangible assets than those that rely on intangible assets. All else equal, the more tangible assets a firm has, the greater is a manufacturing firm's ability to produce its product and generate more revenue from sales. Thus, for such firms, a positive relationship is expected between asset tangibility and financial performance. However, firms in the services sector and retail sectors, which do not engage in actual production, may require more "soft" assets such as inventories and accounts receivable in the ordinary course of events. Since such firms may perform better with fewer tangible assets, a negative relationship is expected. Clearly, the sign of the asset tangibility variable depends on which of the two categories of firms dominates the sample. Finally, a positive relationship is expected between growth opportunities (proxied by the rate of GDP growth) and financial performance. It is important to note that leverage can affect profitability and firm value through taxation. Indeed, several empirical investigations have demonstrated a clear linkage between corporate taxation and capital structure (see, e.g., Barclay, et al., 2013; Lee and Kuo, 2014). However, our investigation shows that Kenya did not have a substantial change in corporate tax laws and rates during the study period. Consequently, the taxation variable is expected to be largely constant over the period and so has been excluded from the analysis.

Now, beyond the company-specific factors identified, we expect that individual companies included in the sample might have other unobserved idiosyncrasies that set them apart from each other. To take care of such unobserved individual-specific effects, we re-write equation (1) as follows:

$$y_{it} = \alpha + \delta z_{it} + \boldsymbol{\theta}'\boldsymbol{x} + \mu_i + \varepsilon_{it} \quad (2)$$

where $\epsilon_{it} = \mu_i + \varepsilon_{it}$ such that μ_i, the time-invariant company-specific effects, account for unobserved heterogeneity and ε_{it} is white noise. Equation (2), is first estimated as a fixed effect model (FEM), on the assumptions that $Cov(\mu_i, \boldsymbol{x_{it}}) \neq 0$; $Cov(\varepsilon_{it}, \boldsymbol{x_{it}}) = 0$; $Cov(\mu_i, \mu_j) = 0$ for i ≠ j; and $Var(\varepsilon_{it}) = \sigma_\varepsilon^2$. In the alternative specification, equation (2) is estimated as a random effects model (REM) in which case we

assume that μ_i are pure stochastic disturbance terms uncorrelated with each other ($Cov(\mu_i, \mu_j) = 0$, for all $i \neq j$), uncorrelated with the explanatory variables ($Cov(\mu_i, \boldsymbol{x_{it}}) = 0$) as well as with the random error term ($Cov(\mu_i, \boldsymbol{\varepsilon_{it}}) = 0$). In this case, $E(\mu_i) = 0$ and, as before, $Var(\mu_i) = \sigma_\mu^2$. In terms of econometric soundness, both the fixed effects and the random effects models have been variously criticized on several grounds (see, e.g., Baltagi, et al., 2008).

In response to the criticisms, we perform diagnostic tests to gauge the suitability of both specifications using the Restricted F-test for the fixed effects models and the Hausman test for the random effects models. If the fixed effects model is the appropriate specification (compared to, say, the restricted pooled model specification), the Restricted F-test should fail to reject the hypothesis that fixed effects estimator produces consistent coefficients. In that case, and in absence of heteroskedasticity and serial correlation in the error term (or if they have been adjusted for in the standard errors), we can conclude that fixed effects estimates are efficient. Similarly, the null hypothesis for the Hausman test is that the coefficient estimates from the random effects specification are consistent. Failure to reject this hypothesis vindicates the appropriateness of the random effects specification for the data.

3.0 DATA

This study examines the relationship between capital structure and firm performance of publicly quoted companies at the Nairobi Securities Exchange using data for the period 2002 through 2011. Observations are sampled at annual intervals because capital structure revisions often require the ratification of company shareholders, who typically meet on an annual basis in Kenya. Year 2002 is important in several respects. First, it coincided with the end of the 2000/2001 global recession. Second, the year also coincided with an important event in Kenya's history: the change of political leadership from the independence party, KANU, to a different political party for the first time since the country's political independence. The incoming political regime was widely viewed as more business friendly than the outgoing one. Third, 2002 also marked the end of the first decade of Kenya's economic reforms. Thus, the performance of firms was expected to reflect the better economic risk and sovereign risk environments as well as improved access to funding because economic reforms would make a wider range of financing instruments available to businesses. The listed companies are analyzed first as a panel of the entire stock market and then by firm size. The performance and capital structure data are collected from firms' audited financial statements contained in NSE handbooks.

The Nairobi Securities Exchange had sixty listed firms at the end of 2011. However, several of the firms were listed after 2002 and hence did not have a time series long enough to enable us include them in the

analysis. For some firms, we were unable to get some of the required data, especially on asset tangibility and on debt financing. Such firms were left out of the analysis. The sample also excluded firms in the financial sector, including banks and insurance companies, because, as Diamond and Rajan (2000a) point out, "bank assets and functions are not the same as those of industrial firms". Indeed, the capital structure of deposit-taking financial firms is often dictated by regulatory rules such as minimum capital requirements. Similarly, our analysis excluded firms that had been suspended from trading, and therefore had missing data, at some point, during the period. The final sample consisted of 29 listed firms.

Table 1
Descriptive statistics

Variable	Mean	Median	Minimum	Maximum	Std Dev	Skewness
Return on equity (ROE)	0.0913	0.0923	-0.6381	0.5348	0.1418	-1.8388
Return on assets (ROA)	0.0959	0.0928	-0.1657	0.5411	0.1835	-1.5276
Tobin's Q	1.8460	0.9342	0.0213	90.122	5.4444	14.806
Total debt to total assets (DA)	0.5702	0.5422	0.1032	0.6886	0.2330	0.1441
Total debt to equity (DE)	0.8470	0.5665	0.1750	7.8937	0.9709	4.6402
Long-term debt to equity (LTD)	0.5147	0.2782	0.0000	8.3751	1.3416	10.116
Asset tangibility (AT)	0.7961	0.8031	0.0924	0.9062	0.2926	-1.3490
Firm size	10.134	12.242	0.4453	23.545	8.6256	0.1294
Sales growth (SG)	1.1300	1.1092	-0.0804	2.7264	0.2801	1.9369
Growth opportunities (Grow)	0.0805	0.1025	-0.0916	0.1699	0.0757	-1.0752

The table shows the descriptive statistics for variables used in the study. The variables are defined thus: Tobin's Q = (Market value of equity + Book value of debt) ÷ Book value of assets; SG is the annual rate of growth in sales; Size is the natural logarithm of total assets; Asset Tangibility is defined as the ratio of fixed assets to total assets;. "Grow" is the annual growth in GDP, believed to represent opportunities for firm expansion in the economy.

Table 1 displays the descriptive statistics for the variables used in the study. The statistics show that the mean value for return on equity (ROE) is 9.13% with a negative skewness, indicating that most of the firms are "clustered" on the left side of the distribution. The mean return on assets invested (ROA) is 9.59%, also with negative skewness. Curiously, the average firm in the market appears to have a higher return on assets than return on equity! However, a closer look reveals that the variability in returns on assets is substantially higher than that of the return on equity suggesting that the mean ROA must have been pulled upwards by extreme values. This becomes more or less obvious when one considers the medians, which are almost similar for the two return metrics. Tobin's Q, a measure that combines market performance with book values, shows a high mean value of 1.846. This may indicate that most of the firms are overvalued relative to their book values.[2]

[2] We were unable to secure the market values of debt and hence surrogated the same with book values.

The capital structure ratios show that the average firm listed on the NSE employs only 0.5147 Kenyan Shilling of long-term debt for every Shilling of equity employed. Clearly, Kenyan firms either prefer to finance their long-term activities through equity or find themselves in that situation courtesy of uncontrollable reasons such as unavailability of diversified long-term financing sources in the capital market (see Gwatidzo and Ojah, 2014). However, when short-term debt is considered, every Shilling of equity employed is matched by about 0.847 Shillings of debt. Thus, even with the short-term debt, firms appear to use less debt in general than they use equity to finance their activities, perhaps due to the high cost of long-term debt, or difficulty in accessing long-term credit from financial institutions. Total debt to asset ratio shows that only about 57% of firms' total assets are financed by debt capital, further confirming Kenyan firms' lack of enthusiasm for debt financing. About 79.6% of all assets are tangible.

Table 2
Correlations and unit root tests

Panel A: Correlation matrix of variables

ROE	ROA	TQ	DA	DE	LDE	AT	Size	SG	Grow	
1.0000	0.8632	0.1059	0.0624	-0.1654	-0.3421	-0.4401	-0.1851*	0.2257	-0.0238	ROE
	1.0000	0.1063	0.0318	-0.1753	-0.3427	-0.4610	-0.1820*	0.2256	0.0103	ROA
		1.0000	0.0660	0.0201	-0.0515	-0.0210	0.0340	-0.0075	-0.0451	TQ
			1.0000	0.2470*	0.0976	0.0535	-0.0171	0.1053	0.0312	DA
				1.0000	0.2425*	0.3027	0.1197	0.0245	0.0215	DE
					1.0000	0.2913*	-0.0353	-0.0551	0.0703	LDE
						1.0000	0.1923*	-0.1595*	-0.0269	AT
							1.0000	-0.0930	0.0047	Size
								1.0000	-0.0249	SG
									1.0000	Grow

Panel B: Unit root tests results

ROE	ROA	TQ	DA	DE	LDE	AT	Size	SG	Grow
-11.84 [0.0000]	-12.12 [0.0000]	-353.56 [0.0000]	-9.48 [0.0000]	-9.62 [0.0000]	-15.46 [0.0000]	-15.21 [0.0000]	-8.02 [0.0000]	-18.58 [0.0000]	-5.82 [0.0018]

ROE is return on equity, ROA is return on assets, TQ is Tobin's Q, DA is total debt to total asset ratio, DE is total debt to equity ratio, LDE is long-term debt to equity ratio, AT is asset tangibility, "Size" is log of total assets, SG is the percentage change in sales, "Grow" is the annual percentage change in GDP.

Panel A: * implies that the correlation coefficient is significant at 5%.

Panel B: Figures in square brackets are the p-values of the Levin-Lin-Chu panel unit root test statistics. Unit root tests for the "Grow" are run using the ADF individual unit root test.

Table 2 presents an analysis of the "relations" between the variables in the analysis. Panel A displays the correlation matrix for the variables. The correlation coefficients between explanatory variables are generally low, indicating that multicollinearity is not a serious concern in the estimations. To avoid

spurious regression estimates in our empirical analysis, it is necessary that variables be stationary. We run panel unit root tests using the method proposed by Levin et al. (2002) and individual unit root test for the variable "Grow" using the augmented Dickey-Fuller method. Results, presented in Panel B of Table 2, shows that the unit roots hypothesis is rejected by all variables at the 1% level of significance.

4.0 EMPIRICAL TESTS RESULTS

4.1 Results of baseline tests

The results of the estimation of the panel data models with each of the performance measures and for the full sample of observations are discussed in this section. Time dummies are included in both the fixed effects model (FEM) and random effects model (REM) to take care of unobserved time-specific effects that may influence firm performance. We report results for profitability and value separately.

4.1.1 Capital structure and profitability

Table 3 presents the results with return on equity (ROE) as the measure of firm profitability. As shown in the table, there is a negative relationship between each of the three capital structure metrics and the return on equity. Capital structure is a significant variable informing the return on equity under the random effects specification when leverage is measured as the ratio of total debt to equity (DE) and as a ratio of long-term debt to equity (LDE). When leverage is measured as total debt to assets, capital structure is not significant under both fixed effects and random effects specifications.

The single most important variable affecting the return on equity of firms listed in Kenya, under both specifications, is asset tangibility. We interpret this variable to represent firms' "earning power/potential". Thus, for manufacturing firms, a higher level of tangible assets will enhance earnings through its positive impact on the ability to produce. For firms in the services and retail sectors, a high level of tangible assets may compromise the ability to provide service or sell merchandise as it ties down money on (fixed) assets, which do not generate income. Coefficient estimates show that an increment in tangible assets by 100% would elicit a drop in returns on equity of the average firm listed on Kenya's Nairobi Securities Exchange by between 11% and 17%. The negative coefficient finding is consistent with the findings of Muritula (2012); it may be explained by the fact the average firm listed at the Nairobi Securities Exchange (as in most parts of the frontier markets) does not engage in manufacturing activities and hence find current assets more useful in the ordinary course of their business. In fact, only about 28% of the sampled firms engaged in manufacturing activities.

Table 3
Regression outputs for return on equity (dependent variable) as performance measure

	Equation 1		Equation 2		Equation 3	
	FEM	REM	FEM	REM	FEM	REM
Constant	-0.30*	0.12**	-0.35**	0.12***	-0.34**	0.12***
	(-1.86)	(2.44)	(-2.54)	(2.65)	(-2.10)	(2.61)
Total debt to assets	-0.01	-0.01				
	(-0.14)	(-0.18)				
Total debt to equity			-0.02	-0.01*		
			(-1.52)	(-1.78)		
Long-term debt to equity					-0.02*	-0.21***
					(-1.75)	(-4.01)
Asset tangibility	-0.13*	-0.17***	-0.11**	-0.15***	-0.11**	-0.14***
	(-1.96)	(-5.28)	(-2.02)	(-4.80)	(-2.05)	(-4.59)
Firm size	0.04***	-0.001	0.05***	-0.001	0.05***	-0.002
	(2.91)	(-0.91)	(4.06)	(-0.82)	(3.03)	(-1.14)
Sales growth	0.03	0.07***	0.03	0.07***	0.03	0.07***
	(1.48)	(2.79)	(1.13)	(2.84)	(1.20)	(2.85)
Growth opportunities	-0.25	-0.13	-0.23	-0.11	-0.25	-0.12
	(-0.79)	(-0.64)	(-0.75)	(-0.53)	(-0.86)	(-0.59)
Adjusted R^2	0.42		0.43		0.45	
Durbin-Watson statistic	1.084		1.072		1.131	
F-statistic	6.11		6.31		6.86	
	[0.00]		[0.00]		[0.00]	
Restricted F-test	4.08		4.31		4.04	
	[0.00]		[0.00]		[0.00]	
Breusch-Pagan test		54.85		58.35		50.88
		[0.00]		[0.00]		[0.00]
Hausman test		11.46		13.93		13.75
		[0.57]		[0.38]		[0.39]

The table reports coefficient estimates (with their t-values in braces). Standard errors for the fixed effects model estimates are robust to heteroskedasticity and autocorrelation. The Durbin-Watson statistic is evaluated against critical values tabulated in Bhargava et al. (1982); the relevant critical values at 5% are: $d_{PL} = 1.8338$ and d_{PU}= 1.8769. In square brackets are p-values of the reported test statistics.

Opportunities for growth presented by the economy appear not to contemporaneously influence firms' return on equity. The growth in sales is positively related to, and significantly affects, return on equity under the random effects model. Similarly, firm size is positively related to and significantly affects returns on equity under the fixed effects model (the variable has a negative sign under the random effects model; however, in each of the equations, the coefficient is not only insignificant but also very small in magnitude suggesting that it has no relationship at all with the return on equity).

Diagnostic statistics show that our model is robust. First, the Durbin-Watson statistic, which tests for first order serial correlation in the errors of a regression output, shows that the hypothesis of positive auto-correlation is not rejected, at the 5% level, under the fixed effects specification. However, because the

standard errors are corrected for autocorrelation and heteroskedasticity, this does not present any threats to the consistency of our estimates. Second, the Adj-R^2 shows that the variables jointly explain between 42% and 45% of the variation in the return on equity of firms listed on the Nairobi Securities Exchange.

Table 4
Regression outputs for return on assets (dependent variable) as performance measure

	Equation 1		Equation 2		Equation 3	
	FEM	REM	FEM	REM	FEM	REM
Constant	-0.23 (1.30)	0.14*** (3.06)	-0.28* (-1.87)	0.14*** (3.32)	-0.26 (-1.54)	0.14*** (3.30)
Total debt to assets	-0.0002 (-0.00)	0.01 (0.15)				
Total debt to equity			-0.02* (-1.86)	-0.01* (-1.68)		
Long-term debt to equity					-0.02** (2.12)	-0.02*** (-3.96)
Asset tangibility	-0.15*** (-2.63)	-0.18*** (-5.92)	-0.13*** (-2.79)	-0.16*** (-5.37)	0.13*** (3.32)	-0.16*** (5.28)
Firm size	0.04** (2.25)	-0.001 (-0.70)	0.04*** (2.90)	-0.001 (-0.60)	0.04** (2.34)	-0.001 (-0.91)
Sales growth	0.02 (1.17)	0.06** (2.57)	0.02 (0.81)	0.06*** (2.62)	0.02 (0.95)	0.06*** (2.63)
Growth opportunities	0.12 (0.41)	0.24 (1.26)	0.14 (0.52)	0.26 (1.41)	0.12 (0.43)	0.25 (1.36)
Adjusted R^2	0.44		0.46		0.48	
Durbin-Watson statistic	1.262		1.262		1.302	
F-statistic	6.65 [0.00]		6.96 [0.00]		7.43 [0.00]	
Restricted F-test	4.80 [0.00]		5.11 [0.00]		4.74 [0.00]	
Breusch-Pagan test		82.73 [0.00]		85.82 [0.00]		76.33 [0.00]
Hausman test		9.81 [0.71]		13.65 [0.40]		12.89 [0.46]

The table reports coefficient estimates (with their t-values in braces).Standard errors for the fixed effects model estimates are robust to heteroskedasticity and autocorrelation. The Durbin-Watson statistic is evaluated against critical values tabulated in Bhargava et al. (1982); the relevant critical values at 5% are: $d_{PL} = 1.8338$ and d_{PU}= 1.8769. In square brackets are p-values of the reported test statistics.

Consistent with the assumptions underlying the fixed effects model specification (see e.g., Gujarati, 2004), the test for the hypothesis of a common intercept for all firms in the sample (restricted F-test) is rejected at 1%; this supports the argument that individual firms in the sample have unique attributes that drive their profitability. Thus, a fixed effects model is more appropriate for this analysis than would a model, such as pooled regression, that restricts the intercept of individual units to be homogeneous. The fixed effects specification is also "validated" by the F-test for goodness of fit, which rejects the

hypothesis that the regressors are not jointly significant. Finally, we evaluate the "validity" of the random effects model using the Hausman test; in each case, the test fails to reject the hypothesis that our estimates are consistent. Similarly, the Breusch-Pagan test rejects the hypothesis of zero-covariance of unit-specific error terms, upholding a key assumption of the REM specification.

Next, we analyze the findings obtained with the return on assets (ROA) as the measure of firm profitability. Results are presented in Table 4. As before, there is a dominant negative relationship between leverage and profitability. Two, out of three, leverage variables (DE and LDE) are statistically significant under both specifications, allowing us to conclude that leverage adversely affects firm profitability. These findings, and those obtained using the return on equity as the measure of profitability, can explain why firms listed in Kenya prefer to finance their activities through equity – the use of debt impacts negatively on reported profits. Asset tangibility still plays a prominent role in influencing firm profitability – with a predominantly negative coefficient. As before, Hausman tests results show that the random effects specification appears to yield consistent estimates just like the fixed effects specifications seem not to violate the heterogeneity assumption underlying the individual unit intercepts estimates (see the restricted-F tests results). Under the random effects specification, we observe that growth in sales by 1% elicits an increment in profitability of between 6% (return on assets) and 7% (return on equity). The opportunities presented by the economy (GDP growth) and firm size appear to have no impact on the reported profits of Kenyan firms. And from the fixed effects results, we observe that an increment in firm size by 1% may cause a firm to report 4% higher profitability. A relationship of this nature may provide managers with the incentive to engage in excessive diversification and expansion.

4.1.2 Capital structure and firm value

Finally, we analyze the relationship between capital structure and firm value. Firm value is proxied by Tobin's Q in our empirical tests. Results are presented in Table 5. Consistent with our findings on firm profitability, our results show a (predominantly) negative relationship between firm value and leverage. However, in contrast to profitability findings, we find that leverage has no statistically significant impact on firm value under both the fixed effects and random effects specifications. The fixed effects model, however, performs rather dismally for the Tobin's Q metric: the F-test for goodness of fit fails to reject the hypothesis that the regressors are "inappropriate" as predictors of value under this specification. And the coefficients of determination show that all the variables explain just about 3% of the variations in Tobin's Q. Nonetheless, the restricted F-test indicates that this specification would still be better than one in which cross-sectional units are restricted to be homogeneous in intercept.

Table 5
Regression outputs for Tobin's Q (dependent variable) as performance measure

	Equation 1		Equation 2		Equation 3	
	FEM	REM	FEM	REM	FEM	REM
Constant	10.68	3.04	10.91	3.86	11.35	3.74*
	(1.23)	(1.48)	(1.23)	(1.95)	(1.23)	(1.89)
Total debt to assets	2.11	2.03				
	(1.09)	(1.34)				
Total debt to equity			-0.27	-0.13		
			(-0.97)	(-0.35)		
Long-term debt to equity					-0.07	-0.17
					(-1.05)	(-0.64)
Asset tangibility	1.85	-0.43	2.05	-0.43	1.89	-0.08**
	(0.92)	(-0.35)	(0.95)	(0.33)	(0.92)	(-2.06)
Firm size	-0.95	0.02	-0.86	0.02	-0.92	0.02
	(-1.08)	(0.56)	(-1.06)	(0.50)	(-1.07)	(0.47)
Sales growth	-0.24	-0.30	-0.26	-0.19	-0.21	-0.17
	(-0.35)	(-0.25)	(-0.36)	(-0.16)	(-0.31)	(-0.14)
Growth opportunities	-16.69	-20.92**	-15.38	-20.01**	-15.64	-19.73**
	(-0.90)	(-2.09)	(-0.87)	(-2.00)	(-0.88)	(-1.97)
Adjusted R^2	0.04		0.03		0.03	
Durbin-Watson statistic	1.064		1.073		1.071	
F-statistic	1.27		1.25		1.25	
	[0.14]		[0.15]		[0.16]	
Restricted F-test	1.54		1.58		1.57	
	[0.04]		[0.04]		[0.04]	
Breusch-Pagan test		1.48		1.56		1.83
		[0.22]		[0.21]		[0.18]
Hausman test		10.00		10.99		10.17
		[0.69]		[0.61]		[0.68]

The table reports coefficient estimates, with their t-values in braces. Standard errors for the fixed effects model estimates are robust to heteroskedasticity and autocorrelation. The Durbin-Watson statistic is evaluated against critical values tabulated in Bhargava et al. (1982); the relevant critical values are: $d_{PL} = 1.8338$ and $d_{PU} = 1.8769$. In square brackets are p-values of the reported diagnostic test statistics.

Now, since the Hausman test appears to give a "clean bill of health" to the random effects specification, we concentrate the rest of our analysis on the outcome of the random effects estimation. Of the control variables, asset tangibility is consistently negative but significant in only one of the equations. The negative relationship can again be explained by the tilt in favor of non-manufacturing firms in our sample. Interestingly, we find that, there is a positive, although insignificant, relationship between firm size and firm value. The finding of an insignificant relationship is remarkable because many studies (see, e.g., Berger and Ofek, 1995) have demonstrated that, overinvestment (and hence firm size) is associated with lower firm value. Indeed, the argument in agency theory is that overinvestment, which may amount to managerial empire building, is not desirable from shareholders' point of view, because diversification, which is it's stated intention, can be achieved by shareholders on their own. Growth opportunities

presented by the economy appear to have a negative and significant contemporaneous effect on the values of firms listed in Kenya. The negative relationship is puzzling. To comprehend it, we conjencture that investors believe that economic growth might present opportunities for new entrants to, and intensify competition in, various industries and hence may adversely affect firms' future cash flows. The Breush-Pagan tests fail to reject the hypothesis that the variances of unit-specific errors were zero.

4.2 Firm size and the effect of leverage on financial performance

Overall, our baseline results indicate that capital structure choices have a statistically significant effect on the profitability, but have no effect on the value, of firms listed on the Nairobi Securities Exchange in Kenya. In this section, we attempt to provide some robustness checks to these results. We do this by running similar but separate regressions for small-size firms and large-size firms. Size of the firm is measured, as before, by the logarithm of total assets. We define small-size firms as those with single digit logs of total assets (values expressed in millions before logs are taken) and large-size firms as those with double digit logs of total assets. This gives us thirteen small-size firms and sixteen large-size firms.

Results for random effects and fixed effects regressions are qualitatively similar. Thus, for the three financial performance metrics, and for both small- and large-size firms, we only report, and discuss, results of the fixed effects specifications. Results for small-size firms are displayed in Table 6. Consistent with our baseline findings, the results indicate that a negative and significant relationship exists between leverage and the profitability of small firms in Kenya.[3] Our baseline results are therefore robust to small-size firms. All the control variables also appear to have a significant influence on small-firm profitability. In particular, it is important to emphasize the seemingly important role played by growth opportunities presented by the economy on the performance of small firms. One could conjecture that, in a competitive environment, small firms rely heavily on the expansion in demand for products and services created by greater economic activity to improve their revenue stream, through more aggressive product promotion. That is, smaller firms strive to take advantage of economic changes *as they unfold*.

This can be contrasted with larger firms, for which an expansion in economic activity is associated with a statistically significant (at 10%) *decline* in return on equity and no significant (again negative) influence on the return on assets (Table 7). What explains these surprise negative contemporaneous relationships? Perhaps, because of the size, and presumption of superior market power, larger firms are more

[3] As before, these results are true when leverage is measured as the ratios of long-term debt to equity and total debt to equity. When leverage is measured as total debt to total assets, we obtain a positive but insignificant relationship, both for return on equity and return on assets.

complacent and do not engage in aggressive promotion of their products to take advantage of changes in the economic environment *as they unfold*. This relationship was also observed for the whole sample in the case of return on equity (Table 3) – we attribute that observation to the influence of large-size firms (which are the majority) on the entire sample.

Table 6
Fixed effects regression output for small-size firms

DV	Return on equity			Return on assets			Tobin's Q		
	Eq. 1	Eq. 2	Eq. 3	Eq. 1	Eq. 2	Eq. 3	Eq. 1	Eq. 2	Eq. 3
Constant	0.09* (1.77)	0.14*** (2.78)	0.10** (2.08)	0.08** (2.11)	0.13*** (3.83)	0.10*** (2.70)	0.23 (0.35)	0.61 (0.83)	0.48 (0.86)
TD to assets	0.002 (0.03)			0.03 (0.51)			1.10 (1.07)		
TD to equity		-0.08*** (-3.24)			-0.06*** (-3.42)			-0.13 (0.30)	
LTD to equity			-0.01** (-4.04)			-0.01*** (-4.71)			0.03 (1.00)
Asset tang.	-0.11 (-1.50)	-0.11** (-2.11)	-0.11 (-1.47)	-0.09* (-1.74)	-0.89*** (-2.69)	-0.08** (-1.99)	-0.81 (-1.37)	-0.41 (-0.94)	-0.41 (-0.96)
Firm size	-0.29*** (-4.43)	-0.31*** (-4.01)	-0.28*** (-4.07)	0.45*** (7.09)	0.43 (1.54)	0.45*** (6.70)	-8.33*** (-7.58)	-8.31*** (-6.43)	-8.29*** (-6.78)
Sales Growth	0.34*** (5.50)	0.36*** (5.63)	0.33*** (5.10)	-0.40*** (-7.31)	-0.39 (-1.39)	-0.41*** (-7.04)	3.43*** (10.13)	8.62*** (8.67)	8.63*** (9.15)
Growth opp.	0.41** (2.21)	0.59*** (3.65)	0.40** (2.30)	0.47*** (3.05)	0.64*** (4.15)	0.47*** (3.19)	3.43 (1.40)	4.29 (1.66)	4.03* (1.71)
Adj. R^2	0.52	0.56	0.54	0.69	0.72	0.71	0.62	0.61	0.61
D-W test	1.24	1.34	1.28	1.09	1.17	1.12	1.15	1.13	1.13
F-statistic	6.68 [0.00]	7.58 [0.00]	7.01 [0.00]	12.55 [0.00]	14.36 [0.00]	13.40 [0.00]	9.44 [0.00]	9.14 [0.00]	9.16 [0.00]
Restd. F-test	9.70 [0.00]	9.45 [0.00]	9.10 [0.00]	19.43 [0.00]	19.74 [0.00]	19.35 [0.00]	14.21 [0.00]	12.04 [0.00]	13.85 [0.00]

The table reports coefficient estimates of fixed effects regression for small-size firms, with t-statistics in braces. Standard errors are robust to heteroskedasticity and autocorrelation. Diagnostic statistics are at the bottom of the table with p-values, where necessary, in square braces. DV is dependent variable; TD is total debt; LTD is long-term debt; "tang" is tangibility; D-W is Durbin-Watson and "Restd" is restricted. The Durbin-Watson statistic is evaluated against critical values tabulated in Bhargava et al. (1982); the relevant critical values at 5% are: $d_{PL} =$ 1.8338 and d_{PU}= 1.8769. *, **, and *** indicate statistical significance at 10%, 5% and 1% respectively.

Tobin's Q regressions show that, even for small firms, capital structure does not affect firm value. The results also show that economic growth has no effect on the value of small firms. Since economic growth positively affects firm profitability, does this result imply that profitability has no impact on firm value? On the contrary, we believe that the effect of economic expansion (and by extension, profitability) would be reflected on firm value (Tobin's Q) with a lag. Alternatively, investors do not build, into their

valuation of firms, contemporaneous developments in the economy, because such information is only revealed to them with a lag. Without a doubt, this is an issue for future investigation. As expected, sales growth positively and significantly affects value of small size firms. Contrarily, size negatively and significantly affects firm value for small size firms – again, this is not unexpected because smaller firms are likely to attract analyst/investor scepticism because of their perceived inability, everything constant, to sustainably generate adequate cash flows in the future.

Table 7
Fixed effects regression output for large-size firms

DV	Return on equity			Return on assets			Tobin's Q		
	Eq. 1	Eq. 2	Eq. 3	Eq. 1	Eq. 2	Eq. 3	Eq. 1	Eq. 2	Eq. 3
Constant	-0.78*** (-2.85)	-0.88*** (-3.50)	-1.07*** (3.69)	-0.61** (-2.00)	-0.73*** (3.42)	-0.86*** (-3.43)	18.26 (1.19)	18.07 (1.18)	20.31 (1.17)
TD to assets	-0.05 (-0.53)			-0.06 (-0.86)			4.12 (0.93)		
TD to equity		-0.02 (-1.25)			-0.02 (-1.56)			-0.45 (-1.13)	
LTD to equity			-0.06** (-2.11)			-0.05** (-2.55)			0.03 (0.13)
Asset tang.	-0.17** (-2.18)	-0.14* (-1.96)	-0.06 (-0.96)	-0.21*** (-3.90)	-0.17** (-2.55)	-0.12** (-2.30)	2.62 (0.83)	2.31 (0.86)	1.72 (0.74)
Firm size	-0.05*** (-3.81)	0.06*** (4.90)	-0.06*** (-4.70)	0.05*** (2.76)	0.05*** (4.89)	0.05*** (4.15)	-0.81 (-0.93)	-0.64 (-0.90)	-0.77 (-0.94)
Sales Growth	0.04 (0.84)	0.04 (0.74)	0.08* (1.67)	0.04 (0.90)	0.04 (0.69)	0.07 (1.41)	-2.51 (-1.28)	-2.60 (-1.28)	-2.52 (-1.23)
Growth opp.	-0.86* (-1.86)	-0.86* (-1.85)	-0.75* (1.98)	0.26 (0.80)	0.26 (0.58)	-0.17 (-0.38)	-33.39 (-1.02)	-32.54 (-1.01)	-32.72 (-1.01)
Adj. R^2	0.37	0.38	0.47	0.34	0.35	0.42	0.02	0.02	0.01
D-W test	1.05	1.02	1.18	1.34	1.32	1.39	1.07	1.09	1.08
F-statistic	4.36 [0.00]	4.47 [0.00]	6.05 [0.00]	3.91 [0.00]	4.05 [0.00]	5.05 [0.00]	1.13 [0.31]	1.10 [0.35]	1.08 [0.37]
Restd. F-test	2.82 [0.00]	3.04 [0.00]	3.67 [0.00]	2.40 [0.00]	2.67 [0.00]	2.95 [0.00]	1.35 [0.18]	1.48 [0.12]	1.47 [0.12]

The table reports coefficient estimates of fixed effects regression for large-size firms, with t-statistics in braces. Standard errors are robust to heteroskedasticity and autocorrelation. Diagnostic statistics are at the bottom of the table with p-values, where necessary, in square braces. DV is dependent variable; TD is total debt; LTD is long-term debt; "tang" is tangibility; D-W is Durbin-Watson and "Restd" is restricted. The Durbin-Watson statistic is evaluated against critical values tabulated in Bhargava et al. (1982); the relevant critical values at 5% are: $d_{PL} = 1.8338$ and $d_{PU} = 1.8769$. *, **, and *** indicate statistical significance at 10%, 5% and 1% respectively.

Table 7 provides fixed effects regression outputs for large-size firms. The results show that capital structure is only important to financial performance when leverage is measured as the ratio of long-term debts to equity. This ratio has consistently recorded negative and statistically significant influence on

firms' profitability, suggesting that perhaps the fixed financing charges it imposes is one of the most important items adversely affecting firms' bottom lines, an indication of high cost of long-term debt financing in Kenya. This is an important observation that might well explain the preference for equity financing among listed firms in the country. There is a predominantly negative relationship between leverage metrics and financial performance even for the sample of large-size firms.

Among the control variables, firm size significantly and negatively affects the return on equity (shareholders suffer when the firm excessively diversifies) while positively affecting the return on assets (diversification is apparently good for stakeholders in general). Asset tangibility, significantly and negatively affect the return on equity and return on assets of large firms while sales growth appears not to have an important influence on the profitability of large firms in Kenya. As is the case with the overall sample, neither leverage nor any of the control variables affects the value (Tobin's Q) of large-size firms.

5.0 CONCLUSIONS

The capital structure debate is one that is unlikely to be settled soon. The importance of setting the right capital structure policy is such that it affects firms' financial performance (as our study shows) and therefore plays a key role in determining their competitiveness and ability to operate as going concerns. Even in Africa, where just a few studies have been conducted, consensus has been hard to build on the right, or optimum, level of debt to employ to maximize value for firms' owners.

Our study contributes to this debate in a number of ways. First, we document evidence suggesting that leverage significantly, and negatively, affects the profitability of listed firms in Kenya. Second, using Tobin's Q, we demonstrate that leverage has no effect on firm value. Our results are robust to alternative panel specifications and hold for both small size and large-size firms. Third, we control for the effects of other variables that affect firm performance. We find very interesting results from the control variables: asset tangibility, sales growth and firm size are important determinants of profitability. Surprisingly, asset tangibility consistently has a negative relationship with profitability.

For small firms, our results indicate that sales growth and firm size are important factors driving firm value. Curiously, these variables do not appear to drive the value of large firms. Finally, we also observe that although the usage of debt financing has grown in Kenya over the decade 2002 – 2011, many of the firms listed on the country's bourse have tended to shy away from the corporate bond markets, whose issues have been dwarfed by equity issues. It is therefore possible that expensive forms of debt, with more adverse effects on revenues, have more often been used to finance Kenyan firms' business activities.

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