THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND PROFITABILITY OF FIRMS LISTED AT THE NAIROBI SECURITITES EXCHANGE

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Abstract

Purpose: The purpose of this study was to examine the relationship between capital structure and profitability of firms listed at the Nairobi Securities Exchange.

Methodology: The researchers used longitudinal research design, by making use of secondary quantitative data derived from the firms' annual audited reports and information from Nairobi Securities Exchange handbooks.

Findings: It was found that the firm's profitability (measured by return on capital employed) was significant and positively correlated with internal equity (r=0.601, p<.01).

Implications: The researchers concluded that non-financial firms listed in NSE are more reliant on equity financing than debt financing.

Value: Kenyan firms should use more internal equity to ascertain profitability as it does not involve costs of acquisition compared with external equity and debt finance.

Introduction

Two major sources are available for firms willing to raise funds for their activities. These sources are internal and external sources (Siro, 2013). The internal source refers to the funds generated from within an enterprise which are mostly retained earnings. It results from the success enterprises earn from their activities. Firms may at the same time look outside to source for their needed funds to enhance their activities.

Although most of the existing 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. Abdul (2012) conducted a study to determine the relationship between capital structure decisions and the performance of firms in

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Pakistan. The study concluded that financial leverage has a significant negative relationship with firm performance as measured by return on assets (ROA), return on equity (ROE), gross profit margin (GPM) and Tobin's Q (method of estimating the fair value of the firm). The relationship between financial leverage and firm performance as measured by the return on equity (ROE) was negative but not statistically significant.

Saeedi and Mahmoodi (2011) investigated the link between capital structure and performance of companies listed in Tehran Stock Exchange. In the study, they found measure of market to have a positive impact on capital structure. However, whereas ROA had a positive impact on capital structure, there was no noteworthy correlation between ROE and capital structure. Kyereboah-Coleman (2007) study revealed that high levels of debt of micro-finance firms in sub-Saharan Africa to be positively correlated with performance. Distinctively, studies done in different countries on capital structure in Africa seem to constantly report a negative correlation between capital structure and firm value Abor (2007) for South Africa and Ghana, Amidu (2007) for Ghana and Onaolapo and Kajola (2012) for Nigeria. However, Ebaid (2009) found a weak-to-no-effect of capital structure on firm performance in Egypt.

In Kenya, Kodongo, Mokoaleli-Mokoteli and Maina (2014) investigated the relationship between leverage and the financial performance of listed firms in Kenya. The results suggested that leverage significantly and negatively affects the profitability of listed firms in Kenya. They further documented that leverage has no effect on firm value. The results were robust to alternative panel specifications and held for both small size and large-size firms.

To create an enabling environment for conducting business in the country, the private sector and the government have invested heavily (Mwangi *et al.*, 2014). As a result, some firms have performed quite well for instance; banking and telecommunication sectors. Conversely, many firms are experiencing downward performance (Mumias Sugar Co. and Kenya Airways) while others have even been delisted from the NSE within the last seven years (CMC Holdings, Access Kenya and Rea Vipingo). Significant efforts to jump-start the struggling and liquidated firms have concentrated on financial restructuring (Mwangi *et al.*, 2014). Nevertheless, CEOs and professionals still do not have enough guidance for achieving the best financing decisions (Kibet, Kibet, Tenai & Mutwol, 2011). Additionally, many of the challenges faced by firms put under statutory management were mostly characterized by inadequate funds (Chebii, Kipchumba & Wasike, 2011). This situation has led to loss of investors' wealth and confidence in the stock market (Mwangi *et al.*, 2014).It is therefore against this background that this study was carried out and unlike most studies done in Kenya

which were either sector specific or used only one independent variable (debt), this study sought to include all sectors of the NSE with the exception of banking and insurance sector whose capital structures are regulated.

Research Objective

The researchers examined the relationship between capital structure and profitability of firms listed at the Nairobi Securities Exchange.

Methodology

The study was carried out using a longitudinal research design, employing secondary quantitative data. Longitudinal research design is where a researcher conducts several observations of the same subjects over a period, sometimes lasting several years. According to Cooper and Schindler (2011), longitudinal study in one that is done many times over a large period of time. The study relied purely on accounting data of firms listed at Nairobi Securities Exchange for the period of 2009 to 2013. The required data on the variables was extracted from audited annual reports of the firms under consideration.

The study target population comprised of 37 non-financial firms listed at the Nairobi Securities Exchange for the period between January 2009 and December 2013, a period of 5 years (attached as appendix one and two). The 11 banking and 6 insurance firms were excluded from the target population because their capital structure is regulated. Due to the relatively smaller size of the population, the study was a census after eliminating firms listed during the study period and the suspended counters (14 firms). The five-year period was considered convenient because of the economic conditions prevailing within it.

The study made use of secondary data. Secondary data is the data that is already available having been collected in the past by other parties other than the researcher for the purpose of their current study. For the purpose of this study, secondary data was the only applicable option since the study sought to examine the relationship between capital structure and profitability of firms which could only be possible by studying past data. This could only be possible by analyzing the trends and the relationship between the variables which could be established by studying secondary data (Thuranira, 2014).

Since the data to be collected was quantitative in nature and sought to determine the degree of association and cause-effect relationship between the variables; Pearson's product moment correlation, descriptive and inferential statistics were used in analyzing the data. . Data was run through the Statistical Package for Social Sciences (SPSS) version 24.

Descriptive statistics were used to test for normality of the data collected. Measures of central tendency and dispersion like mean and standard deviation were computed to see if it concurred with the research objectives. Inferential statistics were used to draw implications from the data for instance; the objectives were achieved by calculating the Pearson product moment correlation coefficient of the variables. This would establish whether the findings indicated a strong or weak, positive or negative correlation.

Correlation coefficient was computed from selected capital structure and profitability ratios derived from five-year financial statements of the selected quoted companies. The coefficient gave an insight into the nature and extent of the relationships. Pearson's product moment correlation coefficient or "Pearson's correlation" is obtained by dividing the covariance of the two variables by the product of their standard deviations. The Pearson's correlation coefficient "r" is defined as:

r = Karl Pearson's correlation formula;

$$\frac{N \Sigma xy - (\Sigma x)(\Sigma y)}{\sqrt{(N \Sigma x^2 - (\Sigma x)^2)(N \Sigma y^2 - (\Sigma y)^2)}}$$

(Bagchi and Khamrui, 2012)

Hypotheses testing (t-test) was also done to test for the significance of the relationship between the various independent variables and the dependent variable in line with the hypotheses at 5% level of significance. The significance level also referred to as the alpha level denoted by (α) is the probability of making the wrong decision when the null hypothesis is true. The alpha level of .05 is used to balance between making a type I error and a type II error. A type I error is supporting the alternative hypothesis when the null hypothesis is true whereas a type II error is not supporting the alternative hypothesis when the alternative hypothesis is in fact true.

Analytical Model

A multiple regression model as presented below was tested to identify the significance, direction and strength of the hypothesized relationships. The model is as:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mathcal{E}$$

Where: Y: Profitability–Return on Capital Employed

X_1: Short-Term Debt to Capital Ratio

X_2: Long-Term Debt to Capital Ratio

X_3: Internal Equity to Capital Ratio

X_4: External Equity to Capital Ratio

X_5: Firm Size

X_6: Sales growth

X_7: Asset Tangibility

Ɛ: Error term

Results and Discussions

Descriptive statistics showed different type of results for 37 companies from non-financial sectors of NSE from 2009 to 2013. First, the results revealed the mean value of data and standard deviation of all variables of the study. It also presented the minimum value and maximum value of dependent variable as well as independent variables. The maximum number of observations or cases was 185. However, this number was reduced after cleaning the data for missing values and removing outliers in every variable that would have affected the intended results. Diagnostic tests of regression models such as residual normality, heteroskedasticity, auto-correlation and multicollinearity were done. Outliers are abnormal observations in the data. The resulting observations were one hundred and eight.

One of the assumptions of Pearson's correlation coefficient is that it assumes normal distribution of data that is, an asymptotic normal distribution. A stem and leaf plot helps identify extreme cases in a data set. Such extreme cases are removed to maintain consistency in the results that give misleading results in the regression model.

Stem and Leaf Plots

ROCE Ratio Stem and Leaf Plot

Frequency	Stem & Leaf
2.00	Extremes (=<-17)
2.00	-0.55
6.00	-0.011124
38.00	0.00000000000000011111233333334444444444
38.00	0.5555566666666666777777778888888888999
25.00	1.00000011111122223333333344

13.00	1.5556666677779
9.00	2.011223344
10.00	2.5566667779
8.00	3.00123333
7.00	Extremes (>=39)

Stem width: 10.00

Each leaf: 1 case(s)

Figure 1: ROCE Stem and Leaf Plot

The stem and leaf plot in the figure above revealed that the variable ROCE ratio had 2 extreme cases equal or less than -17 and seven extreme cases greater than or equal to 39. These cases were removed from the analysis.

Firm Size Stem and Leaf Plot

The stem and leaf plot in the figure below revealed one extreme case that was greater than or equal to 46.2 which thereby was removed from the analysis.

Firm Size Stem and Leaf Plot

Frequency	**Stem & Leaf**
2.00	19.03
2.00	19.58
5.00	20.01234
14.00	20.56777788899999
13.00	21.0000011122344
17.00	21.55557777888899999
19.00	22.0000000000333444444
16.00	22.5566677888888899
16.00	23.0011112222233334
6.00	23.567888
16.00	24.0011111222222334

6.00	24.567999
7.00	25.0000344
7.00	25.5567888
1.00	26.4
1.00	26.9
1.00	Extremes (>=46.2)

Stem width: 1.00

Each leaf: 1 case(s)

Figure 2: Firm Size Stem and Leaf Plot

Asset Tangibility Stem and Leaf Plot

The stem and leaf plot for asset tangibility as shown in the figure below revealed no extreme cases. Therefore, the variables were retained.

Asset tangibility Stem and Leaf Plot

Frequency	Stem & Leaf
1.00	0.1
2.00	0.89
4.00	1.0124
2.00	1.89
6.00	2.011344
11.00	2.57777888999
11.00	3.00011222334
3.00	3.678
2.00	4.02
4.00	4.7789
9.00	5.112334444
7.00	5.6677889

21.00	6.000111122223333333444
13.00	6.5556778888899
15.00	7.000001112344444
12.00	7.555556668889
10.00	8.0001112234
11.00	8.55666677788
1.00	9.3
3.00	9.567

Stem width: .10

Each leaf: 1 case(s)

Figure 3: Asset Tangibility Stem and Leaf Plot

Sales Growth Stem and Leaf Plot

The sales growth stem and leaf plot below revealed three extreme cases less than or equal to 0.44 and five extreme cases greater than or equal to 0.83. Therefore all the eight cases were removed from the analysis.

Sales Growth Stem and Leaf Plot

Frequency	**Stem & Leaf**
3.00	Extremes (=<-.44)
3.00	-3.234
4.00	-2.6889
14.00	-1.11333445555777
18.00	-0.000011111123346677
31.00	0.0112224445555566677788889999999
28.00	1.0001112222222333455566677789
20.00	2.00011223455555567789
9.00	3.000023779
6.00	4.245678

6.00   5.012378

1.00   6.0

5.00   Extremes (>=.83)

Stem width: .10

Each leaf: 1 case(s)

Figure 4: Sales Growth Step and Leaf Plot

External Equity Stem and Leaf Plot

To assess extreme cases of external equity to capital ratio, the stem and leaf plot below revealed twelve extreme cases of greater than or equal to 0.54. These cases were therefore removed from the analysis.

EE to Capital Ratio Stem and Leaf Plot

Frequency	Stem & Leaf
30.00	0.001111111222222233333333334444
35.00	0.55555566666666677777888889999999999
18.00	1.000011111222333344
13.00	1.5666667778899
10.00	2.0011112244
10.00	2.5677778999
4.00	3.0144
3.00	3.556
2.00	4.04
3.00	4.689
12.00	Extremes (>=.54)

Stem width: .10

Each leaf: 1 case(s)

Figure 5: External Equity Stem and Leaf Plot

Internal Equity Stem and Leaf Plot

The variable internal equity to capital ratio stem and leaf plot as shown below revealed three extreme cases of greater than or equal to 1.29. These cases were removed from the analysis.

IE to Capital Ratio Stem and Leaf Plot

Frequency	Stem & Leaf
5.00	0.03334
5.00	0.56667
2.00	1.12
12.00	1.566666778999
11.00	2.00011113344
14.00	2.55566677777899
9.00	3.001233344
20.00	3.55666666666688899999
5.00	4.01123
6.00	4.566689
3.00	5.333
11.00	5.55667777899
8.00	6.00223444
4.00	6.5577
4.00	7.0344
2.00	7.55
4.00	8.0024
3.00	Extremes (>=1.29)

Stem width: .10

Each leaf: 1 case(s)

Figure 6: Internal Equity Stem and Leaf Plot

Long-Term Debt Stem and Leaf Plot

The analysis of long-term debt to capital ratio variable as shown in the stem and leaf plot below revealed four extreme cases greater than or equal to 0.69 which were removed from the analysis.

LTD to Capital Ratio Stem and Leaf Plot

Frequency	Stem & Leaf
22.00	0.0000111122222333333444
15.00	0.5566677777778899
18.00	1.000000112222223344
20.00	1.5556666777777777778899
16.00	2.0000111222333444
8.00	2.56789999
2.00	3.04
8.00	3.66677889
4.00	4.1244
7.00	4.7889999
1.00	5.0
4.00	Extremes (>=.69)

Stem width: .10

Each leaf: 1 case(s)

Figure 7: Long-Term Debt Stem and Leaf Plot

Short-Term Debt Stem and Leaf Plot

The results of short-term debt to capital ratio cases as shown in the figure below revealed one extreme case greater than or equal to 0.78 which was thereby removed from the analysis.

STD to Capital Ratio Stem and Leaf Plot

Frequency	Stem & Leaf
12.00	0.001222333444
6.00	0.567799

10.00	1.0112222344
14.00	1.55555566777899
14.00	2.00112222223344
14.00	2.55667777888889
13.00	3.0000011122344
9.00	3.567788899
8.00	4.01111334
3.00	4.589
9.00	5.001222224
3.00	5.558
4.00	6.0124
1.00	6.5
1.00	Extremes (>=.78)

Stem width: .10

Each leaf: 1 case(s)

Figure 8: Short-Term Debt Stem and Leaf Plot

After removing the extreme cases from the data table 1 below shows that short-term debt (STD) had a positive skew of 0.48 (slightly skewed), long-term debt (LTD) was positively skewed at 0.67, IE (skew=0.31), EE (skew=1.23), Sales Growth (skew=0.078), asset tangibility (skew=-0.62), firm size (skew=0.30) and ROCE (0.63).

The mean value of dependent variable Return on Capital Employed (ROCE) or profitability was 11.09% and standard deviation 8.70% both side of mean so the minimum profitability value was -5.53 and maximum profitability value was 33.13. This could suggest good returns during the duration under review despite the effects encountered at the time of post-election crises when there were unfavourable economic indicators. On other hand, it suggests a bad picture for Kenyan companies when comparing with Abor (2005) study on Ghana companies; return on equity (ROE) average which was 37%. Short-Term debt had a mean of 28.45% whereas Long-Term debt had a mean of 19.45%. This meant that listed companies in the

Nairobi Securities Exchange used more short-term debts to run their operations than long-term debt.

The internal equity (IE) to capital ratio averaged 38.23% while external equity (EE) to capital ratio was 13.91 %. This suggested that the NSE companies under review were more dependent on internal equity (IE) than external equity (EE). This was consistent with Brealey, Myers & Marcus (2009) observation that in applying the pecking order theory, management prefers internally generated funds to externally generated ones. This was not surprising since it was expected that lenders were unwilling to provide funding due to the volatility of the economy at the time. In addition, the coefficients of variation of these two sources of capital derived by dividing the standard deviation by its mean revealed (IE: coefficient of variation=49.71%, EE: coefficient of variation=83%). This meant that variability from the average scores was more for firms' utilization of external equity than for internal equity. This therefore suggested that the firms were more consistent in choosing internal equity than external equity.

Sales growth recorded a minimum negative growth of -0.34 (-34%) and a maximum growth of 0.60 (60%). The average sales growth was 11.53% associated with a standard deviation of 18.86%. Asset Tangibility is the extent to which corporations retain their asset investment in fixed form (Cuong, 2014). The findings revealed an average of 0.5659 (56.59%) with a standard deviation from the mean of 0.2235 (22.35%). Firm size represents the size of a firm normally in relation to investment in assets, sales or employment capacity (Babalola, 2013). It was expressed as the natural logarithm of total assets. The average firm size measured by the natural logarithm of sales was 22.69 million shillings with a standard deviation of 1.56 million shillings.

Table 1: Descriptive Statistics

Descriptive Statistics									
	N	Min.	Max.	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Asset tangibility	108	.01	.88	.5659	.22350	-.617	.233	-.820	.461

EE to Capital Ratio	108	.00	.50	.1391	.11515	1.233	.233	1.049	.461
Firm Size	108	19.38	25.86	22.6896	1.56015	.303	.233	-.602	.461
IE to Capital Ratio	108	.01	.83	.3823	.19007	.309	.233	-.632	.461
LTD to Capital Ratio	108	.00	.51	.1945	.14209	.669	.233	-.494	.461
ROCE Ratio	108	-5.53	33.13	11.0929	8.70415	.628	.233	-.089	.461
Sales Growth	108	-.34	.60	.1153	.18863	.078	.233	.273	.461
STD to Capital Ratio	108	.02	.65	.2845	.16285	.476	.233	-.634	.461
Valid N (listwise)	108								

Variables Normality Test after Removing Extreme Cases

Figures 9 to 16 show the histograms for all the variables after eliminating all the extreme cases.
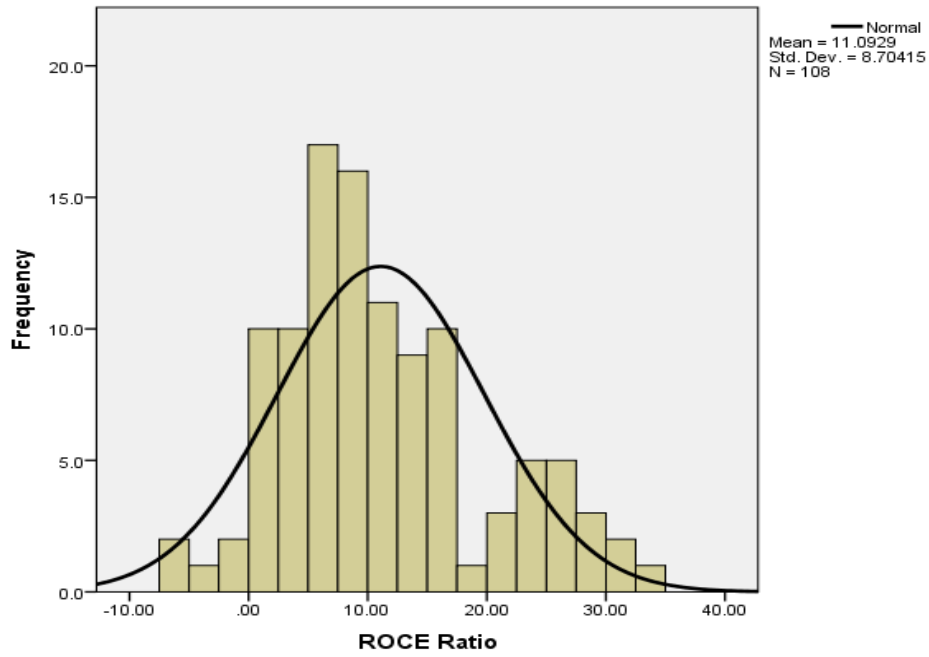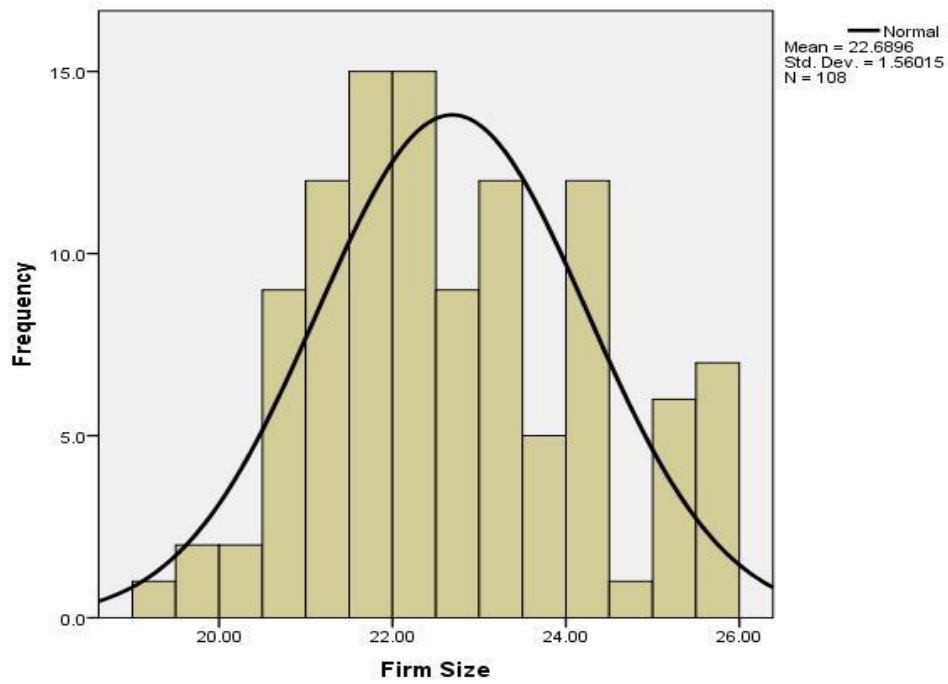
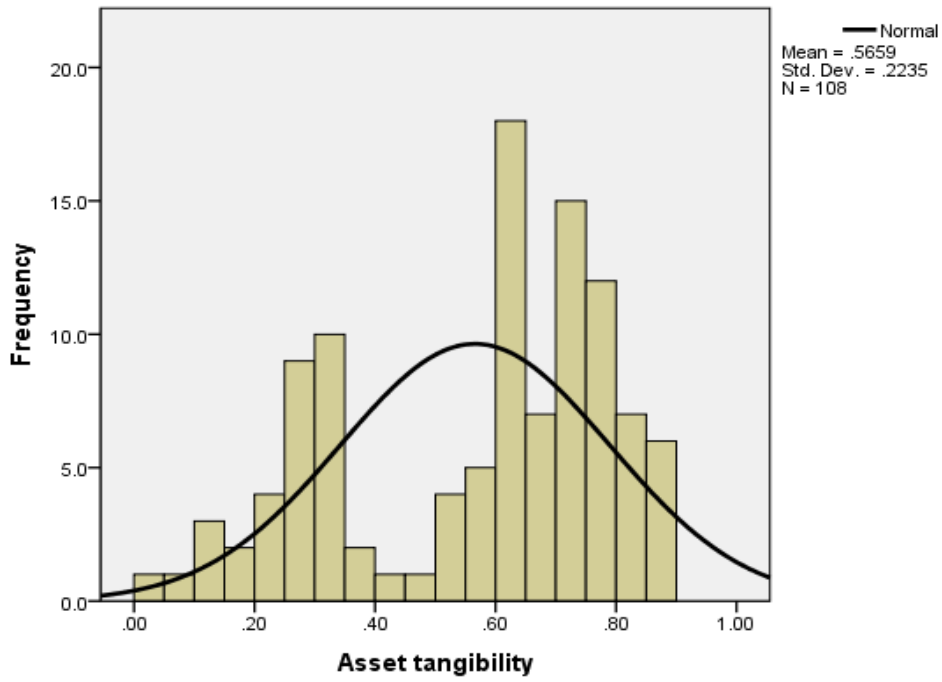**Figure 9: ROCE Histogram**

Figure 10: Firm Size Histogram

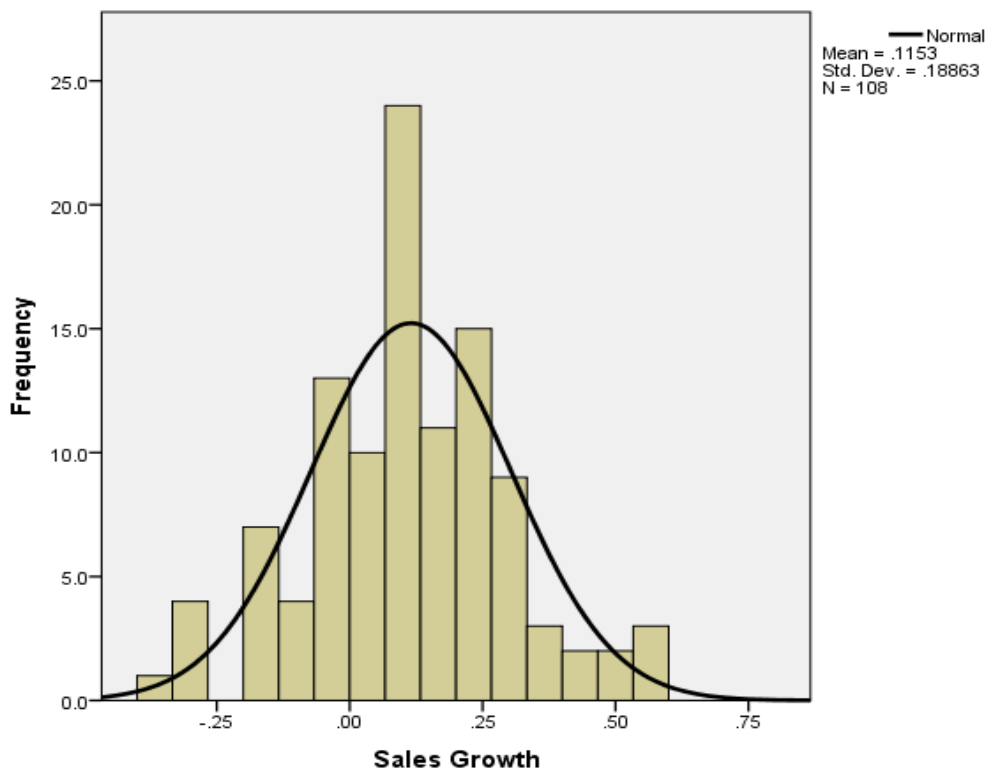**Figure 11: Asset Tangibility Histogram**

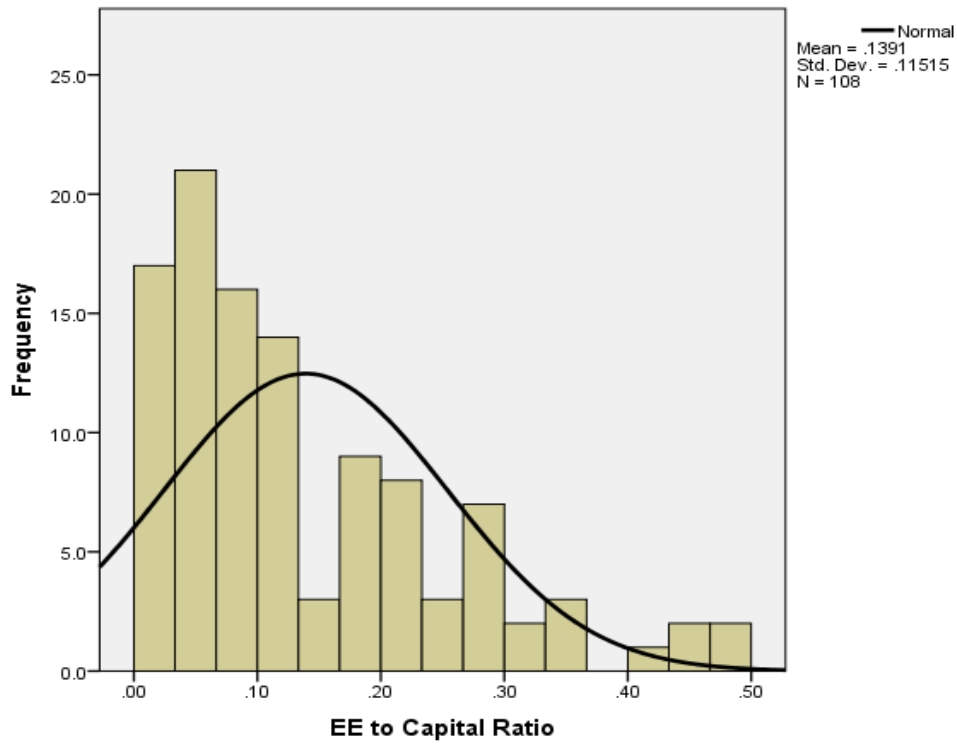**Figure 12: Sales Growth Histogram**

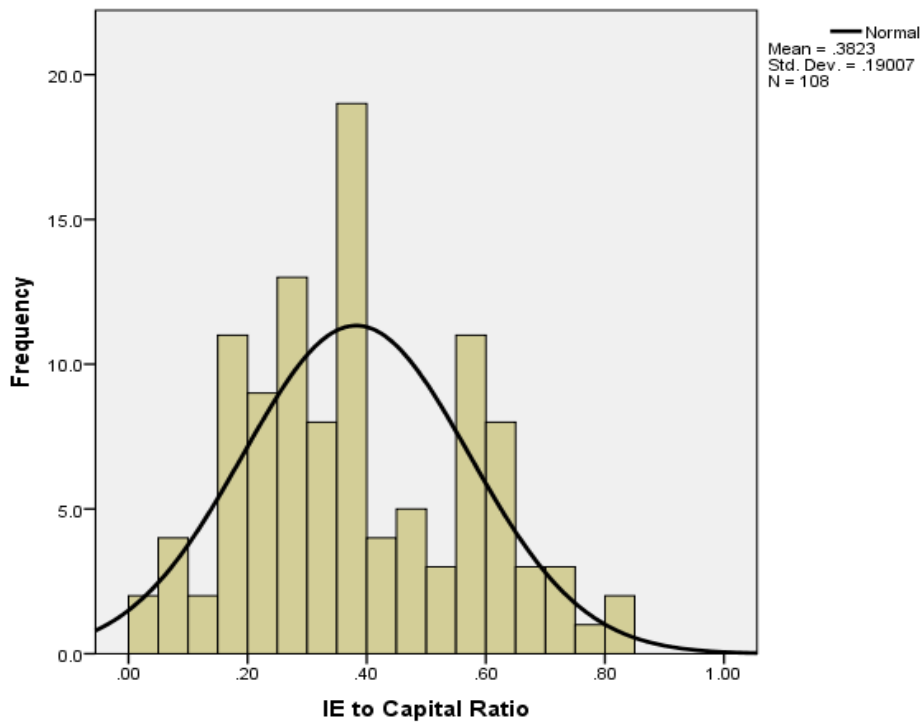**Figure 13: External Equity Histogram**
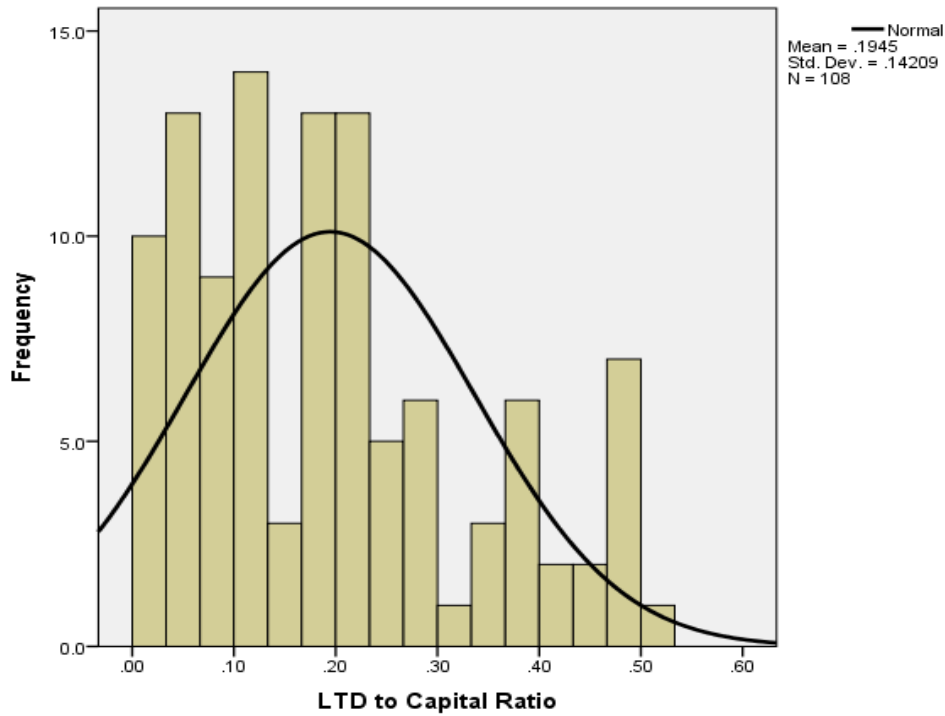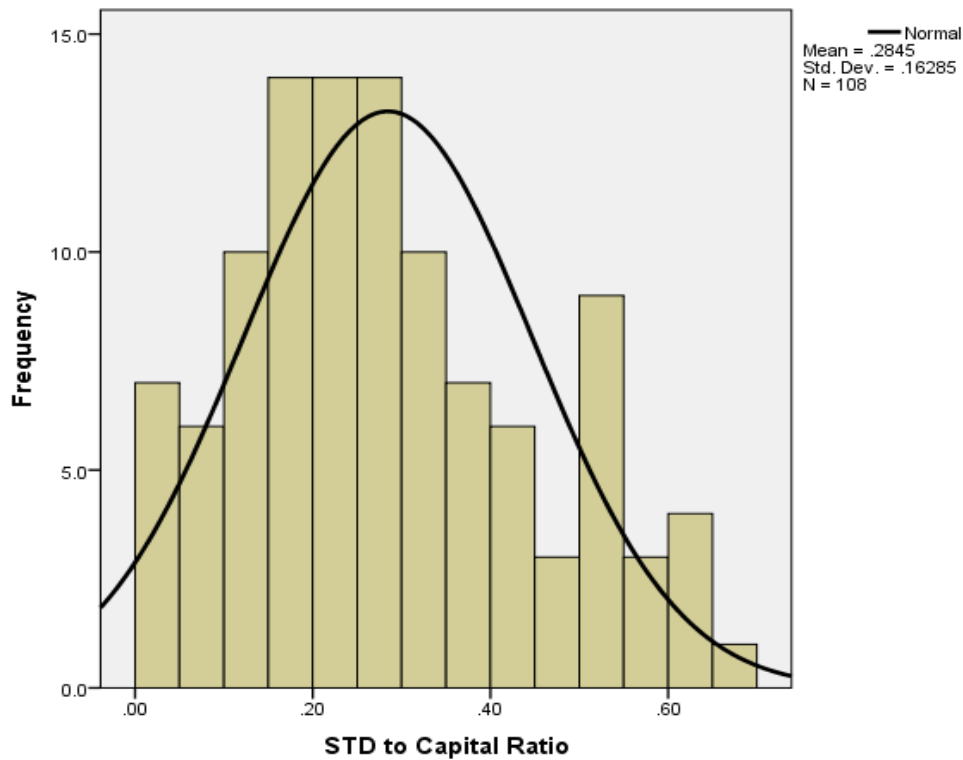

Figure 14: Internal Equity Histogram

Figure 15: Long-Term Debt Histogram

Figure 16: Short-Term Debt Histogram

The histograms above revealed almost normal distribution of the observations. This is illustrated by the coefficient of skewedness and kurtosis values in table 1 above that have

reduced to near normal distribution levels of 0 and 2 respectively. The data was considered good for further analysis in the model.

Multi-collinearity is correlations or multi-correlations of sufficient magnitude to have the potential of adversely affect regression estimates. In particular, it is based on the standard beta weights, standard errors and their corresponding statistical significance levels associated with them. When variables are highly correlated, they both express the same information. Statistically, multi-collinearity is not needed because if they exist, then independent variables are redundant and do not add any predictive value over each other. In general, independent variables having collinearity at 0.70 or greater would not be included in regression analysis (Bitok, Kibet & Mutwol, 2011).

A correlation coefficient matrix was run to determine the relationship between the explanatory, intervening and the dependent variable as shown in the table below. This was to determine whether there was any significant correlation between the dependent variable and the explanatory variables. A hypothesis test will reveal whether the difference is attributed to ordinary random factors or not. Statistical significance confirms whether the difference is due to chance factors or not and if not due to chance, then it is said to be statistically significant. In other words, whether the correlation coefficient is statistically different from zero that is, whether we would expect to see similar results in the population. Therefore, since the data used is sampled and randomized, it cannot be inferred to be 100% significant. Accordingly, this paper used a 5% significance level.

Table 2 Pearson's Correlation Coefficient Matrix of the Relationship between the Explanatory, Intervening, and the Dependent Variable

Correlations								
ROCE Ratio								
	Asset tangibility Ratio	EE to Capital Ratio	Firm Size	IE to Capital Ratio	LTD to Capital Ratio	ROCE Ratio	Sales Growth Ratio	STD to Capital Ratio
Pearson Correlation	-.098	-.171	-.063	.601[**]	-.397[**]	1	.250[**]	-.256[**]
Sig. (2-tailed)	.313	.076	.517	.000	.000		.009	.008

N	108	108	108	108	108	108	108	108

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 above provides the Pearson's correlation Coefficient for the variables that would be used in the regression model. Pearson's correlation analysis was used for data to find the relationship between capital structure (measured in STD, LTD, IE, EE, sales growth, asset tangibility and firm size) and profitability (measured by ROCE).

Relationship between Short-Term Debt and Profitability

In terms of short-term debt, the results revealed a negative correlation and was statistically significant ($r=-.256$, $p<.01$). These results were consistent with the study by Hussain (2015), in the study of effect of capital structure on profitability of firms listed at KSE 100 Index Kazakhstan who found that short-term debt has significant relationship with ROA. However, this study was limited to the sample size (8 firms) and analysis techniques adopted. Githire and Muturi (2015) found that short-term debt has a negative and significant effect on performance. In contrast, Addae *et al.* (2013) in their study on the effect of capital structure on profitability of listed firms in Ghana during the five year period from 2005 to 2009,using regression analysis to predict the relationship between profitability (ROE) and short-term debt (one of the predictor variables used in the study), showed that there is a statistically significant positive relationship between profitability and short-term debt of Ghanaian listed firms similar to the findings of Abor (2005). Abor used a panel data analysis methodology as the main analytical tool to capture data for capital structure and profitability. The methodology involved pooling observations on a cross-section of units over several periods. The results of dependency on debt gave them an indication of how the trade-off, pecking order and the agency theories applied to Ghanaian listed firms.

Relationship between Long-Term Debt and Profitability

Long-term debt was found to be significant and negatively correlated with profitability ($r=-.397$, $p<.01$). The results of the current study were inconsistent with that of Ebaid (2009) on the relationship between debt-equity combinations with company's performance in Egypt. Using multiple regression technique to establish the correlation between debt policy and performance, the study found no noteworthy correlation between long-term debt and return on assets. He suggested that long-term debts are preferred source of debt finance by well-

established firms normally due to their assets base and security is a requirement for most financial institutions.

In addition, Githire and Muturi (2015) in their study of effect of capital structure on financial performance of firms in Kenya listed at the NSE found that long-term debt financing has a positive and significant effect on firm financial performance. They noted the positive influence on firm performance as evidence of competitive advantage in comparison to large firms and the establishment of credit management initiatives specifically targeting small companies in a bid to access long-term finance. They used multiple regression analysis method to analyse and test the hypotheses. They recommended that long-term debt finance improves firm financial performance and that it is essential for financial institutions to extend a favourable credit policy that will enable small companies' access long-term finance.

Relationship between Internal Equity and Profitability

It was found that the firm's profitability (measured by return on capital employed) was significant and positively correlated with internal equity (r=0.601, p<.01). These results were similar to the study by Muigai (2016) who sought to investigate the effect of capital structure on financial distress of non-financial companies listed in NSE. Employing secondary data extracted from audited financial statements and annual reports of individual companies for the ten-year period covering 2004-2013 of all the 41 non-financial companies listed in NSE as at December 2013, he concluded that internal equity has a positive and significant effect on financial soundness of non-financial firms. He utilized descriptive statistics and panel regression analysis techniques to analyse the data. F-test was used to determine the significance of the overall model; while significance of individual variables was determined by t-test. This was also in line with the study done by Angahar and Ivarave (2016).

Relationship between External Equity and Profitability

External equity was negatively correlated with return on capital employed and insignificant (r =-.171, p=0.076). On the contrary, Angahar and Ivarave (2016) found a positive and significant influence of long-term debt and equity on profit of cement manufacturing companies in Nigeria. They examined the effect of capital structure on corporate profit; evidence from cement manufacturing firms in Nigeria putting their emphasis on quoted cement manufacturing firms in Nigeria from 2004-2013 using ex-post facto research design.

Relationship between Intervening Variables and Profitability

Asset tangibility recorded a negative correlation of -0.98 but was not significant (r=-.098, p=.313). For firm size the correlation coefficient recorded was -0.063 but insignificant (r=-.063, p=.517). The results revealed that sales growth had a positive statistically significant correlation with ROCE (r=.25, p<.01). These results confirmed Jermias (2008) suggestion that Firm's size and growth may have a relationship with performance because larger companies have a propensity to enjoy economies of scale that positively impact on financial performance.

Multiple Regression of the Independent Variables

The researcher chose to use multiple regression analysis because, according to Field (2009), "Regression analysis enables us to predict future (outcomes) based on values of predictive variables" (p.198). This methodology allowed for a statistical analysis of the data. It was also an efficient means of gathering data without introducing threats to reliability that can occur with other data collection means. Multiple regression "calculates the contribution of each predictive variable by looking at the significance value of the t-test for each predictor. If a predictor meets the removal criterion (i.e. if it is not making a statistically significant contribution to how well the model predicts the outcome variable) it is removed from the model (Field, 2009, p.213)." After this is completed, any remaining variable would then be assessed to determine their contribution to the outcome of the dependent variable.

In a multiple regression analysis, it is vital for the researcher not to violate the assumption of no multi-collinearity (heavily related variable) by identifying and certifying that the independent variables are not closely correlated with one another. This is achieved by checking the Pearson correlation coefficient, the tolerance level and the variance inflation factor (VIF) values between the predictive variables (Field, 2009). Multi-collinearity is the undesirable situation where the correlations among the independent variable are strong; it refers to actual disparity percentage to total disparity among variables. According to Mohamed (2012), if the VIF factor is less than 5 then there is no multi-collinearity problem. The study examined the effect of multi-collinearity on the regression models using the Variance Inflation Factor for the independent variables (VIF) analysis. The findings indicate (see table 3) that the mean variance inflation factors for the independent variables was 3.66 implying that there was no multi-collinearity problem since independent variables did not have variance inflation factors (VIF) that exceed five.

Multiple regression analysis was carried out to examine the effect of capital structure on profitability of firms listed in the Nairobi Securities Exchange in Kenya. The purpose of multiple linear regressions was to establish a quantitative relationship between a group of predictor variables and a dependent variable. This relationship is useful for understanding which predictors have the greatest effect; knowing the direction of the effect (positive or negative) and using the model to predict future values of the response when only the predictors are currently known.

Table 3 Multi-Collinearity Diagnostics

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Asset tangibility	.362	2.766
	EE to Capital Ratio	.337	2.966
	Firm Size	.796	1.256
	IE to Capital Ratio	.157	6.356
	LTD to Capital Ratio	.198	5.063
	Sales Growth	.945	1.058
	STD to Capital Ratio	.163	6.153
a. Dependent Variable: ROCE Ratio			

The study further analysed the regression results for presence of auto correlation using the Durbin Watson test statistics (see table 4). The findings indicates that the regression models do not have a problem of auto correlation since the models Durbin Watson test statistics did not exceed 3 which is desirable since regression model with the Durbin Watson test statistics of less than 3 indicate that the problem of autocorrelation does not exist.

Table 4: Coefficient of Determination of Explanatory Variables on ROCE

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.746[a]	.556	.525	5.99647	2.170
a. Predictors: (Constant), STD to Capital Ratio, Sales Growth, EE to Capital Ratio, Firm					

Size, LTD to Capital Ratio, Asset tangibility, IE to Capital Ratio
b. Dependent Variable: ROCE Ratio

Regression standard error (Std. Error of the Estimate) is the average forecast error (difference between actual and values predicted by the estimated equation). Small values indicate that the estimated model fits the observed data closely. The Std. Average error (difference between actual and predicted values) was about 5.99. The coefficient of variation derived by dividing the standard error by the mean of the dependent variable and multiplying by one hundred is about fifty four per cent (see table 4 above).

In addition, ANOVA for the explanatory variables was used to describe whether these variables were significant and could be used in the model to predict ROCE as shown in table 5 below. The study revealed an f-statistic of 17.92 that was associated with a p value of $p < .01$ indicating that the variables are significant at 0.01 alpha level. This meant that the regression model could be used because the explanatory variables' impact on the dependent variable was statistically significant.

Table 5: Analysis of Variances

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4510.799	7	644.400	17.921	.000[b]
	Residual	3595.764	100	35.958		
	Total	8106.563	107			
a. Dependent Variable: ROCE Ratio						
b. Predictors: (Constant), STD to Capital Ratio, Sales Growth, EE to Capital Ratio, Firm Size, LTD to Capital Ratio, Asset tangibility, IE to Capital Ratio						

Table 6: Multiple Regression Model

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.554	13.126		1.109	.270
	Asset tangibility	-1.049	4.314	-.027	-.243	.808

EE to Capital Ratio	-23.069	8.671	-.305	-2.660	.009
Firm Size	.563	.416	.101	1.352	.179
IE to Capital Ratio	4.545	7.689	.099	.591	.556
LTD to Capital Ratio	-43.530	9.181	-.711	-4.742	.000
Sales Growth	9.545	3.161	.207	3.019	.003
STD to Capital Ratio	-23.911	8.830	-.447	-2.708	.008
a. Dependent Variable: ROCE Ratio					

4.3 Interpretation of the Coefficients

Table 6 above revealed the regression model of the explanatory variables and intervening variables on the dependent variable. The results showed the unstandardized beta coefficients that could be used to predict the single outcome of profitability measured in ROCE. The table revealed significant *p*-values for external equity, long-term debt, short-term debt and sales growth of p<.01. Therefore, external equity, long-term debt, short-term debt and sales growth were better estimators of profitability of non-financial firms in Kenya while asset tangibility, firm size and internal equity were not good predictors of profitability since their *p*-values were greater than the alpha level of five per cent.

ROCE = 14.55 − 23.91(STD) − 43.53(LTD) + 4.55(IE) − 23.07(EE) + 0.56 (Firm size) + 9.54 (sales growth) - 1.05 (asset tangibility) + ε

According to the findings indicated that the intercept was 14.55, that is, when all the factors are equal to zero the return on capital employed will be 14.55. The beta coefficient for asset tangibility indicated that for every unit of fixed asset a firm withheld in fixed form, profitability would decrease by 1.05 units.

A unitary increase in the level of internal equity gives rise to a 4.55 per cent increase in return on capital employed implying that an increase in internally generated equity is associated with an increase in profitability (Koech, 2013). This can be explained by the fact that internal equity is relatively cheaper to raise compared to other forms of capital structure. Idialu (2013) noted that the pecking order theory does not predict an optimal or target capital structure. The theory asserts that profitable firms will utilize their retained earnings first to meet their capital

needs. They will only choose debt as their second choice and additional equity finance as a source of last resort. It argues that firms that are more profitable rely mainly on their retained earnings to finance their growth, whereas less profitable firms use more of debt financing

In terms of external equity, beta coefficient shows that for every unit increase in external equity ratio, profitability would decrease by 23.07 units. Firm size beta coefficient shows that increase in firm size would be likely increase profitability by 0.56 units. According to the model, profitability is likely to increase by 9.54% for every unit increase of sales. The beta coefficient of STD is -23.91 which means for every unit increase in the level of short-term debt there will be a corresponding decrease in profitability by 23.91 units. This is replicated by other studies including Githire and Muturi (2015) who found that short-term debt has a negative and significant effect on performance. This is according to their study on effects of capital structure on financial performance of firms in Kenya listed at the NSE from year 2008-2013. The objectives of the study were to establish the effect of long-term debt, short-term debt and equity financing on financial performance of firms listed at the Nairobi Securities Exchange.

Profitability (ROCE) decreases by roughly 44% for every unitary increase in long-term debt (LTD). The results of the current study were consistent with that of Harwood and Cheruiyot (2015) in their study on the effect of long-term loan on firm performance in Kenya: a survey of selected sugar manufacturing firms, found that long-term loan negatively affects ROA (β -.479, $p<0.05$). The objectives of the study were to determine the effects of long-term loan on firm performance and; determine the relationship between long-term loan and firm performance.

However, these results were inconsistent with that of Ebaid (2009) who studied the relationship between the different debt-equity combinations with company's performance in Egypt. The aim of the study was to empirically investigate the impact of capital structure choice on firm performance in Egypt. Multiple regression technique was used to determine the impact of debt policy on company's performance. The study revealed that there was no significant relationship between long-term debt and return on assets (profitability). Using three of accounting-based measures of financial performance (i.e. return on equity (ROE), return on assets (ROA) and (GPM) gross profit margin and based on a sample of non-financial Egyptian listed firms from 1997 to 2005 the results revealed that generally, capital structure choice decision has a weak-to-no impact on firm's performance. In conclusion, he postulated that long-term debts are most preferable sources of debt financing

among well-established corporate institutions mostly by virtue of their asset base and collateral is a requirement for many deposit taking financial institutions.

Githire and Muturi (2015) using multiple regression analysis technique to analyse and test the hypotheses in their study of effect of capital structure on financial performance of firms in Kenya listed at the NSE found that long-term debt financing has a positive and significant effect on firm financial performance. They attributed the positive influence on firm performance on competitive advantage when compared to large firms as well as the development of credit management systems specifically suited for small firms so that they can access long-term financing.

4.4 Hypothesis Testing Results

Hypothesis testing is a process by which the researcher infers the result of sample data on the larger population based on a presupposition made prior to commencement of research (Gujarati, 2003). The study performed hypothesis testing by determining statistical significance of the coefficients of explanatory variables. Test-of-significance method is meant to verify the truth or falsity of a null hypothesis by using sample results, showing that the means of two normally distributed populations are equal. This was done by using the two-tailed t-test statistic and the corresponding *p*-values at 1%, 5% and 10% levels. The decision to use a two-tailed test was based on the fact that the alternative hypothesis of the study is composite rather than directional.

In all the tests, the decision rule was that: if the *p*-value observed is less than the set alpha (significance level), then reject the null hypothesis and if the observed *p*-value is greater than the set alpha, do not reject the null hypothesis.

H_{01}: There is no significant relationship between short-term debt proportion of capital structure and profitability of firms listed at the Nairobi Securities Exchange (NSE)
The analysis revealed that short-term debt proportion has a significant negative relationship with profitability of non-financial firms at 1% significance level. This was evidenced by the *p*-value of p<0.01. The decision was to reject the null hypothesis with 99% confidence and conclude that short-term debt had a significant relationship with profitability of non-financial firms in Kenya. (r=-0.26, p<.01).

H_{02}: There is no significant relationship between long-term debt proportion of capital structure and profitability of firms listed at the Nairobi Securities Exchange (NSE)

According to the analysis, long-term debt had a statistically significant negative relationship with profitability on non-financial firms. The decision therefore was to reject the null hypothesis. The results revealed that at 99% confidence level, it can be concluded that long-term debt had a statistically significant relationship with profitability for non-financial firms listed in the NSE.

H_{03}: There is no significant relationship between internal equity proportion of capital structure and profitability of firms listed at the Nairobi Securities Exchange (NSE)

To test the hypothesis for the relationship between internal equity and profitability, results revealed that internal equity had a statistically significant relationship with profitability. The decision was therefore inferred that there was sufficient evidence to suggest at 99% confidence level that internal equity had a significant relationship with profitability of non-financial firms in Kenya ($r=0.607$, $p< .01$).

H_{04}: There is no significant relationship between external equity proportion and profitability of firms listed at the Nairobi Securities Exchange (NSE)

According to the study, external equity had a negative insignificant relationship with profitability. The decision therefore was to fail to reject the null hypothesis. Consequently, we cannot be 95% confident that external equity is likely to have a relationship with profitability of non-financial firms in Kenya.

Conclusions

Decision on capital structure is important in any business concern across all sectors. It is normally challenging for any business to identify the correct combination of debt and equity since the decision a firm takes on its capital structure portfolio affects how competitive it is in the business environment. In addition the capital structure strategy employed by a firm greatly affects its profitability and financial performance. The current study established that over the period under review, profitability measured by ROCE was 11.09% on average. It was concluded that the non-financial firms in the NSE were performing well especially because this was a period in the country of post-election violence that stagnated business operations. Firms displayed a slightly higher dependence on short-term debt (28.45%) than on long-term debt (19.45%). Based on these findings, it was concluded that lending instructions were stringent in offering credit facilities to firms due to the economic situation at the time.

The findings of the combined model revealed that internal equity was significantly and positively correlated with profitability; sales growth was positively correlated with profitability and statistically significant. In addition, long-term debt was statistically and negatively correlated with profitability. This meant that the more a firm sought long-term debt finance, the lower the profitability. It was concluded that an increase in long-term liability decreases profitability hence the higher the long-term debt the lower the profitability since debts are essentially more expensive to service than equity. It was also concluded that non-financial firms listed in NSE are more reliant on equity financing than debt financing. The results of the regression model revealed that only internal equity, long-term debt and sales growth were a statistically significant and the best predictors of profitability based on the observations of the study.

Recommendations

Studies on the relationship between capital structure and profitability of firms are not conclusive. Various factors determine the outcome of results including country specific factors, research design chosen by the researcher, firm factors and variables utilized to measure capital structure as well as profitability. This is evidenced by the distinctive results from previous studies. However, the choice of capital structure cannot be ignored by a firm as it ascertains the long-term profitability and survival of a firm.

The study recommended that Kenyan firms should use more internal equity to ascertain profitability as it does not involve costs of acquisition compared with external equity and debt finance. It was also recommended that firms should restrain from utilizing long-term debt as it negatively affects profitability. That is, increasing long-term debt reduces profitability due to interest costs incurred in repayment.

This study should be replicated using panel data research design collected for a longer duration. The period should be extended to cover more years prior to and after the election violence period. Further studies could be done using different variables to measure capital structure and profitability to determine whether similar results will be achieved.

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