

Relationship Between Microeconomic Characteristics and Leverage Among Companies Listed in East Africa Securities Exchanges

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Abstract

Leverage levels ought to be continuously monitored in any corporate since an uptake of huge amount of debts may trigger possibilities of financial distress especially if the debt is not serviced on time. There are costs associated with the amount of debt and if poorly constituted then there are chances of incurring huge financing costs. The current study was triggered on the need to understand whether profitability, firm size and asset structure have significant influence on leverage ratio among companies listed in East Africa. The study was informed by pecking order theory and Modigliani and Miller theory. The study adopted panel-correlation research design. A panel data set of 65 listed companies over the 2009-2013 period of analysis was analysed using panel data analysis methods. Results of the study showed profitability had a negative and significant influence on leverage while both firm size and asset structures had positive and significant influence on leverage. The study recommends that measures should be put in place to increase profit levels and increase listed company's asset base. Business operations should be intensified and debt levels to be closely monitored to mitigate the possibilities of financial distress.

Keywords: Leverage, Profitability, Firm Size and Asset structure.

1.1 Introduction

The choice of debt and equity in the firm's capital mix is one of the key decisions among organization finance manager. The cost benefit analysis should be evaluated and the most optimal mix of debt and equity should be used to finance the company's financial needs. Capital structure refers to firms financing strategy and financing tactics through the use of debt and equity securities as well as the timing for debt finance (Brealey and Meyers, 2003). Brealey and Meyers posited that a firm is in a position to issue differentiated compositions of debt and equity but it must ensure that they have combination which maximises its value and minimizes its overall cost of capital is attained. They noted that if a firm is purely equity financed all earnings will be enjoyed by ordinary shareholders. But if financed by equity and debt then firm's proceeds must be shared between the contributors of finance whereby the debt holders are entitled to receive benefits prior to the ordinary shareholders thus debt investors are exposed to lower risks as compared to ordinary shareholders as quoted by (Mwangi, Anyango and Ameyia, 2012).

A comparative study conducted in Europe to investigate the determinants of capital structure among firms operating in French, German and British firms. The study argued that the three countries were exposed to different financial system and traditions which were presumed to have influence on capital structure choice. Capital structure was measured using leverage ratio (total debt to total assets). Capital structure determinants were categorised into homogenous groups which composed of firm characteristics (profitability, effective tax rate, market to book ratio, firm size, liquidity and earning volatility) and market related factors (equity premium, term structure of interest rates and share price performance). The finding showed a significant positive relationship between firm size, term structure of interest rates, market to book ratio and share price performance in the overall sample. There was heterogeneous relationship between fixed assets ratio, equity market premium, profitability and effective tax rates and leverage ratio in the three countries (Antoniou, Guney and Paudyal, 2002).

A study conducted in China to explore the determinants of capital structure among the listed firms showed a significant positive relationship between firm specific factors and capital structure. Capital structure was measured using the ratio of book value of total debt to book value of total assets and also book value of long term liabilities to total assets. There was a significant negative relationship between profitability, firm size and capital structure. Further, there was a positive significant relationship between growth opportunities, tangibility and capital structure. Although, there was a positive relationship between financial distresses costs and capital structure it was not significant. Moreover, there was a negative insignificant relationship between tax shield benefits and capital structure (Chen, 2003).

Mishra, (2001) carried out a study in India to identify the determinants of Indian central PSU's capital structure. Capital structure was measured by a ratio of total borrowing to total assets has a negative significant relationship with profitability (return on assets), positive significant relation with tangibility (net fixed assets to total assets). Moreover, the findings showed an inverse significant relationship between tax rate and capital

structure. There was neither positive nor negative significant relationship between non-debt tax shield, volatility and firm size with firm optimal capital structure.

A comparative study was carried out in Ghana, to investigate determinants of capital structure among Ghanaian's firms were categorised into three groups; quoted firms, unquoted firms and small and medium enterprises. Both ratio of long term debt to total assets and short term debt to total assets were used as capital structure measures. The study hypothesised that firm's capital structure is determined by age of the firm, firm size, asset structure, profitability, firm growth, firm risk, taxation and managerial ownership among other factors. Results of the study depicted that there was a mixed significant relationship between firm age and whether a firm was quoted, unquoted or SME. Further, the findings showed a significant negative relationship between asset structure and capital structure among SMEs. Among the quoted firm there was a positive significant relationship between capital structure (short debt ratio) and a negative significant relationship with long-term debt ratio. There was a significant negative relationship between profitability and capital structure while had positive significant relationship (Abor, 2008). It against this backdrop the current article seeks to examine the relationship between micro economic characteristics and leverage among companies listed in East Africa securities exchanges.

1.2 Hypotheses of the Study

The current paper tested the following hypotheses;

- i. H_0 : There is no significant relationship between profitability and leverage.
- ii. H_0 : There is no significant relationship between firm size and leverage.
- iii. H_{04} : There is no significant relationship between asset structure and leverage.

2.0 Review of Related Literature

2.1 Theoretical Review

2.1.1 Modigliani and Miller Hypothesis

The theory was developed in 1958 by Modigliani and Miller as such to explain capital structure irrelevance position. The theory of business finance in a modern sense starts with the Modigliani and Miller (1958) capital structure irrelevance proposition. The theory was based on the assumptions that: particular companies may be classified into the groups of a different risk level (risk class). The companies in the same group are burdened with the same degree of operational risk, measured as a standard deviation of equity profitability ratio, securities issuance and cost connected with their servicing are not included in the cost analysis, securities are optionally divided and information about the capital market is commonly available out of charge, there are no taxes and companies do not go bankrupt and for this reason interest on capital is the same for everyone because the interest rate on the capital market is deprived of risk. They initially came up with three propositions; Proposition I states that; the market value of any firm is independent of its capital structure, changing the gearing ratio cannot have any effect on the company's annual cash flow (Pluto, 2000). Proposition II states that; the rate of return required by shareholders increases linearly as the debt/equity ratio is increased i.e. the cost of equity rises exactly in line with any increase in gearing to precisely offset any benefits conferred by use of apparently cheap debt. In addition, they argued that the expected return on equity of a geared company is equal to the return on a pure equity stream plus a risk premium dependent on the level of capital structure.

Proposition III: Argues that; new investments hurdle rates will always be an average cost of capital and is not significantly influenced by the security used to finance an instrument. Therefore, there is complete independence between sourcing of finance and an investment project undertaken (Pluto, 2000).

Luigi and Sorin (2006), in their paper led subsequently to both clarity and controversy. As a matter of theory, irrelevance of capital structure can be proved under a range of circumstances. Fundamentally capital structure irrelevance can be broadly classified into classic arbitrage-based irrelevance propositions provide settings in which arbitrage by investors keeps the value of the firm independent of its leverage. Secondly, irrelevance proposition concludes that if a firm is operating in a perfect market then firm's value cannot be influenced by either capital structure or a firm's dividend policy. Although the theory does not provide realistic assumptions as to how an organization finances its operations it provides good reasons as to why financing decision matters in an organization.

2.1.2 Pecking Order Theory

This theory was brought forth by Vasilio, Eriotis and Daskalakis (2009) and they posited that there exists no optimal capital structure in any company. According to the theory an organization will prefer raising finances internally and upon exhaustion of internal sources as such to minimize on cost of financing. Although, it is hard to determine the most appropriate order to follow while raising company finances it is always appropriate to consider the cheaper sources first and minimize the possibilities of losing managerial controls (Jurkowsi, 2005). Thus those companies which can manage to make huge profits and maintain a higher proportion should be encouraged to pursue profitability levels and consequently they will minimize costs associated with raising

capital.

2.2 Conceptual Framework

A conceptual framework is a diagram which is used to show the relationship between dependent and independent variables in a study. In the current paper the diagram shows how profitability, growth, firm size and asset tangibility influences the leverage level among companies which are listed in East Africa Securities Exchanges.

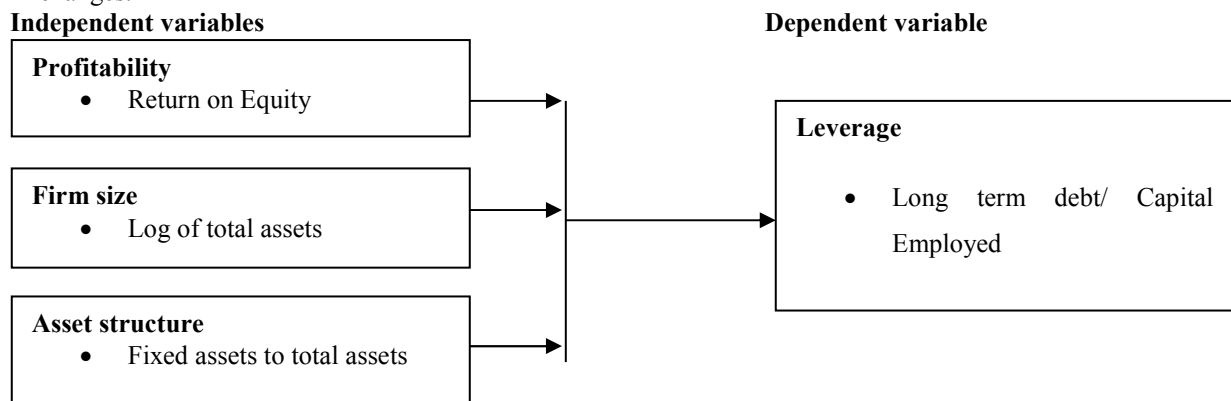


Figure 1 Conceptual Framework

2.3 Empirical Literature Review

A Nigerian study conducted by Yusuf et al., (2014) to investigate the relationship between capital structure and profitability of conglomerate, consumer goods and financial services firms quoted in Nigeria Stock Exchange. Probability sampling techniques was used to select the data of ten companies from the three sectors for years 2000 to 2011 thus the sample size was 120. They used return on assets (ROA), return on equity (ROE) as measures of profitability while debt to equity ratio (DER) and debt to asset ratio (DAR) measured the capital structure. The study used correlation design. Results of the study depicted that there is no significant relationship between profitability and capital structure across all firms with exclusion of 7up and Nestle which had negative significant relationship. After categorization into different companies the study depicted there was a significant relationship between profitability and capital structure. Firms operating in the financial sector showed a negative relationship between return on equity and debt to equity ratio as well as debt to assets ratio. The conglomerate firms had negative insignificant relationship between ROA and debt to equity ratio. From the findings it was deduced that there is a significant relationship between gearing and firm profitability. In the current study it would have been appropriate to use stratified sampling technique to select the respondent in relation to their total population. The choice of ordinary least squares (OLS) was inappropriate and it would have been appropriate to use either fixed or random effects regression methods because the data was panel upon testing the applicability of either model by use of Hausman test.

Pouraghajan et al., (2012) on their study to investigate the relationship between capital structure and firm performance evaluation measures among firms listed in Tehran stock exchange. To attain the main objective of the study secondary panel time series data was collected across 12 industrial groups between 2006- 2010. In the study firm performance was measured using return on assets and return on equity. The study findings showed a significant negative relationship between ROE and debt ratio. In addition, there was a negative relationship between return on equity and debt ratio (capital structure).

Fareed et al., (2014) investigated the relationship between capital structure and profitability. To attain the main purpose of the study 22 listed firms were considered for period of seven years between 2006 -2009. Firm's capital structure was measured using ratio of debt to equity while profitability was measured using return on equity and return on assets. The study findings depicted that there is a negative significant relationship between EBIT (Earnings before interest and tax) and leverage.

Past studies have showed contrasting relationship between firm size and capital structure. For example Huang and Song (2002) and Lihn (2014) showed a positive significant relationship between firm size and leverage, this was attributed to the fact that large firms have high chances of access credit from financial institutions. Similar, findings were found in Pakistan among listed companies in power and sector, firm size was measured as log of total sales (Fareed, Zulfiqar and Shahzard, 2014).

An asset can be defined an item of value in business which can be used to generate revenue in an enterprise. Assets can be classified into tangible and intangible assets: tangible assets include both current and non-current physical assets such as land, buildings, machinery and inventory while intangible assets are non-physical assets such as patents, trademarks. Asset tangibility refers to the ratio of tangible to total assets (Vatavu, 2012).

Bereznicka (2013) defined asset structure as a composition of financial fixed assets, tangible fixed assets, current assets and current investments and cash at hand or bank as ratios of the total assets. Capital structure was measured using the ratio of total debt to total assets, provision to total debt, long term debt to total assets and short term debt to total assets. The study findings across all countries under consideration showed that there is a negative significant relationship between assets structure and capital structure therefore an increase in company's assets was associated with a decrease in leverage ratio across firms.

3.0 Research Methodology

3.1 Research Design

A research design can be defined as schematic guideline show step by step guide of how the study will be carried out (Kerlinger and Lee, 2000; Kombo and Tromp, 2006). The current study adopted panel-correlation design, (Oso and Onen, 2009) posited that correlation design aims at showing the causal relationship between the dependent and independent variables, while it was panel since it relied on panel data which was collected from annual financial statements of listed companies in East Africa securities exchanges. It is appropriate for the current study since the researcher aims to show the determinants of capital structure among listed firms in East securities exchange.

3.2 Sampling Procedure and Sample Size

According to Oso and Onen (2009) sampling is the processing a subset of the target population to be its true representative in the study. In the current study non-probabilistic sampling technique was used to select the companies to be included in the study. Mugenda and Mugenda (2008) argued that non-probabilistic sampling techniques are used to select individual through subjectively defined methods whereby the researcher defines the minimum inclusion criteria in a given study. In the current study 59 companies which were quoted in NSE, 18 companies quoted in USE as well as 20 companies listed in DSE in 2009 - 2013 will be considered. The choice of five year period was guided by past studies such as Tarus (2011), Chumba (2012) which considered a five year period.

3.3 Data Collection Instruments

Creswell (2008) argues that prior to research a researcher ought to develop a data collection instrument which is purely meant to measure, quantify or observe the data under investigation. In the current study a document check index (DCI) will be used as a principal instrument for data collection.

3.4 Data Analysis

The current study seeks to examine the relationship between microeconomic characteristics and leverage among companies which are listed in East Africa securities exchanges. However, not all the firms currently listed since some firms have not been listed in all years from 2009 to 2013. In detail, financial reports during the five year period were collected to obtain the necessary financial data of each firm. Then the data was transformed into variable's data through calculation as shown in table 1 of operationalization of variables. The variables were classified as shown in the conceptual framework; profitability, firm size and asset structure. The data served the purpose of testing the relationship between independent and dependent variables –leverage. Data was analysed with the use of E-views version 7.

Table 1 Operationalization of Variables

	Variables	Measures
Y	Leverage	Long term debt to Capital employed
X ₁	Profitability	Return on equity
X ₂	Firm size	Logarithms of Total assets
X ₃	Asset structure	Fixed assets to total assets

3.4.2 The Model

The nature of data was cross-sectional and time series, which is called the panel data. Asteriou and Hall, (2011) argued that panel data analysis is considered when the researcher seeks to investigate the impact of various variables on a particular dependent variable. In addition, the method is commonly preferred by scientists since it provides for the inclusion of data for N cross-sections i.e. firms, individuals, organizations and the T time period i.e. years, quarters and months. A multiple regression model for panel analysis can be given as follow:

$$y_{i,t} = \alpha + \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \hat{\epsilon}_{i,t}$$

y= Leverage, x₁= Profitability, x₂= Firm size, x₃= Asset structure, $\hat{\epsilon}_{i,t}$ = error term

The following diagnostic tests will be carried out.

Table 2 Panel Data Diagnostic Tests

Test	Test Used	Conclusion
Use of pooled or random effects model	Breusch Pagan LM test	If P value >0.05, use pooled effects model. If p value >0.05, there are no time fixed effects do not use two way model or introduce dummy variables
Time Fixed Effects	F statistics	
Heteroskedasticity	Modified Wald Test Wooldridge Drukker	If P value <0.05, presence of non-uniform variance.
Serial correlation	test	If P>0.05, no serial correlation
Random or fixed effects	Hausman test	If p value>0.05, use random effects model.

4.0 Results of the Study

In the following section data analysis and discussion of the findings will be carried out. Panel diagnostic tests for the panel data will be presented followed by correlation analysis and finally multiple linear regressions to show the relationship between micro economic characteristics and leverage among companies listed in east Africa securities exchanges.

4.1 Panel Diagnostic Tests

In order to choose the appropriate model to fit between pooled effects and random effects regression model, LM test was used to test the null hypotheses which states that there is uniform variance across entities under consideration against the alternative which argues that there is no uniform variance across entities. Since the p value in the current study was greater than 0.05 there was no enough evidence to warrant rejection of the null hypotheses therefore the most appropriate model to fit the data was pooled effects regression model.

Testparm test was carried out to examine the fixed effects across the entities. The test assumed that all dummies in the model were zero. Results of the study revealed that there was no need to introduce dummy variables or use two analysis since the p value was greater than 0.05.

Since both heteroskedasticity and serial correlation had p values greater than 0.05, then there was no enough evidence to support rejection of the null hypotheses and we conclude that there was uniform variance across the error terms and there was no serial correlation amongst the variables. There was no need to carry out Hausman test since pooled effects was fitted on the data.

Table 3 Results for Panel Diagnostic Tests

Breusch –Pagan LM Test	χ^2 -value	p-value
	0.41	0.684
Test Results for Time Fixed Effects	F-value	p-value
	0.93	0.7823
Heteroskedasticity test	χ^2 -value	p-value
	18.94	0.041
Serial correlation	F-value	p-value
	1.346	0.569

Pearson correlation analysis was carried out to examine the strength of the relationship between leverage and micro economic characteristics among companies listed in East Africa securities exchanges. There was a positive and significant relationship between profitability and leverage among companies listed in East Africa securities exchanges, ($\rho = -0.021$, p value<0.05). Secondly, there was a positive and significant relationship firm size and leverage ($\rho = 0.114$, p value < 0.05). Finally, there was a positive and significant relationship between asset structure and firm performance ($\rho = 0.386$, p value < 0.05).

Table 4 Correlation Analysis

	Leverage	Profitability	Firm size	Asset Structure
Leverage	1			
Profitability	-0.021	1		
	0.00	----		
Firm size	0.114	-0.209	1	
	0.046	0.000	----	
Asset Structure	0.386	-0.171	-0.077	1
	0.000	0.003	0.178	----

Table 5 shows the pooled effects regression results. Regression analysis showed that profitability, firm size and asset structure had joint significant influence on leverage among companies listed in East Africa, (F= 27.997, p value <0.05). This shows that one of the slope coefficients was none zero. An R squared of 0.88, shows that

88% of the variations in leverage can be explained by profitability, firm size and asset structure while the remaining percentage can be accounted for by other factors excluded in the model.

The first hypotheses of the study stated that there was no significant relationship between profitability and leverage among companies listed in East Africa. Results of the study revealed that there was a negative and significant relationship between profitability and leverage ($\beta = -0.092$, p value <0.05). This implied that holding other factors constant a unit change in profitability decreases leverage by 0.092 units.

The second hypotheses of the study stated that there was no significant relationship between firm size and leverage among companies listed in East Africa. Results of the findings revealed that there was a positive and significant relationship between firm size and leverage ($\beta=0.040$, p value <0.05). This implies a unit change in firm size while holding other factors constant increases leverage by 0.04 units.

The third hypotheses of the study stated that there was no significant relationship between asset structure and leverage. Results of the study revealed a positive and significant relationship between asset structure and leverage ($\beta= 0.110$, P value < 0.05). This implies that a unit change in asset structure increases leverage by 0.11 units.

Table 5 Pooled Effects Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.871	0.14	6.01	0.00
Profitability	-0.092	0.03	-2.78	0.01
Firm size	0.040	0.01	4.49	0.00
Asset Structure	0.110	0.05	2.22	0.00
R-squared	0.880	Mean dependent variable		0.202
Adjusted R-squared	0.848	S.D. dependent variable		0.222
S.E. of regression	0.086	Akaike info criterion		-1.876
Sum squared residual	1.799	Schwarz criterion		-1.095
Log likelihood	350.021	Hannan-Quinn criterion.		-1.563
F-statistic	27.997	Durbin-Watson statistics		1.425
Prob (F-statistic)	0.000			

5.0 Discussion, Conclusion and Recommendations

The current study sought to examine the relationship between microeconomic characteristics and leverage among listed companies East Africa securities exchanges. The study adopted panel-correlation research design and panel secondary data was collected from annual audited financial statements. LM revealed that the most appropriate model to fit the data was pooled effects regression model. Study findings revealed that 88% of the variations in leverage can be accounted for by profitability, firm size and assets structure jointly while the remaining percentage can be accounted for by other factors which were excluded in the model.

Profitability revealed a positive and insignificant relationship with leverage. These findings are in tandem with firms financing activities as brought forth by pecking order theory which argues that corporate financing calls for financing using internal sources which are cheaper compared to external sources which are acquired after incurring floatation's costs. These results contrasted Githira and Nasieku (2015) who found an insignificant positive relationship and they agreed with Tesfaye and Minga (2013) who reported insignificant relationship. From these findings it can be deduced though there are prospects for better profits within the East Africa region, listed companies have mixed fortunes and though there are not borrowing huge long term amounts there are possibilities of using short term financing to finance most of their business activities which may threaten the survival of them if they may fail to service short term debts on time. All listed companies should intensify their operations so as to increase their profits levels and consequently minimize dependency on borrowed capital.

There was a positive and significant relationship between firm size and leverage. The results were in support of the provisions of trade off theory which argues that the higher the firm the higher the possibility of being leveraged and vice versa. An increase in firm size is associated with increased collateral security which will enhance firms borrowing capacity and they may increase the borrowed capital so as to increase the interest tax shield benefit and use the tax savings to venture into other business opportunities. Although these results were in agreement with Tesfaye and Minga (2013) they contrasted Githira and Nasieku (2015) who found positive and insignificant results. Although big firms are better placed to borrow due to their collateral securities there is need for SMEs to be provided with alternative sources of finances as such to play their role on economic development and more firms should be listed in the securities exchanges even if it calls for the creation of a segment targeting SMEs.

Finally, there was a positive and significant relationship between asset structure and leverage among companies listed in East Africa. Although, theoretically it is alluded that asset base has positive significant influence on borrowing the study contrasted the findings of Nadeem and Wang (2013) and Erdinic et al, (2009)

who reported an inverse and significant relationship between asset structure and leverage but they confirmed positive and significant relationship which was registered by Tesfaye and Minga (2013). From the findings it can be deduced that most firms in the region have huge amount of long term debt due to increased levels of their asset base.

There is need for causal study be carried out to examine the relationship between micro economic characteristics and leverage among listed companies in East Africa. Moreover an examination of panel threshold of capital structure needs to be examined within east Africa. An examination of whether there are chances of financial distress, earnings management and capital structure to be examined.

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