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Effect of Firm Size on Financial Leverage of Firms: A Study on Kenyan Sugar Firms in Kenya

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Abstract:

Sugar firms in Kenya have been facing challenges of operation and frequent closures unlike other global players. Miwani Sugar went under receivership in 2000 whereas Mumias sugar closed down in 2017 both being unable to meet their financial obligations. Report from the Kenya sugar Board portray The report by the departmental committee on Agriculture, Livestock and Co-operatives as presented by the Kenya National Assembly, Eleventh Parliament, third session (2015) raised an alarm on the crisis facing the sugar industry in Kenya and the imminent collapse of the sugar industry in western Kenya depicting these firms to be debt laden and unable to meet their short-term and long term financial obligations. Kenya Sugar sub-sector contributes for 7.5% to the National GDP and 15% to the Agricultural GDP. Previous studies concentrated on the effect of financial leverage on the financial performance of these sugar firms. However, there was lack of information on the relationship between firm size and financial leverage level of these sugar firms. Specifically, the study sought to determine the effect of firm size on financial leverage of sugar firms in Western Kenya. The study was anchored on the pecking order theory. The study adopted correlational research design on a population of 8 sugar firms in Western Kenya sampled using saturated sampling technique. The study used secondary Panel balanced data for June 2008-June 2018 comprising 80 data points. These were obtained from the various firms' financial statements and Kenya Sugar Board. Panel co-integration tests estimating the long run co-integration relationship and Unit root on the data revealed stationarity of the study variables with $p\text{-value} < 0.05$. Findings from panel multiple regression established a significant negative effect of firm size on financial leverage ($R^2 = .1322$, $P = .0002$) (coeff = $-.2819$). The study concluded that firm size negatively predicted financial leverage among sugar firms in Kenya. The study recommended the expansion of the sugar firms to tap the benefits resulting from economies of scale which will in turn help in the reduction of the financial leverage levels of the sugar firms to within the optimal levels. This thesis intends to inform management of the Kenyan sugar firms, policy makers and scholars.

Keywords: Firm size, financial leverage, GDP & GAAP

1. Introduction

Firm size refers to the total assets a firm has and the total sales it achieves annually. This study used total sales to group firms into their respective sizes. Financial leverage refers to the level at which a firm incorporates borrowed funds into its overall financial structure. The financial leverage level of a firm is established using debt ratio and debt to equity ratio. Debt ratio shows the amount of assets financed by debt capital while debt to equity measures the amount of borrowed capital in relation to owners' capital. Kenyan sugar firms have varied capital structures with some having higher percentages of debt capital in relation to equity financing. The perplexing question here is, does size matter in the determination of these sugar firms' financial leverage level?

Based on the pecking order theory by Myers and Majluf (1984), managers follow a hierarchy when considering sources of financing where they first go for retained earnings, followed by debt and choosing equity as a last resort. In this case, firm size plays a major role in determining the financial leverage level of a firm. The study therefore used the pecking order theory to determine the effect of firm size on financial leverage level of sugar firms in Kenya. GDP (Gross Domestic Product) is the monetary market value of all the finished goods and services produced and provided during a country's fiscal year. GAAP refers to the generally accepted accounting principles.

1.1. Objective of the Study

To determine the effect of firm size on the financial leverage level of sugar firms in Kenya.

1.2. Hypothesis of the Study

- H_0 : Firm size has no effect on the financial leverage level of sugar firms in Kenya.

2. Theoretical Review

The pecking order theory by Myers and Majluf (1984) postulates that the cost of financing increases with asymmetric information which creates an imbalance in the transaction of power. Company managers possess more

information regarding the company's performance, prospects, risks and future outlook than external users such as creditors and investors. Financing comes from internal funding, debt and equity. Managers follow a hierarchy when considering sources of financing where they first go for retained earnings, followed by debt and choosing equity as a last resort. This theory implies a negative relationship between firm size and financial leverage because as firms grow larger, they tend to have more retained profits as compared to smaller firms. This theory guided the study in investigating the relationship between firm size and financial leverage among sugar firms in Kenya.

3. Empirical Literature Review

Previous literature on the effect of firm size on financial leverage level yielded the following results: Vithessonthi and Tongurai, (2014) studied the relationship between firm size and financial leverage using assorted firms in Thailand and obtained negative relationship. Baloch et al, (2015) focused on Pakistan Auto sector in his study to establish the relationship between firm size and financial leverage and came up with a negative relationship between firm size and financial leverage. Ezeoha (2015) focused on 71 firms quoted at the Nigerian stock market to investigate the nature and significance of firm size as a determinant of corporate financial leverage and obtained a negative relationship. Kale, (2014) focused on non-financial blue chip companies listed at the NSE and obtained a negative relationship between firm size and financial leverage. In contrast, Marete (2015) examined 64 firms listed at the NSE and found a positive relationship between firm size and financial leverage.

There was an observable lack of cohesion in the research results given that studies of sampled assorted firms' yearly observation, of quoted firms, of listed non-financial blue chip companies and of auto sector consisting of sub-sectors as motor vehicle, trailers and parts revealed a negative relationship between firm size and financial leverage, Contrarily, research carried out on 64 firms listed at the NSE revealed a positive relationship between firm size and financial leverage. However, none of these previous studies focused purely on sugar firms. The discrepancy in the findings and the absence of data on sugar firms made it difficult to draw a conclusion on the effect of firm size on financial leverage among sugar firms in western Kenya. The available literature on the relationship between firm size and financial leverage were based on other industrial set-ups rather than sugar firms. Moreover, their obtained results conflicted each other. However, there was no literature addressing the relationship between firm size and financial leverage in the context of sugar firms in Kenya.

4. Methodology

A research philosophy is a belief about the way in which data about a phenomenon should be gathered, analyzed and used. Two main research philosophies can be identified as positivist also called scientific and interpretivist which is anti-positivist as given by Galliers, (1991). Positivists believe that reality is stable and can be observed and described from an objective viewpoint without interfering with the phenomena being studied (Levin 1988). Dill and Romiszowski (1997) stated the importance of research paradigm by highlighting its functions as those of defining how the world works, how knowledge is extracted from the world and how one is to think, write and talk about this knowledge. It also defines the types of questions to be asked and the methodologies to be used to answer them. They also argued that a paradigm structures the world of the academic worker and provides its meaning and its significance. Weaver and Alson (2006) define it as a pattern of beliefs and practices that regulate inquiry within a discipline by providing lenses, frames and processes through which investigation is accomplished. This study was guided by quantitative positivism paradigm since it is an inquiry based on testing of a theory. It involved variables measured with numbers, and to be analyzed with statistical procedures in order to determine whether the predictive generalizations of the theory held are true (Cresswell, 2003). The study adopted a correlational research design. This was done by examining how firm size and financial leverage relate as guided by the objective of the study. The study targeted 8 sugar firms of various sizes located in western Kenya. These were assessed for the period between, June 2008 and June 2018 yielding a panel of 80 data points. Given that most of the sugar firms are concentrated within western region of Kenya, saturation method was applied to sample the sugar firms for the study. The study used secondary panel data obtained from annual financial reports of the sugar firms from June 2008 to June 2018. The secondary panel data from the financial reports was used given that it is an audited statutory document which meets the GAAP requirements and produced annually by all the firms. This made it a credible data set to use. The panel data of the sugar firms was analyzed using panel multiple regressions to determine the effect of firm size on financial leverage. Moreover, Pearson's coefficient of correlation was used to analyze the relationships and degree of association between firm size and financial leverage among sugar firms in western region of Kenya.

The study used the model below:

$$Debt\ ratio_{it} = \beta_0 + \beta_1 \ln Sales_{it} + \epsilon_{it}$$

$$Debt\ to\ Equity_{it} = \beta_0 + \beta_1 \ln sales_{it} + \epsilon_{it}$$

Where, i represented the number of sugar firms studied (8), t represented the time period (10yrs), it represented the data points of the study (80). β_0 and β_1 were constants, while ϵ represented the error term. The error term accounted for the omitted variables which affect financial leverage other than firm size, the non-linearity in the relationship between firm size and financial leverage, measurement errors and other unpredicted effects of firm size on financial leverage. The equations aided establishing the relationship between firm size and financial leverage in sugar firms in Western Kenya.

5. Findings and Discussions

To establish the relationship among the study variables, the Pearson product moment correlation coefficient was computed. The size of the correlation (r) and the statistical significance were examined. A statistical significance at the alpha = 0.05 level was sufficient for this analysis. The study obtained statistically significant negative relationship between

firm size and all the indicators of financial leverage; debt ratio ($r=-.348$, $p=.002$), debt to equity ratio ($r=-.358$, $p=.001$) as shown below.

	Debt Ratio	Debt To Equity Ratio	Financial Leverage
Firm size	-.348** .002	-.358** .001	-.364** .001

Table 1: Correlation Analysis Result

**Correlation Is Significant at the .01 Level (2-Tailed)

*Correlation Is Significant at the .05 Level (2-Tailed)

Source: Field Data, 2018

In order to investigate the influence of firm size on financial leverage of sugar firms in western Kenya based on regression analysis, the study tested the null hypothesis that there is no statistically significant effect of firm size on financial leverage in sugar firms in western Kenya. Firm size was measured by natural log of average yearly sales revenue, and debt ratios computed from the data as below.

.xtreg Debt Ratio Firm Size, fe						
Fixed - effects (within) regression			Number of obs	=	79	
Group variable : Year			Number of groups	=	10	
R - sq: within	=	0.1878	Obs per group: min	=	7	
Between	=	0.0000	avg	=	7.9	
Overall	=	0.1209	max	=	8	
F (1, 68)	=	15.72	Prob> F	=	0.0002	
Corr (u_i, Xb)	=	-0.0152				
Debt Ratio	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval
Firm Size	-1.008985	.2544842	-3.96	0.000	-1.5168	-5.011697
_cons	1.977747	.250493	7.90	0.000	1.477896	2.477598
sigma_u	.22026135					
Sigma_e	.28328472					
Rho	.37677127	(fraction of variance due to u_i)				
F test that all u_i=0: F(9, 68) = 4.82			Prob> F = 0.0001			

Table 2: Panel Analysis: Fixed Effect Regression Model of Firm Size on Debt Ratio

From the above table, it is evident that 12.1% (overall $R^2 = .1209$) of the variance in debt ratio of sugar firms in western Kenya is explained by firm size. However, it is noted that firm size had negative coefficients (coef. = -1.008), which is 95% within the confidence interval (-1.516, -.501). The fact that the p-value is lower than 0.05, it was concluded that there is a significant negative relationship between firm size and debt ratio.

A linear regression model used for this analysis was of the form $Y = \beta_0 + \beta_1 FS_{it} + \varepsilon_{it}$ where

- Y is the dependent variable, in this case debt ratio
- FS is the independent/ explanatory variable, in this case firm size (In Sales).
- ε is the unexplained variation (error term)

The model can be written and explained as: $Debt\ Ratio_{it} = \beta_0 + \beta_1 In\ Sales_{it} + \varepsilon_{it}$
= 1.978 - 1.01

For every one unit increase in firm size, there is a subsequent decrease in firm debt ratio by 1.01 units.

Regression results of the effect of firm size on debt to equity was performed as follows. Debt equity ratio was calculated by dividing a company's total liabilities by its shareholder equity. The ratio is a proxy to the company's financial leverage. It is a measure of the degree to which a company finances its operations through debt versus net worth. It therefore reflects the ability of shareholder's equity to cover all outstanding debts in the event of a business wind-up.

.xtreg Debt/ Equity Firm Size, fe						
Fixed - effects (within) regression			Number of obs	= 79		
Group variable : Year			Number of groups	= 10		
R - sq: within = 0.1698			Obs per group: min	= 7		
Between = 0.0002			avg	= 7.9		
Overall = 0.1280			max	= 8		
Corr (u_i, Xb) = -0.0166			F (1, 68)	= 13.91		
			Prob> F	= 0.0004		
Debt /Equity	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval
Firm Size	-4.630447	1.241453	-3.73	0.000	-7.107728	-2.153166
_cons	7.172047	1.221983	5.87	0.000	4.733618	9.610476
sigma_u	.81542168					
Sigma_e	1.381951					
Rho	.25824845 (fraction of variance due to u _i)					
F test that all u _i =0: F(9, 68) = 2.77 Prob> F = 0.0079						

Table 3: Panel Analysis: Fixed Effect Regression Model of Firm Size on Debt/Equity

From the model, it is illustrated that 12.8% ($R^2=0.1280$) of the variance of debt equity is explained by firm size, as measured by natural log of sales revenue.

A linear regression model used for this analysis was of the form $Y = \beta_0 + \beta_1 FS_{it} + \varepsilon_{it}$ where

- Y is the dependent variable, in this case Debt Equity
- FS is the independent/ explanatory variable, in this case firm size (In Sales).
- ε is the unexplained variation (error term)

Hence, the model can be written as: $Debt\ Equity_{it} = \beta_0 + \beta_1 \ln Sales_{it} + \varepsilon_{it}$

$$= 7.172 - 4.630$$

The firm size has negative coefficients (coef. = - 4.630) with debt equity. This implies that, for every unit increase in firm size there would be subsequent drop in debt to equity of 4.63 units, at 95% confidence within the boundary of (- 7.108 & -2.153).

.xtreg Leverage Firm Size, fe						
Fixed - effects (within) regression			Number of obs	= 79		
Group variable : Year			Number of groups	= 10		
R - sq: within = 0.1821			Obs per group: min	= 7		
Between = 0.0001			avg	= 7.9		
Overall = 0.1322			max	= 8		
Corr (u_i, Xb) = -0.0163			F (1, 68)	= 15.14		
			Prob> F	= 0.0002		
Fin. Leverage	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval
Firm Size	-2.819716	.724734	-3.89	0.000	-4.265919	-1.373513
_cons	4.574897	.713377	6.41	0.000	3.151375	5.998419
sigma_u	.51568009					
Sigma_e	.80676421					
Rho	.29006061 (fraction of variance due to u _i)					
F test that all u _i =0: F(9, 68) = 3.26 Prob> F = 0.0024						

Table 4: Panel Analysis: Fixed Effect Regression Model of Firm Size on Financial Leverage

From the table it is observable that 13.2% ($R^2=0.1322$) of the variance in financial leverage is explained by firm size.

A linear regression model used for this analysis was of the form $Y = \beta_0 + \beta_1 FS_{it} + \varepsilon_{it}$ where

- Y is the dependent variable, in this case Financial Leverage
- FS is the independent/ explanatory variable, in this case firm size (In Sales).
- ε is the unexplained variation (error term)

The model can thus be written as:

$$Firm\ Performance_{it} = \beta_0 + \beta_1 \ln Sales_{it} + \varepsilon_{it}$$

$$= 4.574 - 2.819$$

As expected, firm size had negative coefficients (coef. = - 2.819) with financial leverage. This is interpreted to mean that, for every a unit increase in firm size, there would be consequent decrease in financial leverage by 2.819 at 95% confidence within the boundary of (- 4.265, -1.373). These findings qualified the rejection of the null hypothesis as they both point to a statistically significant negative relationship between firm size and financial leverage among sugar firms in western Kenya. The findings imply that, as these sugar firms increase in size, they tend to have some internal sources of

funds in addition to the grants that they receive from the government. This results in reduced borrowings by larger firms. This is in line with the pecking order theory which suggests low financial leverage for large firms which are assumed to be profitable and are less likely to opt for external financing for new projects because they have the available funds in form of retained earnings and due to the attached costs of debt and equity financing. In this case, internal financing should be more popular than external financing since they are presumed to have huge amounts of retained profits leaving debt as the best option for smaller firms which have very little in terms of retained earnings. The findings are in tandem with what most previous researchers established.

Baloch et al (2015) used multiple regression analysis to investigate effect of firm size on financial leverage on Pakistan auto-sector using a data of 22 firms and found a negative relationship between firm size and financial leverage. Ezeoha (2015) used panel data fixed effect regression model on 71 firms in Nigeria to investigate the relationship between firm size and financial leverage found a negative relationship between firm size and financial leverage. Although the findings differed from that of Marete (2015) who investigated 64 companies listed at the NSE using regression analysis and Pearson's product moment correlation analysis model and obtained a positive relationship between firm size and financial leverage.

6. Summary of the Research Findings

The second objective of the study was to establish the effect of firm size on financial leverage of sugar firms in western Kenya. Financial leverage was measured in terms of debt ratio and debt to equity ratio. The results of the study established that, although there was significant negative effect of firm size on both proxies of financial leverage, the effect of size of the firm was more on debt to equity than on debt ratio. With regard to both proxies, (debt to equity and debt ratio), the results of the study established that firm size had negative coefficients implying that for every one unit increase in firm size there was subsequent decrease in both debt ratio and debt to equity. In overall, the study established that firm size had a statistically significant negative effect on financial leverage thereby confirming the pecking order theory. This study contributes by urging the management of these sugar firms to enhance the sizes of these firms so as to reduce their dependence on borrowed capital to optimal levels and ease the burden of the fixed charges.

7. Conclusion and Recommendation

Based on the findings of the effect of firm size on financial leverage where a negative relationship was established, it was concluded that, the management of sugar firms need to work towards increasing the sizes of these sugar firms so as to reduce their reliance on borrowed funds since a unit increase in firm size translated to a reduction in financial leverage. It was concluded that although both debt ratio and debt to equity ratios were negatively predicted by firm size, debt to equity experienced more negative effect of firm size than debt ratio. This meant that, as the firm increases in size, it tends to finance its operations using internal funds and the level of equity financing becomes more prominent as opposed to debt financing. This conclusion was in support of the pecking order theory. The study results established a negative effect of firm size on financial leverage among the sugar firms in western Kenya. This was attributed to the fact that, as these sugar firms increase in size, they tend to have alternative internal sources of financing thereby reducing their dependency on external sources of financing such as debt capital. The study therefore recommends that the management of these sugar firms should strive to expand these sugar firms in order to reduce their dependency on borrowed funds which burden them and dilute their returns due to the fixed charges attached to the debt capital.

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