

**MEDIATING EFFECT OF FINANCIAL LEVERAGE ON THE RELATIONSHIP
BETWEEN FIRM SIZE AND FINANCIAL PERFORMANCE OF SUGAR FIRMS IN
WESTERN KENYA**

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ABSTRACT

Firm size and financial leverage influence financial performance as presupposed by the theory of economies of scale and the trade-off theory. Previous research focused on financial leverage and financial performance relationship within different industrial context but ignored the sugar industry. These investigations dealt with the direct effect ignoring a possible influence of financial leverage on the relationship between firm size and financial performance. This study therefore sought to analyse the mediating role of financial leverage on the relationship between firm size and financial performance of sugar firms in Western Kenya. The study used a correlation research design on a target population of 8 sugar firms' panel for 2008-2018 making 80 data points. Financial leverage proved to significantly negatively predict financial performance with a (coeff. = -.0765) implying that for every unit increase in financial leverage, there is a reciprocal change in financial performance of sugar firms in Western Kenya by 0.0765 units. About 13% ($R^2=.1290$, $P=.001$) of the variance in financial performance is explained by financial leverage. Each proxy of financial leverage relates negatively to financial performance as; debt ratio ($R^2=.0766$), meaning 7.7% of variance in financial performance is explained by debt ratio with a significance of $F(1, 69) = 14.53$, $p=.0003$ and debt/equity ($R^2=.05316$) significance of $(1, 69) = 19.35$, $p, <0.001$), meaning debt/equity ratio explains 5.3% of the variance in financial performance. Financial leverage as a mediator variable increases the predictive power of firm size from 15.3% ($R^2=0.1530$) for unmediated model to 20.2% ($R^2 = .2017$) for mediated, a change of 4.9% ($R^2 = 0.0487$). The study concludes that financial leverage negatively mediate on the relationship between firm size and financial performance of sugar firms in Western Kenya. The study recommends that management of these sugar firms should cautiously use financial leverage in their firms as it negatively mediates on firm size financial performance relationship.

Key words: Mediating effect, Financial Leverage, Firm size, and Financial performance.

INTRODUCTION

Statistical report from the Kenya Sugar Board indicates that Kenyan sugar firms achieved -24% average profit after tax during the period 2008-2018. Kenya is an agricultural economy of which sugar is among the cash crops grown in the country, specifically in the western region of the country. The sugar sub-sector accounts for 15% of Agricultural GDP and 7.5% of the national GDP indicating its contribution to the country's economy. Report by the departmental committee on Agriculture, Livestock and Co-operatives (2015) highlighted the crisis and imminent collapse facing sugar industry in Western Kenya. Some sugar firms have been put under receivership as a section of the firms grapple with survival, this is despite the government's effort to create a conducive trade environment through COMESA interventions. The negative financial performance among Kenyan sugar firms contradicts the positive financial performance achieved by other sugar producers such as Brazil's 53% average profit after tax, India's 42% average profit after tax and South Africa's 28% average profit after tax for the same period. The poor financial performance registered suggested failure to consider the influence of some factors with direct bearing on these firms' financial performance. The theories of economies of scale by Gan and Vernon, (2003) and the trade-off theory by Pandey, (2004) presume firm size and financial leverage as among the predictors of financial performance of any firm. The Previous research focused firm size as a moderating variable in the financial leverage and financial performance relationship but failed to look into a possible mediation by financial leverage on the firm size financial performance relationship. Previous research also looked into the effect of liberalization of sugar import, corporate governance and non-diversification as possible causes of the poor financial performance among Kenyan sugar firms. However no study had been done on the influence of financial leverage on the relationship between firm size and financial performance of sugar firms in Western Kenya. Existing literature acknowledged the benefits of economies of scale and financial leverage within different industrial contexts. However, there was lack of information on how firm size and financial leverage interact in predicting financial performance within the context of sugar firms. Therefore, the purpose of this study was to analyze the mediating role of financial leverage on the effect of firm size on financial performance of sugar firms in western Kenya.

Objective

To analyze the mediating role of financial leverage on the effect of firm size on financial performance of sugar firms in Western Kenya.

Hypothesis

H₀: Financial leverage has no mediating effect on the effect of firm size on financial performance of sugar firms in Western Kenya.

THEORETICAL LITERATURE REVIEW

According to Pandey (2004), the Trade-off theory acknowledges the benefits associated with debt financing within optimal capital structure as it helps improve the value of the firm. He refers to debt as a double edged sword with the potentials of improving and destroying the value of the firm. Firms use debt financing together with owners' equity with the intention of earning more return on the fixed charge funds than their cost as well as improve a firm's performance by increasing its

earnings per share (EPS), its return on equity (ROE), return on asset (ROA) and overall profit margin, Pandey, (2004). This theory predicts a positive relationship between financial leverage and financial performance if debt is optimally used. Brigham (2010) on the signaling theory of ROA and ROE states that a firm's ROA reflects a firm's basic earning power resulting from efficient asset utilization as well as effect of interest cost resulting from its use of debt, and that (ROE) above industry average is an indication of a company's greater use of debt. These theories imply positive relationship between financial leverage and financial performance but within the optimal limits above which it becomes disastrous. These theories guided the study in investigating the influence of financial leverage on the relationship between firm size and financial performance by looking at the behavior of ROA and ROE of the firms given their varied sizes when financial leverage is introduced as a mediator variable.

EMPIRICAL LITERATURE

Yoon and Jang (2005) conducted a study on the relationship between return on equity, financial leverage and size of 62 restaurant firms in US for the period 1998 to 2003 using ordinary least square (OLS) regressions. Their results show that highly leveraged firms were less risky in both market and accounting based performance measures. The results also indicate positive relationship between financial leverage and financial performance indicators (ROE). Their findings further indicate that firm size had a more dominant effect on ROE than financial leverage regardless of the level of leverage; smaller firms were relatively more risky than larger firms. Laurente, (2002) studied the relationship between financial leverage and corporate performance in France, Germany and Italy. He used multiple regression technique on the study variables which included financial leverage, asset tangibility, short term liabilities, inventory and firm size. He found mixed results from different countries. His findings revealed negative relationship in Italy but significantly positive relationships between leverage and performance in France and Germany. Vithessonthi and Tongurai (2014) studied the effects of firm size on the leverage-performance relationship during the world financial crisis of 2007-2009. The study was carried out in Thailand using a data of 496,430 firm year observations of a sample of 170,013. Their findings revealed that the magnitude of the effect of leverage on operating performance is non-monotonic and conditional on firm size. Their panel regression results indicate that leverage has a negative effect on financial performance across firm size sub-samples. Their year by year cross-sectional regression results show that the effect of leverage on financial performance is positive for small firms and is negative for large firms.

Pervan and Josipa (2012) studied the influence of firm size and leverage on its profitability using data from Croatian manufacturing industry from 2002-2010. Both linear and non-linear specifications were tested and the results showed that firm size has a significant influence on firm profitability. The results further revealed that asset turnover and debt ratio have statistically significant positive influence on financial performance. Umar *et al* (2014) investigated the moderating role of firm strategy in the relationship between financial leverage and financial performance using a data of 125 Pakistan textile firms listed at the Karachi Stock Exchange for the period of 2006-2011, while applying regression analysis and correlation analysis. Results revealed that both short term and long term debt borrowings are negatively associated with profitability. Kale (2014) investigated the impact of financial leverage on financial performance using the non-financial blue chip companies listed under the NSE 20 share index in Kenya. He measured performance using ROA, ROE and Tobin's Q. The study expanded its explanatory variables by

controlling for liquidity, firm size and firm age. He analyzed data from the three models using random effect model. The results revealed that there is a significant negative relationship between financial leverage and return on assets. The findings from the Tobin's Q model indicate that large firms have a positive insignificant relationship between financial leverage and financial performance.

The findings of the literature reviewed portray some conflicts given the diversified results. Yoon and Jang (2005), Pervan and Josipa (2012) used ordinary least square regression, multiple regression analysis and Tobin's Q and found positive relationships. Whereas, Vithessonthi and Tongurai (2014), Umar *et al* (2014) used panel regressions and year-by-year cross-sectional regression, and correlation analysis and obtained negative relationships. However, Laurente (2002) used multiple regression analysis and obtained varied results across different countries.

Apparently, in some cases firm size had positive relationship with financial performance regardless of the financial leverage level like in the case of the results from the ordinary least square regression analysis. Whereas in other cases financial leverage was found to have influence on financial performance based on the size of the firm, with negative effect on smaller firms but positive on larger firms. Results from year by year cross-sectional regression result indicated that financial leverage had positive effect on smaller firms but negative on larger firms though their panel regression results indicate that financial leverage had negative effect on financial performance across all firm sub-samples. Research findings in different European countries using multiple regressions revealed negative effects in some countries but positive relationship in others, pointing out to contribution of geographical location of the firm on the results. Most of the previous research focused on firm size as either intervening variable or moderating variable on the financial leverage and financial performance relationship but none attempted to look into a possible influence of financial leverage on firm size and financial performance relationship among the sugar firms.

RESEARCH METHODOLOGY

This current research used quantitative paradigm, whereby a correlational research design was adopted. The design was appropriate as it allowed establishing as many relationships between the variables of the study. The study used a panel data of a population of 8 sugar firms of different sizes found in western region of Kenya for the period, 2008-2018 totaling to 80 data points. The data for the analysis of firm size, financial leverage and financial performance was extracted from the financial reports of the various sugar firms obtained from Kenya Sugar Board and the various sugar firms. The experts opined that data items adequately and sufficiently represented the content for each construct. It's assumed that the financial performance is volatile, that it is not stable, that the time series have a unit root, but it's assumed that these variables have fairly stable long-run relationship. The test results showed that all the variables in the study were stationery since the respective $p < .05$ level of significance. Data was analyzed using panel regression analysis model as indicated.

$$\text{Firm Performance}_{it} = \beta_0 + \beta_1 \text{FS}_{it} + \epsilon_{it} \dots\dots\dots 1$$

$$\text{Financial Leverage}_{it} = \beta_0 + \beta_1 \text{FS}_{it} + \epsilon_{it} \dots\dots\dots 2$$

$$\text{Firm Performance}_{it} = \beta_0 + \beta_2 \text{Leverage}_{it} + \beta_2 \text{FS}_{it} + \epsilon_{it} \dots\dots\dots 3$$

Where; Equation (1) establishes direct effect of independent variable on the dependent variable, equation (2) was used to see how the mediator was affected by the independent variable and equation (3) shows how mediator affects the dependent variable when direct effect of independent variable was controlled. Using panel data regression, after performing appropriate Hausman tests to identify the most effective and efficient regression model.

RESULTS AND DISCUSSIONS

Results from the first equation of the mediation model using fixed effect regression model revealed the following relationship between firm size and financial performance.

Table 1 Fixed Effect Model: Influence of Firm Size on Financial Performance

.xtreg Performance Firm Size, fe						
Fixed – effects (within) regression		Number of obs	=	79		
Group variable : Year		Number of groups	=	10		
R – sq: within	= 0.2031	Obs per group: min	=	7		
Between	= 0.0809	avg	=	7.9		
Overall	= 0.1530	max	=	8		
		F (1, 68)	=	17.33		
Corr (u_i, xb) = -0.0667		Prob > F	=	0.0001		
Performance	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval
Firm Size	.5790533	.1390816	4.16	0.000	.3015203	.8565863
_cons	-.6388836	.0361198	-4.67	0.066	-.9120639	-.3657032
sigma_u	.0768989					
Sigma_e	.15482175					
Rho	.19788504 (fraction of variance due to u_i)					
F test that all u_i=0:		F(9, 68)	=	1.96	Prob > F = 0.0571	

Source: Field Data, 2018

Equation (1) $Firm\ Performance_{it} = \beta_0 + \beta_1 FS_{it} + \epsilon_{it}$ Where; FS-Firm size

From the output, it is evident that the mediation model as shown by equation 1 is significant. The model reveals that the independent variable (firm size) has statistically significant effect on the dependent variable (financial performance), as reflected by $t=4.16 > 1.96$, $p < .05$. Firms size explained 15.3% (R-square =.1530) of the variance in financial performance. Evidently, from intra-class correlation, 19.7% (rho=.1978) of the variance is due to differences across panels. However, there is enough evidence to conclude that firm size has statistically significant effect on the financial performance of sugar firms in Western Kenya.

Equation (2) of the mediation model is:

$Financial\ Leverage_{it} = \beta_0 + \beta_1 FS_{it} + \epsilon_{it}$ Where; FS-Firm size

To develop the equation, the study used panel data regression analysis, with firm size used as the predictor variable and financial leverage, as the mediator variable. Firm size was measured as natural logarithm of sales revenue, while financial leverage was computed from debt ratio and debt equity as shown below.

Table 2: Panel Analysis: Random Effect Regression Model of Firm Size on Financial Leverage

.xtreg Leverage Firm Size, fe						
Random - effects GLS 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, X) = 0 (assumed)			Wald chi2(1)	=	15.23	
			Prob > chi2	=	0.0001	
Firm size	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval
Leverage	-2.801972	.7180492	-3.90	0.000	.4.209323	.-1394622
_cons	4.559819	.7215959	6.32	0.066	3.145517	5.974121
sigma_u	.46198823					
Sigma_e	.80676421					
Rho	.24694288 (fraction of variance due to u_i)					

Source: Field Data 2018

The table above reveals that the model is statistically significant as indicated by Wald chi2=15.23 and p=0.0001, implying the model was a good fit for the data and adequate to predict the relationship between the two variables. Firm size has statistically significant effect on financial leverage (p=.000 <.001) and about 13.2% ($R^2 = .1322$) of the variance in firm performance is explained by financial leverage. However, 24.7% (rho=.2469) of the variance is due to differences across panels. It was concluded that firm size has statistically significant effect on the financial leverage among sugar firms of Western Kenya thereby validating the hypothesis.

Table 3: Correlation Analysis on Financial Performance and Financial Leverage

. correlate ROA ROE Debt Ration Debt Equity (obs = 80)				
	ROA	ROE	Debt Ratio	Debt Equity
ROA	1.0000			
ROE	0.9427	1.0000		
Debt Ratio	-0.1729	-0.3041	1.0000	
Debt Equity	-0.1979	-0.4167	0.8595	1.0000

Source: Field Data, 2018

The correlation analysis table above shows that the relationship between the indicators of financial leverage (Debt ratio and Debt to equity) and individual indicators of financial performance (Return

on Assets and Return on Equity) had negative correlations. Although, all of them reflected reciprocal relationship with each other, return on asset and debt ratio had negative but the least correlation with each other.

Equation 3. Mediation Equation model

$$\text{Firm Performance}_{it} = \beta_0 + \beta_1 \text{Leverage}_{it} + \beta_2 \text{FS}_{it} + \epsilon_{it} \dots\dots\dots 3$$

This step of mediation model requires that when dependent variable (financial performance) is regressed on independent variable (firm size) as well as mediating variable (financial leverage), both explanatory variables should turn out to be significant. Moreover, the size of coefficient of independent variable (firm size) should change.

Table 4 : Financial Performance Regressed on Firm Size and Financial Leverage

.xtreg F. Performance Firm Size, Leverage fe						
Fixed – effects (within) regression		Number of obs		=	79	
Group variable : Year		Number of groups		=	10	
R – sq: within = 0.2967		Obs per group: min		=	7	
Between = 0.0178		avg		=	7.9	
Overall = 0.2017		max		=	8	
Corr (u_i, xb) = -0.1860		F (2,67)		=	14.13	
		Prob > F		=	0.0000	
F.Performance	Coef.	Std. Err.	T	P> t	[95% Conf.	Interval
Firm Size	.3936745	.1455527	2.70	0.009	.1031501	.6841988
F.Leverage	-.0657438	.0220261	-2.98	0.004	-.1097082	-.0217794
_cons	-.3381125	.1641433	-2.06	0.043	-.6657439	-.010481
sigma_u	.8457527					
Sigma_e	.1465344					
Rho	.24988297 (fraction of variance due to u_i)					
F test that all u_i=0:		F(9, 67) = 2.52		Prob > F = 0.0151		

Source: Field Data, 2018

Table 4 confirms that the first condition is met, that is both explanatory variables are significant; firm size (p=0.009) and financial leverage (p=0.004) have significantly significant effect on financial performance. Secondly, when financial performance variable was regressed on firm size as well as financial leverage, a part from both explanatory variables turning out to be statistically significant, the magnitude of the coefficient of firm size changed from approximately 0.579 (Table 1) to approximately 0.393 (Table 4). From this it can be concluded that financial leverage does indeed play a mediation role in financial performance determination. Similarly, the size of mediation or indirect effect, as was given by the product of the coefficient of independent variable (firm size =-2.8019) in Equation (2) and the coefficient of mediation variable (financial leverage= -

.0657) in Equation (3). The estimate of this product turns out to be approximately 0.184. This amount approximately equals the .186 change in the estimate ($0.579 - 0.393 = 0.186$) of the coefficient of firm size due to inclusion of financial leverage in the model.

The comparative analysis of the regression results of both the un-mediated model and the model upon mediated by financial leverage, show that the introduction of financial leverage as mediator increases the predictive power from 15.3% ($R^2 = 0.1530$) for the un-mediated model to 20.2% ($R^2 = .2017$). The change in R^2 equivalent to 0.0487 implies that there is about 4.9% increase in the variation explained by the addition of financial leverage. The ANOVA results from fixed effect regression model indicates that there is a statistical significant mediating effect of financial leverage on the relationship between firm size and financial performance among the sugar firms in Western Kenya [$F(2, 67) = 14.13, p = 0.000 < .005$].

A general regression prediction model was developed as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon.$$

Where Y = Financial performance; X_1 =Firm size; X_2 =Debt ratio; and X_3 = Debt to Equity

Thus, the predicated optimum level of financial performance among sugar firms in Western Kenya was represented by:

$$Y = -.3592 \text{ units} + 0.3995X_1 \text{ units} - 0.0037X_2 \text{ units} - 0.0379 X_3 \text{ units} + \text{error}$$

From the model, the coefficients indicate how much financial performance varies with a variable when all other variables are held constant. For example, for each one unit increase in firm size, there is ensuing improvement in the level of financial performance by 0.3995 units. On the contrary, for each one unit increase in the debt/equity there is an ensuing drop of financial performance among the sugar firms by .0369 units. Hence, it is concluded that there was statistically significant mediation effect of financial leverage on the effect of firm size on financial performance among sugar firms in Western Kenya.

The above findings are in tandem with that of Vithessonthi and Tongurai, (2014) who investigated the effect of firm size on the relationship between financial leverage and financial performance in Thailand using multiple regression analysis on a sample of 170013. His findings revealed that the magnitude effect of financial leverage on financial performance was non-monotonic but conditional on firm size. They also established a negative relationship between financial leverage and financial performance on larger firms but a positive one with smaller firms. The findings also agree with that of Yoon and Jang, (2005) who investigated the relationship that exists between Financial Performance as reflected by ROE, Financial leverage and Firm size in US firms for the period 1998 to 2003 using ordinary least square regression model and established that firm size had dominant effect on ROE than financial leverage.

SUMMARY OF RESEARCH FINDING

The study sought to investigate the mediating effect of financial leverage on the relationship between firm size and financial performance of sugar firms in Western Kenya. The study yielded a

significant mediating effect of financial leverage on the relationship between firm size and financial performance. The findings from the comparative analysis of the regression results established that un-mediated model and the model upon mediated by financial leverage, show that the introduction of financial leverage as mediator increases the predictive power of firm size from 15.3% ($R^2 = 0.1530$) to 20.2% ($R^2 = .2017$). The change in R^2 equivalent was 0.0487 indicating that there was about 4.9% increase in the variation explained by the addition of financial leverage in the model. The results indicates that there is a statistical significant mediating effect of financial leverage on the relationship between firm size and financial performance among the sugar firms in Western Kenya [$F(2, 67) = 14.13, p = 0.000 < .005$]. Hence, the hypothesis that there is no significant mediating influence of leverage on the relationship firm size and financial performance was rejected and conclusion reached that there is statistically significant mediating effect of financial leverage on the relationship between firm size and financial performance.

CONCLUSION AND RECOMMENDATIONS

The findings of the study concludes that financial leverage has a significant mediating influence on the relationship between firm size and financial performance of sugar firms in Western Kenya. This conclusion was derived from the increase in predictive power by 4.9% after introduction of the mediating variable term in the primary model. Therefore, the importance of financial leverage cannot be overemphasized since it influences the likelihood of financial performance. The study recommends the adoption of the best practices in control level of financial leverage that will go a long way in enhancing financial performance. The other recommendation of the study is that it's necessary for the managers of sugar firms to expand firm size so as to enjoy the benefits of economies of scale in financial performance. Future researchers could consider out carrying out similar studies on non-agricultural firm to assess any variation in results.

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