Does Firm Size Moderate the Relationship Between Working Capital Level and Firm Profitability?

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Abstract

This study is aimed at investigating whether firm size moderates the relationship between working capital level and profitability of manufacturing firms in Uganda. The study was based on theResource – Based Theory and it is to do with resources invested in the firm and much emphasis is put on the short term assets. The study used secondary data and applied simple and stratified sampling techniques. The unbalanced pooled panel data analysis of cross sectional and time series was employed. A record survey sheet was used to collect data and there after diagnostic tests was carried out for normality and data was fairly normally distributed and also showed a linear relationship which is a condition for parametric data. A total population of 169 manufacturing firms was considered and a sample of 116 was taken into consideration giving a response rate of 27% as only 31 firms were able to avail information. Results showed R^2 = .155, F (3, 85) = 5.185, P< .05. The interaction termwas not significant thus (β = .001, P > .05). Findings revealed that the moderating influence of firm size on the association between working capital level and firm profitability was not statistically significant and consequently the null hypothesis was not rejected. It can be concluded that size does not moderate the relationship between working capital level and firm profitability.

Keywords: Profitability, firm size and working capital level

INTRODUCTION

Firm Size is a featurespecific to any business and is often regarded as what defines the difference between firms (Snow & Hrebiniak, 1980). This feature is also commonly referred to as a firm level factor. Ayyagari, Ashi and Vojislav (2005) assert that size may attribute to the success or failure of the firm since this characteristic is a context upon which a firm is operationalized. It is fundamental since it is regarded as establishing the organizational competences of a firm's core strength. Firm level factors portray how the firm changes, adapts to its environment and these include age, firm size, regulatory frame work, asset growth, sales growth among others.

This study investigated one of the key firm characteristics, firm size because it is one of the most popular variables used by theorists to classify levels of a firm and so can be relied upon (Salimath, 2008). Organizations that have been in existence for a long time are normally large in size and can therefore access external financing more easily with favourable terms and their WC (working capital) is improved (Caballero et al. (2010). They also assert that firmsize has a positive correlation to its working capital.

Objective of the study: To examine the moderating effect of firm size on the association between working capital level and manufacturing firms' profitability in Uganda.

Null hypothesis (H₁): The moderating influence of firm size on the association between working capital level and manufacturing firms' profitability in Uganda is not significant.

Theoretical Foundation
The study is based on the Resource - Based Theory as business survival depends on the resources invested in the firm in various forms. The size of a firm is highly dependent on the investment into the business.

Empirical Literature Review

Working Capital Level, Firm Size and Profitability
Having investigated Working Capital Management (WCM) as well as firm profitability in the United Kingdom(UK) for three years (2006 – 2008) using a sample of 30 UK firms, Chatterjee (2010) analysed and discovered a negative connection between profitability and liquidity of the UK firms and that a progressive association manifests with size and returns. Results recommend that the managers could improve returns by bringing down both receivable and inventory days outstanding and to take an elongated to pay less profitable firms. Nevertheless, the study dwelt on a developed economy and such findings cannot be compared to developing economies like Uganda because of differences in endowment.

Abdu and Mohamed (2007) investigated the influence of various constructs of WCM and existing proportion of the net profit of companies quoted on KSE in Pakistan from 1999 up to 2004 and a sample of 94 firms was considered. Correlation and regression analyses were employed and the findings exhibited a negative association between the constructs of WCM and profitability implying that as CCC (cash conversion cycle) rise, profitability reduced. They also discovered that liquidity and profitability did not relate positively while firm size and profitability related positively and finally a negative relationship was displayed between debt and profitability.

Chatterjee (2010) inspected the effect of WCM on profitability of firms registered in the London Stock Exchange (LSE) for a three-year period (2006 – 2008) applying a sample of 30 UK firms. The researcher discovered that there existed a remarkable negative link between profitability and liquidity of the companies operating in UK and that a positive association manifests between firm size and its profitability. The outcome indicates that the managers can ensure production through bringing down days receivable outstanding and days inventory outstanding and to take a longer time to pay less profitable firms. Three years may not be long enough to compare profitability so five or more years may bring out better comparison for the period.

A study was done with the use of Pearson Bivariate Correlation and regression analysis, by Almazari (2013) and this was undertaken to examine the relationship between WCM and firms' profitability for cement firms in Saudi. A sample of 8 Saudi firms listed on the Saudi Stock Exchange (SSE) was considered from (2008 – 2012) and this sample appeared so small as it would translate int a very big standard error which was likely to bias results. The study findings were that firms' current ratio affected profitability most. The regression tests done confirmed an association between the variables.

METHODOLOGY

This section represents the methodology that was used in the study, an un balanced panel was applied on cross sectional and time series. The cross sectional referred to the different manufacturing firms and time series was for a period of five years.

Data Analysis

Data was cleaned by checking for omissions, and entry errors. Descriptive statistics like frequency distributions, graphs, mean scores, standard deviations and coefficient of variation were used to ascertain the basic features of the data. Pearson product moment correlation (r) analysis was made to determine the direction of association among variables and in addition, hierarchical linear regression was used where by an outcome variable was predicted as a function of a linear combination of one or more variables. Hierarchical regression was used to assess the link between a set of independent variables and that of dependent variables, with a keen concern on the impact of various sets of independent variables on the dependent variables. Hierarchical multiple regression requires that outcome variables be metric and predictor be metric or non – metric.

RESULTS

**Relationship between Working Capital Level (WCL) and profitability moderated by Firm Size**

$$P_{it} = \beta_0 + \beta_1 WCL_{it} + \beta_2 Size_{it} + WCL*Size_{it} + \mathcal{E}_{it}$$

Firm Size (FS) was measured using log (Total assets) while WCL was measured using cash position ratio (CPR). Firm size was calculated as the logarithm to base ten of total assets $(Log_{10} TA)$.

Table 1: Tests of Normality of the Study Variables using Shapiro – Wilk test

Variables	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
Return on Assets	.974	89	.072
Working Capital Financing Approaches	.887	89	.000
Cash Position Ratio	.529	89	.000
Days Sales Outstanding	.386	89	.000
Days Inventory Outstanding	.131	89	.000
Firm Size	.976	89	.102

Source: Author, 2020
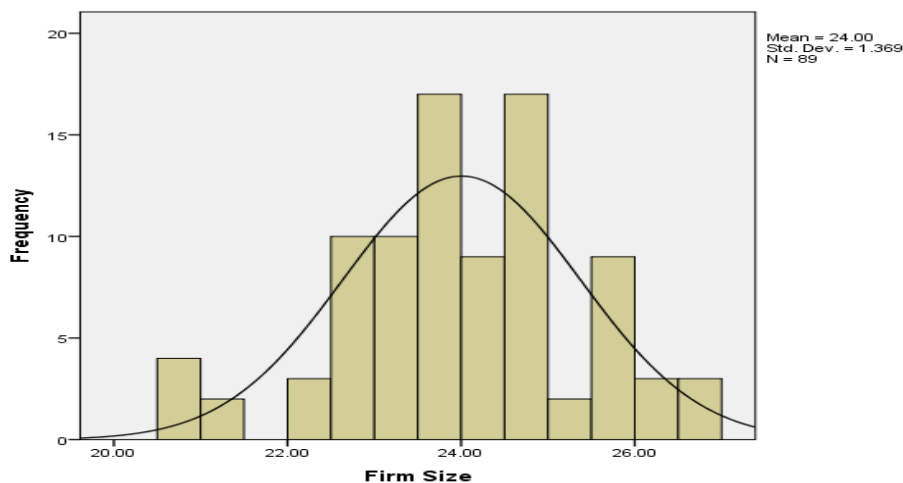
Figure 1: Testing for Normality on Size after Data Transformation

The moderator firm size met the assumption of normality when it showed a statistic of .976 and a p – value > than .05 as indicated in table 1.

Descriptive statistics
Variables that commonly provide insight into a firm's characteristic include size and age (Chen &Hambrick (1995). A firm characteristic (FC) was measured using firm size and was computed as Natural log of total assets (log TA).

Table 2: Firm Size

	N	Minimum	Maximum	Mean	SD
Firm Size (log TA)	89	20.64	26.80	24.00	1.37

Source: Author, 2020

The results in Table 2 showed that Firm Size as a characteristic had a mean of 24.0 with a minimum of 20.6, a maximum of 26.8 and SD of 1.37. Most of the firms considered had size that did not deviate from the mean a lot meaning that firms had reasonable number of assets.

Correlation Analysis
The correlation coefficient is a standardized measure of an observed effect and therefore, it is used to measure the size of an effect and that values $^+$.1 represent a small effect, .3 is a medium effect and .5 is a large effect (Field, 2009).

Table 3: Pearson Product-Moment Correlations between Return on Assets, Firm Size, Working Capital Financing, Cash Position Ratio, Days Sales Outstanding and Days Inventory Outstanding

Scale	1	2	3	4	5	6
1. Return on Assets	1	.143	.030	-.087	.095	-.390**
2. Working Capital Financing		1	-.343**	.108	.083	-.437**
3. Cash Position Ratio			1	-.070	.117	.043
4. Days Sales Outstanding				1	.234*	.311**
5. Days Inventory Outstanding					1	.099
6. Firm Size						1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Relationship between ROA (Return on Assets) and size is negative, moderate and statistically significant ($r = -.390$, $p< .01$) and this implies that as size increases, ROA reduces significantly. Relationship between CPR and size was very weak and non – statistically significant ($r = .043$, $p< .01$) and this implied that as size increased, CPR increased but with a very small change. The relationship between DSO (Days sales outstanding) and DIO (Days inventory outstanding) is positive, weak and statistically significant ($r =.234$, $p< .01$) implying that as DIO increases, DSO increases as well with a significant change. The relationship between DSO and size is moderate and statistically significant ($r = .311$, $p< .01$) implying that as size increases, DSO increases with a moderate effect. Results also showed a very weak, positive and not statistically significant relationship between DIO and size ($r = .099$, $p< .01$) and this implied that as size increases, DIO increases though with a very trivial change.

Hypotheses Testing
The Null hypothesis tested the moderating effect of firm characteristics on the relationship of WCL and profitability.

The Moderating Effect of Firm Size on the Relationship between WorkingCapital Level and Profitability of Manufacturing Firms in Uganda

The objective of this study was to determine the effect of firm size on the relationship between working capital level and profitability of manufacturing firms in Uganda. The study predicted that the moderating effect of firm size on the relationship between WCL and profitability of manufacturing firms in Uganda is not statistically significant. Hierarchical multiple regression analysis was utilized in assessing if the association between working capital level (measured using CPR) and profitability was moderated by the size of firm. To assess the effect of size of the firm on the association between WCL and profitability, the following hypothesis was tested.

Hypothesis 1: The moderating influence of firm size on the relationship between working capital level and industrial firms' profitability in Uganda is not significant.

Baron and Kenny's technique (1986) was employed in assessing the moderating effect. In order to test moderating effect, first there is need to forecast the outcome of dependent variable (ROA) from the predictor variables (WCL and Firm Size). Normally the model ought to be significant. In addition, the independent variables and the moderator are centered and interaction term formed through multiplication of the moderator and the independent variable moderator (CPR*Size). The interaction term is then put in the regression equation to determine whether the moderator variable alters the strength of the causal relationship. The R^2 change and interaction term should be significant ($p<.05$). If both are significant, then moderation is occurring. In the first step, outcomes of hierarchical multiple regression foreseeing ROA from Working Capital Level (evaluated with the use CPR) as well as firm size are reported in Table 4.

Table 4: Model Goodness of Fit with Profitability (ROA) as Dependent Variable and Working Capital Level (CPR), Firm Size and Interaction Term (CPR*Size) as Predictors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.393[a]	.154	.135	.03410	.154	7.844	2	86	.001
2	.393[b]	.155	.125	.03430	.000	.042	1	85	.839

a. Predictors: (Constant), Firm Size, Cash Position Ratio
b. Predictors: (Constant), Firm Size, Cash Position Ratio, Interaction term (CPR*Size)

Model 1 (The multiple regression model) formed Adjusted R^2 = .154, F (2, 86) = 7.844, $p<$ .05 Model 2 demonstrates a statistically significant association between ROA, CPR (independent variable) and Firm Size (moderator). The variability accounted for by firm size and WCL (measured using CPR) on profitability is 15.4% leaving 84.6% to be explained by other factors.

In model 2 (step 2), the intermingling between CPR and Firm Size (CPR*Size) was put in the regression equation. The change in variance accounted for (ΔR^2) was equalizing to .042, which demonstrated no statistically significant rise in variance accounted for beyond the step 1 model as given in Table 4. Model 2 demonstrates that the association betweenROA, CPR, Firm Size and the interaction term (CPR*Size) together was statistically significant, R^2 = .155, F (3, 85) = 5.185, $p<$ .05 as given in Table: 4. Model 2 accounted for 15.5% of the variance in ROA (R^2 =.155) leaving 84.5% to be accounted for by other factors.

Table 5: Model Overall Significance with Return on Assets as Dependent Variable and Working Capital Level (CPR), Firm Size and Interaction Term (CPR*Size) as Predictors

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	.018	2	.009	7.844	.001[b]
1	Residual	.100	86	.001		
	Total	.118	88			
	Regression	.018	3	.006	5.185	.002[c]
2	Residual	.100	85	.001		
	Total	.118	88			

a. Dependent Variable: Return on Assets
b. Predictors: (Constant), Firm Size, Cash Position Ratio
c. Predictors: (Constant), Firm Size, Cash Position Ratio, Interaction term (CPR*Size)

As displayed in Table 6, prior to contemplation of the interaction term (model 1), the regression coefficient (β) value of CPR was .002 with a t-test of .474 and significance level (p-value) of .637. The regression coefficient (β) value of Firm Size was -.011 with a t-test of -3.949 and significance level (p-value) < .05. After consideration of the interaction term, the regression coefficient of CPR remained at .002 and it was not statistically significant (p>.05). The beta coefficient of Firm Size was -.010 and it was statistically significant (p<.05). The interaction term (CPR*Size) was not statistically significant (β=.001, p>.05) as shown in Table: 6.

Table 6: Model Regression Coefficients with Return on Assets as Dependent Variable and Working Capital Level (CPR), Firm Size and Interaction Term (CPR*Size) as Predictors

Model		Unstandardized Coefficients		t	Sig.	Collinearity Statistics	
		B	Std. Error			Tolerance	VIF
	(Constant)	.313	.064	4.864	.000		
1	Cash Position Ratio	.002	.004	.474	.637	.998	1.002
	Firm Size	-.011	.003	-3.949	.000	.998	1.002
	(Constant)	.311	.066	4.706	.000		
	Cash Position Ratio	.002	.004	.486	.628	.991	1.009
2	Firm Size	-.010	.003	-3.807	.000	.958	1.043
	Interaction term (CPR*Size)	.001	.003	.204	.839	.952	1.050

a. Dependent Variable: Return on Assets

This hypothesis (H_1) explored the relationship between ROA, working capital level (evaluated using CPR) and Firm Size in manufacturing firms in Uganda by suggesting that the moderating influence of firm size on the association between working capital level and profitability of manufacturing firms in Uganda is not significant. The value of R^2 change was .042 as shown in Table 4 and results were not statistically significant. The interaction term was not statistically significant (p>.05). This indicatesthat Firm Size has no moderating effect on the association between ROA and WCL and therefore null hypothesis was supported. The regression equation is as shown below:

$$ROA = .311 + .002CPR_{it} - .010Size_{it} + .001CPR*Size_{it} + \varepsilon_{it}$$

DISCUSSION

The objective was concerned with moderation of firm size on the relationship between working capital level and firm profitability. The null hypothesis stated that the moderating influence of firm size on the relationship between working capital level and firm

profitability is not significant. There could be a number of reasons why size of the firm may not reflect in firm profitability and according to the findings, size as a firm characteristic did not moderate the relationship between WCL and profitability.Size had a p – value > .05 meaning that the relationship was insignificant and by such it is very normal to think that a large establishment and large enough firm would be benefitting from economies of scale which interprets in being able to suffer low production costs compared to the smaller firms, whose production costs would automatically interpret in low profitability and this has not been the case. Despite the size, these firms have indicated low profitability as compared to smaller firms in the same industry and this could be due to nature of industry thus firms in food industry have different profit levels from those in other manufacturing industries due to differences in costs of production and the nature of products. Food industries like Hot loaf Ltd in Uganda produce goods with a short expiry date than other goods from other manufacturing industries of different sectors.

Firms in different industry may reflect low profitability regardless of size due to nature of goods produced. Consistent with the current study, Goddard, Tarakoli et al., (2005) analysed the European manufacturing and services industries and showed evidence that a firm's size had a negative relationship to profitability. Unlike this finding, Nunes&Serrasqueiro (2008) addressed that the size of small and medium firms had a positive and significant correlation with profitability whereas an insignificant relationship between size and profitability was observed in large Portuguese firms. Inconsistent with the study, Almazari, (2013) discovered that as size increases in a manufacturing firm, profitability increased. In the same vein Chatterjee, (2010) found that there exists a positive relationship between size of the firm and its profitability. Akoto et al (2013) assert that firm size significantly and positively affects profitability.

It can be argued that among the many reasons why size has had an insignificant reflection on firm profitability is the fact that firms have been able to adopt, develop or improve in many areas that have given them a competitive edge over others. This has been common especially with new firms that have redesigned their operation process that have enabled them to improve on the goods produced at a competitive price or that has kept them ahead of other long-standing firms, even with similar production in technology. Realization of good profitability may be highly dependent of good firm management, on the contrary, Banos – caballero et al. (2010), argues that larger firms usually get external financing more easily and under better conditions, so they tend to have more working capital. If external financing is not well managed, the firm will not bear fruit and this will have an effect on profitability.

CONCLUSION

In conclusion, manufacturers should bear in mind that a firm that is large in size may not translate into higher profitability. A large firm requires a high level of resources in different forms and is expected to have better performance than a smaller firm but may not meet the expectations and yield the profit required. Firms in different industry may reflect low profitability regardless of size due to the nature of goods and other factors.

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