EFFECT OF LEVERAGE ON PROFITABILITY AND MARKET PERFORMANCE IN THE MANUFACTURING SECTOR OF SRI LANKA: A PANEL REGRESSION ANALYSIS

S.M.R.K. Samarakoon[1], U.E.S. Kumara[2] and U.G.V.D.D. Gunarathne[3]
Department of Accountancy, Wayamba University of Sri Lanka, Kuliyapitiya, Sri Lanka
[1]ruwankithsirisamarakoon@yahoo.com [2]emilkumara@yahoo.com
[3]deepa.gunaratne@gmail.com

ABSTRACT

This paper presents an analysis which explains the impact of two distinct forms of leverage that arises due to the financing activities and operational activities, upon the profitability and market performance of a firm. The sample consists of twenty eight listed companies in the manufacturing sector of Colombo Stock Exchange, and data is gathered for the period 2008-2012. Study discusses the explanatory power of Financial Liability Leverage (FLEV), Operating Liability Leverage (OLLEV), and Total Leverage (TLEV) on Profitability and Market Performance. While profitability is measured by Return on Equity (ROE), Return on Assets (ROA) and Return on Net Operating Assets (RONOA), market performance is proxied by Price to Book value ratio (PB), Price Earnings ratio (PE), Market Capitalization (LGMCAP) and Tobin's Q. Panel regression analysis is employed where fixed effects and random effects are tested to select the best suited model. The findings revealed that relationship between leverage and profitability best describes by the RONOA model and where OLLEV and FLEV exhibit a positive significant impact on the RONOA. While FLEV affects the ROA negatively and significantly, there is a negative significant relationship between TLEV and ROE. Only LGMCAP is captured by OLLEV and TLEV positively and negatively respectively. Accordingly LGMCAP model is the best suited model to explain the relationship between leverage and market performance.

Key words: Leverage, Profitability, Market Performance, Manufacturing Sector, Sri Lanka

1. INTRODUCTION

When analyzing the capital structure of a firm an analysis of leverage plays a vital role. The leverage can be classified in to two specific categories as financial leverage and operating leverage. The financial leverage arises due to the use of funds with fixed- charge commitments. Any firm which employs financial leverage is intended to earn more return on the fixed charge funds than their costs. Such a surplus or deficit will increase or decrease the return on the owners' equity. Hence, the rate of return on the owners' equity is levered above or below the rate of return on the total assets.

The operating leverage arises due to the determination of a firm's cost as variable and fixed. If a firms cost structure includes a relatively higher proportion of fixed

expenses which may lead to an operating leverage. On the other hand, the total leverage of a firm is affected by both fixed operating expenses and fixed financial expenses. In fact, the variable cost is beyond the control of the management because it varies as per the volume of sales made or services provided. However, the fixed cost can be controlled, and relatively lower fixed cost is an indication of managerial efficiency. The firms with higher fixed cost are exposed to higher leverage, and ultimately it may affect the profitability as well. However, the degree of impact towards the profitability resulted by the leverage may be determined by the operational effectiveness of the firm. The empirical evidences in Sri Lanka emphasize that there is a Value Relevance for accounting information (Vijitha P. and Nimalathasan B, 2014, and Karunarathne W.V.A.D. and Rajapakse R.M.D.A.P, 2010). If there is such, investors would not demand for stocks of highly leveraged firms, and lower demand for shares will decrease the share prices. The declined share prices result in lower market performance. Accordingly, the objective of the current study is to examine the influence of leverage for a firm's profitability and its performance in the stock exchange.

The standard measure of leverage is total liabilities to equity. However, liabilities are taken in to account as a single amount in this measurement. Some of these liabilities arise because of the financing activities e.g. bank loans, bonds issued etc. and the others arise as a result of the operating activities e.g. trade payables, deferred revenues and pension liabilities etc. When considering the financing liabilities, they are traded in well-functioning capital markets. On the other hand, firms can add value in operations because operations involve trading an input and output that are less perfect than the above mentioned capital markets. Thereby, when analyzing the equity, there are significant reasons for distinguishing the operating liabilities from financing liabilities.

In this study it is questioned, whether a rupee of operating liabilities in the balance sheet is priced (effect on market performance) and contributed to profitability (effect on profitability) differently from a rupee of financing liabilities. In the standard equity analysis, operating liabilities are not distinguished from the financial liabilities. Therefore, in construction of specifications for the empirical analysis, this study presents an analysis that identifies the effects of both operating and financing liabilities on profitability and market performance using different proxies.

The leverage from operating liabilities typically levers profitability more than financial leverage. However, the operating liability leverage analyzed in this study should not get confused with the operating leverage; a measure which is used to indicate the proportion of fixed and variable costs in a firm's cost structure. Accordingly, the total leverage is formed by the aggregation of operating liability leverage and financial leverage.

2. REVIEW OF LITERATURE

The scholarly interest related, evolved with a variety of focuses and environments. Many of prior work concentrated on the fact of studying the impact of leverage or its subdivision upon the profitability, dividend policy and stock returns etc. And, the

other studies have conducted to discover whether the leverage or its subdivision become a determinant.

Among the vast literature, Chandrakumaramangalam, S and Govindasamy, P (2010) have studied the impact of leverage on profitability with reference to the selected cement companies in India. They have studied the relationship between Leverage (Financial leverage, Operational leverage and Combined leverage) and the Earnings per Share. The results suggested that the leverage as well as profitability and growth are related and the leverage is having an impact on the profitability of the firms. Also, It was suggested that the EPS of a company is not depended upon on the debt capital in capital structure and the profits can be increased by using debt capital structure due to tax advantage by Kharuna, S and Gupta, ML (2010) with their study on the impact of leverage on profitability of pharmaceutical companies in India. Further, they concludes that the optimal capital structure of companies is depended upon other factors like size, growth, uniqueness, profitability, collateral value of assets and not only on leverage.

Meanwhile, Yoon. E and Jang. SC (2005) studied the effect of financial leverage on profitability and risk of restaurant industry for the period of 1998-2003. The study presented on empirical insight into the relationship between return on equity, financial leverage and size of the firms. It was found that at least during the test period firm size had a more dominant effect on return on equity of restaurant firms than debt use, larger firms earning significantly higher equity returns. Returns also suggested that regardless of having lower financial leverage, smaller restaurant firms were significantly more risky than the larger firms. Further, it is proved that the debt in general don significantly affect the companies' profitability by Singapurawako. A and Wahid. MSME (2011). They arrived in to this conclusion, after studying the impact of financial leverage to profitability based on a sample of non financial companies from Indonesian stock exchange. The independent variable was the Return on Equity which is depended on Equity Multiplier, Total Asset Turnover, logistic of Total Assets and Bank Interest Rate.

In addition, Sachchidanand and Navindra (2012) carried on a study upon the influence of financial leverage on shareholders' return and market capitalization based on the automotive cluster companies of Pithampur, and it was concluded that there is no significant influence of financial leverage on shareholders' return and market capitalization. Also the study concludes that there might be other non-quantitative factors which may lead to nullify the impact of financial leverage on shareholders return like recession, saturation of auto industry, competition and government policy. It should be noted that financial leverage is a speculative technique and there are special risks and costs involved with financial leverage and specially noted that a financial leverage strategy will be successful during any period in which it is employed. With a similar study, Kose. E (2011) tested the effect of leverage on stock returns. The findings emphasize, that the higher short term leverage is associated with higher industry risk, lower investment, lower long term leverage, lower net long term debt issuance and higher current assets. Higher long term leverage and higher net long term debt issuance are associated with lower industry risk, higher investment, lower short term leverage and lower current assets.

On the other hand, Asif. A, Rasool. W and Kamal. Y (2011) tested the impact of financial leverage on dividend policy based on a sample selected (403 companies) from Karachchi stock exchange (year 2002-2008). Dividend Yield (DY), Debt Ratio (DR) and Change in Earnings (ΔE) had been used as the independent variables and Dividend per Share (DPS) used as the dependent variable. Panel data regression (fixed effect and random effect models) used for the analysis. The suggested model of this study is as follows.

$$DPS_{it} = \alpha_0 + \alpha_1 DR_{it} + \alpha_2 DY_{it-1} + \alpha_3 \Delta E_{it} + \varepsilon_{it}$$

It was found that change in earnings has no significant impact on dividend policy on case of Pakistani firms while the dividend yield has positive impact and vice versa. The fixed effect model supports only the significant effect of dividend yield on DPS. Besides, Franklin. J and Muthusamy. K (2010) found that the variables like growth in sales, price to book ratio, cash flow, leverage, liquidity and return on assets have a relationship with dividend payout ratio and EPS and PE ratio are negatively related to the dividend payout ratio by. A study conducted on leverage, growth and profitability as the determinants of dividend payout ratio based on a sample selected from the Indian paper industry derived this conclusion. The tested independent variables of the study include Growth in Sales, Earnings per Share, Price Earnings Ratio, Price to Book Ratio, Cash Flow, Leverage, Liquidity and Return on Assets.

With a completely different focus, Gill. A and Mathur. N (2011) studied on the factors that influence the financial leverage of the Canadian firms. The sample consisted with 166 Canadian firms listed on the Toronto stock exchange for a period of 3 years (2008-2010). The results showed that financial leverage of Canadian firms is influenced by the collateralized assets, profitability, effective tax rate, firm size, growth opportunities, number of subsidiaries and industry dummy.

Finally, the findings of Afza. T and Tahir. S (2012)'s study on the determinants of the price earnings ratio, being based on the chemical sector companies in Pakistan, can be summarized. In the study, PE ratio is the dependent variable which is depended on the Dividend Payout (DP), Tobin's Q (Q), Leverage (LEV), Market Return (Mktrtn), Variability in market price (VMP), Earnings Growth (Egrowth) and Corporate size (SIZE). They suggested the following model.

$$PE_{it} = \alpha + \beta_1 DP_{it} + \beta_2 Q_{it} + \beta_3 LEV_{it} + \beta_4 Mktrtn_{it} + \beta_5 VMP_{it} + \beta_6 Egrowth_{it} + \beta_7 SIZE_{it} + \varepsilon_{it}$$

Results demonstrated that the dividend payout ratio and Tobin's Q remain the most important determinants of the PE ratio for pooled as well as time series analysis.

3. METHODOLOGY

3.1 Sample Selection and Data Collection

The study carried out only on manufacturing companies which are listed in the Colombo stock exchange (CSE). Although there are several sectors in the CSE, the study focuses only on the manufacturing sector due to manufacturing sector has

relatively large investments on capital assets, and thereby those companies may access more to the debt market to finance those projects. Access more to the debt capital rather than equity may result higher financial leverage and large investments in property, plant and equipments affect the operating leverage as well. Furthermore there can be seen a clear distinction between the operating assets and financial assets as well as between the operating liabilities and financial liabilities on those firms.

Out of 37 listed manufacturing companies, only 28 companies are selected as the sample, and data will be gathered as panel data for a period of 5 years from year 2008 to year 2012. To address the study's issue three explanatory variables; Operating Liability Leverage (OLLEV), Financial Liability Leverage (FLEV) and Total Leverage (TLEV), are chosen, and Profitability and the stock market performance are the respond variables. While profitability is measured by using Return on Equity (ROE), Return on Assets (ROA), and Return on Net Operating Assets (RONOA), market performance is measured by Price-to-Book Value ratio (PB), Price Earnings ratio (PE), Market Capitalization (LGMCAP) and Tobin's Q.

3.2 Methods and Analytical Tools

Because of employing three proxies for profitability and four proxies for measuring market performance study tests seven panel regression models in total as follows.

Model 1: $ROE_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

Model 2: $ROA_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

Model 3: $RONOA_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

Model 4: $PE_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

Model 5: $PB_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

Model 6: $LGMCAP_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

Model 7: $TobinQ_{it} = \beta_0 + \beta_1 OLLEV_{it} + \beta_2 FLEV_{it} + \beta_3 TLEV_{it} + \varepsilon_{it}$

In overall, Coefficient of Correlation (R^2) is used to test the power of estimating of the models, and coefficients of each variable are tested at 5 percent significant level. If the respective P value of a variable is less than 0.05 it is considered as a significant variable in explaining the dependant variable.

Panel data models examine fixed and/or random effects of entity (individual or subject) or time. The core difference between fixed and random effect models lies in the role of dummy variables. If dummies are considered as a part of the intercept, this is a fixed effect model. In a random effect model, the dummies act as an error term. Park, Hun Myoung (2009) has distinguished between Fixed Effect Model and the Random Effect Model as follows (Table 1).

Table 1 Fixed Effect and Random Effect Models

	Fixed Effect Model	Random Effect Model
Functional form	$y_{it} = (\alpha + u_i) + X_{it}\beta + v_{it}$	$y_{it} = \alpha + X_{it}\beta + (u_i + v_{it})$
Intercepts	Varying across groups and/or times	Constant
Slopes	Constant	Constant
Estimation	LSDV, within effect method	GLS, FGLS
Hypothesis test	Incremental F test	Breusch-Pagan LM test

The fixed effect and random effect models are applied to estimate the effect of each independent variable on the dependent variables with an extension of least square process with no weights and white (diagonal) as the coefficient covariance method. Each model is tested with the fixed effect and random effect models separately, and R^2 supports the selection of either fixed effect model or random effect model. In the model selection process F test is also expected to be applied and where following hypothesis is to be tested at 5 percent significant level.

H_0: $\beta_1 = \beta_2 \ldots\ldots\ldots = \beta_k = 0$

H_1: at least one $\beta_i \neq 0$ (dependent variable depends on at least one independent variable)

4. DATA PRESENTATION AND ANALYSIS

4.1 Correlation Analysis

Pearson correlation was used to check the correlation among only independent variables and dependent variables. Table 2 shows that how the variables are correlated each other where only the significant correlations have been considered. However, Multi-colinearity among independent variables was ignored in the study.

Table 2 Correlation Analysis

Variables		ROE	ROA	RNOA	LGMCAP
OLLEV	Coefficient (Probability)	-0.19432 (0.02140)*	-0.2657 (0.0015)*	-	-0.23487 (0.00520)*
FLEV	Coefficient (Probability)	-	-	0.97419 (0.0000)*	-
TLEV	Coefficient (Probability)	-0.15351 (0.07020)**	-0.24461 (0.00360)*	-	-0.27063 (0.00120)*

*significant at 5 percent level

**significant at 10 percent level

Accordingly, ROE, ROA and LGMCAP are negatively correlated with OLLEV and TLEV. These correlations are significant at 5 percent significant level except the correlation between ROCE and TLEV. There is a positive and strong correlation between FLEV and RNOA.

4.2 Panel Regression Analysis

4.2.1 ROE against OLLEV, FLEV and TLEV (Model 1)

As per the Table 3, both models indicate that OLLEV and FLEV have not been significant in predicting ROE because respective P values are higher than 0.05 at 5 percent significant level accepting the null hypothesis. However, they have a positive relationship with ROE. In terms of TLEV, a similar result is given by the models showing a negative and significant relationship with ROE. As far as R^2 is concerned, comparatively fixed effect model is in a good position in predicting ROE than the random effect model because it explains nearly 72 percent from the model. Therefore the fixed effect regression model is the best fitting model for explaining ROE.

Table 3 ROE against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	0.139392	0.0000	0.137230	0.0000
OLLEV	0.029639	0.4039	0.016345	0.6831
FLEV	0.000325	0.8094	0.000116	0.9195
TLEV	-0.068317	0.0186	-0.060223	0.0114
R^2	0.721586		0.079111	
F-statistic (Probability)	8.004018 (0.000000)		3.894434 (0.010452)	

The F statistics also proves that the validity of the fixed effect model rejecting the null hypothesis at 5 percent significant level because its respective P value is less than 0.05. Accordingly, ROE depends on at least one independent variable of the model.

4.2.2 ROA against OLLEV, FLEV and TLEV (Model 2)

Table 4 ROA against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	0.073786	0.0000	0.080488	0.0002
OLLEV	0.009988	0.5989	0.005050	0.7945
FLEV	-0.001880	0.0236	-0.001717	0.0063
TLEV	-0.020886	0.2526	-0.029598	0.0855
R^2	0.663506		0.053636	
F-statistic (Probability)	6.089448 (0.000000)		2.569295 (0.056926)	

Table 4 illustrates that OLLEV and TLEV are not significant variables in both models to explain the changes in ROA because P values of both variables do not support to reject null hypothesis at 5 percent significant level. However ROA's relationship with OLLEV has been positive and with TLEV it is negative, and FLEV has significant negative relationship with ROA. R^2 ensures that the fixed effect model is the best suited model to cover up ROA having nearly 66 percent. Selection of this model is further supported by the P value of F-statistic rejecting the null hypothesis.

4.2.3 RONOA against OLLEV, FLEV and TLEV (Model 3)

Table 5 RONOA against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	-1.119221	0.0249	-0.935173	0.0310
OLLEV	5.846554	0.0000	7.002688	0.0000
FLEV	5.943503	0.0000	6.122823	0.0000
TLEV	-4.165755	0.0002	-4.920714	0.0000
R^2	0.975876		0.964658	
F-statistic	124.9288		1237.388	
(Probability)	0.000000		0.000000	

Table 5 indicates that all the variables in the both models have been significant at 5 percent significant level with equal sign. Accordingly, both OLLEV and FLEV have a positive relationship with RONOA and relationship between TLEV and RONOA has been negative. Either model can be applied to forecast the changes in RONOA because of higher R^2 values. However fixed model is the most appropriate one with relatively higher R^2. The same assurance is given by the results of F test.

4.2.4 PE against OLLEV, FLEV and TLEV (Model 4)

Table 6 PE against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	32.44346	0.2540	45.21850	0.0502
OLLEV	-49.20333	0.4837	-12.26830	0.8751
FLEV	-1.449309	0.4051	0.618837	0.3961
TLEV	62.76212	0.3353	29.25568	0.5733
R^2	0.198655		0.005666	
F-statistic	0.765577		0.258340	
(Probability)	0.811526		0.855281	

With regards to results reported in table 6, considering the significance of individual variable and their nature of relationship with PE is worthless due to neither fixed effect nor random effect models are fitting with poor R^2 values. The results of the F test have also revealed the invalidity of both models in forecasting PE.

4.2.5 PB against OLLEV, FLEV and TLEV (Model 5)

Table 7 PB against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	4.074759	0.0000	4.561492	0.0478
OLLEV	0.755740	0.4239	1.269049	0.1081
FLEV	0.004925	0.9000	0.000402	0.9837
TLEV	0.083863	0.9214	-0.849216	0.2508
R^2	0.887289		0.004161	
F-statistic	24.31141		0.189420	
(Probability)	0.000000		0.903456	

As per the Table 7, irrespective whether the nature of the model, all the explanatory variables have become insignificant in capturing the behavior of PB. Therefore it prevents validity of the explanatory power of R^2.

4.2.6 LGMCAP against OLLEV, FLEV and TLEV (Model 6)

According to the Table 8, only the fixed effect model can be adopted because of its higher explanatory power with regards to R^2, and where only OLLEV and TLEV are the significant variables and they have positive and negative relationships with LGMCAP respectively. The selection of fixed effect model is also evidenced by the F statistic.

Table 8 LGMCAP against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	21.06446	0.0000	21.08590	0.0000
OLLEV	0.322570	0.0116	0.337735	0.0012
FLEV	-0.001495	0.6738	-0.001203	0.8225
TLEV	-0.309449	0.0034	-0.348103	0.0001
R^2	0.964576		0.071359	
F-statistic	84.08986		3.483512	
(Probability)	0.000000		0.017693	

4.2.7 Tobin's Q against OLLEV, FLEV and TLEV (Model 7)

It can be observed in the Table 9 that the insignificance of the all independent variables in forecasting Tobin's Q at 5 percent significant levels. This leads to the omission of selecting either model ignoring the goodness of fit criteria.

Table 9 Tobin's Q against OLLEV, FLEV and TLEV

Variable	Fixed Effect Model		Random Effect Model	
	Coefficient	Probability	Coefficient	Probability
C	3.026991	0.0000	3.320031	0.0217
OLLEV	0.299817	0.6888	0.632242	0.3092
FLEV	0.002275	0.9376	-0.004405	0.7851
TLEV	-0.099512	0.8746	-0.668084	0.2588
R^2	0.869847		0.003602	
F-statistic	20.63955		0.163888	
(Probability)	0.000000		0.920520	

5. CONCLUSIONS

The main purpose of this study was to shed some light into the association between leverage and profitability and association between leverage and market performance, by employing a sample of companies listed under the manufacturing sector in the Colombo Stock Exchange for the period 2008-2012.

The study employed Operating liability Leverage, Financial Leverage and Total Leverage to measure the leverage. Profitability and market performance measured by utilizing Return On Equity (ROE), Return On total Assets (ROA), Return On Net

Operating Assets (RONOA), Price Earnings ratio (PE), Price To Book ratio (PB), Market Capitalization (LGMCAP) and Tobin's Q ratio. As a result, seven models were formed and tested. Panel data were utilized to verify the null hypothesis with the help of regression analysis while fixed effects model and random effects model, coefficient of correlation and descriptive statistics were applied, wherever needed.

It was found that there is a significant relationship between the total leverage and ROE. The total leverage of a manufacturing firm affects to the ROE of the firm. Although financial leverage and operating liability leverage subscribed for the total leverage, their individual effect on ROE is not significant. When considering the ROA, the regression results indicates that financial leverage affects to the ROA significantly and it was surprisingly negative. However OLLEV and TLEV are not significantly affecting to the ROA. The most interesting finding is the relationship between RONOA and the leverage. OLLEV and FLEV exhibit a positive significant impact on the RONOA where as that effect reduces by TLEV which demonstrates a negative significant effect on RONOA.

Surprisingly, price earnings ratio and price to book ratio of the manufacturing sector companies were not significantly affected by the leverage. However, market capitalization is significantly affected by the operating liability leverage and total leverage. Although there is an effect of FLEV, that is not significant. Finally, the regression results indicate that there is no significant relationship between the leverage and Tobin's Q ratio.

Among all the models, RONOA model become the best model which describes the relationship between the leverage and profitability of the manufacturing sector companies. When considering the market performance, market capitalization model best describes the relationship between the leverage and the market value of a firm. The best suited models can be suggested as follows for the profitability and market performance.

$$RONOA = -1.1192 + 5.8466\ OLLEV + 5.9435\ FLEV - 4.1658\ TLEV$$

$$LGMCAP = 21.0645 + 0.3226\ OLLEV - 0.0015\ FLEV - 0.3095\ TLEV$$

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