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# THE DEGREE OF FINANCIAL LEVERAGE AS A DETERMINANT OF FINANCIAL RISK: AN EMPIRICAL STUDY OF COLOMBO STOCK MARKET IN SRI LANKA

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## **Abstract**

The decision to involve in the financial market is more complicated due to correct decisions will make a return for the firm and wrong decisions will hurt the firm. A knowledge on how well the firm has used the total assets with comparison to how they were financed of the market is magnitude for financial managers as well as investor to make strategic decisions in the market. This study investigates the relationship between the degree of financial leverage and financial risk with the explanatory variables, firm size effect and industry effect, in different industries of Sri Lanka. The study was based on fifteen companies over six years for the period from 2006 to 2011 in Hotels and Travels, and Chemicals and Pharmaceuticals industry of the Colombo Stock Exchange in Sri Lanka. The findings of the study revealed that the degree of financial leverage has a significant positive correlation with financial risk. And also, the industry effect significantly affects to the financial risk. However, firm size does not significantly affect the financial risk. In addition, the degree of financial leverage can be considered as a determinant of financial risk for managers and investors in determining their investment in a company, an industry or a market. The study also provided valuable insights that financial managers and investors could utilize to develop more focused finance and investment strategies, which may enable them to gain an optimal return in an increasingly competitive market setting.

*Keywords:* The Degree of Financial Leverage; Earnings before Interest and Taxes; Earnings Per Share Financial Risk

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## **1. Introduction**

The one of the major principles of modern corporate finance is that the expected return on equity should go up with the portion of debt in a capitalization plan (Modigliani and Miller, 1958). Accordingly, the understanding of financial leverage and its behaviour towards financial risk is more important for financial managers and investors since they have to make investment decisions, it is at the same time making a financial decision as well. Pandey (2005) states that financial decision at lower cost than the firm's rate of return will magnify the shareholder's return. In other words, the main objective of the decisions is to maximise profit or minimize loss. In order to achieve this objective, the management of the firm is making arrangements with a view to increasing revenue of the firm while maintaining its cost efficiency and effective manner. In this context, the firm needs to expand its firm's assets, But the problem is how to finance such firm's assets. The solution depends on internal funds availability of the firm. Long and Malitz (1985) point out that a firm seeks external fund based on the availability of internal funds. Then the firm will decide its choice of funding as debt, equity capital or an optimum mix of

both. But there is a problem how well management of the firm has used the total assets with comparison to how they were financed.

In making such a financial decision, Luoma and Spiller (2002) explain that the use of debt or preference share capital increase the firm's riskiness. In making financial decisions, the firm should concern the regarding the trade-off between a higher return to the shareholders through degree of financial leverage and the potential decreases in financial strength and solvency. Penman (2008) points out the equity or debt investors expect the return based on the riskiness of the investment rather than the required return from investment exceeds the cost of capital for equity or debt. However, the effect of the financial decision will come to the reality after several years. If the firm does not perform well, the return of the firm will not exceed the cost of the debt capital and the risk, financial risk, will expand more than before making additional the funding decision. Then the future of the firm will be in a problem, since the potential investors will not invest in the firm, if they are risk averse.

Bank interest rate increases and decreases time to time in Sri Lanka\*, and also there is a more fluctuating inflation rate. I.e. inflation rate in 2006 is 12.1% and in 2008 is 22.6%†. This background will create a more complicated financial market for firms in Sri Lanka. As well as, firm's financial planning will not achieve its targets and it will be a problem regarding the financial risk predictions. Conversely, Pandey (2005) points out that The degree of financial leverage will be affected by a number of factors, namely size, nature of product, capital intensity, technology, market conditions and management attitudes etc.. The objective of the study is to investigate the relationship between degree of financial leverage and financial risk in the different industries in Sri Lanka. In addition, To identify the degree of financial leverage as a determinant of financial risk and how industry effect and total assets of the firm affect on the relationship between degree of financial leverage and financial risk. However, little published research in finance literature relating to financial leverage has addressed the problem of degree of financial leverage and financial risk in the Sri Lankan context. As such, this study attempts to find a solution for unattended research problem of "how does financial leverage affect toward financial risk in Sri Lanka?" As well as "how are differences between the industries?"

This study undertakes to quantify the financial behaviour in the selected companies and implication among the selected variables. Although many literatures exist on financial leverage, several studies have hardly been conducted in Sri Lanka. The some studies conducted in other countries cannot be directly applied to the companies in Sri Lanka, since its entirely different market structure and environment. The results have important practical implications for financial managers that use this information in formulating the firm's financial and operating policies. In addition, the findings of the present study can be used as information for the investors in making their optimal investment decisions. Further, the learners who are interested in to learn the behaviour of financial leverage and financial risk would be benefitted with the finding of the study.

The impact of the financial market affects differently to companies in the market based on different factors such as firm size, industry effect, nature of product, capital intensity, technology, market conditions and management attitudes. All those factors will not be addressed in the study except firm size and industry effect. This is a one of the limitations of the research. Another limitation is that the effect of internal war to the industries was not considered due to a substantial number of observations cannot find from the study period. After the war. It is

\* <http://www.treasury.gov.za/legislation/pfma/interest%20rates/Standard%20interest%20rates%20on%20debts%20owing%20to%20the%20State%20-%20effective%201%20Jan%202011.pdf>

† <http://www.indexmundi.com/g/g.aspx?c=ce&v=71>

only two years out of six years in the study period. It may be identified as limitations of this research. For instance, the effect to the industries before the internal war and after the internal war. In addition, The limitation of this study is that it is based on only 6 year data and the selected variables have been measured as an average of the year. Thereby the fluctuations over the period may have not addressed properly.

The literature review relevant to the study presents in section two. The section three describes and explains the the study design and methods. The section four presents a deeper analysis and discussions on secondary data. The section five summarizes and concludes findings and proposes managerial implications and suggestions for further research.

## **2. Review of the relevant literature**

A better financial market is important for any firm to operate in the market since firms can expand its business activities with the help of getting funds from the financial market. At present, firms use fixed income securities, which are preference share and debt, in the capitalization plan. When the debt capital is used by a firm , the degree of financial leverage (DFL) is a more significant concept to be paid attention. According to Pandy (2005), The idea behind this concept is that a firm seeks to earn more return on fixed charge funds than its cost. In other words, it explains how fixed cost assets or funds are used to magnify the shareholder's return. In addition, Prezas (1987), and Horne and Wachowicz (2005) explain DFL as the changes in earnings per share (EPS) as a result of changes in earnings before interests and taxes (EBIT). In other words, it is "a quantitative measure of the sensitivity of a firm's earnings per share to a change in the firm's operating profit" (Horne and Wachowicz , 2005, p. 426). When using debt capital in the capitalization plan of a firm, the important thing is that the return on debt capital should exceed its cost, then it will increase the return on equity capital and vice versa (Pandy 2005). According to Scott et al (1999), the DFL describes that a portion of the firm's assets is financed by securities bearing a fixed rate of return with the aim of increasing the ultimate stockholder's return. Panday (2005) point out that EPS and return on equity (ROE) increase with the higher DFL. As well as , under the favourable market condition, ROE is higher than the return on investment (ROI) with the higher DFL. However it is not an easy task to fulfil in the marketplace, since the market fluctuates time to time, place to place and situation to situation. As a result, variations in sales and expenses will cause to vary the EBIT as well as EPS. Accordingly, Higher variations in EBIT will increase the firm's risk. Specially, in this context, financial risk (FR) will increase.

FR consist of both the risk of the additional chance of insolvency borne by the common stockholder and the additional variability in earnings per share that is caused by the use of the DFL (Scott et al 1999, and Horne and Wachowicz 2005). Hence the important thing is why FR varies in companies, in industries as well as in the market. According to Loudon (2004), FR is uncertainty regarding future cash flows, because of changes in general economic conditions as well as specific changes in revenues, operating and financing costs. Indeed, FR arises from borrowed funds or money received from preferred stock to finance a portion of the firm's assets. It is commonly included in financial statement analysis in the form of debt-equity ratios or stock-equity ratios (Luoma and Spiller 2002). According to Levy and Sarnat (1994), the variability of earnings per share is intensified by introducing DFL. As a result, additional variance of earnings due to DFL is the FR Accordingly, it is obvious that FR is an additional risk due to introducing fixed cost bearing securities to the firm. Therefore, the management of the firm can manage the FR as they wish while maximizing shareholder's profit.

The important decision should be made by firms how they invest the funds, which are taken from outside on the basis of fixed financial charge, in the firm's assets, since the investing in a profitable investment will make a profit

for the firm and it will reduce the FR of the firm. Long and Malitz (1985) developed a model that shows that DFL of a firm depends on whether it invests in the tangible assets, capital assets or in intangible assets, firm-specific assets. The study was based on both a large sample individual firm and 68 firm portfolios. The conclusion was that a major factor, which affects corporate leverage decisions, is the type of investments in which a firm undertakes. Moreover, a firm must look for an outside funding sources, its choice between debts or equity will depend on the level of potential agency costs of debt. Firms which invest highly in intangibles, such as research and development, and advertising, have a firmly debt capacity than those invest in tangible assets. According to Aivazian et al (2005) the DFL has a negative relationship with the firm's investment at the 1% significance level. This study was based on 863 Canadian publicly traded companies in the period of 1982 to 1999.

Prezas (1987) explored a study to demonstrate how debts affect on DOL and DFL. Under his study, when interactions exist, changes in capital structure affect both DOL and DFL. Unlike the textbook analysis, where DFL goes up while DOL remains unchanged as debt goes up, this study suggests that DOL and DFL could go up or go down with debt depending on the sizes of the debt elasticity of real capital and contribution margin. He concluded that when interactions exist between the firm's real and financial decision, changes in debt affect adjustments in the real side of the firm. This implies that when the capital structure of the firm affects DOL and DFL. In addition, the DFL varies due to the adjustment in the interest payments. Unlike the no interactions case where DOL remains unchanged while DFL goes up with debt, It was shown that DOL may go up or go down along with debt while DFL may go up, remain unchanged, or go down with debt. The changes in DOL and DFL depend on the relative sizes of the debt elasticity of real capital and contribution margin.

### **3. The Study Design and methods**

The adopted research method was quantitative and the sample of listed companies was selected randomly from the Hotels and Travels industry (HTI) and the Chemical and Pharmaceuticals industry (CPI) in the Colombo Stock Exchange (CSE). Newly listed companies and de-listed companies within the study period were dropped from the sample to maintain the consistency of the sample across the time period. Accordingly, 8 listed companies out of 39 listed companies were dropped. The final data set consists of fifteen public listed companies out of 31 listed companies in both selected industries over six years resulting in 90 observations. The sample of the study comprised of ten out of thirty public listed companies from the HTI and five out of nine public listed companies from the CPI in the period of 2006 to 2011. To select two industries, highest market capitalization growth rate was based over the study period. It shows the highest growth rates in the Information Technology industry, CPI and HTI. The CPI is 1570 percent while HTI growth rate is 1413 percent. However, Information Technology industry shows higher growth rate (1620%) during the period, but this industry was not chosen due it has one and only company during the period. Accordingly, these two industries were chosen as the industry sample. The Growth rates for selected industries may show significant variation in sales, operating profit and earnings per share over the last six year period due to they have different growth rates. Accordingly, selecting different industries is important in valuing the DFL and its risk. With the purpose of selecting the companies, a sample of fifteen listed companies was randomly chosen. The data for the study were gathered secondary data through databases of CSE and the selected companies' web sites. Databases of CSE have to be purchased from the CSE, since they are not publicly available.

The measuring FR has been done differently in the literature. It implies that there is no a commonly accepted method. According to Horne and Wachowicz (2005), the FR is that the difference between the coefficient of variation of EPS and coefficient of variation of EBIT. In other words, the FR is that total risk minus operating

risk. Accordingly, To calculate FR , first, total risk was measured, according to Horne and Wachowicz (2005), The Standard Deviation of EPS is divided by expected EPS is called total risk. EPS in five years in which are included the considering year and four years before the considering year were considered to calculate standard deviation of EPS over the period. Average EPS in five years was considered as expected EPS in each year. Second, operating risk was measured. The coefficient of variation of EBIT is a measure of relative operating risk (Levy and Sarnat, (1994), Horne and Wachowicz, 2005). The DFL is as a relationship between change in operating profit and change in earnings per share (Horne and Wachowicz 2005). To measure the DFL, the change in EPS was divided by change in EBIT. For that purpose, The change in EPS was measured as a percentage change in current and previous year EPS while change in EBIT was measured as a percentage change in current and previous year EBIT.

All of collected data from the sample of the population were tabulated, computed and analysed to test the objectives between the selected variables. To examine the relationship between dependent and independent variables, multiple regression analysis was used. Based on the regression analysis, results of regression coefficient ( $\beta$ ), standard error of coefficients and the coefficient of determination ( $R^2$ ) used to interpret the significance of findings. The significance level was considered as 95% confidence level for the entire of the analysis.

### 3.1 Regression model

To measure the influence of DFL on FR, this study employs following regression model including a set of control variables. First, model A assesses that the relationship between DFL and FR is measured without control variables in the period from 2006 to 2011 and then model B assesses that the influence of control variables on the relationship is measured for the same period.

$$FR_{it} = \alpha + \beta_1 DFL_{it} + \varepsilon_{it} \quad (\text{A})$$

$$FR_{it} = \alpha + \beta_1 DFL_{it} + \beta_2 LTA_{it} + \beta_3 DIND_{it} + \varepsilon_{it} \quad (\text{B})$$

Where FR denotes financial risk which is obtained using the difference between the coefficient of variation of EPS and coefficient of variation of EBIT whereas i indexes listed companies and t indexes time. Further, the DFL is explained the ability to recover firm's fixed financial charges. Pandey (2005) and Horne and Wachowicz (2005) measure it by dividing the change in EPS by change in EBIT. Measuring the impact of firm size in term of TA on FR may be more appropriate, in order to get a clearer understanding regarding the impact of DFL on FR. Aivazian et al (2005), Long and Malitz (1985) and Aggarwala and Zhaob (2007) includes their studies LTA as a variable in measuring DFL. DIND is a dummy variable to differentiate between industries where it takes the value 1 if the industry is HTI and 0 if the industry is the CPI. LTA denotes the logarithm of total assets of the particular listed companies. Finally,  $\beta$  denotes regression coefficients,  $\varepsilon$  denotes the random error and  $\alpha$  denotes the intercept.

## 4. Data Presentation and Discussion

The main objective of the study was to evaluate the behaviour of the FR due to the effect of DFL and other explanatory variables over the six year period ranging from 2006 to 2011. Accordingly, two different industries, HTI and CPI, have been employed in the study in order to achieve the objective. The involvement in the financial market will happen with an eye to financing the firm's assets, when the sufficient internal funds are not available at the firm. Indeed, this financial decision is made by the management of the firm under the different management attitudes and styles, financial policies of lending firms and other circumstances. However, the

operations of both industries are not relatively similar, For instance where the HTI provides its service to the local and foreign tourists. The effect of some occurrences, i.e internal war, political instability and natural disasters etc., in the country or in the world will negatively affect to this industry. In addition, the seasonal effect of the year will affect on the industry. As a result, there is a huge fluctuation in turnover over the year. In the CPI, the main portion of the products is imported, as well as these products are directly or indirectly more essential for the people in the country over the year. In addition, occurrences such as internal war and natural disasters may positively affect to this industry. Accordingly, the fluctuations in turnover may be low.

Descriptive statistics for the regression variables in the empirical analysis are displayed in Table 1. The mean scores of the FR are 0.3352 and 0.1197 for HTI and CPI respectively. It is implicit that the HTI has a higher variation in EPS and EBIT than the CPI. Moreover, it is proved that the HTI has a higher standard deviation than the CPI. However, the mean scores of DFL are 1.1538 and -0.4080 for HTI and CPI respectively. It implies that EPS is increased by 1.15%, when the EBIT is increased by 1% in the HTI, but in the CPI, the EPS has dropped by -0.41 %, when the EBIT is dropped by 1%. Panday (2005) points out that the role of the DFL is to magnify the return on equity (ROE) based on the assumption that fixed charges funds can be taken at a cost lower than the rate of return on investment (ROI). Then EPS or ROE will increase. In the CPI, the DFL is negative. It reflects that it the ROE is not to magnify from DFL due to the ROI is higher than ROE. The mean scores for LTA are .5819 and .4766 for the HIT and the CPI respectively. It shows that there is a small difference between industries.

Table 1: Descriptive statistics of regression variables during 2006 - 2011

Variables	Industry	N	Mean	Std. Deviation	Minimum	Maximum
FR	HTI	60	0.3352	0.3604	-0.66	1.68
	CPI	30	0.1197	0.1399	-0.11	0.48
	Total	90	0.2633	0.3208	-0.66	1.68
DFL	HTI	60	1.1538	3.1478	-8.90	9.61
	CPI	30	-0.4080	2.7589	-7.94	5.30
	Total	90	0.6332	3.0979	-8.90	9.61
LTA	HTI	60	0.5819	0.5704	-0.64	1.60
	CPI	30	0.4766	0.6022	-0.58	1.30
	Total	90	0.5468	0.5799	-0.64	1.60
DIND	Total	90	0.6667	0.4741	0.00	1.00

Note - FR= Financial Risk, DFL = Degree of Financial Leverage, LTA = Logarithm of Total Assets, DIND = Dummy variable, Equals one if the industry is HTI.

Regression results have been illustrated in table 2. Model A assesses the impact of DFL on FR whereas model B assesses the impact of DFL on FR with considering the explanatory variables, industry effect and size effect, in the period of 2006 to 2011. All models are statistically significant according to the *F*-test at the  $P \leq 0.05$  levels and are capable of explaining 12.9% and 19.3% of the variation in the FR respectively. Model A provides statistically significant evidence that there is a significant positive relationship between DFL and FR ( $\beta = 0.359$ ,  $P \leq 0.01$ ). It means that one unit of variation in the DFL will result to 35.9% variation in FR. Moreover, It implies that an additional EBIT has to be earned to compensate for additional risk, financial risk, arising from the financial activities of the firm.

Due to effect of explanatory variables, the beta coefficient between FR and DFL has declined than before. However, model B does not provide statistically significant evidence for the variation in FR due to the variation in

the total assets of companies in both industries. Aivazian et al (2005) points out that the DFL has a negative relationship with the total assets. Accordingly, there may be a negative relationship between FR and total Assets. The regression result shows that there is a negative relationship between them, but the relationship is not significant. The total assets does not affect to the FR in the HTI and the CPI .

However, the result of Model B suggests that the HTI has a higher FR than the CPI. Loudon (2004) states that FR is uncertainty regarding future cash flows, due to changes in general economic conditions as well as specific changes in revenues, operating and financing costs. An instance where the HTI was threatened due to the terrorism war in the country. The tourist's arrival was less than 550,000 tourists before 2009. As a result, the variability in EBIT and uncertainty in future cash flow has increased in the industry over the period of 2006 to 2011, but the end of the internal conflict in Sri Lanka, the tourist's arrival has increased up to 750,000 tourists by 2011. The tourism has been one of the key beneficiary sectors<sup>†</sup>. Conversely, the CPI is based on imported products. The 85% of total health requirement in Sri Lanka is met by Western Medicine<sup>§</sup>. The productions of the industry are essential for all the people. Even though there was an internal war in the country, the industry has a lower variation in EBIT and a lower uncertainty regarding future cash flow than HTI. As a result, the HTI has a higher FR than the CPI.

Table 2: Model estimation – regression result

	Model A		Model B	
	$\beta$	Std Errors	$\beta$	Std Errors
$\alpha$	0.240	0.032	0.155	0.060
DFL	0.359	0.010 **	0.319	0.011 **
LTA	-		-0.082	0.055
DIND	-		0.249	0.068 *
F- test		13.049 **		6.853 **
R Sq		0.129		0.193

Model A assesses the impact of DFL on FR, whereas model B assesses the impact of DFL on FR with considering the explanatory variables in the period of 2006 to 2011.

\*\* Significant at 1%, \* Significant at 5%.

Similarly, the HTI has a higher DFL than the CPI. The higher DFL means that the increase in the percentage changes in EPS should be more than the increase in the percentage changes in EBIT and vice versa. Conversely, The showing a higher DFL implies that a higher proportion of the total capital is represented by the fixed charge bearing capital namely debt capital and preference share capital. As a result, the EPS and return on equity (ROE) increase of the HTI than the CPI. Accordingly, the DFL is one way of improving EPS and ROE without increasing the return on total investment (ROI). As a result, the coefficient of variation of EPS and EBIT will increase than the CPI. In other words, the FR in the HTI will increase than the CPI. It is explicit that "More risk, more return" is an old adage that it is working here.

## 5. Conclusions

The study empirically examined the behaviour of the FR due to the effect of DFL and other explanatory variables, firm size effect and industry effect, in the two different industries, HTI and CPI, over the six year period ranging

<sup>†</sup> [http://www.scribd.com/inde\\_lk/d/52606881-Hotel-Industry-18-01-11](http://www.scribd.com/inde_lk/d/52606881-Hotel-Industry-18-01-11)

<sup>§</sup> [http://www.iptu.co.uk/content/srilanka\\_export\\_opps.asp](http://www.iptu.co.uk/content/srilanka_export_opps.asp)

from 2006 to 2011. However, a considerable amount of studies has not been conducted to measure the behaviour of the FR due to the effect of DFL and other explanatory variables. Moreover, fewer studies have focused on developing countries. The finding of the study indicates that the relationship between the degree of financial leverage and financial risk was positive. This relationship was supported by the literature. Moreover, the finding of this study was complied with the findings of Levy and Sarnat (1994), Luoma and Spiller (2002) and Pandey (2005). Conversely, the R square has been increased from 12.9% to 19.3%. It means that the impact of the DFL on FR is more significant with other explanatory variables. Accordingly, These conclusions can be generalized in the companies of HTI and CPI in the Sri Lankan context.

Aivazian et al (2005) points out that the DFL has a negative relationship with the total assets. Accordingly, the relationship between FR and total Assets might be negative. The finding was that there is a negative relationship between them, but the relationship is not significant. Hence, the firm size in term of total assets does not affect to the FR in the HTI and the CPI in the Sri Lankan context. The study proves that the HTI has a higher FR than the CPI. Similarly, the HTI has a higher DFL than the CPI. The higher DFL indicates that the increase in the percentage changes in EPS should be more than the increase in the percentage changes in EBIT and vice versa. Conversely, The showing a higher DFL reflects that a higher proportion of the total capital is represented by the fixed charge bearing capital namely debt capital and preference share capital. As a result, the EPS and ROE increase of the HTI than the CPI. Accordingly, the DFL is one way of improving EPS and ROE without increasing the ROI. Accordingly, it is obvious that an idea of the behaviour of EPS, ROE and ROI can be drawn on the based the DFL. However, How much FR is associated with the firm directly cannot be recognized since the FR normally is not measured by firms. Accordingly, the DFL can be used to measure the behaviour of FR over the period. Hence, the DFL can be considered as a determinant of the financial risk in the firms of HTI and CPI in Sri Lanka.

This study aimed to identify the importance of the behaviour of the DFL and FR. However, this research is limited to the measures of FR. Therefore, it will be a good study how the DFL affect to the systematic risk and unsystematic risk as well as the impact on the firm's value and market price of the firm's share. This information is more important for investors and financial managers in making their investment and financial decisions. On the other hand, This study limited to reviewing only two different industries. Thus this does not allow generalizing to all companies in Sri Lanka. Hence, it is important to extend this study up to several industries. This research is limited to Sri Lanka. This does not allow generalizing the results to different market settings around the world. Then, it may be important to make comparisons of the study's regarding the DFL and FR with other explanatory variable in different market settings around the world.

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