

# Financial Distress and firm Performance of Listed Plantation Companies in Sri Lanka: an Application of Altman's Model

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**Abstract:** The research investigates the financial distress on the financial performance of listed plantation companies in Sri Lanka by applying Altman's model. All 19 plantation companies in the Colombo Stock Exchange were selected as a population. The study period is five years, from 2015 to 2019. Altman's Zscore model is used to diagnose the financial health of companies, and then the impact of financial distress is measured on financial performance. The study shows a significant association between financial distress and financial performance in the plantation companies on the Colombo Stock Exchange. The research outcomes also exhibit that a company's financial performance increases with the rise in Z score values and decreases in financial distress.

**Keywords:** financial distress, financial performance, Altman's model, plantation companies

## INTRODUCTION

Stakeholders (Managers, stockholders, lenders and employees) are always concerned about their firm's financial condition. The job security of managers and employees, stockholders' equity position and lenders' claims depend on the organization's financial health. As a regulator in a competitive market, the government is concerned about the consequences of financial distress for firms, and it controls capital adequacy through the regulatory capital requirement. This shared interest among managers, employees, investors, and the government creates continual inquiries and recurrent attempts to answer an ongoing question about how we predict financial distress or what firms' credit risk reveals. Therefore, the motivation to indicate corporate distress is most important in Sri Lanka because of the corporate failures identified during the last decade.

Business entities try to maximize financial performance every year in the competitive market. However, some business organizations need help to survive and fail in the competitive market. Financial distress is one of the significant factors in the failure of a business organization. Shumway (2001) describes financial distress as when a company cannot meet its financial obligation. Goudie (1987) indicates microeconomic factors, mismanagement, high cost, and ineffective sales strategy lead a firm towards financial distress. Financial distress is a significant problem worldwide and cannot be ignored.

Some financial and non-financial companies collapsed in Sri Lanka during the last decade due to various factors. Altman (1968) explains business organizations' failures are common problems in developing and developed economies. Therefore, predicting business failure has become the subject of considerable academic research for nearly four decades. Financial distress prediction is significant for companies in this era of globalization because financial distress leads a company to bankruptcy if not handled timely.

The study investigates the financial distress in the financial performance of listed plantation companies in Sri Lanka by applying Altman's model. The study will contribute to the knowledge area by conducting new research in the Sri Lankan market. It will help the upcoming researchers who want to study the Sri Lankan corporate sector.

### **Literature review**

Most research has been performed to study financial distress and its association with financial performance. These studies use different models but are still helpful for our study. Earlier research involves the prediction of bankruptcy by using a single variable. Beaver (1966) showed that bankruptcy could be effectively predicted by using a single variable. Bathoray (1984) also studied and evidenced the effective prediction of bankruptcy by using a single variable. Altman (1968) did a multivariate analysis and used many important considerations instead of one variable to predict bankruptcy. Altman used a multivariate framework using five different ratios to predict bankruptcy effectively. Altman developed a Z-score model in which the combined effect of five distinct ratios is measured to diagnose the company's financial health. Other researchers have developed many more models in the past to predict bankruptcy.

A study by Kuruppu, laswad, and Oylere (2003) in Newzeland compares the corporate bankruptcy model and liquidation prediction model to analyze the better prediction model for firm liquidation. The result indicates that the liquidation prediction model was more precise in anticipating the liquidating and continuing companies than corporate bankruptcy. In another study done by Waqas, Hussain and Anees (2014), the traditional Zmijewski model was applied to the Pakistani manufacturing sector. The data was collected over about eight years from firms listed on the Karachi Stock Exchange. The study's outcome proves that the Zmijewski model is helpful for Pakistani companies in predicting corporate bankruptcy. A study was revealed by Tan (2012) to hit upon the effect of financial distress on firm performance. The study outcome indicates a negative link between financial distress and business performance. A study explored by Pranowo, Achسانی, Manurung and Nuryartono (2010) examines the corporate financial distress of public companies. The Debt coverage ratio represents financial distress. The study shows that an increase in the current ratio, efficiency and equity ratio is a positive sign because it increases the company's debt coverage ratio. The more leverage there is, the less the debt coverage ratio is, hence, a negative sign for the company. The higher liquidity of the company is a good sign for the company.

Many researchers have measured financial distress during the last four decades using several methods. Some research studies test financial distress and its association with financial performance. Empirical research done by Shaykat and Affandi (2015) using Altman's Zscore model proves a significant association between financial distress and financial performance in Pakistan. Mamo (2011) and Bwisa (2010) carried out research on the applicability of Altman's (1968) model in predicting the financial distress of commercial banks and other firms listed at the Nairobi Stocks Exchange in Kenya, where they found the model to be accurate and applicable locally. Tan (2012) finds that the effect of financial distress on firm performance and study outcome indicates a negative link between financial distress and business performance. Opler and Titman (1994) use market share and sales growth as performance proxies and find that the relationship between firm performance and financial distress is negative and significant. Using a similar approach to Opler and Titman (1994),

A study by Beaver (1966) shows that bankruptcy could be effectively predicted using a single variable. Later, many researchers found that there are more suitable approaches to using a single variable when measuring a company's financial health. Altman (1968) developed a Zscore model that uses multiple variables to study financial distress. Altman Zscore model is used to see financial health through various angles. Altman used a combination of five different ratios in his classic model to measure the financial health of the companies. Altman's Zscore model is considered the most effective method of measuring financial distress. Altman's Z score model is used many times by researchers to know about the financial health of companies. Research done by Rawi (2008) shows that in the Altman Z score model, the firm strategic assets are financed through equity, whereas less strategic assets are financed through debt. This type of financing increases the cost to the firm and reduces its profitability. A further study done by Kuntlura, Muppani and Khan (2008) shows that capital turnover measures the effective use of company assets to produce sales. The lower value of a firm's capital turnover depicts the effective use of assets, resulting in higher performance.

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The working capital to total asset ratio calculates the company's liquidity. A study revealed by Rehman and Nasar (2007) that a firm must have an adequate amount of current assets. Current assets must not be in excess and should not be in deficit. Excess would lead towards more liquidity and, hence, less profitability. Less working capital would lead to insolvency. A new study done by Shakoor (2012) investigates the association between working capital and profitability. The number of selected companies was 25 from the Karachi Stock Exchange. The study's findings prove that the company's operating capital is higher than its performance. The profitability ratio is calculated through retained earnings to total asset ratio. Martani and Mulyono (2009) conducted a study in Indonesia by taking samples of 39 manufacturing companies listed on the Indonesia Stock Market. Research shows that profitability, turnover, and market ratios significantly impact stock returns. Research carried out by Taani and Khaled (2011) on Jordanian companies shows that Profitability ratios significantly affect performance. Another study by Aguado and Benito (2012) was conducted to analyze the determinants of corporate default. The outcome strongly links retained earnings, total assets, and corporate default.

Returns on assets are calculated through EBIT to total assets. A study on Jordanian firms revealed by Taani et al. (2011) shows no impact of total asset turnover on earnings per share. Another study conducted by Menaje (2012) depicts a strong link between the EPS and the share price, and ROA shows a weak negative link with the price per share. A study was done by Waddock and Graves (1997) to uncover the effect of corporate social performance on financial performance. The variables used were return on equity, return on assets, return on sales, and profitability. The study results show that return on assets has a strong and positive association with the firm's performance. A solvency ratio tells us about the market value of equity to total liabilities. A study conducted by Bernstein (1988) shows that four kinds of financial ratios, profitability, solvency, capital structure, and turnover, can be used to determine the performance of companies. Another study by Eriotis, Frangouli, and Neokosmides (2002) shows that leverage and firm performance have a negative relationship because when companies take more debt to finance their operations, they have to pay the borrowing cost, which reduces the firm's profitability. The capital turnover ratio tells us how effectively the company uses its assets to produce sales. A study by Kochhar (1997) shows that the firm's strategic assets are financed through equity whereas less strategic assets are financed

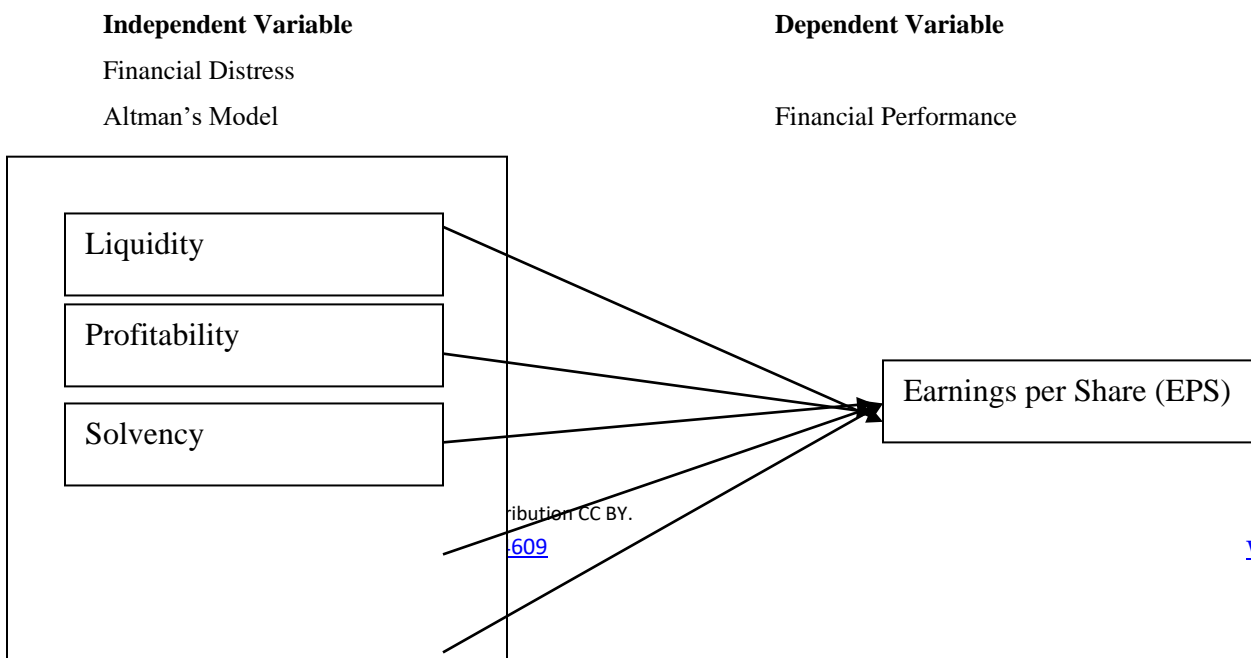
through debt. This type of financing increases the cost to the firm and reduces its profitability. A further study done by Kuntlura, Muppani and Khan (2008) shows that capital turnover measures the effective use of company assets to produce sales. The lower value of a firm's capital turnover depicts the effective use of assets, resulting in higher performance.

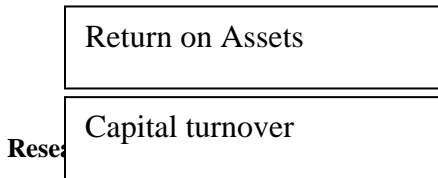
Much research has been conducted to determine the best possible measure of financial performance. Graham, Harvey, and Rajopal (2005) surveyed 400 financial executives and collected data about the usefulness of earnings per share; many financial executives thought that EPS was the most trusted measure of financial performance. EPS can be calculated and easily understood. Cudia and Manaligod (2011) revealed a study on 233 companies in the Philippines. The result shows that earnings per share is a better measure of companies' performance. A survey by Kootanaee, Talari and Babu (2012) shows that the Eps significantly affects the firm's market value, which is one of the best performance measures.

In the Sri Lankan context, Samarakoon and Hasan (2003) find that Altman's Z-Score models have a remarkable degree of accuracy in predicting financial distress in the emerging market of Sri Lanka. Lakshan and Wijekoon (2013) found a new model that uses accrual and cash flow-based financial ratios to predict corporate failure. This study helps to utilize a combined model to predict the corporate failure of listed companies in Sri Lanka. According to the researcher's best knowledge, Samarakoon and Hasan (2003) and Lakshan and Wijekoon (2013) empirically test the impact of Financial Distress on Financial Performance carried out in Sri Lanka. Therefore, few studies were conducted to find the effect of Financial Distress on Financial Performance in Sri Lanka.

### Theoretical framework

The theoretical framework is the graphic representation of the relationship between independent and dependent variables. Here, five independent variables are used to study financial distress, and one dependent variable, earnings per share, shows the financial performance. The model that is derived in the light of previous literature is as follows,





**Research Hypothesis**

A hypothesis is used to identify the relationship between different variables. Five hypotheses are used to discover the association between two variables. The following are the five hypotheses developed using the Altman Zscore model.

Hypotheses (H1): Liquidity has a positive relationship with financial performance. Hypotheses (H2): Profitability is positively associated with financial performance.

Hypotheses (H3): Solvency is positively linked with financial performance.

Hypotheses (H4): Return on assets positively affects the financial performance. Hypotheses (H5): Financial performance increases with increased capital turnover.

**Methodology**

**Sample and Procedure**

The Colombo Stock Exchange (CSE) has 295 companies representing 20 business sectors. The researcher selects the plantation sector companies for study. All the plantation companies listed in the Colombo Stock Exchange are selected as population. The data collection period is five years, from 2015 to 2019. Altman's classic Zscore model is used to investigate the multiple independent variables and, based on that, identify the distressed firms. The research uses a quantitative approach—the data of research analyses through the SPSS model. The Regression Analysis Model' and 'Correlation are used to analyze and interpret the data. Secondary data is collected from Financial Statements published in the Colombo Stock Exchange in Sri Lanka and official websites.

Data is analyzed and interpreted based on results obtained by measuring the five financial ratios. Those ratios are,

	Empirical Proxy	Formula/Method
X1	Liquidity	Working Capital/Total Assets
X2	Profitability	Retained Earnings/Total Assets
X3	Return On Assets	EBIT/Total Assets
X4	Solvency	Market value Of Equity/Total Liabilities
X5	Capital Turnover	Net Sales/Total Assets
Overall Index	Z Score (model)	$Z= 1.2 X1 + 1.4 X2 + 3.3 X3 + 0.6 X4 + 1.0 X5$

The individual and combined impact of these ratios is found in the performance of the companies represented by earnings per share. Distress and non-distress companies are identified based on Altman's Zscore model, and the results are interpreted and analyzed according to the specific criteria. If the value of

$Z < 1.80$ , the firm is in a distress zone and will go into bankruptcy

Z > 1.80 and < 2.99 firms will be in the grey zone, which means there is a likelihood that the firm will go bankrupt

Z > 2.99, the firm will be in the safe zone, which means no bankruptcy

## Result and discussion

The study investigates the Impact of Financial Distress on Financial performance: Evidence from Manufacturing Sector companies in the Colombo Stock Exchange.

Table 1. Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation
Liquidity	0.0121	0.8836	0.5808	0.1162
Profitability	-0.2101	0.7915	0.1652	0.0382
Return on assets	-0.3859	0.8115	0.1995	0.0339
Solvency	-0.4724	30.3847	1.6880	1.1700
Capital Turnover	-0.1858	0.6102	0.1884	0.1379
Altman Z score	1.0000	6.1000	2.8513	1.5700
EPS	0.0214	1.0836	0.6808	0.1162

N=95, Independent variables: Liquidity, Profitability, Return on Assets, Solvency, Capital Turnover. Dependent variable: EPS

The above table shows the descriptive statistics of five independent variables and one dependent variable. The liquidity variable has a maximum value of 0.8836. The average change is 58% during five years, and the deviation rate is 11%. The profitability variable has a maximum value of 0.7915. The average change is 16% during five years, and the deviation rate is 3.82%. The return on assets variable has a maximum value of 0.8115, the average change is 19% during five years, and the deviation rate is also 3%. The solvency variable has a maximum value of 30.38. The average change is 168% during five years, and the deviation rate is 117%. The capital turnover variable has a maximum value of 0.6102. The average change is 18% during five years, and the deviation rate is 13.7%. The z score variable has a maximum value of 6, the average change is 285% during five years, and the deviation rate is 17%

Table 2. Correlation Analysis

Variables	Liquidity	Profitability	ROA	Solvency	Capital Turnover	Z Score Value	EPS
Liquidity	1						
Profitability	0.192**	1					
ROA	0.170**	0.973**	1				
Solvency	0.088	0.002	-0.062	1			
Capital Turnover	0.124**	0.890**	0.872**	-0.029	1		
Z Score Value	.315**	0.215	0.819**	.421**	.834**	1	
EPS	0.411**	.292**	.271**	.098**	.224**	.586**	1

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

The above table shows a positive relationship between liquidity and earnings per share. There exists a significant positive association between profitability and EPS. The value of Pearson correlation is 0.192, and the value of correlation using two-tailed approaches is .001. There is a strong positive correlation between return on assets and earnings per share, and the value of correlation is 0.170, whereas the value of correlation using two-tailed approaches is .000. The Table exhibits a strong positive association between capital turnover and EPS. The correlation value is 0.124, and the value using a 2-tailed approach is 0.00. The table depicts a strong positive association between Z score value and earnings per share. The value of Pearson correlation is 0.315, and the value using the 2-tailed approach is <0.01.

Table 3. Regression Analysis Model Summary

Model	F	T	R	R Square	F Change			Durbin-Watson
					df1	df2		
Altman Z score	44.75	6.75	0.68	0.652	0.000	5	172	1.4

a. Predictors: (Constant), CT, Solvency, Liquidity, ROA, Profitability

b. Dependent Variable: EPS

R square tells about dependent variable variation due to the combined effect of independent variables. R square does not speak about the individual impact of variables. It tells about the combined strength of independent variables to bring the changes in the dependent variable. The table above shows the R square value of 0.68, which means that the separate variable Z score is responsible for a 68% change in dependent variable earnings per share. The adjusted R square removes the effects of extraneous elements in the R square. The adjusted R<sup>2</sup> defines the variance in the future outcome that the model explains. It determines the measurement of results and how they are likely to be predicted. The R<sup>2</sup> (65.2%) shows the variety of independent Altman Z score variables among the dependent variable, earnings per share. The table above shows the t value of 6.75; the significance level is 0.00, below 0.05. The regression analysis suggests a significant association between the z score and EPS. The value of F =44.75 and the p<0.05 which shows that the Z score model significantly predicts the dependent variable earnings per share.

### Conclusion

The study investigates the effect of financial distress on financial performance by applying Altman's model. The study is conducted on the plantation sector of Sri Lanka from 2015 to 2019. The plantation sector plays a fundamental role in the country's economic development. The results depict that 8 out of the 19 companies have shown distress values, and the performance of these companies also declined in that period. The Z score value of 11 companies remained mainly in the safe zone, and their performance increased in that period. Companies in this sector need to be more concerned about the future. The plantation sector is a vital industry in the country and is the backbone of the economy's growth. The performance of the companies related to the plantation sector mostly remains better in the study period. The EPS is strongly associated with liquidity, profitability, ROA, and capital turnover. The Z score value also strongly and significantly associated with financial performance. The research outcomes also exhibit that a company's financial performance increases with the rise in Z score values and decreases in financial distress.

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