ASSESSING FINANCIAL HEALTH OF COCONUT OIL MILLS IN WESTERN TAMIL NADU USING ALTMAN'S Z- SCORE MODEL

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INTRODUCTION

The agri-business sector plays a crucial role in country's socio-economic development significantly contributing to Nation's Gross Domestic Product. The study used Altman's (1968) Z score model to predict the bankruptcy position of coconut oil mills in Western Tamil Nadu. The study sample consisted of 40 coconut oil mills in Western Tamil Nadu and the data collected for five-year period from 2009-10 to 2013-14. The study analyzed the coconut oil mill's financial statements with an objective to assess the bankruptcy position to determine the financial stability. The Z score "cut-off" values are greater than 3.00 for "non-bankrupt", below 1.81 for bankrupt and area between 1.81 and 2.99 for "grey area". The Z score results showed that financial health of the medium and large category was too healthy and financially stable. However, the average Z score of firms in small category was under "grey zone". Hence, the management has to take steps to maintain the Z score for medium and large categories. The firms in small category have to take necessary actions to increase the average Z score value to cross atleast by three.

Key Words: Agribusiness sector, Bankruptcy model, Altman's Z-score analysis.

JEL Classification: G33, L66, M13, Q14

INTRODUCTION

Over the years, because of the shortcomings of financial ratio analysis, various authors (Atman, 1968; Edmister, 1970) have suggested the combination of similar ratios in a group to develop meaningful bankruptcy prediction models to overcome these shortcomings. It is to be noted that most of studies on bankruptcy prediction models have concentrated primarily upon large asset-size firms and have generally ignored small business (Edmister, 1970). Edmister's study results indicated that ratio functions might also be accurate at predicting failure of small businesses as well. The study used bankruptcy prediction model as a framework for analysis and interpretation. The reason was that most models used a combination of a relatively smaller number of ratios found to be the most significant predictors of business failure to compute a single score. The interpretation of that score might be used by SMEs, as a financial measurement tool to assess how they are doing financially. The use of bankruptcy prediction models with fewer ratios will also make it easier for practical use by SMEs.

Bankruptcy usually occurs when someone owes more than the ability to repay or the condition of a legal entity that does not have the financial means to pay their incurred debts as they come due. Company's bankruptcy is not a new phenomenon in the world of business. Recently the failure of Lehman Brothers in the USA followed by many

others such as General Motors and Chrysler sent shock waves around the globe and caused many other businesses to fail and declare bankruptcy as well.

Business failure leads to heavy losses whether financially and non-financially consequences. Thus, the importance to predict business failures accurately on a timely manner is useful to stakeholders including managers, the government, suppliers, customers and employees to take the necessary actions to avert a potential financial failure (Byrne & Barron, 1993).

Altman is known for the development of the Z-Score formula, which he published in 1968. The Z-Score for predicting bankruptcy is a multivariate formula for a measurement of the financial health of a company and a powerful diagnostic tool that forecasts the probability of a company entering bankruptcy within a 2 years period. Studies measuring the effectiveness of the Z-Score have shown that the model has 70 per cent to 80 per cent reliability. The Z score analysis has been the base for research in this paper.

The purpose of this paper is to build a robust framework that enables banks and financial institutions in emerging market economy like India to classify a firm in the default or non-default category based on the information of its financial variables. This kind of model can serve as a useful tool for quick evaluation of the company risk profile. Secondly, it can be useful to track the firms to check for their default status over time. As a result, such model can help banks to get an early warning signal about the default status of its clients.

LITERATURE REVIEW

A review of the literature is an essential part of the academic research. The review is a careful examination of a body of literature pointing towards the answer to the research problem. Hence, the literature on concepts, analytical techniques and

results pertaining to the study were reviewed and presented as follows:

Researchers of the statistical models had used financial ratios for building some predictive functions of bankruptcy. All predictive studies of enterprises' bankruptcy were based on original contribution of Beaver's (1966) and Altman (1968).

Beaver (1966) contributed to the univariate analysis of the company's bankruptcy position. The univariate analysis technique implied the usage of single financial ratios into a model of bankruptcy forecasting. Beaver had analyzed separately few financial ratios and had selected the critical point for each rate and maximized the prediction accuracy.

According to **Altman (1968),** bankruptcy was referred as a condition where the total liabilities exceeded the fair value of assets. Financial performance of the firm and its management were normally gauged through financial statements. From the financial statements like profit and loss statement, balance sheet and cash flow statements various ratios could be calculated and the current performance, future prospects of the concerned firm could be assessed. Some of the ratios used were current ratio, quick ratio, and working capital to total debt, total debt to total assets, profit margin to sales and return on total assets.

Grice et al. (2001) mentioned that the relation between financial ratios and financial distress changed over time. The accuracy for the manufacturing firms was higher at 69.1 per cent than for the entire sample of 57.8 per cent. The authors concluded that Altman's coefficients needed to be reworked, and caution should be needed when using Altman's model.

Shumway (2001) elaborated a corporate default prediction model based on the financial indicators of Altman and Zmijeski to which he added the company history and the standard

deviation of the return on equity and return on assets.

Saretto (2005) created a model and assessed corporate risk of bankruptcy in a continuous way. Researcher used financial ratios, which reflected both book value and market value to predict the corporate risk.

The new Z-score model exhibited a high predictive power in terms of its ability to detect bad firms, **Bandyopadhyay (2006)**. The model clearly outperformed the other two contesting models, Altman's original and emerging market set of ratios in the Indian context. Using the new Z-score model the investors could get the early warning signals about the firm's solvency status and might reassessed the magnitude of the default premium they required on low-grade securities. The default probability estimated from the logistics analysis would help banks for estimation of credit risk capital (CRC) and setting corporate pricing on a risk adjusted return basis.

Mosalakae (2007) opined that a bankruptcy prediction model might be used to assess whether or not a firm will still be able to continue its operations.

Stroe and Nicoleta (2010) results showed that some companies had a high risk of bankruptcy, which might be in the area of uncertainty and the enterprises from less uncertainty area might be assessed as a minimum risk of bankruptcy.

Davydenko (2012) conducted a research on the impact of financial indicators and assessed the probability of corporate default using valorized Moody's database CRD — Customer Research Database. He concluded that bankruptcy probability was determined by alarming financial ratios.

METHODOLOGY

The sampling design, data collection and analytical frameworks are outlined in this section.

Sampling Design and Data Collection

The list of coconut oil mill was collected from Coconut Oil Mill Association and District Industries Centre (DIC) for Western Zone (Tiruppur and Coimbatore) of Tamil Nadu. The list comprised of 126 coconut oil mills in Tiruppur and 15 oil mills in Coimbatore districts. From that list, 40 coconut oil mills were selected by simple random sampling method.

Five year period from 2009-10 to 2013-14 was considered for evaluating the financial performance and efficiency of coconut oil mills in Western Tamil Nadu. The entire study profoundly relied on the interview schedule (financial management practices) and secondary data (balance sheet, income statement and cash flow statement) from the annual reports of the coconut oil mills.

Altman's Z Score Model Description

Altman is known for the development of the Z-Score formula, which he published in 1968. The Z-Score for predicting Bankruptcy is a multivariate formula for a measurement of the financial health of a company and a powerful diagnostic tool that forecasts the probability of a company entering bankruptcy within a short period. Studies measuring the effectiveness of the Z-Score have shown that the model has 70%-80% reliability. The Z score analysis has been the base for most of the bankruptcy prediction models.

Edward Altman has developed a 'Z' Score model using financial statement ratios analyses to predict bankruptcy for publicly traded manufacturing firms. The specification of this model is given below;

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5$$

Where Z = overall index

X**1** = Working capital to Total Assets

X**2** = Retained Earnings to Total Assets

X**3** = Earnings before Interest and Tax to Total Assets

X**4** = Market value of Equity to Book value of Total Liabilities

X**5** = Sales to Total Assets

Elements of the Altman Z score model for Prediction of Bankruptcy

Z Score	Status	Zone
Above 3.00	Will not fail i.e. its financial health is viable and there is no risk of a fall.	"Safe" Zone or Too Healthy Zone
1.8 to 2.9	May or may not fail. Financial viability is healthy. The failure in this situation is uncertain to predict	"Gray" zone or Healthy Zone
Below 1.8	Failure is certain and extremely likely and would occur probably within two years.	Distress Zone or Bankruptcy Zone

Z score Components

The Z score is calculated by using the following accounting ratios, which is efficient in predicting bankruptcy.

1. X1 (Working Capital/Total Assets): This ratio expresses the liquidity position of the company towards the total capitalization. Working capital is defined as the difference between current assets and current liabilities. Working capital ratio indicates that the corporation suffers from meeting its current obligations. Lower the ratio silently indicates that these companies are investing funds too much in current assets instead of investing in potential investments.

2. X2 (Retained Earnings (RE)/Total Assets): It indicates the amount reinvested, the earnings or losses, which, reflects the extents of company's leverage. As retained earnings is free reserves and cheaper source of finance than debt, the firms with high Retained Earnings relative to total assets have retention of profits and have not utilized as much debt. It also highlights either the use of internally generated funds for growth (low risk capital) or OPM (other people's money)-high risk capital. This is measure of cumulative profitability overtime and leverage as well. Higher the ratio greater the financial stability of the company at times of low profitability periods and also it depicts that the company utilizing its own earnings as cheaper source of finance rather than debt finance.

3. X3 (EBIT/Total Assets): It is the measure of the company's operating performance and it indicates the earning power of the company. It measures operating efficiency apart from tax and leveraging factors. As, a firm's ultimate existence is based on the earning power of its assets; this ratio appears to be particularly appropriate for studies dealing with credit risk.

4. X4 (Market Value of Equity/Book Value of Total Liabilities): It is the measure of the long-term solvency of a company. It is reciprocal of the familiar debt-equity ratio. Equity is measured by the combined market value of all shares. While debt includes both, current and long term liabilities. This measure shows how much assets of an enterprise can decline in value before the liabilities exceed the assets and the concern becomes insolvent. The company having 1:1 equity-debt mix is considered as quite good. Excessive debt tends to cause insolvency. Fixed interest paid on debt where as variable dividend is paid on equity. If debt is more than the equity, it will reduce the profit of the company, despite increases the profitability of the shareholders. It will be a curse in times of bad performing.

5. X5 (Sales/Total Assets): This is a standard turnover measure. Unfortunately, it varies greatly from one industry to another. Sales plays very

important role in the overall performance of the companies because all the operation are more or less depends on that revenue only. Therefore, higher the ratio indicates the better performance and poor ratio indicates the poor financial management of the companies in the optimum utilization of its assets in generating the sales. In addition to this, it will reveal the sale generating capacity of the company's assets and measure of management's capacity to deal with competitive conditions.

RESULTS AND DISCUSSION

Classification of Coconut oil Mills

Based on the Overall Working Capital Management Efficiency Index (EI $_{WCM}$), the coconut oil mills were classified as efficient and inefficient category. Oil mills having EI $_{WCM}$ more than one (EI $_{WCM}$ > 1) were classified as efficient category and less than one (EI $_{WCM}$ < 1) were under inefficient category. The results are presented in Table 5.1.1.

Table 5.1.1. Classification of Coconut oil Mills

S.No.	Category	Numbers	Percentage
1	Efficient Category	28	70
2	Inefficient Category	12	30
Total		**40**	**100**
t stat = 7.627118; p = 2.08E-08 < 0.01			

Among the 40 coconut oil mills, majority (70 per cent) of them belonged to efficient category, while the next were in inefficient category (30 per cent). The results of unequal variance t-test (two sample) revealed that there was a significant difference between efficient and inefficient category oil mills.

Financial Health of the Coconut Oil Mills

Financial Health of the Coconut Oil Mills using Altman Z Score Approach

Jonah (2002) discussed the theoretical aspect of a financially distressed firm based on a cyclical concept and examined the financial performance of small business firms based in Kenya using Z score model. Category wise financial health of the coconut oil mill was assessed using Altman Z score approach and the results are presented in table 5.4.1.2.

Table 5.4.1.1. Financial Health of the Coconut Oil Mills - Altman Z score Approach

(N=40)

Categories	2009-10	2010-11	2011-12	2012-13	2013-14	Category Average
Efficient Category	2.80	3.37	3.81	4.63	4.09	3.74
Inefficient Category	2.27	2.65	2.88	3.11	2.49	2.68
Annual Average	2.54	3.01	3.35	3.87	3.29	3.21
T stat = 3.0793; P = 0.02168 < 0.05						

Table 5.4.1.1 shows the category wise Z score values of selected companies for the years 2010-14. In the efficient category, average Z score value of selected companies was found to be higher (3.74), which indicated that these categories were in "too healthy zone" or in "Safe Zone" and will not fail. Z score value of inefficient category was 2.68, which is lesser than the average score of 3.21. The companies in that category were in "Gray" zone or

"Healthy Zone" and they may have a chance to fail or may not fail.

The annual average Z score was increased from 2009-10 to 2012-13, which indicated that the company's performance was better over the years. The highest annual average Z score (4.63) was noticed in efficient category for the year 2012-13, which indicated that the companies were in "too healthy zone" or in "Safe Zone" and will not fail. Overall, financial health of coconut oil mills was good and positive signs could be seen as the companies performance improved year by year. The results of t- test revealed the financial health of efficient and inefficient category oil mills were significantly different (P = 0.02168 < 0.05). Hence, the financial health of oil mills was significantly associated with performance.

Vimala (2014) obtained similar results. Author indicated that Altman's Z-score model exhibited a 90.9 per cent success rate in predicting bankruptcy one year prior to firm's demise and identified non-bankrupt firms with an accuracy rate of 97 per cent with continuing economic solvency.

Shumway (2001) also stated that Z score declined steeply in the year 2007, as earnings before interest and taxes (EBIT) went negative and working capital and retained earnings also dipped. Z-Score fell every year between 2006 and 2010, landed in the danger zone at 1.79 in 2010. The next year, the company would bankrupt.

CONCLUSION

The financial health of the coconut oil mill was analyzed with the help of Z score model. Several studies had showed that Altman model predicted the business failures on time; it would be helpful for the management to take corrective action. As per the Altman guidelines, the result showed that financial health of the coconut oil mill in medium and large category was too healthy and financially stable. However, the firms in small category may or may not fail in their performance. Hence, the management has to take steps to maintain the Z score for medium and large categories. The firms in small category have to take steps to increase the average Z score value so that Z score may cross three. This zone is considered, as no risk zone and financial positions is too healthy.

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