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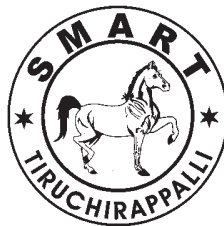
EDWARD ALTMAN Z SCORE MODEL PREDICTING CORPORATE SOLVENCY

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Introduction

The Indian Textile Machinery Industry is one of the leading machinery manufacturing industries in Asia. There are around 120 companies manufacturing complete range of textile machineries. Out of 120, there are at least 20 Companies offering textile machinery for spinning, weaving and text tuning. The Lakshmi group of companies of Coimbatore has been the most successful of these companies. Lakshmi's success is attributable to its longevity in the sector and its ability to offer a range of textile machinery.

The industry has been in recession during the period 1995-99. The reasons may be due to relaxation in import of second hand machinery, introduction of technologically advanced products in the market by global players, WTO and opening of the production capacities, strain due to lot of imported machinery etc. The players in this industry have become very cost conscious and price sensitive and have resorted to various cost cutting measures for their survival. However, the industry is making a turnaround and the future looks bright for used textile machinery. An attempt has been made to study the financial health of one of the leading manufacturers of textile machineries in Tamil Nadu.

LMW founded in the year 1962, is today a global player and one among the three manufacturers of the entire range of textile machinery. Dr.G.K.Devarajulu (late) promoted the company, a great visionary and philanthropist. History stands as a documented proof of LMW's corporate and financial success reflecting phenomenal growth since its first year of operations. LMW has 60% of market share in the domestic textile spinning machinery industry. LMW diversified into CNC machine tools and is a brand leader in manufacturing customised products. The other two divisions are foundry and textile machinery divisions. LMW's foundry division makes precision castings for industries the world over. This is the only company in Asia outside Europe to manufacture OE products for Mikron of Switzerland.

The company's textile machinery division has three units and they are situated in Periyanaickenpalayam (Coimbatore), Kaniyur (Coimbatore) and at Kalapatti. The machine tools division and foundry division are situated at Arasur, Coimbatore.

Statement of the Problem

The textile machinery industry was hit by recession and the recessionary period spanned over a decade. The companies and in particular Lakshmi Machine Works Ltd. witnessed some of the symptoms discussed about indicators of financial distress like decline in amount of dividend paid, declining stock prices, laying off of staff etc. Therefore, the present study is about application of Edward Altman Z score model to predict the Company's solvency position and offer some suggestions, if any, to improve the functioning and operational efficiency.

M/s Lakshmi Machine Works Ltd., one of the leading manufacturers and exporters of

textile machineries in Asia, was hit by recession during the period 1995-1999 and consequently had its impact on its financial performance. The Government's policies towards textile machinery industry like import of second hand textile machineries, liberalisation of import policies etc contributed to the lowering of the performance of the company.

The company acquired loss making subsidiary concerns such as M/s Deejay Leasing Ltd., LMW Investments Ltd., in the year 2002. Another concern viz., Textool Ltd, was acquired in the year Sep.'03. The present study is about analysing the performance of the company, its creditworthiness and future prospects. This is necessary because LMW is one of the few companies to survive during the recessionary period and improve its performance by adopting recovery measures at different levels

Objectives of Study

The following are the objectives of the study undertaken to analyse the credit worthiness of Lakshmi Machine Works Ltd.:

i)   To identify key financial ratios which are used to study the financial aspects of the unit under study.

ii) To analyze the financial performance of the company by application of ratios.

iii) To project the financial ratios relative to solvency used in the model and compare it with the actual.

iv) To examine the creditworthiness of the company and to offer suggestions for the betterment of the company

Methodology

Case study method has been followed in this study.The study is descriptive and analytical. The data relating to study have been collected from secondary sources. The required information for the present analysis was obtained from the annual reports of the company and other required details by interacting with the officials of Finance Department of the Company. Also various websites, news papers and magzines were referred to relating to the review of literature that forms part of the study.

Edward Altman Z Score Model

Z score analysis has been established by Edward Altman (1968) to evaluate the general trend in the financial health of an enterprise over a period . Many of the individual accounting ratios used frequently to predict the financial performance of an enterprise may provide only warnings when it is too late to take a corrective action. Edward Altman has combined a select set of ratios and has formed an index using Multiple Discriminant Analysis(MDA).

The final discriminant function is as follows:

$$Z = 1.2 X_1 + 1.4 X_2 + 3.3 X_3 + .6 X_4 + X_5.$$

Where

X_1 = Working Capital/Total Assets (WC/TA)

X_2 = Retained Earnings/Total Assets (RE/TA)

X_3 = Earnings before Interest and Taxes/Total Assets (EBIT/TA)

X_4 = Market value of equity/Book value of total liabilities (MVE/TL)

X_5 = Sales /Total Assets (S/TA)

Conclusion according to Edward I. Altman

Situation	Z Scores	Zones	
I	**Below 1.8**	**Bankruptcy zone**	**Certain to fall**
II	**1.8 to 2.99**	**Healthy Zone**	**Uncertain to predict**
III	**2.99 & Above**	**Too Healthy**	**Not to fall**

Statistical Tools Employed

The following statistical tools were used for the purpose of study :

(a)   Method of Least Squares

(b)   Chi-square Test

Method of least square was used for projections and to facilitate comparison with the actual results. Chi-square test was used to test whether there is wide difference between the actual score and projected score.

Hypothesis of the Study

H_0 (Null Hypothesis) :

There is no significant variation between projected and actual Z scores.

H_1 (Alternate Hypothesis) :

There is significant variation between projected and actual Z scores.

Period of Study

The period taken for the analysis of information is 7 years i.e., from 1996-97 to 2002-2003.

Analysis of Financial Health of M/s Lakshmi Machine Works Ltd.

Table - I below shows the score obtained by the Company during the period of study. It is inferred that the overall Z score is 2.699 times. The Z score came down from 2.888 times to 2.206 times in the year 1998-99 and during the subsequent periods, the scores were fluctuating. Only in the year 2002-03, it increased to 3.022 times. According to Altman, a score between 1.88 and 2.99 is considered to be 'Healthy Zone'. A company's solvency position with this score is unable to predict. A score of 2.99 and above is considered to be in 'Too Healthy Zone' and the company' solvency position is extremely good. As far as this company is concerned, this solvency position is very strong.

Table II below shows the comparison between projected and actual Z score. The projections were carried out using 'Method of Least Squares'. The projected score for the period of study shows that the company has not performed well in the years 1998 & 1999. The actual scores during these two years are less than the projected score. On the whole, the company has performed extremely well during the period of study as the actual scores are higher than the projected. The projected scores show a decreasing trend (i.e. from 2.725 times in 1996-97 to 1.52 times in 2002-03). The score has decreased by almost 44% when compared to the base year (1996-97). The company would have run into financial crunch in the year 2002-03 because the projected score is 1.52 and a score of less than 1.8 is always considered to be a danger zone. But the actual performance during that year (2002-03), has been phenomenal as the actual score was 3.022 times higher than the projected.

Testing of Hypothesis

H_0 : There is no significant variation between actual and projected Z scores.

H_1 : There is significant variation between actual and projected Z scores.

Years	Observed Frequency (O)	Expected Frequency (E)	(O-E)	$(O-E)^2/E$
1	2.888	2.725	1.63	.0097
2	2.451	2.537	(.086)	.0027
3	2.206	2.300	(.094)	.0034
4	2.896	2.126	.77	.278
5	2.792	2.129	.663	.206
6	2.578	2.157	.421	.082
7	3.022	1.52	1.502	1.48
			Calculated value	2.0613

$$X^2 = \frac{(O-E)^2}{E}$$

Table value at 0.05 level of significance = 12.592

Since the calculated value is less than the table value, null hypothesis is accepted.i.e; there is no significant difference between actual and projected score. This also shows that the company has improved its position by taking necessary steps to avoid solvency problems.

Findings of the Study

1.   The company's reserve position is also very strong. The ratio of retained earnings / total assets has considerably increased and the actual performance is much better than what is projected.

2.   The ratio of market value of equity / book value of liabilities has declined from 1.06 times to .20 times. The market value of equity has grown in the years 2002 and 2003. By comparing the actual performance with the projections, the actual performance was better, since the projections showed erosion of the wealth of the shareholders.

3.   Regarding the overall Z score, the company was in situation II i.e., 'Healthy Zone' during the period from 1997 to 2002 because the Z score on an average was around 2.6. A score between 1.88 and 2.88 is considered to be healthy zone. At this score, it was uncertain to predict the company's solvency. But in the year 2003, the Z score had increased to 3.022 i.e. the company has moved to 'Too Healthy' zone, which means that the company is very sound and strong.

4.   Comparing the projected Z score regarding the solvency position with the actual score, the company's actual performance has been outstanding. The projected Z score especially in the year 2003 (1.52) indicated weakness in the financial position. But its actual performance during that particular year (2003) far exceeded the anticipation and the company has moved to a strong position.

Suggestions

Based on the findings of the study, the following suggestions may be considered :

1. The company needs to aggressively market its products and make wide publicity of its innovations by publishing in journals and magazines especially connected with the industry. This will help the company to compete with the multinationals who adopt aggressive methods of marketing their products. Though the company participates in trade fairs and exhibitions (National and International), the executives of the company should be so trained to give more thrust to marketing rather than selling.

2. The company can jettison some of the group concerns and associates, where the investments have not yielded fruitful returns, which in turn has not contributed to the growth of the group. By shedding these companies, the company can concentrate on the core area i.e manufacturing of textile machinery.

3. In the post liberalised era, where competition and survival of the fittest are the rules of the day, pricing of the products competitively is the key factor. Adoption of modern costing methods like Activity Based Costing to determine the cost of the final product will be helpful in determining the exact cost of machineries manufactured. Activity Based Costing Scores are superior to traditional costing because the former calculates costs based on the activities and the amount of resources such activities consume. The management of the company can consider implementing Activity Based Costing though not immediately, atleast in the near future, for effective costing of its products.

Conclusion

To sum up, the company's financial position is very sound. Considering the problems the industry and the company had to undergo, the company has really done well. It has taken a lot of cost cutting measures such as downsizing of labour force, implementation of ERP to improve the functioning of the company. The management has also taken decisions at the right time to make a turn around and be more competitive in this field. It is anticipated that a revival package similar to the one provided to Textile Industry would make the Industry financially viable. There are signs of demand for textile machinery picking up and this Company which is financially well off will definitely reap the benefits. The Government's policies to restructure the textile mills by replacing all outdated machineries with technologically advanced machineries will see demand for textile machineries picking up which in turn will help the company to reap the benefits as the company may get substantial supply orders. A cause of concern for this company is their investment policy especially investments in group concerns. Most of the concerns, which were acquired in the recent past, have been incurring huge losses and this has had an impact on total value of assets. The Company needs to rethink and work out strategies before taking a decision of merger and takeover of its sister concerns, which are in distress.

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TABLE - I

ACTUAL Z SCORE

(In times)

YEARS	X1	X2	X3	X4	X5	OVERALL SCORE
1996-97	.552	**.476**	**.264**	**.636**	**.96**	**2.888**
1997-98	**.60**	**.504**	**.231**	**.276**	**.84**	**2.451**
1998-99	**.444**	**.588**	**.132**	**.252**	**.79**	**2.206**
1999-00	**.444**	**.602**	**.462**	**.588**	**.80**	**2.896**
2000-01	**.492**	**.644**	**.528**	**.108**	**.97**	**2.792**
2001-02	**.48**	**.70**	**.462**	**.096**	**.84**	**2.578**
2002-03	**.528**	**.77**	**.594**	**.12**	**1.01**	**3.022**

TABLE - II

Comparison between Projected with Actual Z score

(In times)

Year	Projected	Actual	Variance	% change from base year	% change from base year
1996-97	**2.725**	**2.888**	**.163**	**-**	**-**
1997-98	**2.537**	**2.451**	**(.086)**	**(6.89)**	**(15.13)**
1998-99	**2.3**	**2.206**	**(.094)**	**(15.59)**	**(23.61)**
1999-00	**2.126**	**2.896**	**.77**	**(21.99)**	**.27**
2000-01	**2.129**	**2.792**	**.663**	**(21.87)**	**(3.32)**
2001-02	**2.157**	**2.578**	**.421**	**(20.84)**	**(10.73)**
2002-03	**1.52**	**3.022**	**1.502**	**(44.22)**	**4.63**