

“Financial Distress Analysis of Selected Indian Automobile Companies by Using Altman Z score Model”

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ABSTRACTS: The main purpose of this paper is to examine the financial distress of automobile companies through Altman Z score technique. The study is a descriptive-explanatory in nature with a purposive sampling technique. The sample of the study was six automobile companies i.e. Maruti Suzuki India limited, Tata Motors limited, Mahindra and Mahindra limited, Hero Moto Corp limited and TVS Motor Company. The data has been collected from the concern company's annual reports for the period of last five year from 2015 to 2019. This paper examine the financial distress risk for the automobile companies. And also examine their financial soundness against any bankruptcy threat. The results indicates that out of the six companies, Baja auto limited and Hero Motor Corp limited, are financially sound & stable. And also it's indicates the so-called prevalent company, Tata Motors is in the distress zone which is not a positive sign for the company and its stakeholders.

KEY WORDS: Altman Z score model, bankruptcy, financial distress and automobile industry.

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I. INTRODUCTION

The Indian automobile industry is booming in a most spectacular way, According to the global source, it's the fourth largest producer in the world. And it is one of the potential future markets in the world. The Indian automobile market has shifted from a seller dominated market in the late 1980s to a consumer-dominated market in today's era. To continue with the same pace, one has to aware of the liquidity risk. Liquidity risk is defined as the risk that the organization is unable to meet its short-term financial obligation. Hence to analyses the financial risk and financial strength of a company, there is one famous model called Altman Z score. Altman Z score predicts the bankruptcy of a particular company in a scientific manner.

Altman Z score model

The Z-score model for predicting bankruptcy was published by Edward I. Altman in 1968, who was, an assistant professor of finance at New York University. The model is very useful to predict the probability of bankruptcy in the upcoming years. The Altman Z-Score is an analytical representation which consists of five distinctive financial indicators used for predicting the odds of bankruptcy amongst companies. Normally, a lower score reflects a higher probability of bankruptcy and vice-versa. The present study has used the Z-score model for evaluation of the financial health of manufacturing firms over the study period.

Structure of Z-score estimate formula for manufacturing, non-manufacturing, private firms & emerging market

Table No.1

Nature of Firm	Private Firm	Non-Manufacturing & Emerging Markets	Manufacturing Firms	Non-Manufacturing
X1	working capital / total assets	working capital / total assets	working capital / total assets	working capital / total assets
X2	retained earnings / total assets	retained earnings / total assets	retained earnings / total assets	retained earnings / total assets
X3	EBIT / total assets	EBIT / total assets	EBIT / total assets	EBIT / total assets
X4	book value of equity / total liabilities	book value of equity / total liabilities	market value of equity / book value of total liabilities	book value of equity / total liabilities
X5	sales / total assets	-	Sales / total assets.	-
Z Value	$0.717X1 + 0.847X2 + 3.107X3 + 0.420X4 + 0.998X5$	$3.25 + 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$	$1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5$	$6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$
Zone of Discriminations	$Z > 2.9$ = "Safe" $Z > 1.23$ & < 2.9 = "Grey" $Z < 1.23$ = "Distress"	$Z > 2.6$ = "Safe" $Z < 2.6$, & > 1.1 = "Grey" $Z < 1.1$ = "Distress"	$Z > 2.99$ = "Safe" $Z < 2.99$, & > 1.8 = "Gray" $Z < 1.81$ = "Distress"	$Z > 2.6$ = "Safe" $Z < 2.6$, & > 1.1 = "Grey" $Z < 1.1$ = "Distress" Zone

Source: Wikipedia

II. REVIEW OF LITERATURE

Edward Altman (1968), in his research paper, found that with the help of five distinctive financial indicators any company can predict the probability of bankruptcy in the subsequent years. He has determined the coefficient with the help of ratio analysis and multiple Discriminant analysis.

M.S.Ramaratnam, R Jayaraman (2010), found that Altman Z score plays a crucial role in predicting the financial bankruptcy of the Steel Companies and thereby a firm can judge its financial position and also found that all the selected manufacturing companies are financially sound during the study period.

Jayadev (2006), in her empirical study, it is found and provided empirical evidence on the acceptability of the Z-score model. The researcher used 3 forms of the Z-score model and estimated the coefficients in all the 3 equations by using a sample size of 112 companies.

Dr. Bhavik U. Swadia, Shreedha Shah (2016), in their research study entitled “Testing of Altman’s z-score model, a case study of Ambuja cement limited” found that Altman’s Z score shows likelihood, not a prediction. From financials of Ambuja Cement, it may look likely that the company may face bankruptcy, but proper managerial decisions, the managers may succeed in improving the results.

III. STATEMENT OF PROBLEMS

One of the main problem which the investors are facing at the time of investing money in any company is the 'Risk of bankruptcy'. And it has been well documented that such bankruptcy does not come all of a sudden. But there are few signs that would indicate such scenario. Therefore, a researcher has to predict the signs of the bankruptcy if any to protect the interest of investors and company. The selected companies are financial healthy as of now According to business perception but world is always changing its scenario hence it's never static at all. Hence, the researcher strongly felt that predicting bankruptcy of a company would help to investors and company as well. And also it is helps to investors for taking appropriate decision for Long-term.

Objective Of The Study

- To investigate the overall financial soundness of the selected automobile company by using the Altman Z score model.
- To predict the possibility of bankruptcy of the selected players in the automobile industry through the Altman Z score model.

Significance Of The Study

Based on the profitability of the companies the investors used to invest their hard earn money and they are unaware about the bankruptcy risk and liquidity risk of the companies that's why sometimes they loss their hard earn money. Hence the main purpose of this study to predict the probability of bankruptcy of selected companies so that investors will get to know the probability of bankruptcy of a particular company. Therefore, this research have significant weight.

IV. METHODOLOGY

Types of research:

For the purpose of this study, the descriptive explanatory research method has been used.

Sources of data:

The research is purely based on the secondary data which is collected from the concern company’s annual reports for the period of five years.

Period of the study:

For this purpose, five years of data has been used i.e. 2015-19 of each company.

Sample:

The following companies has been selected based on profitability and popularity.

Maruti Suzuki India Limited	Tata Motors Limited	Mahindra and Mahindra Limited
Hero Moto Corp Limited	TVS Motor Company	Bajaj Auto Limited

V. DATA ANALYSIS

There are four sets of formulae under the Altman Z score model for different types of firms and there are three specific zones given for each set of formulae which are explained in the table No.1. However, our main focus is only on manufacturing firm that too of automobile companies.

Formulae of Altman Z score for manufacturing firm:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Ranges of Altman Z score for manufacturing firm

Table No.2

Z > 2.99	Safe zone
1.8 < Z < 2.99	Grey zone
Z < 1.8	Distress zone

Five distinctive financial indicator or variables of Altman Z score are as follows

Table No.3

Variables	Formulae
X1	working capital / total assets
X2	retained earnings / total assets
X3	EBIT / total assets
X4	market value of equity / book value of total liabilities
X5	Sales / total assets.

The data analysis and interpretation of the six selected companies are as follows and all the financial figure are in crores:

Financial Information of Tata Motors Limited

Table No.4

Particulars	Years				
	2019	2018	2017	2016	2015
Retained Earning	21,483.30	19,491.76	20,483.39	22,582.93	14,195.94
Current Liabilities	22,940.81	24,218.95	21,538.35	18,701.74	20,370.63
Current Assets	13,229.30	14,971.66	12,757.08	11,861.69	8,572.97
Total Assets	60,909.63	59,212.30	58,878.28	56,676.00	49,943.17
Profit/Loss Before Tax	2,398.93	-946.92	-2,353.27	155.81	-3,974.72
Interest	1,793.57	1,744.43	1,569.01	1,592.00	1,611.68
Net Sales	68,764.88	57,441.05	43,340.62	42,345.39	35,890.50
total Liabilities	38,747.11	39,041.32	37,715.67	33,413.89	35,080.58
Total Non-Current Liabilities	15,806.30	14,822.37	16,177.32	14,712.15	14,709.95

Sources: compiled by author from Annual reports.

Altman Z-score of Tata Motors

Parameters	Coefficient	2019	2018	2017	2016	2015
x1	1.2	-0.15944	-0.15617	-0.14914	-0.12069	-0.23622
x2	1.4	0.352708	0.329184	0.347894	0.398457	0.284242
x3	3.3	0.009939	-0.04545	-0.06662	-0.02534	-0.11186
x4	0.6	0.325466	0.326591	0.362548	0.225641	0.765248
x5	0.999	1.128966	0.970086	0.736105	0.747149	0.718627
z score		1.658375	1.288529	1.041143	1.211178	0.922408
zone		distress	distress	distress	distress	distress

From the above table, it is depicted that Altman z score of Tata motors is consistently increasing at an increased rate though the score always been in the distressed zone. The working capital of the company is not up to the mark. Hence, there is a possibility of liquidity glitches to the companies in upcoming years.

Financial Information of Mahindra & Mahindra Limited

Table No.5

Particulars	years				
	2019	2018	2017	2016	2015
Retained Earning	33,613.43	29,699.07	26,488.81	22,126.85	18,948.60
Current Liabilities	14,334.07	13,323.21	9,634.05	9,844.32	8,974.27
Current Assets	18,071.06	16,474.47	12,608.00	11,635.68	10,128.21
Total Assets	52,697.06	47,416.75	39,968.32	35,499.57	32,944.87
Profit/Loss Before Tax	6,325.01	6,102.37	4,722.61	4,284.46	4,168.89
Interest	113.39	112.2	159.59	186.05	214.3
Net Sales	53,614.00	48,112.32	43,378.93	40,386.75	38,391.61
total Liabilities	18,487.83	17,122.71	13,182.70	13,076.40	13,689.78
Total Non-Current Liabilities	4,153.76	3,799.50	3,548.65	3,232.08	4,715.51

Sources: compiled by author from Annual reports.

Altman Z-score of Mahindra & Mahindra Limited

Variables	Coefficient	2019	2018	2017	2016	2015
x1	1.2	0.070915	0.066459	0.07441	0.050461	0.035026
x2	1.4	0.637862	0.626341	0.66275	0.623299	0.575161
x3	3.3	0.117874	0.12633	0.11417	0.11545	0.120037
x4	0.6	0.236254	0.214578	0.01246	0.094825	0.325615
x5	0.999	1.0174	1.014669	1.08533	1.137669	1.165329
z score		2.525224	2.51592	2.4856	2.507582	2.60291
zone		Grey	Grey	Grey	Grey	Grey

By applying the Altman Z score model we have found that the company has been in the distress zone over the study period. From the above table, it is also depicted that Altman Z-score of Mahindra & Mahindra limited is stable over the years. Most probability, company is nearer to a safe zone and it is also found that the profit of the companies has drastically increased over the years.

Financial Information of hero

Table No.6

Particulars	years				
	2019	2018	2017	2016	2015
Retained Earning	12,817.17	11,728.94	10,071.35	7,904.81	6,501.39
Current Liabilities	4,130.36	4,343.32	4,093.33	4,048.82	3,883.42
Current Assets	8,115.64	8,848.18	7,453.18	5,935.09	5,282.13
Total Assets	17,641.19	16,738.80	14,694.26	12,340.69	10,521.70
Profit/Loss Before Tax	5,010.73	5,244.16	4,658.46	4,394.58	3,328.82
Interest	8.6	6.25	6.05	2.15	11.09
Net Sales	33,650.54	31,589.51	28,169.54	28,359.91	27,518.00
total Liabilities	4,784.07	4,969.92	4,582.97	4,395.94	3,980.37
Total Non-Current Liabilities	653.71	626.6	489.64	347.12	96.95

Sources: compiled by author from Annual reports.

Altman z-score of hero

Variables	Coefficient	2019	2018	2017	2016	2015
x1	1.2	0.225908	0.269127	0.228651	0.15285	0.132936
x2	1.4	0.726548	0.700704	0.685393	0.640548	0.617903
x3	3.3	0.283548	0.31292	0.316614	0.355931	0.315323
x4	0.6	10.32517	8.325614	7.625158	9.362541	8.362541
x5	0.999	1.907498	1.887203	1.917044	2.298081	2.615357
z score		10.92466	9.217258	8.76898	10.16807	9.695418
zone		Safe	Safe	Safe	Safe	Safe

- From the above analysis shows that company is standing in the Safe zone area, it means that company’s financial position is good and also it is documented there is no insolvency threat to the company in upcoming years. It is also depicted from data that Altman Z-score of Hero is full satisfactory over the years.

Financial Information of TVS

Table No.7

Particulars	years				
	2019	2018	2017	2016	2015
Retained Earning	3,299.81	2,832.91	2,360.82	1,910.83	1,597.85
Current Liabilities	4,041.68	3,779.50	2,851.08	2,315.88	2,243.38
Current Assets	3,154.90	2,578.11	2,186.89	1,886.37	2,029.02
Total Assets	8,369.36	7,179.47	5,904.67	4,952.18	4,604.20
Profit/Loss Before Tax	960.96	878.64	698.68	628.94	456.16
Interest	80.56	56.62	43.95	48.73	27.42
Net Sales	18,209.92	14,966.78	12,009.07	10,967.04	9,916.57
total Liabilities	5,022.04	4,299.05	3,496.34	2,993.84	2,958.84
Total Non-Current Liabilities	980.36	519.55	645.26	677.96	715.46

Sources: compiled by author from Annual reports.

Altman z-score of TVS

	Coefficient	2019	2018	2017	2016
x1	1.2	-0.10596	-0.16734	-0.11249	-0.0867
x2	1.4	0.394273	0.394585	0.399823	0.38586
x3	3.3	0.105193	0.114496	0.110883	0.11716
x4	0.6	1.56248	1.5428	1.325884	1.42517
x5	0.999	2.635218	2.084664	2.033826	2.21459
z score		4.342044	3.73771	3.618006	3.89023
zone		Safe	Safe	Safe	Safe

By applying the Altman Z score model we come to know that z score of TVS Motors is increasing progressively. And also it is depicted that Altman Z-score of TVS Motors Limited is full satisfactory over the years. Company is in a safe zone and it is also found that the liquidity position of the company is sounds good and there is a no signal of bankruptcy.

Financial Information of Bajaj

Table No.8

Particulars	years				
	2019	2018	2017	2016	2015
Retained Earning	21,490.53	18,814.49	16,744.76	12,977.18	10,402.78
Current Liabilities	4,873.68	4,111.29	3,212.58	2,780.99	4,476.79
Current Assets	7,062.66	9,235.63	9,391.37	4,725.25	9,526.27
Total Assets	27,380.39	23,819.49	20,814.89	16,486.50	15,562.32
Profit/Loss Before Tax	6,703.16	5,782.57	5,335.63	5,547.32	4,084.79
Interest	4.48	1.31	1.4	1.05	6.49
Net Sales	29,567.25	24,700.30	21,373.52	22,151.71	21,103.93
total Liabilities	5,600.49	4,715.63	3,780.76	3,219.95	4,870.17
Total Non-Current Liabilities	726.81	604.34	568.18	438.96	393.38

Sources: compiled by author from Annual reports.

Altman Z-score of Bajaj

Variables	Coefficient	2019	2018	2017	2016	2015
x1	1.2	0.07995	0.21513	0.29684	0.11793	0.32447
x2	1.4	0.78489	0.78988	0.80446	0.78714	0.66846
x3	3.3	0.24465	0.24271	0.25627	0.33641	0.26206
x4	0.6	14.3257	12.3654	10.3252	11.2537	9.25469
x5	0.999	1.07987	1.03698	1.02684	1.34363	1.35609
z score		10.6763	10.6201	9.54905	10.4481	9.09756
zone		Safe	Safe	Safe	Safe	Safe

By applying the Altman Z score model to the above figures we found that Z score of Bajaj auto limited is sounds good i.e. 10.6763 in 2019, 10.6201 in 2018, 9.54905 in 2017, 10.4481 in 2016 and 9.09756 in 2015 respectively. From the above data, it is portrayed that Altman Z-score of Bajaj auto limited is sounds satisfactory over the years

Financial Information of Maruti

Table No.

Particulars	years				
	2019	2018	2017	2016	2015
Retained Earning	45,990.50	41,606.30	36,280.10	29,733.20	23,553.20
Current Liabilities	14,150.30	15,442.10	13,226.40	11,039.20	8,823.00
Current Assets	12,361.60	7,921.40	8,776.20	7,846.00	8,197.90
Total Assets	62,931.80	59,370.10	51,250.60	41,940.00	33,551.00
Profit/Loss Before Tax	10,465.60	11,003.40	9,960.30	7,443.70	4,868.20
Interest	75.8	345.7	89.4	81.5	206
Net Sales	83,026.50	78,104.80	66,909.40	56,441.20	48,605.50
total Liabilities	16,790.30	17,612.80	14,819.50	12,055.80	9,846.80
Total Non-Current Liabilities	2,640.00	2,170.70	1,593.10	1,016.60	1,023.80

Sources: compiled by author from Annual reports.

Altman Z-score of Maruti

Variables	Coefficient	2019	2018	2017	2016	2015
x1	1.2	-0.0284	-0.1267	-0.0868	-0.0761	-0.0186
x2	1.4	0.7308	0.7008	0.7079	0.70895	0.70201
x3	3.3	0.1651	0.17951	0.1926	0.17554	0.13896
x4	0.6	10.3256	13.2654	12.3256	12.3256	10.3256
x5	0.999	1.31931	1.31556	1.30553	1.34576	1.4487
z score		9.04718	10.695	10.2221	10.2202	9.06164
zone		Safe	Safe	Safe	Safe	Safe

From the above data, it is demonstrate that Altman z-score of Maruti Suzuki is fully tolerable over the study period. Remarkably, Firm is in safe zone and that too it has very decent score i.e. Z-score 9.04 (2019) and it is also found that the liquidity situation of the firm is comprehensively good and there is a no sign of bankruptcy at all.

VI. CONCLUSION:

Altman Z score is a likelihood technique, not an exact prediction. From a company's financial statements, it may look probable that bankruptcy reveals, but the management can avoid it by improving the matters. On the basis of the study accompanied, it is conclude that out of the six companies, Baja auto limited and Hero Motor Corp limited, are financially sound & stable. And also it's indicates the so-called prevalent company, Tata Motors is in the distress zone which is not a positive sign for the company and its stakeholders. It is also found that the majority of selected companies are in “Safe Zone” i.e. four out of six companies. Therefore, it is concluded that the overall financial strength of automobile companies is satisfactory.

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