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Altman's Z-score Model with Selected Financial Indicators

Keerti Kulkarni[1] & Manish Kothari[2]
[1]Assistant Professor and [2] Associate Professor, Dr.D.Veerendra Heggade Institute of Management Studies and Research, Dharwad
Corresponding Author: Keerti Kulkarni

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ABSTRACT: The study was undertaken at one of the leading fasteners manufacturers which are prominent OEM's for Automobile Industry in order to identify or predict company bankruptcy to use pioneering approach of using Altman's Z-score model. Through this paper, an attempt has been made to know the strategic importance of financial ratios and selected financial indicators in predicting the financial health and sustenance for long term. The study was done by using the model composed of five linear combinations of business ratios, which used a multivariate approach, MDA, in order to measure the business performance or competence of a firm. For instance, financial ratios can be calculated as a criterion of company performance; those involving profitability, liquidity, capital structure and efficiency. The secondary information for the same was being collected from Annual Reports – Balance sheet and Profit and Loss Account for 5 years. The Company has also provided with schedules in order to cover the description of individual financial pictures. The data thus collected was then checked and validated by using Altman's Z-score model.

Keywords: Financial statements, Financial Ratios, Altman's Z-score Model, Financial Health, Bankruptcy, MDA.

I. INTRODUCTION:

The world's increasing globalization requires more interaction among people from diverse backgrounds and due to rapidly changing policies, competitive parameters and world becoming global village where all companies fight on the common platform of accessibility to various markets. It also becomes equally important for companies to be financially fit, credible and stronger when it comes to gaining the confidence of the stakeholders. People no longer live and work in an insular environment; they are now part of a worldwide economy competing within a global framework. For this reason, profit and non-profit organizations need to become more diversified to remain competitive.

The concept of 'Altman's Z-score Model with Reference to Selected Financial Indicators' has become increasingly acceptable and prevalent in organizations all around the world. It is obvious that profits and growth are the main objectives for a business. As a consequence, the evaluation of if a company is progressing well or a prediction that a corporation will go bankrupt has been researched widely among researchers and academics in different countries. According to Neophytou and Molinero (2004), over the past four decades studies on the ability to predict the failure of corporations have been broadly produced by academics, researchers and practitioners. However, corporate failure is considered to be the most significant challenge faced by numerous businesses in various industries around the world. As a result, the problem of corporate failure continues in contemporary economies. A rigorous and reliable method for predicting bankruptcy status has not yet been discovered and so research attention is most likely to continue.

It is clear that the failure of corporations does not happen suddenly and that there are many factors that lead businesses to fail. The majority of economists agree that the high proportion of interest rates, high debt burdens, the nature of businesses operations, government regulations and substandard economic times, such as a recession, might contribute to the failure of businesses. Moreover, studies conducted in the field of corporate failure prediction in the UK, Australia, the US and Canada have considered that newly emerging companies and private and small companies with ineffective supervisory and regulatory policies, as well as a weakness in cash flow, are significantly exposed to financial distress compared to public, large and well-established companies.

The accuracy and validity of the failure prediction models are useful to numerous economic agents, such as prospective investors, managers, customers, suppliers, lenders, creditors and others. Consequently, there has been a continuous interest paid to failure prediction modeling in financial and accounting studies ever since the pioneering work first published by William Beaver in 1966. The number of corporate failure prediction models has rose significantly, especially in the 1980s and 1990s, due to increased data availability and the improvement and development of econometric methods. Thus, the A Study on Altman‟s Z-score Model with Reference to Selected Financial Indicators majority of this work has been heavily influenced by a number of early studies, such as Altman (1968), Ohlson (1980), Zavgren (1985) and Dewaelheyns et al. (2006).

According to Wang and Campbell (2010), US corporations‟ data have been used by many researchers who have provided different techniques to help identify bankruptcy. It is reported that the Altman Z-score model (1968) and Ohlson‟s model (1980) are two models that are well accepted and commonly used at present. After the spread of the Altman Z-score model, studies on this model increased widely

It is reported that the Altman Z-score model (1968) was the first study that identified companies as failed and non-failed companies. Altman‟s study (1968) analysed 33 inactive and 33 active companies using MDA. Ultimately, Altman's Z-score results found that the accuracy of the first and the second year prior to failure was 95% and 72%, respectively. Public manufacturing firms were utilized in the original Altman Z-score model (1968) for predicting bankruptcy. Later, private manufacturing firms were employed in the revised Altman Z‟-score model (1983). The accuracy of this last model was demonstrated by the 95% and 73% accuracy at year one and year two prior to failure, respectively.

The concept of corporate failure is a situation in which a business has to close down because of the inability to continue its work successfully. According to Argent (1986), there are two types of failure. Firstly, economic failure, defined as firm's failure to achieve the return on capital invested. Secondly, financial failure is a situation when a company faces financial insolvency. In these cases, a firm may be liquidated and this leads the firm to bankruptcy.

However, the concept of business failure can be defined in different ways. Some examples of business failure are bankruptcy, bond defaults, bank loan defaults, insolvency, the delisting of a firm, liquidation and government interference through special financing (Altman and Narayanan, 2007). Under a broad definition, Wu (2010) has defined business failure as the circumstances in which a company cannot fulfill its

A Study on Altman’s Z-score Model with Reference to Selected Financial Indicators obligations to lenders, preferred stock shareholders, suppliers or where a firm is bankrupt according to law. On the other hand, financial distress is a term that is utilized excessively in the financial studies available. Levratto (2013) defines it as whenever a company's liabilities exceed its book value of assets, predominantly it leads to financial distress. It is clear that an increase in fixed expenditures in a company, it might leads to a raise in the risk of financial distress (Johnsen and Melicher, 1994). Thus, the bankruptcy and insolvency are the two terms, which are used commonly in the literature. The bankruptcy process begins when the firms are incapable of paying back their obligations to banks, suppliers, tax authorities and employees. When aggregate liabilities of firm override the face value of the company's assets, this leads to bankruptcy, whereupon the assets are utilised to repay a portion of outstanding debt (McKee, 2003). In contrast, insolvency is a case in which the company is no longer able to meet its financial obligations when debts become payable. Insolvency happens when current assets are less than current liabilities.

ALTMAN’S Z-SCORE (1968) MODEL

Altman’s Z-score model (1968) is the first, pioneering approach to use financial ratios to identify or predict company bankruptcy. Since that time, it has been considered that the evaluation and apply of financial ratios has become a vital component for failure prediction techniques. In addition, Edward Altman’s Z-score model (1968) is commonly utilized to assess company insolvency. His model composed of five linear combinations of business ratios, which used a multivariate approach, MDA, in order to measure the business performance or competence of a firm. For instance, financial ratios can be calculated as a criterion of company performance; those involving profitability, liquidity, capital structure and efficiency (Altman, 1968). Moreover, Altman (1968) has drawn attention to the fact that the MDA approach has a marked preference compared to the traditional univariate ratio analysis. The first advantage is that the statistical MDA approach has the possibility of analysing an entire set of explanatory variables with their interaction in the same instant.

A Study on Altman's Z-score Model with Reference to Selected Financial Indicators advantage is that the MDA technique decreases the number of explanatory variables that are being considered. The Altman analysis is concerned with two categories of companies which active and inactive companies - and thus converts this analysis to its simplest form. Altman's study consists of 66 manufacturing companies with 33 bankrupt and 33 non-bankrupt. Thus, his study consists of a list of 22 financial variables (ratios) which have been compiled for evaluation. However, only five financial variables (ratios) have been chosen from this list based on their capacity predictive for company bankrupt such as liquidity, profitability, leverage, solvency and activity. Altman"s original Z-score model (1968) equation was:

Z=
0.012X1+0.014X2+0.033X3+0.006X4+0.999X5
Z= Cumulative Values

Based upon Altman's formula, the firms were classified into three categories according to the company's sustainability. For instance, if the firm is in the distress area then there is a strong probability of failures when the Z-score index of the company is below 1.8. On the other hand, when the Z-score index exceeds 2.99, it is considered that the enterprise is in the safe zone, with a low percentage of company failure. Moreover, when the value of the Z-score index is greater than 1.80 and less than 2.99, there is no strong evidence to specify the financial condition of the company; that is, the results cannot precisely ascertain whether the company is in the safe or distressed zone (Altman, 1968).

Z < 1.80→Distress Zone
Z > 2.99→Safe Zone
1.8 < Z < 2.99→Grey Zone

II. RESEARCH METHODOLOGY

Need for the Study: The financial soundness is the most important aspect for the stakeholders as well as the company. The future of the financial performance of any business is determined by its present performance but making predictions regarding future, whether it would be bankrupt or will operate effectively is the most important concern to enable the company to predict its future performance. The study has undertaken Altman's Z-score model for predicting the financial soundness of the company. For this selected financial Ratios have been applied pertaining to the model, since this tool is very important since it identifies whether the company have the ability to improve their financial position during the coming years. Further only selected financial indicators are the once which are of greater essence since, they predict the financial position effectively. Also the correlation Analysis has been conducted since this Analysis helps the study critically to establish stronger or weak relationship between the selected dependent and Independent variables.

Objectives Of The Study

1. To understand the effectiveness of the financial soundness of the company through Analyzing selected Financial Ratios.
2. To analyse the Solvency position of the company and to estimate the liquidity position.
3. To predict the financial soundness of the company by adopting Altman's Z-score model to Establish and analyze the co-relationship and study the relationship between the selected dependent and Independent Variables.
4. To evaluate the overall financial position of the company

TYPE OF RESEARCH:

The research is descriptive type. Descriptive research provides the researchers with a general understanding of the problem and seeks conclusive data to answer question necessary to determine a particular cause of action.

METHOD OF DATA COLLECTION:
SECONDARY DATA SOURCE:

The Financial Data of last 5 years was collected from the company which included annual audited Balance sheet along with P&L statements. The company has provided with schedules in order to cover the description of Individual financial Pictures.

STATISTICAL TOOLS FOR ANALYSIS:

Statistical tools such as MS Excel Correlation analysis tool, tabulation, percentage calculation, and construction of bar charts and column charts are used in order to find the relationship between the X and Y variables.

LIMITATIONS OF THE STUDY:

1. The data collected from the company is assumed to be true.
2. The study was restricted for the period restricting to five years duration only as the data was collected for only five years.
3. The study focused only on few financial Ratios like, Liquidity, Solvency and Profitability as mentioned in the Altman's Z-score model.

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Table No: 2.1 Showing the Z-Score Result for the Year – 2011-12

Sl. No	Ratio	Calculation	Total
X1	Working Capital Total Assets	51432215 139189295	0.369
X2	Retained Earnings Total Assets	30107388 139189295	0.216
X3	Earnings Before Int and Tax Total Assets	16532450 1391892950	0.118
X4	Book Value of Equity Book Value of Total Liabilities	7500000 10151907	0.738
X5	Sales Total Assets	178730844 139189295	1.284

Z=0.369X1.2+1.4X0.216+3.3X0.118+0.6X0.738+ 0.999X1.284=2.86

INTERPRETATION:

From the above table it can be seen that the Z-Score for the financial Year 2011-12 stood at 2.86 this means the firm is declared as **"Safe Zone".** This means that the firm has generated good amount of Profits where their current assets exceeds the Current Liabilities indicating a good position in meeting its short term obligations. From the firm's generation of Profits has resulted quite a good and favorable growth in the consecutive years. Therefore, in this year the firm has been safe and considerably into a good financial stability

Table No: 2.2 Indicating the Z-Score Result for the year 2012-13

Sl. No	Ratio	Calculation	Total
X1	Working Capital Total Assets	22474794 143568270	0.0156
X2	Retained Earnings Total Assets	6456789 143568270	0.045
X3	Earnings Before Int and Tax Total Assets	19363058 143568270	0.135
X4	Book Value of Equity Book Value of Total Liabilities	7500000 129611481	0.058
X5	Sales Total Assets	176232299 143568270	1.227

Z=0.156X1.2+1.4X0.045+3.3X0.135+0.6X0.058+ 0.999X1.227=1.95

INFERENCE:

From the above, it can be inferred that the firm's Z-Score for the year 2012-13 was at 1.95. From this result it can be interpreted that the firm is declared at **"Gray Zone"**. This indicates that the company's Financial Position would deteriorate provided the firm does not take call in managing its current short term obligations judiciously. If not taken care would lead to firm's probability of going into pathetic instable Financial Conditions. This indicates that the firm has to keep a close eye on its financial operations effectively in the way their profitability will not have a negative impact with the operations if all functioned effectively.

Table No; 2.3 Showing the Z-Score Result for the Year – 2013-14

Sl No	Ratio	Calculation	Total
X1	Working Capital	955719	-0.006
	Total Assets	145186959	
X2	Retained Earnings	7339004	0.050
	Total Assets	145186959	
X3	Earnings Before Int and Tax	21271346	0.146

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	Total Assets	145186959	
X4	Book Value of Equity	20000000	0.169
	Book Value of total	227847955	
	liabilities		
X5	Sales	158223506	1.089
	Total Assets	145186959	

Z =1.2 X(-0.006) +1.4X0.050 +3.3X0.146 +0.6X0.169 + 0.999X1.089=1.73

INFERENCE:

From the above, it can be predicted that the firm's Z-Score for the year 2013-14 was at 1.73. This is an indication of a Firm falling in a **"Gray Zone"**. This indicates that the company's Financial Position would Detroit provided the firm does not take call in managing its current short term obligations judiciously. If not taken care would lead to firm's probability of going into pathetic instable Financial Conditions.

This indicates that the firm has to keep a close eye on its financial operations effectively in the way their profitability will not have a negative impact with the operations if all functioned effectively

Table No: 2.4 Showing Z-Score Result for the Year –2014-15

Sl.No	Ratio	Calculation	Total
X1	Working Capital	6249195	0.032
	Total Assets	194541331	
X2	Retained Earnings	13986843	0.072
	Total Assets	194541331	
X3	Earnings Before Int and Tax	25354176	0.130
	Total Assets	194541331	
X4	Book Value of Equity	20000000	0.124
	Book Value of total	160554488	
	liabilities		
X5	Sales	241496746	1.241
	Total Assets	194541331	

Z=1.2X0.032+1.4X0.072+3.3X0.130+0.6X0.124+ 0.999X1.241=1.8823

INFERENCE:

From the above, it can be inferred that the firm's Z-Score for the year 2012-13 was at 1.88. From this result it can be interpreted that the firm is declared at **"Gray Zone"**. This indicates that the company's Financial Position would Detroit provided the firm does not take call in managing its current short term obligations judiciously. If not taken care would lead to firm's probability of going into pathetic instable Financial Conditions. This indicates that the firm has to keep a close eye on its Financial operations effectively in the way their profitability will not have a negative impact with the operations if all functioned effectively.

Table No: 2.5 Showing Z-Score Result for the Year 2015-16

Sl. No	Ratio	Calculation	Total
X1	Working Capital	30345232	0.164
	Total Assets	184372615	
X2	Retained Earnings	18322502	0.099
	Total Assets	184372615	
X3	Earnings Before Int and Tax	27463714	0.148
	Total Assets	184372615	
X4	Book Value of Equity	20000000	0.136
	Book Value of total liabilities	146050113	
X5	Sales	250687325	1.359
	Total Assets	184372615	

Z=1.2X0.164+1.4X0.099+3.3X0.148+0.6X0.136+ 0.999X1.359=2.92

INFERENCE:

From the above table it can be seen that the Z-Score for the financial Year 2015-16 stood at 2.90 this means the firm is declared as **"Safe Zone".** This means that the firm has generated good amount of Profits where their current assets exceeds the Current Liabilities indicating a good position in meeting its short term obligations. From the firm's generation of Profits has resulted quite a good and favorable growth in the consecutive years. Therefore, in this year the firm has been safe and considerably into a good financial stability

Correlation

A statistical term (usually denoted by r) that measures the strength of the association between two variables where two variables are completely unrelated, then their correlation co-efficient will be zero; where two variables are perfectly related, then their correlation would be one. A high correlation coefficient between two variables merely indicates that the two generally vary together - it does not imply causality in the sense of changes in one variable causing change in the other variable where high values of one variable are associated with high values of the other (and vice-versa), then they are said to be positively correlated. Where high values of one variable are associated with low values of the other (and vice-versa), then they are said to be negatively correlated. Thus correlation coefficients can range from +1 for perfect positive association to -1 for perfect negative association, with zero representing the case where there is no association between the two.

Liquidity-Profitability

From what has hitherto been stated, it becomes obvious, that, a firm in its bid to maximize the rate of return on investment has first to strive for ensuring its most appropriate level of investment for working capital purposes. That is to say, its investment in working capital must be optimum neither be in excess nor be in adequate. Secondly, once the most appropriate level of investment in Working Capital has been determined, the firm has to concentrate on the optimum use of the same. Where investment in Working Capital is much in excess of requirement, no doubt, it will impair the firm's profitability.

On the other hand, inadequate investment in Working Capital will tell upon the profitability of firms. Therefore, it may generally be assumed that there is always a negative relationship between the two. But that is, however, not true in all the cases.

It is only when the investment in Working Capital is optimum that firms can maximise their rates of return not only from the standpoint of profitability but also from the standpoint of liquidity. For existence of a linear relationship, though not continuous, between profitability and liquidity corresponding to the holding of current assets at least

III. CONCLUSION

The Altman‟s Z-Score model has been undertaken for the present study as it is explained as an important tool from time to time to the manufacturing company‟s since this model helps in identifying financial ratios to predict a company‟s probability of failure. The main purpose of this model in the study was to measure the company‟s financial health and to predict the probability that a company would be finding itself either in safe, Gray or Distress zone within few years. However, any situation is not considered critically except that only in ratios are calculated assessed and provided with necessary predictions. From the Analysis of the study the firm showed a Safe Zone indication in the year 2015-16, this prediction reveals about the firm that has been reliable with good liquidity Management it has managed to utilize its Assets in sound investable funds to generate favourable earnings.

From the solvency point of view the firm has been effective since it has maintained a healthy and sound debt-equity capital structure and managed to pay off its long term obligations effectively.

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