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Research Paper Management

# Measuring The Performance Of Hypothetical Ltd. Using Z-Score Model

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**ABSTRACT**

*This paper discusses one of the venerable models for measuring the performance by way of assessing the distress of industrial corporations using Z-Score model. The Z-score formula for predicting bankruptcy was published in 1968 by Edward I. Altman, who was, at the time, an Assistant Professor of Finance at New York University. The Z-score uses multiple corporate income and balance sheet values to measure the financial health and to predict the corporate defaults of a company.*
*Hypothetical Ltd. provides highly specialized services of its kind to the Oil & Gas sector. As per the Altman guidelines, the financial health of the Hypothetical Ltd. is tested through Z-score, and is concluded that the financial health of Hypothetical Ltd.is too healthy and its financial health is viable and there is no risk of a failure.*

**Keywords : Industrial Corporations, Financial Health, Corporate Bankruptcy, Leverage, Retained Earnings, Capital Turnover Ratio.**

**Introduction**
In the changing scenario, every business strives hard for survival in the present day's era of core competence. Survival of the business in the modern world is possible, only when, apart from other things, it has sufficient finance. The financial requirements of a business must be sufficient to meet its long-term and short-term commitments. To meet long-term commitment, it needs permanent capital and for short-term commitment, it needs working capital. Thus, finance is significant facet of every business. Therefore, the financial analyst is responsible to monitor the financial position of the business regularly.

**Background**
This paper discusses one of the venerable models for assessing the distress of industrial corporations. It is the Z-Score model (1968). A set of financial and economic ratios will be analyzed in a corporate distress prediction context using a multiple discriminant statistical methodology. This paper not only explores the quantifiable characteristics of potential bankrupts but also the utility of a much-maligned technique of financial analysis: ratio analysis.

**The Z Score Model**
The Z-score formula for predicting bankruptcy was published in 1968 by Edward I. Altman, who was, at the time, an Assistant Professor of Finance at New York University. The formula may be used to predict the probability that a firm will go into bankruptcy within two years. Z-scores are used to predict corporate defaults and an easy-to-calculate control measure for the financial distress status of companies in academic studies. The Z-score uses multiple corporate income and balance sheet values to measure the financial health of a company.

Z = z score(X) returns a centered, scaled version of X, the same size as X. For vector input x, output is the vector of z-scores z = (x–mean(x)). /std (x). For matrix input X, z-scores are computed using the mean and standard deviation along each column of X. For higher-dimensional arrays, z-scores are computed using the mean and standard deviation along the first non-singleton dimension. The columns of Z have mean zero and standard deviation one (unless a column of X is constant, in which case that column of Z is constant at 0). z-scores are used to put data on the same scale before further analysis. [Z,mu,sigma] = zscore(X) also returns mean(X) in mu and std(X) in sigma. [...] = z score(X,1) normalizes X using std(X,1), that is, by computing the standard deviation(s) using n rather than n–1, where n is the length of the dimension along which zscore works. zscore(X,0) is the same as z score (X).

**MDA (MULTIPLE DISCRIMINANT ANALYSIS)**
It is a statistical technique used to classify an observation into one of several a priori groupings dependent upon the observation's individual characteristics. It is used primarily to classify and make predictions in problems where the dependent variable appears in qualitative form, for example, bankrupt or non bankrupt. Therefore the first step is to establish group classifications.

After the groups are established, data are collected for the objects in the groups. MDA in its most simple form attempts to derive a linear combination of these characteristics which "best" discriminates between the groups. If a particular object, for instance, a corporation, has characteristics (financial ratios) which can be quantified for all the companies in the analysis the MDA determines a set of discriminant coefficients. When these coefficients are applied to the actual ratios, a basis for classification into one of the mutually-exclusive-grouping-exists. The discriminant function of the form Z= V1X1 + V2X2 +...+VnXn transforms the individual variable values to a single discriminant score , or Z value, which is then used to classify the object where V1,V2,...Vn = discriminant coefficients X1,X2....Xn-=-independent-variables. The Z-Score model is a linear analysis in that five measures are objectively weighted and summed up to arrive at an overall score that then becomes the basis for classification of firms-into-one-of-the-a-priori-groupings(distressed-and-non-distressed). The-final-discriminant-function-is-as-follows: Z=-1.2X1-+-1.4X2-+-3.3X3-+-0.6X4-+-0.999X5 where, X1-=-working-capital/total-Assets X2-=-retained-earnings/total-Assets X3-=-earnings-before-interests-and-taxes/total-Assets X4-=-market-value-of-equity/book-value-of-total-liabilities X5-=-sales/total-Assets Z = overall index

**The Revised Z-Score model**
A complete re estimation of the model occurs by substituting the book values of equity for the Market value in X4. All the coefficients change and the classification criterion and related-cut-off-scores-also-change.The-revised-Z-score-is-as-follows:

Z' = 0.717X1 + 0.847X2 + 3.107X3 +0.420X4 +0.998X5

THERE wAS A FURTHER REVISION TOO.

**ABOUT THE COMPANY**
Hypothetical Ltd. provides highly specialized services of its kind to the Oil & Gas sector. Ever since Hypothetical Ltd's inception in 1998, it has played an active role in delivering vast, varied and versatile services, such as Comprehensive Catalyst Handling including under Nitrogen atmosphere, with all types of dense loading technologies to Refineries, (Petro) chemicals, Fertilizers, Chemical, Gas, Power, Iron & Steel Plants. Hypothetical Ltd. also provides Inspection/Internal Repair/Welding in inert and toxic atmosphere; Hot Tapping, Line Stopping & Allied Services; Super Sucker Vacuum Truck Services; Heat Exchanger Bundle Pulling and Cleaning; Bolt Tensioning / Torquing; Mechanical Maintenance; High Pressure Hydro Blast Cleaning, Industrial Tank Cleaning, Oily Sludge Liquid Treatment, with its eminent work force who have had rich experience of over a decade in these specialized fields.

**RESEARCH DESIGN**
**OBJECTIVES OF THE STUDY**
The objectives of the study is

- To assess the overall financial performance of the company.
- To know the efficiency in the financial operations.
- To predict the financial health and viability of the company using 'z' score.

The study is on the secondary data, which was obtained from the published sources i.e Annual reports for the period of 10 years from, 2001 to 2010.

**LIMITATIONS OF THE STUDY**
The following are the limitations of the study.

- The study is limited to 10 years.
- The data of this study has been primarily taken from published annual reports but the name of the company is not revealed.
- It is difficult to compute various variables like sales, since it's a service industry.

**ALTMAN GUIDELINES FOR HEALTHY ZONE**
With the help of Altman guidelines, the overall financial health of Hypothetical Ltd. is measured during the study period with the Z-Score model. The guidelines are given in table 1

Table 1 about here shows Altman Guidelines

| Situation | Z Score | Zones | Remarks |
|---|---|---|---|
| 1 | Below 1.8 | Not healthy | Its failure is certain andextremely lightly and would occur probably within a period of 2 years. |
| 2 | Between 1.8 and 2.99 | Healthy | Financial viability is considered healthy the failure in this situation is uncertain to predict. |
| 3 | 3.0 and Above | Too healthy | Its financial health is viable and there is no risk of a fail. |

All the five ratios which are the ingredients of Z- score are calculated and interpreted. The working capital of the Hypothetical Ltd. was fluctuating, whereas, total assets were increasing year by year which shows the company concentrated more on the investments in fixed assets. The efficiency of Hypothetical Ltd. in the matter of management of working capital helps the company to maintain the good financial health, but the working capital management of this company was satisfactory and not effective and sound.

Calculation of retained earnings to total assets ratio of Hypothetical Ltd. during the study period. It is clear from the above analysis that the ratios are fluctuating throughout the study period. It was at its highest in the year 2001, at 0.639 and lowest in the year 2010 at 0.354. The mean ratio of working capital to total assets was 0.449 during the study period.

Calculation of EBIT to total assets ratio of Hypothetical Ltd. during the study period. It is clear from the above analysis that the ratios are fluctuating throughout the study period. It was at its highest in the year 2010, which was 0.271 and the lowest in the year 2001 at 0.024 .The mean ratio of working capital to total assets was 0.108 during the study period.

The total debts fluctuated every year and the value of debt remained constant for every 3yrs during the study period. This ratio is the reciprocal of debt equity ratio. The highest ratio was in the year was in the year 2001, at 24.09, and the lowest was in the year 2010, at 0.965.

Calculation of X5 shows that the sales and total assets were fluctuating from 0.49 to 1.81 in Hypothetical Ltd. It shows the companies have the capacity to increase their sales over periods but not to the desired level.

**Z- SCORE VALUE**
Table 2 about here shows "Z"-Score of Hypothetical Ltd.

(Arrived at By using the weighted factors)

| Ingredients | 2001 | '02 | '03 | '04 | '05 | '06 | '07 | '08 | '09 | '10 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X1 | 0.395 | 0.074 | 0.127 | 0.173 | 0.373 | 0.269 | 0.294 | 0.179 | 0.125 | 0.247 | 0.226 |
| X2 | 0.895 | 0.728 | 0.785 | 0.535 | 0.526 | 0.591 | 0.634 | 0.594 | 0.507 | 0.496 | 0.629 |
| X3 | 0.079 | 0.083 | 0.614 | 0.323 | 0.261 | 0.512 | 0.208 | 0.208 | 0.393 | 0.898 | 0.358 |
| X4 | 14.45 | 3.097 | 1.633 | 1.040 | 1.081 | 0.634 | 1.512 | 1.864 | 1.204 | 0.579 | 2.71 |
| X5 | 0.494 | 0.601 | 1.010 | 1.447 | 1.758 | 1.813 | 0.934 | 0.776 | 0.985 | 1.313 | 1.110 |
| Z- score | 16.31 | 4.583 | 4.169 | 3.518 | 3.999 | 3.819 | 3.552 | 3.621 | 3.214 | 3.533 | 5.033 |

For determining the financial health of the company, the study used the Z- score model, which provides the financial soundness of the business and a road map outlining the direction in which the business is heading. The Z- score is in too healthy zone during the study period. The average Z score value of the study period was 5.033. Based on the guidelines, the researcher concludes that the financial health of the Hypothetical Ltd. during the study period is too healthy.

**conculsion**

To keep an eye on their investments, investors should consider checking their companies' Z-score on a regular basis. A deteriorating Z-score can signal trouble ahead and provide a simpler conclusion than the mass of ratios. Given its shortcomings, the Z-score is probably better used as a gauge of relative financial health rather than as a predictor. Arguably, it's best to use the model as a quick check of financial health, but if the score indicates a problem, it's a good idea to conduct a more detailed analysis.

It is concluded that the financial health of Hypothetical Ltd. is too healthy and its financial health is viable and there is no risk of a failure.

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