STUDY OF FINANCIAL DISTRESS OF PUBLIC SECTOR UNDERTAKINGS COMPANIES IN INDIA

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ABSTRACT

This paper analyses financial distress of two group of public sector undertakings of companies in India. The present study using the Kolmogorov-Smirnove for testing if a variable follows a given distribution in a population. This “given distribution” is usually -not always- the normal distribution. The data collected from the journals, reports bse.com and money control.com and other websites. 15 companies were selected for this present study based on the convenient sampling method. SPSS and MS-excel software used for the present paper. Moreover 15 financial ratios have been taken for analysis that is net cash, total assets, total debt, sales, net worth, net income, long term liability, current assets, current liability, working capital, cash flow from operating activities, cash flow from financial activities, total external source, dividend and cash flow in investment activities. The selected companies are grouped based on the total debt ratio financial ratio. Based on the ratio, the company classified into seven distress companies and eight non-distress companies. It is resulted that the distress and non-distress companies has been identified based on the z value. It is equal to the proportion of the total variance in the discriminant scores, not explained by differences among the distressed and non-distressed companies.

Key word: financial distress, public sector undertaking companies, Kolmogorov-Smirnov, Discriminant Analysis and chi-square.

Cite this Article: Richard Paul V and Kalyani B, Study of Financial Distress of Public Sector Undertakings Companies in India, Journal of Management, 6 (3), 2019, pp. 71–76.

http://www.iaeme.com/JOM/issues.asp?JType=JOM&VType=6&IType=3

1. INTRODUCTION

Public Sector Undertaking is a term used for the government owned corporation. The term is used to refer the companies in which government either central or state government or both owns more than 51% of the stake in company equity. The government-owned corporations
play a pivotal role in the economic development of emerging economies because their participation is higher in the industrial and commercial activities of these economies. In India and China, public sector undertakings companies were the key catalyst in capital formation in the early stages of industrial development. Public Sector Undertakings hold sizeable share in economic activity of a number of developed and developing economies like France, Japan, Germany, Italy, Australia, South Korea, China, Malaysia, Philippines, Indonesia, Sri Lanka, and India. The financial distress is an important sign of business failure. A company can evade from moving financial distress to business failure but it is possible if one can predict financial distress so that corrective actions can be taken in order to improve the financial position of the distressed company. In the present study is to analyse the financial distress of Public Sector Undertakings in India.

2. REVIEW OF LITERATURE
Ezzamel et al (1987) studied the distributional properties of financial ratios of firms in textiles, retail foods and the metal industry for the period of 1980-81. Two statistical tests for normality were used; the Kolmogorov smirnov test and the shapiroiwilk test. They found that the results were consistent with previous research, the raw financial ratios exhibiting positive skewness except for the leverage ratio for the retail food industry. Arif et al (1998) examined the distributional characteristics of the financial ratios of Malaysian firms after classifying them into relevant industry groups, and inspecting the degree of informational redundancy among ratios in a particular sector. 57 firms for a period of 5 years from 1987 to 1991 were investigated using 13 financial ratios. The Kolmogorov- smirnov test was employed to investigate the approximation of normality. They found that the distribution of ratios did not conform to normal distribution, finally it was found that an informational redundancy existed between the ratios, and there were differences in the characteristics of the various industries.

3. METHODOLOGY
In this present study, to identify the ratios that influence the predictability of financial distress and to predict the normality of data Kolmogorov – Smirnov test has been implemented. This step removed all those ratios that do not match the normality test before applying the discriminant analysis. The discriminant analysis helps in identifying the ratios that have the greater power to indicate the state of financial distress of a company.

The study consists of two groups in the order of distressed companies on the one hand and of the non-distressed companies on the other hand.

Therefore, the analysis is transformed into its simplest form. The discriminant function of the form:-

\[ Z = V_1X_1 + V_2X_2 + V_3X_3 + \ldots \ldots \ldots \ldots V_nX_n \]

It transforms the individual variable value which is then used to classify the object.

Where \( V_1, V_2, \ldots, V_n = \) Discriminant coefficient means the discriminant score identified statistically for the ratios that have the significant level as 0.000.

\( X_1, X_2, \ldots, X_n = \) Independent variables are those which are considered as ratios for the study.

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Y0, Y1 = Grouping Variable (ranges between 0, 1 for the study). It is the qualitative data that is transformed into quantitative data. They are distressed and non-distressed companies.

The MDA computes the discriminant coefficient, Vj while the independent variables are actual values, that is the ratio. Where, j =1, 2 ....n

Independent Variable – The independent variables, considered in the study are the ratios that are predictors of distress of companies.

Grouping Variable – Two categories of companies such as, distressed and non – distressed are taken for the study. Distressed company is identified as 0 and the non – distressed company is identified as 1.

The study period paved from 2007-08 to 2016-17 financial year. The companies are classified in two groups namely distressed and non-distressed with cluster companies. The table 1 presented the cluster of the companies selected for the present study.

Table 1 Sampling Framework of companies

| Sl.No | Companies                               | Categories       |
|-------|-----------------------------------------|------------------|
| 1.    | Bharat Electronic Limited               | Distress Companies |
| 2.    | National Aluminum Company Limited       |                  |
| 3.    | National Mineral Development Corporation|                  |
| 4.    | Bharat Earth Mover Limited             |                  |
| 5.    | Chennai Petroleum Corporation           |                  |
| 6.    | Hindustan Copper                        |                  |
| 7.    | Shipping Corporation India              |                  |
| 8.    | Mahanagar Telephone Nigam Limited       |                  |
| 9.    | Hindustan Petroleum Corporation Limited |                  |
| 10.   | Neyveli Lignite Corporation             | Non-distress Companies |
| 11.   | Oil India Limited                       |                  |
| 12.   | Power Finance Corporation               |                  |
| 13.   | Power Grid Corporation of India Limited|                  |
| 14.   | Rural Electrification Corporation       |                  |
| 15.   | Mangalore Refinery and Petrochemicals   |                  |

The table 2 classifies fifteen companies and fifteen financial variables. The financial variable can be classified in cash flow and financial ratios included in the regression model to fit.

Table 2 Financial Ratios used in this study

| Sl.No | Expansion of Ratios                               |
|-------|---------------------------------------------------|
| 1.    | NC/TD Net Cash/Total Debt                         |
| 2.    | NI/S Net Income/Sales                             |
| 3.    | NI/TA Net Income/Total Assets                     |
| 4.    | CL/TA Current Liabilities /Total Assets           |
| 5.    | CL+LTL/TA Current Liabilities/Long-term liabilities/total assets |
| 6.    | CF/TA Cash flow /total assets                     |
| 7.    | WC/TA Working capital /total assets               |
| 8.    | CFFA/CL Cash flow from financial activities/current liabilities |
| 9.    | CA/CL Current assets/Current Liability            |
| 10.   | NW/S Net worth/Sales                              |
| 11.   | CFFA/TA Cash flow financial Activities/Total asset|
| 12.   | CF/NI Cash flow /Net Income                       |
| 13.   | CF/NC Cash flow/Net cash                          |
| 14.   | CF/TA Cash flow/Total asset                        |
| 15.   | CF/S Cash Flow/ Sales                             |

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There have been ten financial ratios used in this study. At the outset, those selected ratios are put into the test of normality using Kolmogorov-Smirnov test. The results of such non-parametric test are presented in table 3.

Ha 1: Financial Ratios have the normality to predict financial distress of companies

| Table 3 Normality Test Using Kolmogorov-Smirnov Test- Financial Ratios |
|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                | Mean           | SD             | Absolute       | Positive       | Negative       | Kolmogorov-Smirnov Z |
| 1. NC/TD       | 1024.610       | 3568.913       | .40357         | .40357         | .00000         | 2.466          |
| 2. NI/S        | .151           | .337           | .41607         | .10357         | .41607         | .53036         |
| 3. NI/TA       | .076           | .124           | .31607         | .31607         | .06071         | 1.931          |
| 4. CL/TA       | .419           | .395           | .21964         | .21964         | .04643         | 1.342          |
| 5. CL+LTL/TA   | 7593.591       | 8941.798       | .53036         | .00000         | .53036         | 3.241          |
| 6. CF/TA       | .073           | .195           | .23393         | .23393         | .04464         | 1.429          |
| 7. WC/TA       | .041           | .650           | .31964         | .31964         | .17857         | 1.953          |
| 8. CFFA/CL     | .275           | 1.384          | .38750         | .0000          | .38750         | 2.368          |
| 9. CA/CL       | 4.013          | 7.843          | .35714         | .35714         | .18929         | 2.182          |
| 10. NW/S       | 1.292          | .915           | .24286         | .14446         | .24286         | 1.484          |
| 11. CFFA/TA    | .063           | .104           | .16786         | .16786         | .03750         | 1.026          |
| 12. CF/NI      | 1.917          | 10.327         | .20893         | .20893         | .08214         | 1.277          |
| 13. CF/NC      | 14.124         | 96.699         | .24286         | .24286         | .14107         | 1.484          |
| 14. CF/TA      | -4.042         | 33.132         | .28036         | .28036         | .05000         | 1.713          |
| 15. CF/S       | 1.53333        | .50056         | .23571         | .23571         | .13750         | 1.440          |

Source: Calculated Data

The application of Kolmogorov-Smirnov test confines the significance of financial ratios to determine the discrimination among the variables. The significance of Kolmogorov-Smirnov Z Values at 5% level qualifies the variables to conduct the test of normality. The normality indicates that the variables have the efficiency to form the group classifications against the predicted groups of financial distress. As per the results of the test, the level of significance is less than 0.05 for all the ten financial ratios chosen for the study. Hence, it is proved that the financial ratios used in the study have the normality to predict financial distress of companies. The table 3 presented the cross tabulation of financial ratios.

| Table 4 Cross Tabulation – Financial Ratios |
|-------------------------------|----------------|----------------|----------|
|                               | Non-Distressed | Distressed    | Total    |
| Non-Distressed Count          | 7              | 8              | 15       |
| % within Cluster Number of Case | 95.7 %         | 4.3 %         | 100      |
| Distressed Count              | 7              | 8              | 15       |
| % within Cluster Number of Case | 21.3%         | 78.8%         | 100      |

Source: Calculated Data

The cross tabs as per table 4, are the indicators for considerable percentage of frequency distribution of distressed and non-distressed companies.

The classification of samples as far as the financial ratios are concerned, would undergo two types of errors, namely Type I error and Type II error. Out of fifteen companies selected for the study, eight companies face financially distressed situation and the remaining seven companies face financially non-distressed situation at the end of the year 2007-08. While predicting the group membership for identification of financial ratios, it was found that 8 companies face Type I error and 7 companies face Type II error. Type I error occurs when a financially distressed company is identified as non-distressed. Type II error occurs when a non-distressed company is identified as distressed company. The effect of such a wrong classification would be that the banks and other financial institutions might not be ready to
grant loan to a non-distressed company which is classified as distressed but deserves for such a loan. As a result, the first error is more severe than the second error. The table 5 presented the discriminant analysis for financial ratios.

Ha 2: Financial ratios have significant ability to predict financial distress of companies

| Table 5 Discriminant Analysis for Financial Ratios |
|-----------------------------------------------|
| Variables | Wilks’ Lambda | F     | Sig |
| NC/TD     | .95113        | 7.6042| .0066|
| NI/S      | .99999        | .0018 | .9661|
| NI/TA     | .94652        | 8.3628| .0044|
| CL/TA     | .99779        | .3273 | .5681|
| CL+LTL/TA | .73777        | 52.6058| .0000|
| CF/TA     | .98625        | 2.0638| .1529|
| WC/TA     | .96100        | 6.0070| .0154|
| CFFA/CL   | .88086        | 20.0185| .0000|
| CA/CL     | .97388        | 3.9689| .0482|
| NW/S      | .99511        | .7278 | .3950|
| CFFA/TA   | .99231        | 1.1471| .2859|
| CF/NI     | .98659        | 2.0123| .1581|
| CF/NC     | .99284        | 1.0677| .3031|
| CF/TA     | .98641        | 2.0396| .1554|
| CF/S      | .97969        | 3.0677| .0819|

Source: Calculated Data

It is essential to extract the perfectly discriminating variables using Wilk’s Lambda and F Values. The significance at 5% level exactly determines crucial financial ratios for financial distress. Standard deviation is a measurement of the distribution of data from mean. It describes the dispersion of distressed and non-distressed companies on either side of a mean value. A low standard deviation indicates that the ratio is clustered around the mean value, whereas a high standard deviation indicates that the ratio is widely spread with significantly higher / lower figures than the mean.

As per the standard deviation results, derived and presented in table 3, it is found that with lower standard deviation values, the first three ratios are clustered around their mean values and the remaining two other ratios are widely spread with significantly higher figures than their mean values. The association between distressed and non-distressed companies using financial ratios is presented in the following Wilk’s Lambda and chi-square values. The table 6 presented the Wilk’s Lambda test of financial ratios.

| Table 6 RESULTS OF WILKS’ LAMBDA TEST- Financial Ratios |
|-----------------------------------------------|
| Test of Functions | Eigen value | Wilks’ Lambda | Chi-square | DF | Dig |
|-------------------|-------------|---------------|-------------|----|-----|
| 1*                | 1.1384      | .467629       | 106.791     | 15 | .0000|

Wilk’s lambda is a measure of how well each function separates ratios into groups. It is equal to the proportion of the total variance in the discriminant scores, not explained by differences among the distressed and non distressed companies. Smaller values of Wilk’s lambda indicate greater discriminatory ability of the function. The associated chi-square statistic tests the hypothesis that the means of the functions listed are equal across distressed and non distressed companies. The values of Wilk’s Lambda normally range between 0 and 1. If such a value for a ratio is close to 0, it indicates that the group means are different and similarly, if the value is close to 1, it indicates that the group means are not different. In case, the value equals to 1, it indicates that all means are the same. From the above table 1.5, it is found that the Wilk’s Lambda value of .467629 and chi-square value 106.791 are
statistically significant at 5% level to extract the ratios such as, Working capital/ Total Assets; Cash + Receivables / Total Assets; Current Liabilities / Total Assets; Net worth / sales; Net Income / Sales. But a parametric justification is required to prove the proximity among the extracted ratios.

4. CONCLUSION
The present study analysed the financial distress of public sector undertaking companies in India applied normality test for Kolmogorov- Smirnove Test with 14 financial ratios. Resulted that the company classified in two group that is distress and non-distress companies based on the financial ratios. It is found that positive financial ratios among the distress and non-distress companies. It shows that the significant value polarized the difference of the companies. It is equal to the proportion of the total variance in the discriminant scores, not explained by differences among the distressed and non-distressed companies.

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