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MANAGEMENT

Performance Analysis of Indian Companies

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ABSTRACT

A number of researchers have undertaken empirical studies in predicting the determinants of financial soundness of business. Using discriminant analysis Altman developed a z-score model to classify the business. Prior studies reveals that z-score become best predictor of business failure. Z-score model uses financial information to predict business performance. The analysis of 28 ratios reveal significant difference between different companies for 19 ratios. The discriminant coefficient of net profit to sales, inventory turnover ratio, sales to total assets ratio, current ratio, net profit to total assets ratioand total debt to total assets ratio are higher and emerged as discriminators between companies. These seven ratios determine the financial efficiency of the companies.

1. Introduction

The objective of financial statements is to provide valuable information about the financial position andperformance of a business. Which is useful to several users in making various decisions. But understanding financial statements is not so easy for all. Financial statements of firm may be used by users for different objectives. Users expect that it should be understandable, relevant, reliable and comparable for analysis. Investors, analysts, researchers and regulators use it for different purposes. Kumbiraiand Robert (2010) investigates the performance of South Africa's commercial banks and employedfinancial ratios to measure the profitability, liquidity and credit quality performance of five large South African based commercial banks. Kotane and Irina (2012) opine that evaluation of small companies' business performance and financial status have a significant role in making financial managerial decisions. They also states that the main source of information about financial indicators of business activities is the financial statements of a company. Adedeji(2014) supports ratio analysis as a veritable means of monitoring, measuring and improving performance in anorganization. His study confirmed thatthere is significant relationship between ratio analysis and organizational performances. Based on the findings of study, he opines that ratio analysis should be used to measure performance in terms of profitability. Rehmanet. al. (2015) study conclude that financial performance of any firm or bank can be assessed with the help of financial ratios. They also opine that financial ratio plays an important role to check the condition of any bank or company either is in profit or loss.

Financial researchers have used financial information in predicting business failure and classification of business according to their financial efficiency. Using discriminant analysis Altman developed a z-score model long ago. Several other researchers in the developed countries developed different models to predict business failure. Most of the empirical studies reveals that z-score become best predictor of business failure and helps to classify the companies according to their financial strength. Z-score model uses financial information to predict business performance. Z-score model consists of the ratios with highest discriminate coefficients. Discriminate coefficients of ratios, determine the financial efficiency of the companies and included in the z-score model. This study examine the financial statements of BSE 500 companies to identify the ratios that best discriminates between companies.

2. Objectives

A number of researchers have undertaken empirical studies in predicting business performance using financial analysis. This study is conducted to identify the financial variables that best discriminate between companies. It also aims to develop a discriminant model (Z- score) model which discriminates between financially sound (creditworthy) and weak (non-creditworthy) companies.

3. Methodology

Discriminant analysis is used to evaluate and classify companies according to their financial performance. This technique is used to classify objects/companies into one of the alternative groups on the basis of a set predictor variables. The methodology of the study involves use of multiple discriminate analyses (z-score) which was used and developed by Altman (1968a), Altman (2000). Discriminant model consists of independent variables and discriminant coefficients.

$$Z = V_1X_1 + V_2X_2 + V_3X_3 + V_4X_4 + \ldots + V_xX_x$$

Z is the discriminant score used to group the companies according to their performance. X_1 X_2, X_3, X_4 and X_n are independent variables (financial ratios). V_1 V_2, V_3, V_4, and V_n are discriminant coefficients, which is sample specific.

Discriminant coefficients is based on the principle that the ratio of between group sum squares to within group sum squares should be maximised in one way ANOVA. This will make the make the groups differ as much as possible on the values of discriminant function (Altman (1968), Chawla and Neena (2011)). The discriminant coefficients are used to calculate the Z, the discriminant score by substituting the independent values (X_x) in the estimation model.

4. Sources of data and Sample

The entire study is based on the secondary data collected from various sources. Financial statement information are collected from Prowess, the corporate database of Centre for Monitoring Indian Economy (CMIE). The sample size is restricted to BSE 500 companies and the 18 years (1998 to 2015) financial data were considered for the development of discriminant model.

5. Literature Review:

Financial analysts and investors provide considerable emphasis on evaluating the financial ratios to evaluate the performance of the companies. Prior researchers provide evidence in support of the use of financial data for evaluating the financial soundness of companies. Williams and Goodman (1971) opines that financial variables do tend to distinguish the various industrial classifications and that, with only a corporation's financial characteristics known, its industrial classification may be reliably determined. Analysis of financial data of company provides sufficient evidence of the firm's

creditworthiness. Deakin. (1972) opines that discriminant analysis, can be used to predict business failure from accounting data as far as three years in advance with a fairly high accuracy. Edmister (1972) indicates that analysis of selected financial ratios is useful for predicting failure of medium and large-asset size firms. He also opines that ratio analysis may be as useful in predicting small business failure as it is for predicting failure of medium and large businesses when three annual statements are available for analysis. Hunter and Natalia (2006), reveals that comparison of models based on financial ratios alone, the models with macro variables perform better in predicting company failure. They also report that in addition to the macro variables, gearing, liquidity and profitability are the important company specific determinants of failure. Danbolena and Sarkys(1980) examine ratio stability to predict corporate failure and reports that measures of ratio stability showed remarkable difference between failed and non-failed firms. They also opine that profitability ratio, activity ratios, liquidity ratios and indebtedness ratios have been shown to have considerable merit in financial analysis and in measurement of financial wellbeing of corporate entities. After 1960s researchers concentrated on developing business failure prediction models. Altman is one of the pioneers in the development of failure prediction model. After his landmark discriminant model of 1968, more researchers developed new models to predict business failure. Altman (1968a) developed a discriminant model to assess and classify the bankrupt/failed and non-bankrupt/successful firms. His model consists of working capital to total assets, retained earnings to total assets, EBIT to total assets, market value of equity to book value of debt and sales to total assets as discriminator. Altman (2000) replaced market value of equity to book value of debt with book value of equity to book value of debt. Altman (1968b) reveals that the multiple-discriminant model exhibits exceptional accuracy as a bankruptcy-prediction procedure. His results also reveal that the accuracy holds for even as much as two years prior to bankruptcy, with the effectiveness of the model substantially diminishing after the second year. Further his result implies that any potential bias, due to classifying firms in the same sample as the one in which the parameters are established, is not significant. He also opines that the discriminant technique for predicting bankruptcy also gives promise of application in the investment area. Pinches and Kent (1973) MDA model incorporated six variables: X1-subordination, X2-years of consecutive dividends, X3-issue size, X4-net income + interest/interest: five year mean, X5-long term debt/total assets: five year mean, and X6-net income/total assets. Results of their model performed very poorly for Baa rated bonds due to lack of statistically significant difference in the quantifiable variables considered for the study. Dimitras et al (1996) reveal that the most important financial ratios came from the solvency category were working capital to total asset (WC/TA) and total debt to total assets (TD/TA). Further they reveal that the profitability ratios were also important. Emerging Market Score (EMS) Model of Altman (2005) is an enhanced version of the statistically proven Z-Score model. His EMS model can be applied to nonmanufacturing companies, and manufacturers, and is relevant for privately held and publicly owned firms. His adjusted EMS Model incorporates the particular credit characteristics of emerging markets companies, and is best suited for assessing relative value among emerging markets credits. Further his original model has been enhanced to make it applicable for private companies and non-manufacturers. Altman (2005) concludes that the original Z-Score model was tested on samples of both non-manufacturers and manufacturers in the U.S. and its accuracy and reliability have remained high. He also advocates building and testing models derived from the country's own data and experience. Jayadev (2006) developed an equation by surveying the internal credit rating models of the Indian banks and the ratios selected are: current ratio, debt-equity ratio, and operating margin. His second equation is similar to that of Altman's (1968) original equation with a slight modification: instead of debt-to-market value of equity, debt-to-book value of equity is considered. His second model also consists of working capital to total assets, retained earnings to total assets, and earnings before interest and taxes to total assets. He also used Emerging Market Score Model of Altman, Hartzell and Peck's, which consists of all the ratios of Altman's (1968a) equation except

the asset turnover ratio. He finds that dominant variables discriminating the default companies from non-default ones are: current ratio, debt-equity ratio, operating margin, working capital to total assets, earnings before interest and tax to total assets, net worth to debt, and asset-turnover ratio. His result provide evidences that the most widely used two ratios current ratio and debt-equity ratio are relatively poor in predicting the default companies. His hold-out sample accuracy results show that the selected variables are capable of predicting default. Consistent with Altman's (1968a),Jayadev (2006) opines that failing firms exhibit ratios and financial trends that are very different from those companies that are financially sound.

6. Discriminant Model

Table No. 1 Variance Analysis of Ratios and Discriminant Coefficients

Sl.no	SS Between groups	SS within groups	F	F crit	Discriminant coefficient
X_1	75076269.14	1100456615	9.2476091	1.1776	0.682228632
X_2	1071.733722	10226.474	1.6595068	1.1765	0.10479993
X_3	7.24E+13	2.81E+14	4.3164354	1.1762	0.258160017
X_4	133736.7175	1101885.1	1.922514	1.1765	0.121370839
X_5	75076269.14	1100456615	9.2476091	1.1776	0.682228632
X_6	1565220.783	12803867	1.9235398	1.1765	0.12224594
X_7	13.43467145	14.009623	14.81114	1.1767	0.958960212
X_8	13541.73212	75539.757	2.1117569	1.1787	0.179266293
X_9	6957266.625	57329227	1.5060324	1.1783	0.121356365
X_{10}	16734851.29	2608061.1	54.701405	1.182	6.416587176
X_{11}	8.32E+15	3.04E+17	0.232859	1.182	0.027346921
X_{12}	3.79E+15	1.18E+17	0.2738236	1.182	0.032157804
X_{13}	1.34E+11	7.413E+10	27.79413	1.1767	1.80188852
X_{14}	16122.98454	92211.261	2.710149	1.1766	0.174848325
X_{15}	408902435.8	5.737E+09	0.5951039	1.1823	0.071269938
X_{16}	8.62E+13	1.41E+14	5.093733	1.1823	0.613333294
X_{17}	6398.724075	136105.6	0.7390433	1.1765	0.047012937
X_{18}	27637389.73	204900611	2.0913443	1.1766	0.134881929
X_{19}	154587.3213	462652.88	5.3327532	1.1764	0.334132407
X_{20}	278906.8867	2292553	0.7731351	1.1861	0.121657772
X_{21}	26.57948726	16.106524	20.0008	1.1785	1.650231077
X_{22}	411131 56088	3.94E+11	0.6858271	1.1855	0.1043877
X_{23}	4.72E+20	2.87E+21	2.0174548	1.1784	0.164824739
X_{24}	1048.801735	200.37653	66.787813	1.1781	5.234154669
X_{25}	58090676.14	93722069	8.1630102	1.1778	0.619818545
X_{26}	4.72E+11	7.79E+11	3.7819441	1.1863	0.606080796
X_{27}	3.24E+15	3.84E+16	1.3067686	1.1766	0.08419901
X_{28}	5.506407209	12.195747	7.0118301	1.1766	0.451502266

The analysis of variance of 21 ratios reveal significant difference between different companies. This result indicates that these ratios differentiate between companies. All other 7 ratios reveal insignificant difference between different companies. Discriminant coefficient of inventory turnover ratio, sales to total assets, current ratio and total debt to total assets are higher than one. The discriminant coefficients of net profit to total assets ratio, net profit to sales ratio are less than 1 and emerged as next higher discriminators. The above four ratios may be used to differentiate companies and can be used to determine the financial efficiency of the companies. Four ratios emerged as the major discriminating ratios between companies followed by net profit to total assets ratio, net profit to sales ratio and inventory turnover ratio. The discriminant coefficient of all the seven ratios are included in the discriminant model to classify companies according to their financial efficiency. The discriminant model for BSE 500 companies consists of $X_1, X_5, X_7, X_{10}, X_{13}, X_{21}$ and X_{24} variables and their respective discriminant coefficients.

$$X_1*0.6822 + X_5*0.6822 + X_7*0.9589 + X_{10}*6.4165 + X_{13}*1.8018 + X_{21}*1.6502 + X_{24}*5.2341$$

Where, X_1= Net profit to sales, X_5= Inventory Turnover Ratio,

X_7=Net profit to total assets ratio, X_{10}= Inventory turnover ratio, X_{13}=Current ratio, X_{21}= Total debt to total assets ratioandX_{24}= Sales to total assets ratio.

This new discriminant model can be used to classify the companies according to their financial strength.

7. Conclusion
This study uses financial information's to discriminate between companies and classify the companies based on the financial soundness. Discriminant coefficients is based on the principle that the ratio of between group sum squares to within group sum squares should be maximised in one way ANOVA. This will make the make the companies differ as much as possible on the values of discriminant score. The discriminant coefficient of net profit to sales, inventory turnover ratio, sales to total assets ratio, current ratio, net profit to total assets ratio and total debt to total assets ratio are higher and emerged as discriminators between companies. These seven ratios determine the financial efficiency of the companies and included in the z-score model.

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