CHAPTER-6

OVERALL FINANCIAL PERFORMANCE

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6.1. Introduction

According to oxford dictionary, the term 'overall' means taking everything into account.

Financial performance analysis is the analysis of component parts of financial statement with the help of available tools and techniques to find out the financially strong and poor side of a business institution.

Overall financial performance means all financial strengths and weaknesses taken together into a single score.

The information extracted from financial statements for analyzing financial performance may be transformed into financial ratios, standardized financial statements, application of financial analysis(building up of a model by combining a set of financial ratios such as, Altman's Z score models for determining healthy and unhealthy firms, Multiple regression model of financial performance etc. **(Chandra, 2008)**[1]. The overall financial performance analysis can be done by combining the various aspects of financial performance i.e., liquidity, solvency, profitability, activity etc. into a single score. The Comprehensive Ranking Scores used by **Singh (2012)**[2] and other researchers, Multiple Regression Model of overall financial performance **(Doumpos et al, 2012)**[3], Multiple Discriminant Analysis **(Altman's Z-score,1995)**[4] etc. are the ways in which the overall financial performance can be assessed. However, these methods of analyzing overall financial performance of firms have their own strengths and weaknesses. Choosing the methods of analysis is not easy as some methods are considered methodologically superior, others are deemed better due to higher rate of uses by managers and researchers. However, in this study, the researcher has divided the chapter into three sections, namely, comprehensive ranking analysis concerning liquidity, solvency, profitability etc. taken together to find out overall financial performance rank of selected life insurance companies, multiple regression analysis concerning   factors affecting overall financial

performance and financial health analysis of selected life insurance companies under the study etc.

6.2. OVERALL FINANCIAL PERFORMANCE ANALYSIS ON THE BASIS OF RANK SCORES OF PROFITABILITY, SOLVENCY AND LIQUIDITY

Authors of financial performance analysis literatures have attempted to rank the companies on the basis of ratio analysis for overall financial performance i.e., the performance of profitability, solvency, liquidity etc. taken together in a single point score for the study periods. Many researchers have tried overall ranking of the business organization on the basis of few years' average of various performance ratios. However, in this study, the researcher has found out the ranks of each year in ratio-wise and then added all the ranks to find out the rank of ranks for each year's overall financial performance of the companies under the study. Finally, year-wise ranks have been added to get ten years' total ranks. Accordingly, as per ten years' total ranks, the ultimate ranking is done taking the points into consideration that the lower the points score, higher the overall performance position and vice-versa (Ranking used by **Panigrahi, 2013[5]**, **Mandal et.al, 2010[6]** , **Rajdev, 2013[7] and other researchers**) and thereafter Kruskal-Wallis test has been applied to find out whether there are significant differences in the mean rank scores across the select life insurance companies under the study. The following null hypothesis has been tested-:

"There is no significant difference in overall financial performance across the life insurance companies in India.''

6.2.1. Data Analysis and Interpretation

Analysis of data has been made by preparing the tables of rank scores of overall financial performance and Kruskal-Walis Test of Rank Scores of Overall financial performance which are as follows.

Table-6.1

Rank Scores of Overall Financial Performance

Name of the Company	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	Total Scores	Ranks
AVIVA	78	77	109	73	69	122	82	101	113	102	926	1
BAJAJ ALLIANZ	73	101	106	102	99	113	117	92	75	66	944	3
BIRLA SUNLIFE	115	132	132	120	106	113	108	78	85	101	1090	9
HDFC STANDARD	82	109	88	82	82	84	125	113	109	92	966	5
ICICI PRUDENTIAL	128	122	140	132	133	125	140	125	123	106	1274	12
ING VYSYA	69	80	93	115	103	101	116	111	125	131	1044	8
KOTAK MAHINDRA	107	84	108	113	99	91	84	73	99	93	951	4
PNB MET LIFE	89	85	74	100	73	91	108	121	114	121	976	6
LICI	138	143	145	134	128	111	111	126	117	131	1284	13
SBI LIFE	103	101	95	98	129	110	86	89	82	104	997	7
TATA AIA	129	98	85	96	129	99	116	128	122	104	1106	10
MAX N Y	134	119	93	90	95	96	71	74	77	83	932	2
RELIANCE	120	114	97	110	120	109	101	134	124	131	1160	11

Source: Computed from Annual Reports of IRDA, Various Issues

The table-6.1 shows that overall financial performance ranks achieved by most of the selected life insurance companies under the study period are not consistent and there are differences in the overall financial performance. The study finds that AVIVA, MAX N Y, BAJAJ ALLIANZ, KOTAK MAHINDRA, and HDFC STANDARD have secured 1st, 2nd, 3rd, 4th and 5th position respectively for overall financial performance during the study period of ten years taken together. Analysis also shows that RELIANCE, ICICI PRUDENTIAL and LICI have been ranked 11th, 12th and 13th position respectively for ten years' overall financial performance. All other companies are ranked in between two groups mentioned above.

The result of Kruskal-Wallis test to find out whether there is significant difference in overall financial performance across the selected life insurance companies in India has been shown in the following table:

Table-6.2

Kruskal-Walis Test of Rank Scores of Overall financial performance

Test Statistics	
Chi-Square	49.353
df	12
Asymp. Sig.	.000

The Kruskal–Wallis test in the table-6.2 determines that overall financial performance across the select life insurance companies under the study during the study period is significantly different with low significant value of .000 and this value is less than .05. So it is concluded that there is significant difference in overall financial performance rank scores across the selected life insurance companies in India at 5% significance level. Hence, the null hypothesis is rejected.

6.3. ANALYSIS OF FACTORS DETERMINING OVERALL FINANCIAL PERFORMANCE OF LIFE INSURANCE COMPANIES

6.3.1 Introduction

Although MDA (multiple discriminant analysis) has been utilized in a variety of disciplines as well as practical business world in recent years to study overall

financial performance of a business organisation, it is not as popular as multiple regression analysis (**Altman, 2000**)[8]. Several previous studies recognize the usefulness of financial statement variables and explore insurance specific ratios as explanatory variables in empirical models to find out difference between low and high risk insurers (**Das et.al, 2003**)[9]. After the setting up of IRDA in India, this type of studies can be undertaken on Indian life insurers and results can be compared with the results of studies conducted in insurance industry or other financial sectors across the world. The researcher has, therefore, tried to build up a multiple regression model exploring the firm specific factors determining the financial performance of life insurance companies in India. To estimate the overall financial performance indicator, **Doumpos et al, (2012)**[3] have relied on seven core financial (criteria) ratios (Equity/Total Assets, Equity/Net Premium, Technical Reserve/Net Premium, Liquid Assets/Total Liabilities, Underwriting Expenses including Commission/Net Premium Written, Incurred Losses and Loss adjustment expenses/Net Premium Earned) including Return on Assets, since there is no theoretical guidance for the selection of specific criteria. Actually, the set that has been used by them is selected on the basis of (a) data availability, (b) previous studies on insurance firms and (c) an attempt to cover various dimensions of the financial profile of insurers and a multi-criteria method has been used in the form of multiple regression analysis to estimate a combined indicator of financial performance of insurance firms.

Adams (1996)[10] and **Malik (2011)**[11] are among others who have suggested that although there are different ways to measure financial performance, it is better to use ROA. In contrast, **Greene and Segal (2004)**[12] have argued that the performance of insurance companies in financial terms is normally expressed in net premium earned, profitability from underwriting activities, return on investment and return on equity. **Shiu (2001)**[13] has used return on shareholders' fund as dependent variable in the multiple regression analysis of financial performance of U. K. general insurance companies. **Daniel et al (2011)**[14] have used return on equity as dependent variable in a study for the Romanian Industrial Companies. **Khatab et al (2011)**[15] measured performance of firms by ROA and ROE (return on equity). **Kanwal and Nadeem(2013)**[16] has used Ordinary Least Square (OLS) method to examine the effect of 3 major external factors; inflation rate, real gross domestic product (GDP) and real interest rate on profitability indicators- return on assets (ROA), return on equity

(ROE) etc. to find out the impact of macro-economic variables on the profitability of listed commercial banks in Pakistan. **Effiok et al (2012)**[17] has used ROE as dependent variable in multiple regression analysis to find out the implications of corporate governance in the financial institutions' performance of Nigeria. **Ching and Gerab (2012)**[18] have used (ROS) return on sales,(ROA) return on assets and (ROE) return on equity as dependent variables to find out the impact of selected independent factors on the financial performance on Brazilian companies

"However, though widely used, ROA is an odd measure because its numerator measures the return to shareholders whereas its denominator measures the contribution of all investors (Shareholders as well as lenders)…………………….. The return on equity measures the profitability of equity funds invested in the firm. Because maximizing shareholders' wealth is the dominant financial objective, ROE is the most important measure of performance in an accounting sense" **(Chandra, 2008)**[1]. Thus, ROE is less biased from inflationary point of view than total assets of any insurance companies.

Many earlier studies have been made with respect to the determinants of overall financial performance of insurance firms in developed countries, while there are few studies that have been made in developing countries. **Adam and Buckle (2000)**[19] provide evidence that insurance companies with high leverage have better operational performance than insurance companies with low leverage. **Charumati (2012)**[20] finds that there is a significant negative relationship of financial performance with leverage and equity capital. Significant positive relationship with financial performance has been found in case of size and liquidity and no significant relationship with underwriting risks. **Malik (2011)**[11] finds that overall profitability of Pakistan insurance companies is significantly and positively influenced by volume of capital, size and tangibility of assets and significantly and negatively influenced by leverage. The study of **Ahmed et al (2011)**[21] shows that size is significantly and positively related to the financial performance of insurance companies while tangibility of assets and liquidity have also a positive relation to performance of insurance companies but they are statistically insignificant.

So far as use of ratios relating to leverage , liquidity, underwriting risks, tangibility are concerned, **Charumati (2012)**[20], **Malik (2011)**[11], **Chen and Wong (2004)**[22],

Ahmed et al (2011)[21] and **Adam and Buckle (2000)[19]** are researchers who have used ratios in measuring insurance companies' financial/profitability performance. Ratio is a relative measure and it permits the comparison of groups of unequal size **(Krishnaswami and Ranganathan, 2008)[23]**.

6.3.2. Variables Selection

In line with earlier studies, the following are the details of variables selected by the researcher for study:

6.3.2.1. Overall Financial Performance

There are various ways in which overall financial performance can be measured as mentioned by researchers in previous studies. However, in this study, the ratio of profit before tax to shareholders' funds is selected as an indicator of overall financial performance while its numerator measures the return to shareholders and its denominator measures the amounts due to Shareholders.

6.3.2.2. Size of the Company

Different insurance researchers use different measurement of company size such as, total assets, net premium, etc. Size has a definite influence on financial performance of insurance companies. So the size is taken as book value of total assets in this study. **(Almajali et al, 2012).[24]**

6.3.2.3. Volume of Capital

After the setting up of IRDA, there has been injection of more capital in life insurance companies which helped the companies to expand and open new branches, resulting which there will be an increase in operating expenses. As a result insurers with more capital will have either positive or negative impact on their financial performance **(Charumati, 2012)[20]**.Most of the previous studies use book value of equity as volume of capital. However, in this study book value of shareholders' fund is taken as volume of capital.

6.3.2.4. Leverage

Reasonable leverage risks can be taken by insurance companies for the prosperity of the companies. Many studies support the view that there is deterioration of company's

performance as a result of leverage and could become insolvent if the risk is out of control. It is a financial ratio which indicates that how much percentage of firms' assets that is financed with debt. Leverage is measured as total liabilities divided by total assets **(Mehari and Aemiro, 2013)**[25].In this study the ratio of total liabilities divided by total assets is taken as leverage.

6.3.2.5 Liquidity

Liquidity measures the ability of insurance companies to pay policy holders and other creditors money as and when it becomes due. The ratio of current assets to current liabilities is selected as independent variable by many researchers **(Adam and Buckle, 2000)**[19]. However, there are other liquidity ratios which are used by other researchers as independent variable for study. In this study, current assets to current liabilities have been taken as an independent variable.

6.3.2.6 Underwriting Risk

Many life insurance firms increase the amount of risks assumed by writing life insurance policies e.g., life insurance written on lives of elderly persons to procure more new business are required to maximize investment earnings or alternatively adopt risk reduction measures such as reinsurance **(Adams,1996)**[10]. So, underwriting risk does have a definite impact on financial performance. This study has taken the ratio of benefits paid to net premium as a measure of underwriting risk.

6.3.2.7 Tangibility

Tangibility has a definite impact on the financial performance because a firm can easily borrow against large portion of fixed assets at nominal rate of interest and using this borrowed money to increase more new business. According to **Ahmed et al (2011)**[21], OLS regression analysis has revealed that tangibility of assets has a positive relation to financial performance of insurance companies with statistically insignificant results. In this study, tangibility ratio (ratio of fixed assets to total assets) is taken as independent variable.

6.3.3 Basic Assumptions of Multiple Regression Analysis

Residuals should be normally distributed about the predicted scores on the dependent variable. There is a linear relation between the predictors and the dependent variables.

Two or more explanatory variables in a multiple regression model should not be highly correlated. There should not be outliers since outliers indicate model misfit **(Coaks, 2005)[26].**

6.3.4 Model Specification

The linear multiple regression model developed for the study is specified as**:-**

$$ROE = \beta_0 + \beta_1 UWR + \beta_2 LIQ + \beta_3 TAN + \beta_4 LEV$$
$$+ \beta_5 LnOFBVOFEQUITY + \beta_6 LnOFTOTALASSETS + \varepsilon i$$

Where,

ROE (Return on Equity)=Profit before Tax/Shareholders' Fund(PBTTOSF)(Overall Financial Performance),

UWR=Benefits Paid/Net Premium (BPTONP) (Underwriting Risk),

LIQ=Current Assets/Current Liabilities (CTOCL)(Liquidity),

TAN=Fixed Assets/Total Assets (FATOTA)(Tangibility),

LEV=Total Liabilities/Total Assets (TLTOTA)(Leverage),

LnOFBVOFEQUITY =Natural log of Book Value of Equity {volume of capital) (VOC)},

LnOFTOTALASSETS=Natural log of Book Value of Total Assets (size).

Here, ROE=Profit Before Tax to Shareholders' Fund is taken as dependent variable and UWR, LIQ, TAN, LEV, LnOFBVOFEQUITY and LnOFTOTALASSETS are taken as independent variables and εi is the error term.

6.3.5. Testing of Hypotheses:-

To attain the objective of the study, the following null hypotheses already framed in chapter-1 have been tested-:

H_0E_1: There is no significant relationship between ROE (return on equity) and underwriting risks;

H_0E_2: There is no significant relationship between ROE and liquidity;

H$_0$E$_3$: There is no significant relationship between ROE and tangibility;

H$_0$E$_4$: There is no significant relationship between ROE and leverage;

H$_0$E$_5$: There is no significant relationship between ROE and volume of capital; and

H$_0$E$_6$: There is no significant relationship between ROE and size

6.3.6.   Results and Discussions

6.3.6.1. Regression Diagnostics Tests

6.3.6.1.1 Descriptive Statistics of Variables

The descriptive statistics of seven variables as produced by SPSS-17 are shown in the table-6.3.

Table-6.3

Descriptive Statistics

Variables	Mean	Std. Deviation	N
PBT/SF	-.1174	1.22336	130
BP/NP	.2343	.26701	130
CA/CL	.9963	.67186	130
FATOTA	.0206	.02806	130
TLTOTA	.8730	.15350	130
BVOFEQ	10.5084	.93687	130
TA	13.4577	2.05493	130

The above table indicates that mean values of all variables ranges from 0.0206 for tangibility to 13.4577 for size. The average financial performance as measured by ROE of selected life insurance companies in India during the study period is -0.1174 and the Standard deviation is 1.22336 which implies that there are significant differences among the values of ROE. The table-6.3 also indicates that there are no differences among the values of underwriting risks and tangibility and there are significant differences among the values of liquidity, leverage, volume of capital and size.

6.3.6.1.2. Correlation Matrix for Measuring Degree of Correlation

The degree of correlation among the seven variables has been given in table-6.4(output of SPSS-17).

Table-6.4

Correlation Matrix

	Variables	PBT/SF	BP/NP	CA/CL	FATOTA	TLTOTA	BVOFEQ	TA
Pearson Correlation	PBT/SF	1.000	.437	.473	-.298	.109	.189	.668
	BP/NP	.437	1.000	.172	-.439	.274	.641	.578
	CA/CL	.473	.172	1.000	.040	-.113	-.065	.350
	FATOTA	-.298	-.439	.040	1.000	-.643	-.526	-.660
	TLTOTA	.109	.274	-.113	-.643	1.000	.409	.542
	BVOFEQ	.189	.641	-.065	-.526	.409	1.000	.605
	TA	.668	.578	.350	-.660	.542	.605	1.000
Sig. (1-tailed)	PBT/SF	.	.000	.000	.000	.109	.016	.000
	BP/NP	.000	.	.025	.000	.001	.000	.000
	CA/CL	.000	.025	.	.326	.100	.233	.000
	FATOTA	.000	.000	.326	.	.000	.000	.000
	TLTOTA	.109	.001	.100	.000	.	.000	.000
	BVOFEQ	.016	.000	.233	.000	.000	.	.000
	TA	.000	.000	.000	.000	.000	.000	.

The correlation analysis as depicted in the table -6.4 shows that ROE is significantly correlated with all the independent variables under the study and no two independent variables are highly correlated.

6.3.6.1.3. Analysis of Variance for Goodness of Fit of the Model

SPSS-17 also can indicate whether multiple regression equation accurately explain the variation in the dependent variable as shown in table-6.5 below.

Table-6.5

Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	120.976	6	20.163	34.403	.000
Residual	72.087	123	.586		
Total	193.062	129			

In multiple linear regressions, ANOVA table-6.5 can indicate whether the mathematical model (multiple regression equation) can accurately explain variation in the dependent variable. The significant value of 0.000 (less than 0.05) and hence it can be concluded that changes in dependent variable result from changes in independent variables and therefore the model is a good fit.

6.3.6.1.4. Co-linearity Diagnostic

SPSS-17 calculates collinearity statistics indicating whether two independent variables are highly correlated or not as shown in table-6.6 as follows.

Table-6.6

Collinearity Statistics

	Tolerance	VIF
BP/NP	.513	1.949
CA/CL	.614	1.627
FATOTA	.413	2.422
TLTOTA	.518	1.930
BVOFEQ	.427	2.342
TA	.282	3.540

SPSS-17 produces various co-linearity diagnostics as variance inflation factor (VIF) which shows whether a predictor has strong linear relationship with other predictor(s). The VIF may be expressed as 1/ (1-R square) and it is suggested that a value of 10 is a good value at which to worry **Gujarati (1995)**[27]. At the same time, SPSS-17 presents tolerance statistics, which is 1/VIF and if this value is below 0.1, then there is a problem of multi co-linearity **(Field, 2005)**[28]. The table-6.6 shows that VIF values are less than 10 and tolerance value is not below 0.1 and therefore the model does face any problem of multi co-linearity.

6.3.6.1.5. Residual Statistics Representing Errors in the Model

Residual statistics as presented by SPSS-17 indicates the degree of errors in the model as shown in the table-6.7 below.

Table-6.7

Residual Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Std. Residual	-4.240	3.489	.000	.976	130

As the observations are selected from many cross section companies for limited time periods, this kind of panel data takes the form of cross section analysis and heteroscedaticity is a common problem in this type of analysis **(Green, 2000 in Shiu, 2001)**[29].

Fitness of the model with respect to outliers and influential cases can be checked with Standardised residual statistics as presented by SPSS-17. The standardized residuals may be expressed as residuals divided by an estimates of their standard deviation i.e. they are converted into scores that are distributed around a mean of zero with a standard deviation of one and this provides more precise estimates of the error variance" **(Field,2005)**[28.].

By looking at the table-6.7, it may be understood that residuals are identically distributed with mean almost zero and equal variance and therefore, there is no problem of heteroscedasticity **(Charumati, 2012)**[20].
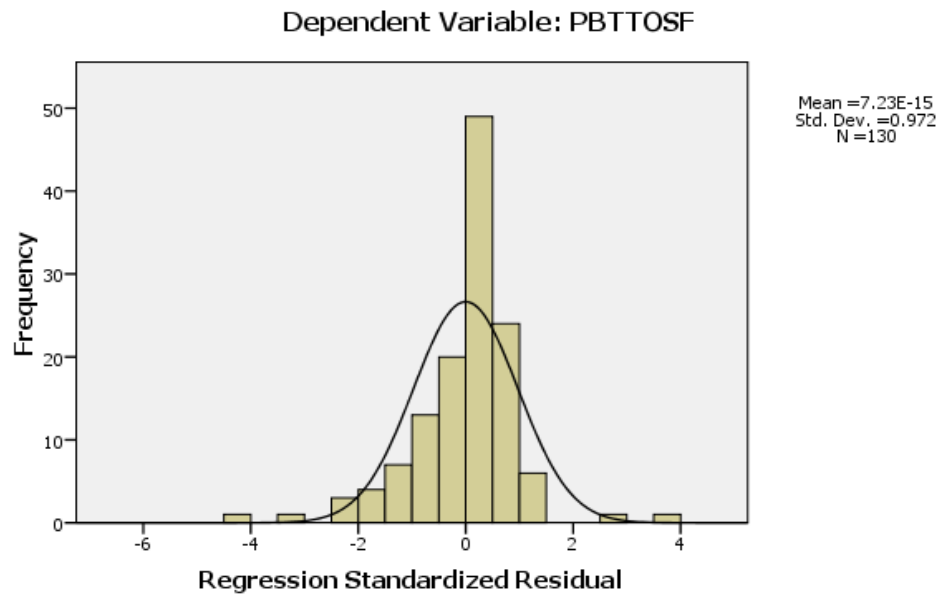
6.3.6.1.6. Test of Normality

SPSS-17 presents diagram of histogram indicating the normalcy of distribution of dependent variable which is shown in the diagram-6.1 below.

Diagram-6.1

Normality Test

Histogram

Dependent Variable: PBTTOSF

The plot of the residuals of transformed data has been depicted in the figure above. When the residuals are normally distributed with a mean of zero, the histogram is bell-shaped. The diagram shows that the histogram is bell-shaped which means that the residuals are normally distributed around their mean of zero.

6.3.6.1.7. Method of Regression

The researcher has chosen Forced Entry (or Enter as it is known in SPSS-17) method for analysis which is a method of regression in which all predictors are forced into the model simultaneously.

6.3.6.2. Regression Results

6.3.6.2.1. Variation in ROE Explained by Independent Variables

SPSS-17 also presents model summary in multiple regression analysis explaining the variation in dependent variable by independent variables shown in table-6.8 below.

Table-6.8

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.792	.627	.608	.76555

The value 0.792 as shown in the ''R'' column of the table-6.8 indicates a strong multiple correlation coefficient. It represents the correlation coefficient when six independent variables are taken together and compared with the dependent variable. In the next column, ''R Square'' is very important. The R Square of .627 indicates that 62.7% (0.627x100) of the variance in ROE (Dependent variable) can be explained by six independent variables. It is safe to say that the model has a ''good'' predictor of ROE if underwriting risk, liquidity, tangibility, leverage, volume of capital and size are known.

6.3.6.2.2. Discussions on the Basis of Regression Summary

Finally, SPSS-17 presents regression summary which can be transformed in the form of an equation as shown in table-6.9.

Table-6.9

Regression Summary

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		b	Std. Error	Beta		
1	(Constant)	-.703	1.180		-.596	.552
	BP/NP	1.059	.352	.231	3.004	.003[*]
	CA/CL	.109	.128	.060	.850	.397
	FATOTA	1.312	3.739	.030	.351	.726
	TLTOTA	-2.110	.610	-.265	-3.459	.001[*]
	BVOFEQ	-.498	.110	-.381	-4.521	.000[*]
	TA	.541	.062	.908	8.760	.000[*]

In multiple regressions, the model takes the form of equation and in that equation there are several unknown quantities (the b-values). The first part of the table gives estimates for these b-values and these values indicate the individual contribution of each predictor to the model. If b-values are filled up in the equation, the model can be defined as-:

$$\text{ROE} = (-)\,0.703 + 1.059\,\text{UWR} + 0.109\,\text{LIQ} + 1.312\,\text{TAN} + (-)\,2.110\,\text{LEV} + (-)\,0.498\,\text{VOC} + 0.541\,\text{SIZE}$$

From the above equation it can be interpreted that, if underwriting risk is increased by 1, ROE will increase by 1.059 assuming that all other variables to be constant. Similarly the influence on ROE for every unit increase or decrease in the other factors can be explained by their coefficients .The negative values for leverage and volume of capital show that as the leverage and volume of capital increase, the ROE will decrease.

6.3.6.2.3. Findings on the Basis of Regression Summary

Independent Variables	Relationship with Financial Performance/ ROE(Dependent Variable)	Null Hypotheses	Relationship found by other Authors with Financial Performance
Underwriting risks	Significant and Positive	Rejected	Insignificant and Positive (Charumati,2012)[20]
Liquidity	Insignificant and Positive	Accepted	Insignificant and Positive (Charumati,2012)[20],Significant and Negative (Adams and Buckle,2000)[19]
Tangibility	Insignificant and positive	Accepted	Insignificant and Positive (Ayele,2012), Significant and Positive (Malik,2011)[11]
Leverage	Significant and Negative	Rejected	Significant and Negative (Charumati,2012)[20,]Significant and Positive (Adams and Buckle,2000)[19]
Volume of capital	Significant and Negative	Rejected	Insignificant and Negative (Charumati,2012)[20],Significant and Positive (Malik,2011)[11]
Size	Significant and positive	Rejected	Significant and Positive (Charumati,2012)[20)],Insignificant and Positive (Adams and Buckle,2000)[19]

*Significant at 5% level

6.4. ALTMAN'S "Z"-SCORE ANALYSIS

6.4.1. Introduction

Edward I Altman has written in 1968 that the academicians in the late 1990 are preparing for the elimination of financial ratio analysis as an analytical technique in studying the performance of business enterprises. But, after a careful consideration of the nature of the problem and purpose of this analysis, he has selected multiple discriminant analysis (MDA) as the appropriate statistical technique to study financial health. **(Altman, 2000)**[8].

With the help of multiple discriminant analysis, Altman evaluated 22 different financial ratios using a database of 66 publicly traded manufacturing firms and proposed the following model for publicly traded manufacturing companies:-

Z=0.012(X1) +0.014(X2) +0.033(X3) +00.006(X4) +0.999(X5)

Where,

X1=Working Capital/ Total Assets

X2=Retained earnings/Total Assets

X3= Earnings before Interest and Taxes/Total Assets

X4=Market Value of Equity/Book value of Total Debts

X5=Sales/Total Assets

Z= Overall Index

Altman's conventional model has been modified for privately held firms as-

'Z'=0.717(X1)+ 0.847(X2)+3.107(X3)+0.420(X4)+0.998(X5) changing the variable as Book value of Equity in place of Market value of Equity and for non manufacturing firms as-

''Z''=6.65(X1) +3.26((X2) +6.72(X3) +1.05(X4) excluding the variable X5.

Altman's predetermined cutoff points or boundaries may be summarized as follows:

Prediction	Publicly traded Manufacturing Firms	Privately held Manufacturing Firms	Non-Manufacturing Firms
Unhealthy	< 1.81	< 1.23	< 1.1
Zone of Ignorance	1.81 to 2.99	1.23 to 2.90	1.1 to 2.6
Healthy	> 2.99	> 2.90	>2.6

For determining financial health of companies, a method widely used is Altman's Z-score model.

In this study Altman's Z-score model for non-manufacturing firms has been used for grouping the life insurance companies under the study to healthy, zone of ignorance and unhealthy groups and to rank life insurance companies under the study according to their performance.

Thus, Altman's "Z"-score model for Non-Manufacturing Firms is given as

''Z''=6.65(X1) +3.26(X2) +6.72(X3) +1.05(X4)

Where,

X1= Working Capital/Total Assets

X2= Retained Earnings/Total Assets (RE/TA)

X3= Earnings before Interest and Tax/Total Assets

X4= Book Value of Equity/Total Book Debts

''Z''=Overall index

Decision rule for Non-Manufacturing firms

''Z''-SCORE VALUE	FINANCIAL PERFORMANCE	COLOUR USED FOR DISCRIMINATION
Below 1.10	Weak Performance/Bankruptcy Zone	RED
1.10 to 2.60	Healthy Performance /Zone of Ignorance	YELLOW
Above 2.60	Very Healthy Performance/Non Bankruptcy Zone	GREEN

6.4.2. Data Analysis and Interpretation

"Z"-score analysis is made for each selected company under the study in the form of two tables- one for computed "Z"-score and other for classification of "Z"-score and one diagram narrating the trend of "Z"-score for each selected company at the end of which findings of the analysis and interpretation is given. Company-wise Z-score analysis presented in the form of tables and diagrams is analysed as follows:-

6.4.2.1. "Z"-Score Analysis of AVIVA

Table No-6.10

Computed Z-score(AVIVA)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.223	0.001	-1.965	2.021	0.279
2004-05	0.215	0.000	-1.511	0.499	-0.796
2005-06	-0.481	0.000	-0.991	0.158	-1.314
2006-07	0.018	0.000	-0.473	0.198	-0.257
2007-08	0.021	0.000	-0.425	0.125	-0.279
2008-09	-0.110	0.000	-0.816	0.095	-0.831
2009-10	0.000	0.000	-0.340	0.064	-0.276
2010-11	-0.093	0.000	0.024	0.077	0.009
2011-12	-0.145	0.000	0.061	0.085	0.000
2012-13	-0.119	0.000	0.026	0.089	-0.004

Diagram No.6.2

Trend of ''Z''-scores (AVIVA)
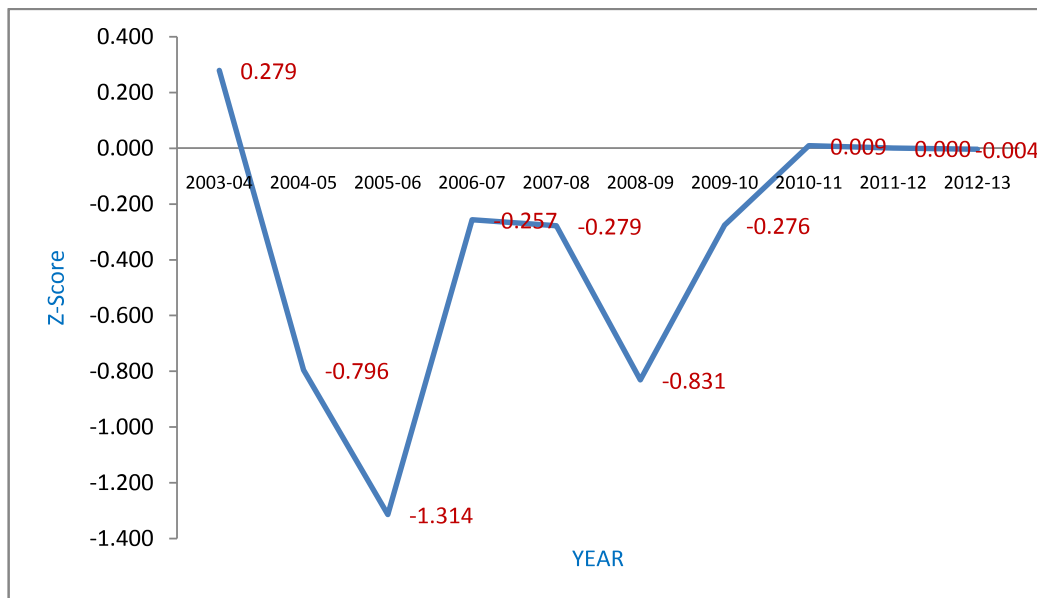
Table No-6.11

Classification of ''Z''-score (AVIVA)

YEAR	''Z''-Score
2003-04	0.279
2010-11	0.009
2011-12	0.000
2012-13	-0.004
2006-07	-0.257
2009-10	-0.276
2007-08	-0.279
2004-05	-0.796
2008-09	-0.831
2005-06	-1.314

From Table-6.10, Table-6.11 and Diagram-6.2, it is clear that ''Z''-scores of AVIVA are in the unhealthy/bankruptcy zone and there is no sign of improvement.

6.4.2.2. "Z"-Score Analysis of BAJAJ ALLIANZ

Table No. 6.12

Computed ''Z''-score (BAJAJ ALLIANZ)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.133	0.909	-0.509	1.136	1.668
2004-05	-0.197	0.351	-0.226	0.184	0.111
2005-06	-0.039	0.305	-0.177	0.092	0.181
2006-07	-0.282	0.245	-0.066	0.067	-0.035
2007-08	-0.251	0.244	-0.101	0.058	-0.051
2008-09	-0.114	0.193	-0.027	0.041	0.094
2009-10	-0.113	0.101	0.110	0.038	0.136
2010-11	-0.038	0.170	0.180	0.063	0.374
2011-12	-0.037	0.273	0.223	0.101	0.561
2012-13	0.010	0.383	0.226	0.146	0.765

Diagram-6.3

Trend of ''Z''-scores (BAJAJ ALLIANZ)
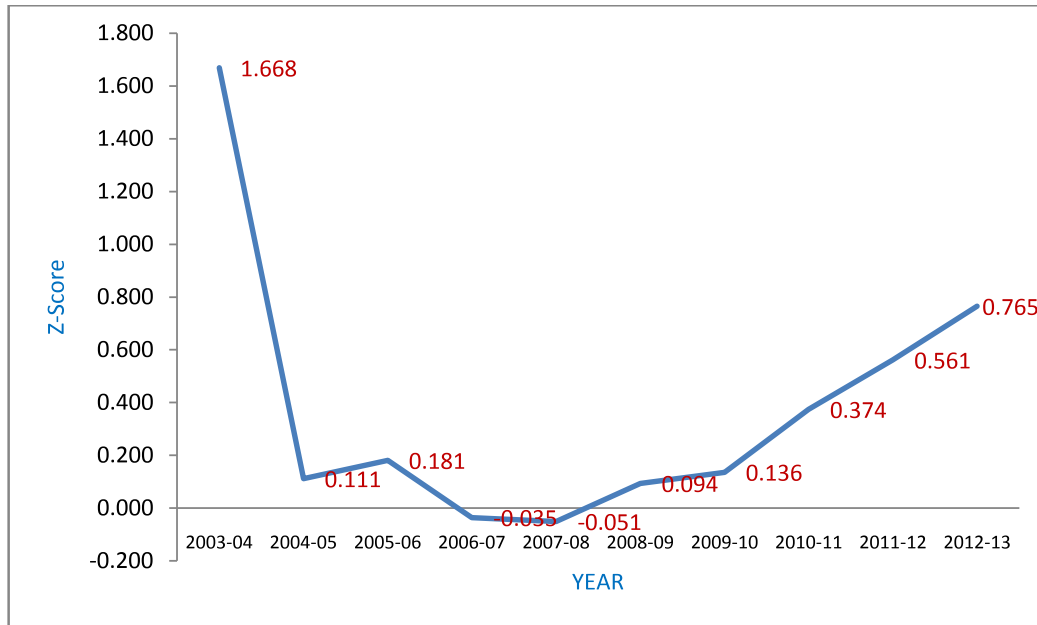
Table No. 6.13

Classification of ''Z''-Score (BAJAJ ALLIANZ)

YEAR	''Z''-Score
2003-04	1.668
2012-13	0.765
2011-12	0.561
2010-11	0.374
2005-06	0.181
2009-10	0.136
2004-05	0.111
2008-09	0.094
2006-07	-0.035
2007-08	-0.051

From Table-6.12,Table-6.13 and Diagram-6.3, it is clear that "Z''-score of BAJAJ ALLIANZ in the year 2003-04 lies in healthy zone/zone of ignorance but during rest of the years under the study, "Z''-scores lie in the unhealthy/bankruptcy zone . It is

also important to note that ''Z''-scores from 2007-08 to 2012-13 are having an increasing trend and there is an effort of improvement.

6.4.2.3. "Z"-Score Analysis of BIRLA SUN LIFE

Table No. 6.14

Computed ''Z''-Score (BIRLA SUN LIFE)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	-0.221	0.000	-0.707	0.178	-0.751
2004-05	-0.208	0.000	-0.283	0.084	-0.408
2005-06	-0.152	0.000	-0.153	0.064	-0.241
2006-07	-0.146	0.000	-0.217	0.058	-0.305
2007-08	-0.073	0.000	-0.400	0.057	-0.416
2008-09	-0.094	0.040	-0.477	0.046	-0.485
2009-10	-0.059	0.093	-0.173	0.027	-0.112
2010-11	-0.039	0.076	0.100	0.039	0.176
2011-12	-0.041	0.071	0.140	0.055	0.225
2012-13	-0.046	0.071	0.153	0.059	0.236

Diagram-6.4

Trend of ''Z''-Scores (BIRLA SUN LIFE)
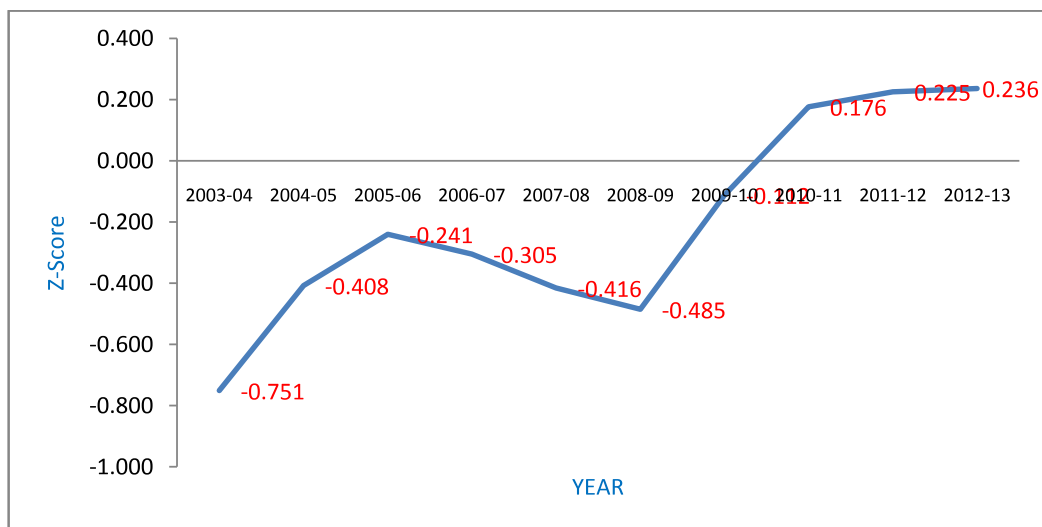
Table No. 6.15

Classification of ''Z''-Score (BIRLA SUN LIFE)

YEAR	''Z''-Score
2012-13	0.236
2011-12	0.225
2010-11	0.176
2009-10	-0.112
2005-06	-0.241
2006-07	-0.305
2004-05	-0.408
2007-08	-0.416
2008-09	-0.485
2003-04	-0.751

From Table-6.14, Table-6.15 and Diagram-6.4 it is clear that ''Z''-scores of BIRLA SUN LIFE from the year 2003-04 to 2012-13 lie in the unhealthy/bankruptcy zone. It is also important to note that ''Z''-scores from 2008-09 to2009-10 are having an increasing trend and thereafter remain almost constant during 2011-12 and 2012-13.

6.4.2.4. "Z"-Score Analysis of HDFC STANDARD

Table No. 6.16

Computed ''Z''-Score (HDFC STANDARD)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.462	0.002	-0.285	0.415	0.594
2004-05	0.032	0.001	-0.554	0.145	-0.377
2005-06	0.262	0.015	-0.293	0.126	0.111
2006-07	0.173	0.004	-0.157	0.083	0.103
2007-08	0.157	0.019	-0.169	0.074	0.081
2008-09	0.029	0.014	-0.296	0.064	-0.189
2009-10	-0.145	0.011	-0.086	0.029	-0.191
2010-11	-0.061	0.026	-0.024	0.019	-0.040
2011-12	-0.043	0.021	0.054	0.028	0.059
2012-13	-0.006	0.016	0.073	0.036	0.119

Diagram-6.5

Trend of ''Z''-Scores (HDFC STANDARD)

Table No. 6.17

Classification of ''Z''-Score (HDFC STANDARD)

YEAR	''Z''-Score
2003-04	0.594
2012-13	0.119
2005-06	0.111
2006-07	0.103
2007-08	0.081
2011-12	0.059
2010-11	-0.040
2008-09	-0.189
2009-10	-0.191
2004-05	-0.377

From Table-6.16, Table-6.17 and Diagram-6.5, it is clear that "Z''-scores of HDFC STANDARD from the year 2003-04 to 2012-13 lie in the unhealthy/bankruptcy zone. It is also important to note that "Z''-scores during the study period are continuously fluctuating and from 2009-10 increasing at decreasing rate.

6.4.2.5. "Z"-Score Analysis of ICICI PRUDENTIAL

Table No. 6.18

Computed ''Z''-Score (ICICI PRUDENTIAL)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	-0.242	8.996E-05	-0.830	0.131	-0.941
2004-05	-0.185	7.899E-06	-0.362	0.065	-0.482
2005-06	-0.179	6.371E-03	-0.148	0.030	-0.290
2006-07	-0.138	1.534E-01	-0.277	0.033	-0.229
2007-08	-0.161	2.565E-01	-0.344	0.028	-0.220
2008-09	-0.103	3.207E-01	-0.174	0.033	0.077
2009-10	-0.112	1.875E-01	0.032	0.024	0.131
2010-11	-0.088	1.589E-01	0.081	0.033	0.185
2011-12	-0.075	1.603E-01	0.133	0.046	0.264
2012-13	-0.062	1.604E-01	0.140	0.059	0.298

Diagram-6.6

Trend of ''Z''-scores (ICICI PRUDENTIAL)
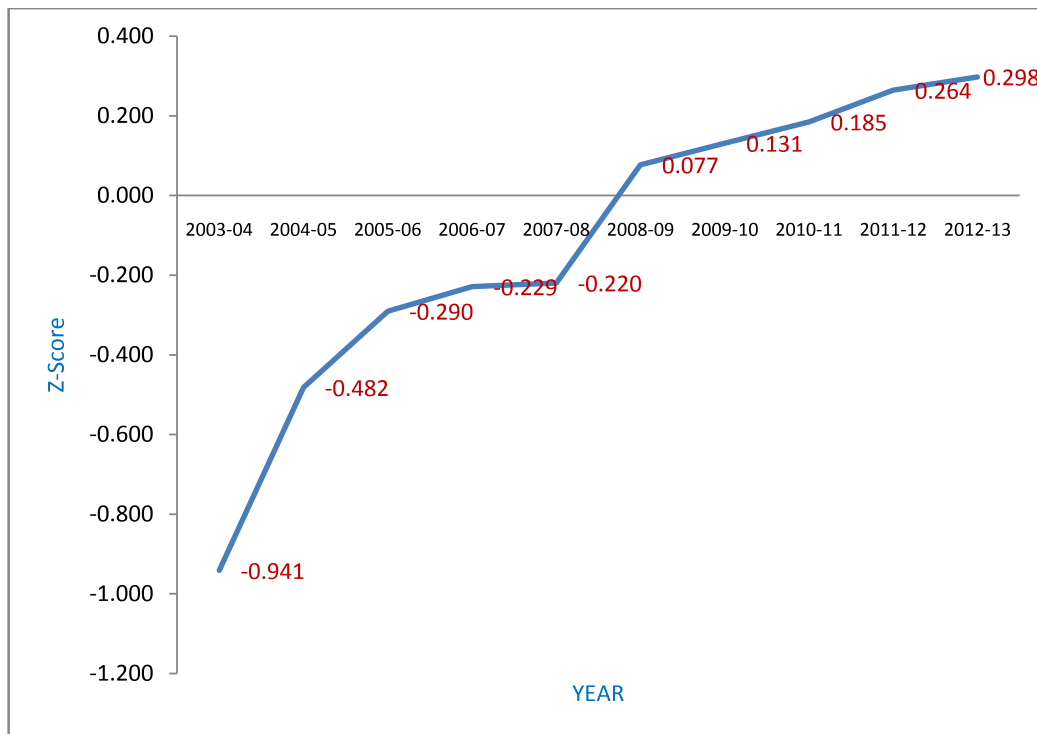
Table No. 6.19

Classification of ''Z''-Score (ICICI PRUDENTIAL)

YEAR	''Z''-Score
2012-13	0.298
2011-12	0.264
2010-11	0.185
2009-10	0.131
2008-09	0.077
2007-08	-0.220
2006-07	-0.229
2005-06	-0.290
2004-05	-0.482
2003-04	-0.941

From Table-6.18, Table-6.19 and Diagram-6.6 it is clear that ''Z''-scores of ICICI PURDENTIAL from the year 2003-04 to 2012-13 lie in the unhealthy/bankruptcy zone. It is also important to note that ''Z''-scores from 2003-04 to 2012-13 are having an increasing trend.

6.4.2.6. "Z"-Score Analysis of ING VYSYA

Table No. 6.20

Computed ''Z''-score (ING VYSYA)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	1.503	0.0006	-2.110	1.349	0.743
2004-05	0.402	0.0001	-0.934	0.338	-0.194
2005-06	-0.214	0.0001	-0.906	0.189	-0.930
2006-07	-0.389	0.0001	-0.792	0.127	-1.053
2007-08	-0.085	0.0000	-0.529	0.079	-0.535
2008-09	-0.016	0.0001	-0.422	0.062	-0.376
2009-10	-0.062	0.0004	-0.182	0.033	-0.211
2010-11	-0.007	0.0010	-0.076	0.063	-0.019
2011-12	0.022	0.0003	-0.032	0.053	0.044
2012-13	0.144	0.0006	0.022	0.052	0.218

Diagram-6.7

Trend of ''Z''-Scores (ING VYSYA)
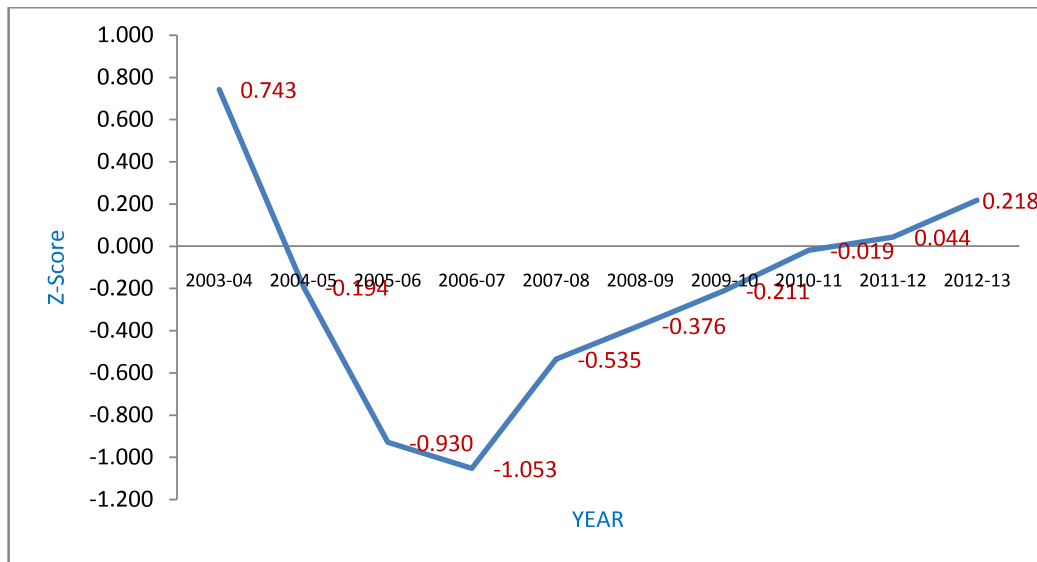
Table No. 6.21

Classification of ''Z''-Score (ING VYSYA)

YEAR	''Z''-Score
2003-04	0.743
2012-13	0.218
2011-12	0.044
2010-11	-0.019
2004-05	-0.194
2009-10	-0.211
2008-09	-0.376
2007-08	-0.535
2005-06	-0.930
2006-07	-1.053

From Table-6.20, Table-6.21 and Diagram-6.7 it is clear that ''Z''-score of ING VYSYA for the year 2003-04 lies in healthy zone/zone of ignorance but during rest of the years under the study, ''Z''-scores lie in the unhealthy/bankruptcy zone . It is also important to note that ''Z''-scores from 2003-04 to 2006-07 are having a decreasing trend and there is an effort of improvement thereafter.

6.4.2.7. "Z"-Score Analysis of KOTAK MAHINDRA

Table No. 6.22

Computed ''Z''-Score (KOTAK MAHINDRA)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.169	0.679	-2.485	0.569	-1.069
2004-05	0.195	0.261	-0.193	0.197	0.460
2005-06	0.036	0.138	-0.238	0.137	0.073
2006-07	0.023	0.086	-0.376	0.066	-0.199
2007-08	-0.041	0.052	-0.149	0.067	-0.071
2008-09	-0.037	0.040	0.023	0.064	0.090
2009-10	-0.079	0.024	0.067	0.050	0.062
2010-11	-0.057	0.019	0.077	0.052	0.090
2011-12	-0.091	0.033	0.136	0.069	0.147
2012-13	-0.070	0.084	0.114	0.081	0.208

Diagram-6.8

Trend of ''Z''-Scores (KOTAK MAHINDRA)

Table No. 6.23

Classification of ''Z''-score (KOTAK MAHINDRA)

YEAR	''Z''-Score
2004-05	0.460
2012-13	0.208
2011-12	0.147
2008-09	0.090
2010-11	0.090
2005-06	0.073
2009-10	0.062
2007-08	-0.071
2006-07	-0.199
2003-04	-1.069

From Table-6.22, Table-6.23 and Diagram-6.8 it is clear that ''Z''-scores of KOTAK MAHINDRA from the year 2003-04 to 2012-13 lie in the unhealthy/bankruptcy zone. It is also important to note that ''Z''-scores from 2003-04 to 2004-05 increased sharply and thereafter up to 2006-07 having a decreasing trend and after 2006-07 there is an effort of slight improvement.

6.4.2.8. "Z"-Score Analysis of PNB MET LIFE

Table No. 6.24

Computed ''Z''-Score (PNB MET LIFE)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.276	0.0007	-0.564	2.881	2.594
2004-05	0.110	0.0047	-1.521	1.318	-0.088
2005-06	-0.053	0.0044	-1.493	0.389	-1.152
2006-07	-0.632	0.0017	-0.086	0.212	-0.505
2007-08	-0.387	0.0002	0.067	0.087	-0.233
2008-09	-0.192	0.0001	0.030	0.083	-0.079
2009-10	-0.201	0.0000	0.027	0.033	-0.141
2010-11	-0.095	0.0000	0.021	0.035	-0.039
2011-12	-0.087	0.0000	0.024	0.041	-0.022
2012-13	-0.038	0.0007	0.031	0.056	0.051

Diagram-6.9

Trend of ''Z''-Scores (PNB MET LIFE)
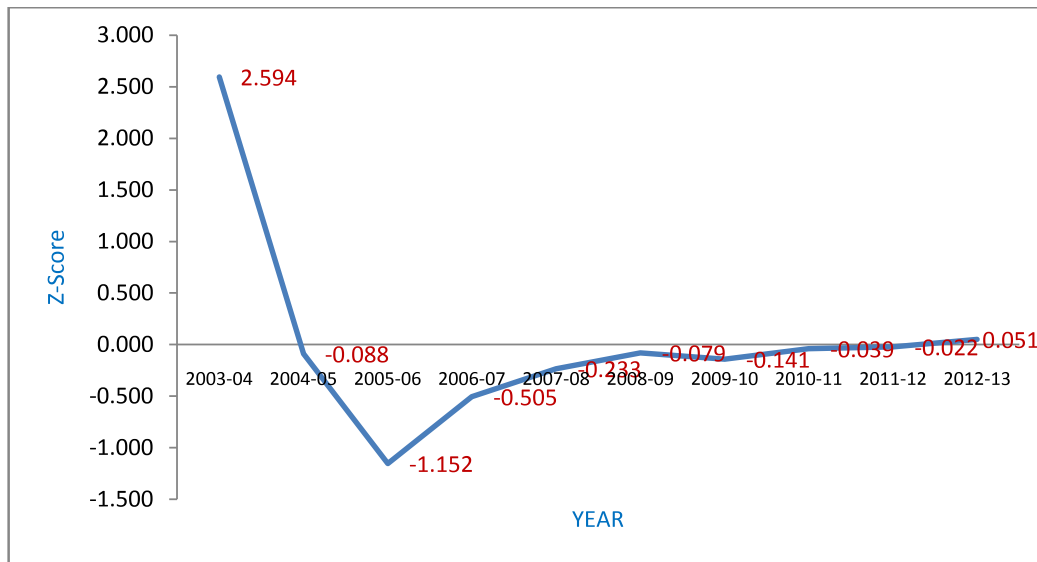
Table No. 6.25

Classification of ''Z''-Score (PNB MET LIFE)

YEAR	''Z''-Score
2003-04	2.594
2012-13	0.051
2011-12	-0.022
2010-11	-0.039
2008-09	-0.079
2004-05	-0.088
2009-10	-0.141
2007-08	-0.233
2006-07	-0.505
2005-06	-1.152

From Table-6.24, Table-6.25 and Diagram-6.9 it is clear that ''Z''-score of PNB MET LIFE for the year 2003-04 lies in zone of ignorance and from 2004-05 onwards ''Z''-scores lie in the unhealthy/bankruptcy zone. It is also important to note that ''Z''-

scores from 2003-04 to 2005-06 decreased sharply and thereafter there is slight effort of improvement.

6.4.2.9. "Z"-Score Analysis of LICI

Table No. 6.26

Computed ''Z''-Score (LICI)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.072	0.0011	0.0004	0.00036	0.074
2004-05	0.055	0.0010	0.0003	0.00033	0.057
2005-06	0.116	0.0010	0.0003	0.00034	0.118
2006-07	0.143	0.0015	0.0005	0.00048	0.145
2007-08	0.170	0.0012	0.0004	0.00040	0.172
2008-09	0.222	0.0013	0.0004	0.00041	0.224
2009-10	0.159	0.0010	0.0028	0.00277	0.165
2010-11	0.227	0.0010	0.0003	0.00033	0.228
2011-12	0.312	0.0010	0.0004	0.00039	0.314
2012-13	0.505	0.0009	0.0003	0.00035	0.506

Diagram-6.10

Trend of ''Z''-Scores (LICI)
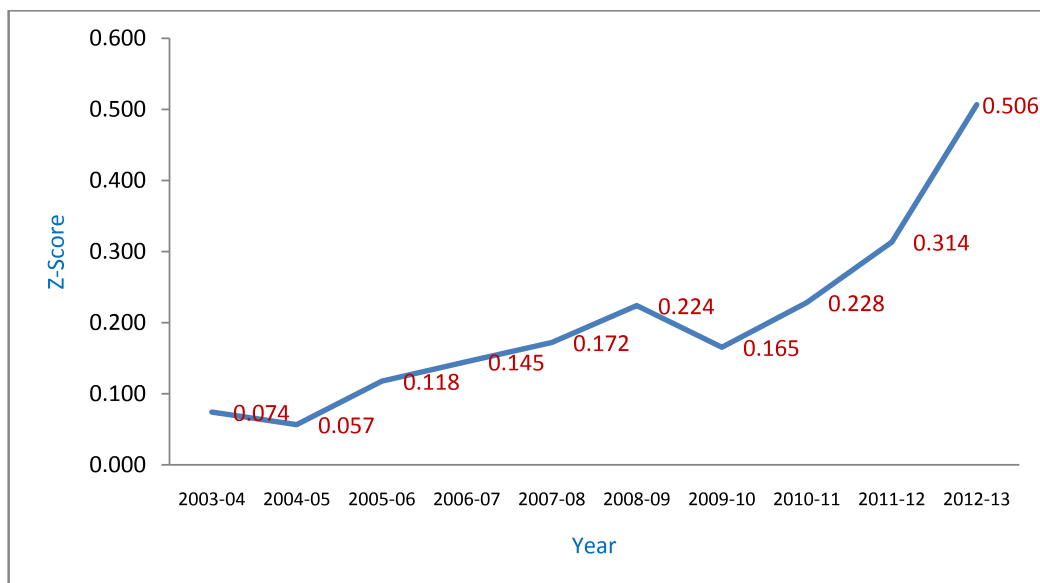
Table No. 6.27

Classification of ''Z''-Score (LICI)

YEAR	''Z''-Score
2012-13	0.506
2011-12	0.314
2010-11	0.228
2008-09	0.224
2007-08	0.172
2009-10	0.165
2006-07	0.145
2005-06	0.118
2003-04	0.074
2004-05	0.057

From Table-6.26, Table-6.27 and Diagram-6.10 it is clear that "Z''-score of LICI from the year 2003-04 to 2012-13 lies in unhealthy/bankruptcy zone. It is also important to note that "Z''-scores from 2003-04 to 2008-09 increased slowly and thereafter up to 2009-10 having a decreasing trend and after 2009-10 there is an effort of good improvement during rest of the study period.

6.4.2.10. "Z"-Score Analysis of SBI LIFE

Table No. 6.28

Computed ''Z''-Score (SBI LIFE)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.408	0.005	-0.238	0.513	0.688
2004-05	-0.059	0.004	-0.066	0.390	0.269
2005-06	-0.028	0.010	0.006	0.221	0.209
2006-07	-0.123	-0.006	0.005	0.107	-0.017
2007-08	-0.115	0.002	0.022	0.101	0.010
2008-09	-0.267	0.000	-0.012	0.073	-0.206
2009-10	-0.142	0.029	0.063	0.047	-0.003
2010-11	-0.061	0.050	0.060	0.043	0.093
2011-12	0.255	0.078	0.077	0.049	0.459
2012-13	0.244	0.104	0.078	0.056	0.481

Diagram-6.11

Trend of ''Z''-Scores (SBI LIFE)
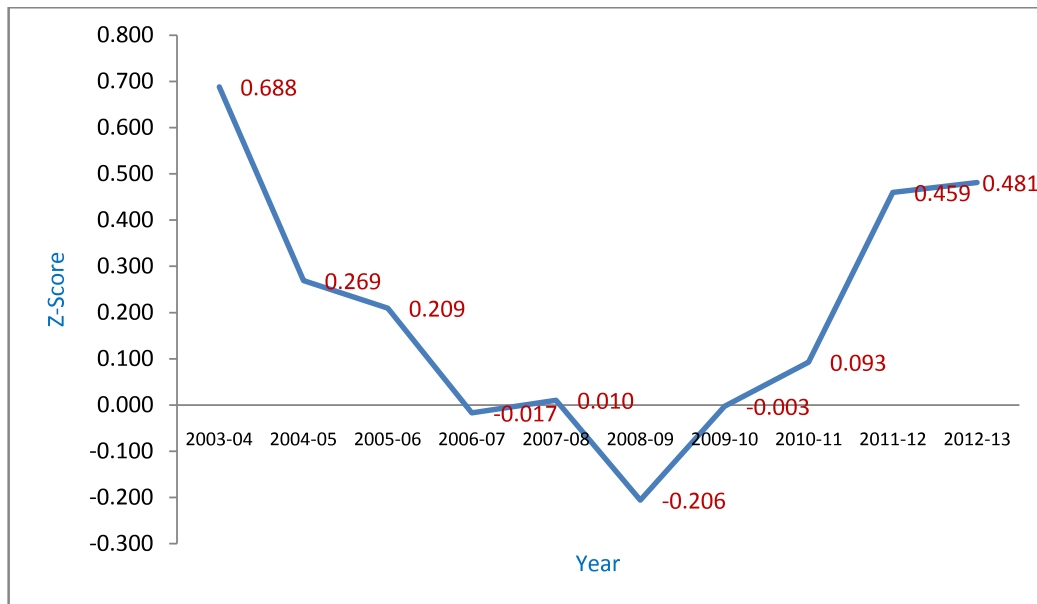
Table No. 6.29

Classification of ''Z''-Score (SBI LIFE)

YEAR	''Z''-Score
2003-04	0.688
2012-13	0.481
2011-12	0.459
2004-05	0.269
2005-06	0.209
2010-11	0.093
2007-08	0.010
2009-10	-0.003
2006-07	-0.017
2008-09	-0.206

From Table-6.28, Table-6.29 and Diagram-6.11 it is clear that "Z''-score of SBI LIFE from the year 2003-04 to 2012-13 lies in unhealthy/bankruptcy zone. It is also important to note that "Z''-scores from 2003-04 to 2008-09 are having a decreasing trend and after 2008-09 having an increasing trend up to 2011-12 and thereafter almost remains constant during 2012-13.

6.4.2.11. "Z"-Score Analysis of TATA AIA

Table No. 6.30

Computed ''Z''-Score (TATA AIA)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	0.303	0.03059	-1.074	0.415	-0.326
2004-05	-0.011	0.02622	-0.469	0.290	-0.163
2005-06	0.002	0.00000	-0.257	0.194	-0.060
2006-07	-0.105	0.00000	-0.198	0.120	-0.183
2007-08	-0.231	0.00000	-0.541	0.062	-0.709
2008-09	-0.141	0.00000	-0.691	0.064	-0.768
2009-10	-0.140	0.00000	-0.270	0.034	-0.376
2010-11	-0.098	0.00001	0.026	0.033	-0.038
2011-12	-0.073	-0.00007	0.117	0.049	0.092
2012-13	-0.012	0.00015	0.133	0.067	0.188

Diagram-6.12

Trend of ''Z''-Scores (TATA AIA)
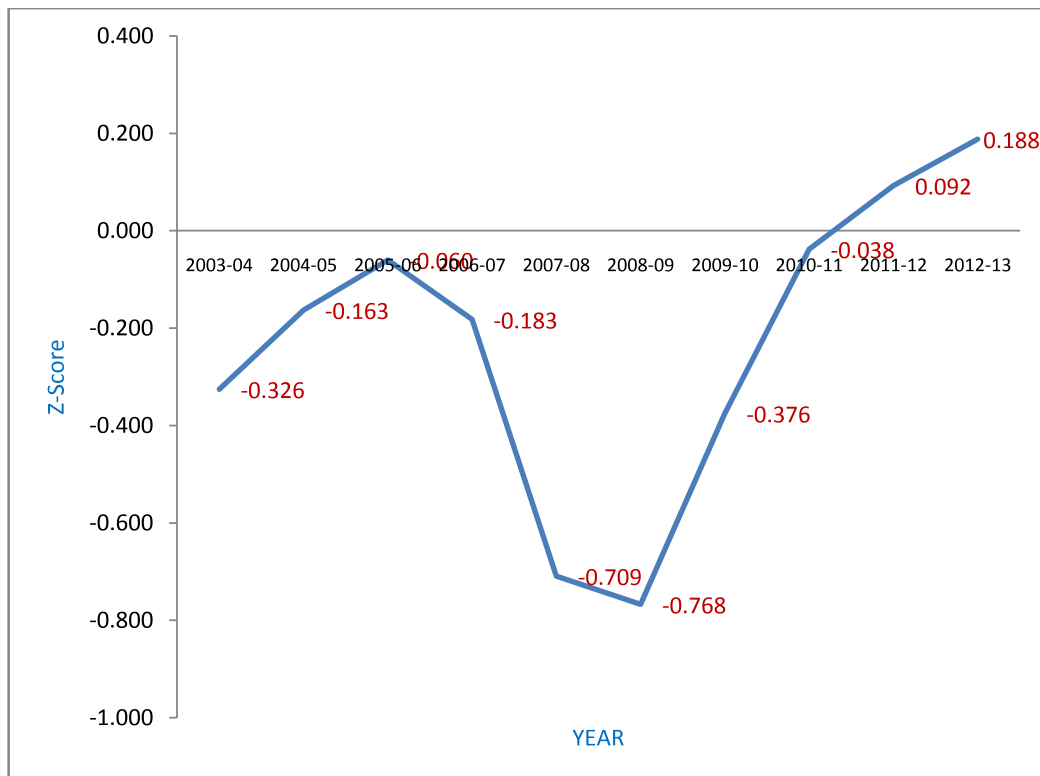
Table No. 6.31

Classification of ''Z''-Score (TATA AIA)

YEAR	''Z''-Score
2012-13	0.188
2011-12	0.092
2010-11	-0.038
2005-06	-0.060
2004-05	-0.163
2006-07	-0.183
2003-04	-0.326
2009-10	-0.376
2007-08	-0.709
2008-09	-0.768

From Table-6.30, Table-6.31 and Diagram-6.12 it is clear that "Z''-score of TATA AIA from the year 2003-04 to 2012-13 lies in unhealthy/bankruptcy zone. It is also important to note that "Z''-scores from 2005-06 are having a sharp decreasing trend and after 2008-09 having a sharp increasing trend up to 2012-13.

6.4.2.12. "Z"-Score Analysis of MAX N Y

Table No. 6.32

Computed ''Z''-Score (MAX N Y)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	-0.517	0.0004	-4.535	0.515	-4.536
2004-05	-0.472	0.0376	-1.108	0.319	-1.223
2005-06	-0.271	0.0176	-0.377	0.201	-0.430
2006-07	-0.230	0.0175	-0.191	0.167	-0.237
2007-08	-0.267	0.0131	-0.252	0.125	-0.382
2008-09	-0.101	0.0045	-0.415	0.149	-0.363
2009-10	-0.123	0.0406	-0.013	0.108	0.013
2010-11	-0.181	0.0311	0.088	0.097	0.035
2011-12	-0.181	0.0330	0.170	0.116	0.138
2012-13	-0.176	0.0309	0.147	0.103	0.104

Diagram-6.13

Trend of ''Z''-Scores (MAX N Y)
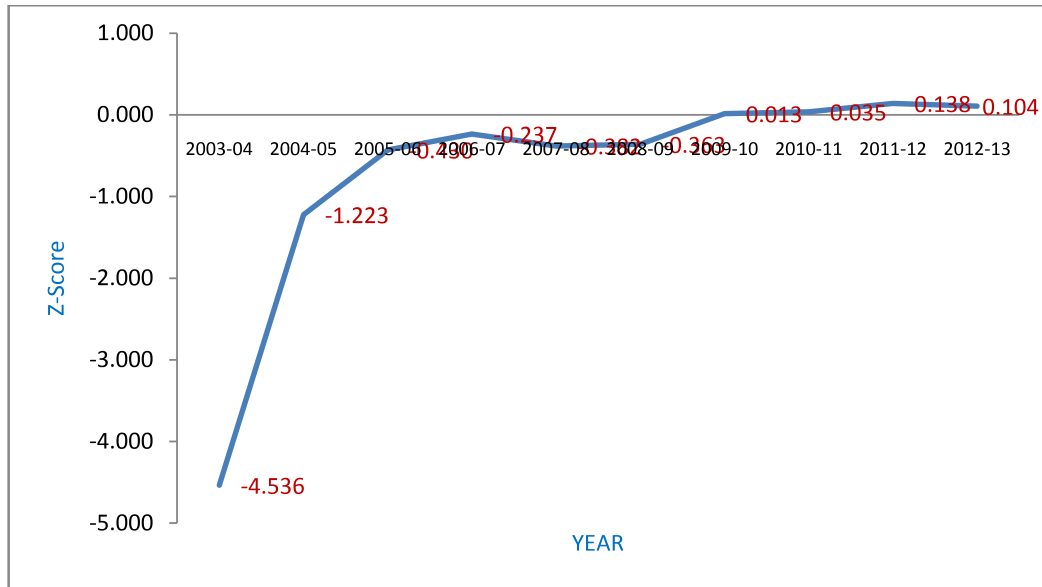
Table No. 6.33

Classification of ''Z''-Score (MAX N Y)

YEAR	''Z''-Score
2011-12	0.138
2012-13	0.104
2010-11	0.035
2009-10	0.013
2006-07	-0.237
2008-09	-0.363
2007-08	-0.382
2005-06	-0.430
2004-05	-1.223
2003-04	-4.536

From Table-6.32, Table-6.33 and Diagram-6.13, it is clear that "Z''-score of MX N Y from the year 2003-04 to 2012-13 lies in unhealthy/bankruptcy zone. It is also

important to note that ''Z''-scores from 2003-04 to 2006-07 has increased sharply and thereafter having a small fluctuating trend during the study period.

6.4.2.13. "Z"-Score Analysis of RELIANCE

Table No. 6.34

Computed ''Z''-Score (RELIANCE)

YEAR	X1*6.56	X2*3.26	X3*6.72	X4*1.05	''Z''-Score
2003-04	-0.008	0.0016	-4.207	2.675	-1.539
2004-05	-0.043	0.0017	-1.720	0.837	-0.925
2005-06	-0.076	0.0127	-1.357	0.309	-1.111
2006-07	-0.378	0.0003	-1.439	0.099	-1.717
2007-08	-0.175	0.2681	-1.165	0.051	-1.020
2008-09	-0.100	0.7417	-1.054	0.055	-0.357
2009-10	-0.048	0.4119	-0.133	0.023	0.254
2010-11	-0.044	0.3425	-0.047	0.017	0.268
2011-12	-0.056	0.3709	0.130	0.052	0.497
2012-13	-0.376	0.3796	0.136	0.074	0.213

Diagram-6.14

Trend of ''Z''-Scores (RELIANCE)
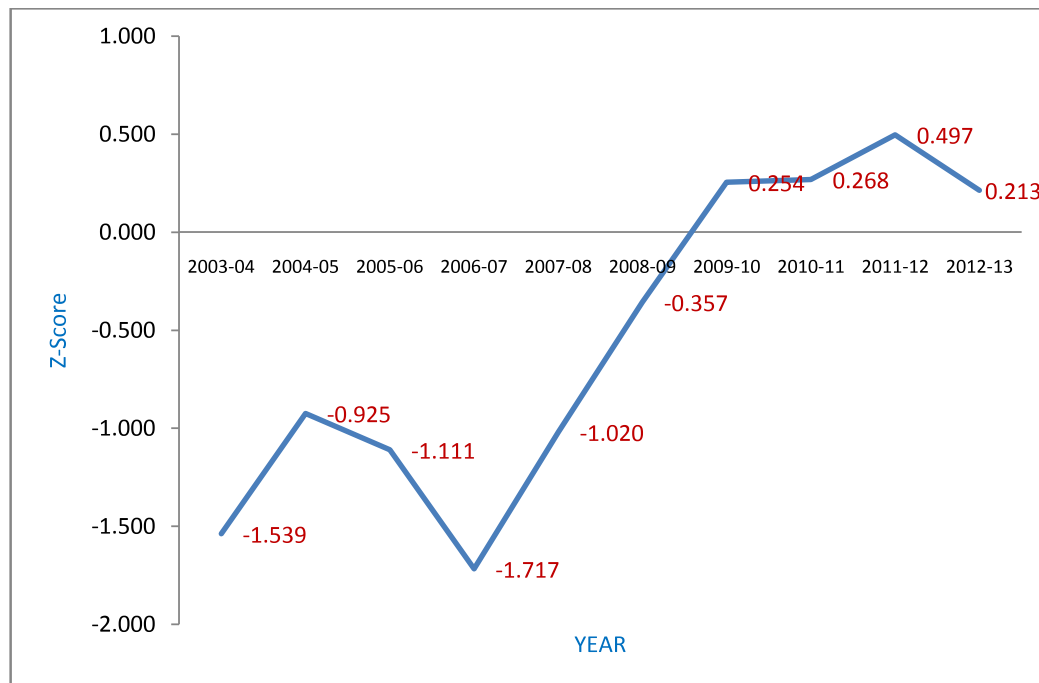
Table No. 6.35

Classification of ''Z''-Score (RELIANCE)

YEAR	''Z''-Score
2011-12	0.497
2010-11	0.268
2009-10	0.254
2012-13	0.213
2008-09	-0.357
2004-05	-0.925
2007-08	-1.020
2005-06	-1.111
2003-04	-1.539
2006-07	-1.717

From Table-6.34, Table-6.35 and Diagram-6.14, it is clear that "Z''-score of RELIANCE from the year 2003-04 to 2012-13 lies in unhealthy/bankruptcy zone. It is also important to note that "Z''-scores from 2004-05 to 2006-07 has decreased sharply and thereafter increased sharply up to 2009-10 and during rest of the year there is a mixture of increasing and decreasing trend.

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