CHAPTER - V

STATISTICAL ANALYSIS OF INDIAN AIRLINES AND AIR INDIA

5.1 DETERMINANTS OF CAPITAL STRUCTURE

Introduction

In this chapter it is proposed to analyze the determinants of capital structure analysis by using the correlation and multiple regression analysis technique for the two air corporations Indian Airlines and Air India. The following are the variables employed and the definitions are given below.

5.2 DEFINITION OF RATIOS

a) Debt-equity ratio

Debt-equity mix indicates the relationship between borrowed funds and owners funds in the capital structure of a company. An important question facing companies in need of new finance is whether to raise debt or equity. In spite of the continuing theoretical debate on debt-equity mix, there is relatively little empirical evidence on how a company actually selects between financing instruments. Though the management makes its own decision as to its capital sources, there is a certain general factor which seems to influence the debt-equity mix.

b) Assets structure

As the fixed assets demand long term funds, their proportion in the total assets structure will have a direct bearing on the determination of the proportion of long term funds in the total finances, i.e., capital structure. The asset structure is one of the ratios closely interacting with the help of the 'net fixed assets to total assets'.

c) Liquidity

The principles and conventions of finance suggest that a portion of long term funds should be invested in current assets as to ease the firm from short term risks and to ensure liquidity by reducing the burden of current liabilities. While the liquidity is governed by cash flows, the discretionary components of cash outflows such as interest charges, dividends will influence the debt-equity mix.

d) Turnover

The size of turnover of a business enterprise represents the efficiency attained for a given capital investment. Therefore, the size of investment and turnover are very much interested. The selection of turnover as an indicator of operating performance is also influenced by the premise that it represents the growth of a firm.

5.3 MULTIPLE REGRESSION ANALYSIS

5.3.1 Indian Airlines

In this section multiple regression analysis is used to explain the variation in the Debt-equity ratio (dependent variable) based on the variation over the ratios (independent variable) quick ratio, fixed assets ratio, Return on Capital Employed and fixed assets turnover ratio. Therefore the multiple regression equation becomes

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

Dependent variable Y = Debt - equity ratio

Independent ratios are X_1 = Quick ratio

X_2 = Fixed assets ratio

X_3 = Return On Capital Employed ratio

X_4 = Fixed assets turnover ratio

The following Table 5.1 shows the values of mean and standard deviation of the debt equity ratio, quick ratio, fixed assets ratio, Return On Capital Employed and fixed assets turnover ratio of Indian Airlines.

Table 5.1

Descriptive Statistics of Indian Airlines

Ratios	Mean	Std. Deviation
Debt - equity ratio	4.37	9.25
Quick ratio	0.65	0.22
Fixed assets ratio	2.21	1.51
Return On Capital Employed ratio	-2.38	8.44
Fixed assets turnover ratio	1.56	1.13

Table 5.2

Correlations of Indian Airlines

Ratios	Debt - equity Ratio	Quick ratio	Fixed assets ratio	Return On Capital Employed ratio	Fixed assets turnover ratio
Debt -equity Ratio	1.000				
Quick ratio	.330	1.000			
Fixed assets ratio	.129	.012*	1.000		
Return On Capital Employed ratio	.425	.051	.000**	1.000	
Fixed assets turnover ratio	.202	.130	.003**	.000**	1.000

** Highly Significant

The above matrix represents the correlation coefficients of Indian Airlines. The significance of these correlations is tested through the table

value of 't' distribution with degrees of freedom (n-2) = (15-2). The correlations co-efficient which are higher than the table value are the only significant correlations.

The correlation matrix of Indian airlines represents the significant correlations. Quick ratio and fixed assets ratio, fixed assets ratio and return on capital employed, fixed assets turnover ratio and all other variables are not significantly correlated with each other. The correlation co-efficient only predicts the association between the variables. The nature and the degree of association of these variables have further been tested through coefficient of multiple regression analysis.

R, the multiple correlation coefficient, is the linear correlation between the observed and predicted values of the dependent variable. It is found that the multiple correlations between the Debt - equity Ratio towards and other ratios are 0.587 which indicates that the model as fitted explains 34 percent variability in the Debt-equity Ratio.

Table 5.3

Multiple Correlation of Indian Airlines

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.587	.345	.083	8.86

The significance of correlation is tested and found that the 'p' value is 0.00. It indicates a positive correlation of very high degree among the variables for Indian Airlines. The regression co-efficient and residual values are calculated and tested by ANOVA and shown in Table 5.4 and it shows no significance.

Table 5.4

ANOVA for Indian Airlines

	Sum of Squares	df	Mean Square	F	Sig.
Regression	413.007	4	103.252	1.315	.329
Residual	784.936	10	78.494		
Total	1197.944	14			

Table 5.5

Regression Coefficients of Indian Airlines

	B	Std. Error	t	p
(Constant)	19.51	14.683	1.329	.213
Quick Ratio	-2.65	13.432	-.198	.847
Fixed Assets Ratio	-11.77	6.742	-1.746	.111
Return On Capital Employed	0.50	.260	1.924	.083
Fixed Assets Turnover Ratio	-5.24	3.891	-1.346	.208

Dependent Variable: Debt - Equity Ratio

The regression co-efficient for exogenous variables, quick ratio and fixed assets ratio indicates a negative correlations with dependent variable capital structure (Debt-equity ratio). It implies that with the rise of 1 unit in

proportion of quick ratio and fixed assets ratio will reduce 2.65 and 11.77 times in debt-equity ratio of Indian Airlines respectively.

The regression co-efficient for independent variable return on capital employed (ROCE) indicates positive relationship with the dependent variable debt-equity ratio in Indian Airlines. It implies that with the rise of Re.1 in profit margin and other variables remaining constant, there will be an increase of 0.5 times in the debt equity ratio, whereas in the fixed assets turnover ratio is negatively associated with debt-equity Ratio. It implies that with the rise of Rel in fixed assets turnover ratio there will be a decline of 5.24 times in the debt-equity ratio of Indian Airlines

5.3.2 Air India

In this section multiple regression analysis is used to explain the variation in debt -equity ratio (dependent variable) based on the variation over the ratios (independent variable) quick ratio, fixed assets ratio, Return on Capital Employed and fixed assets turnover ratio. Therefore the multiple regression equation becomes

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$

Dependent variable Y = Debt-equity ratio

Independent ratios are X_1 = Quick ratio

X_2 = Fixed assets ratio

X_3 = Return on capital employed ratio

X_4 = Fixed assets turnover ratio

The descriptive statistics of the ratios of Air India shows mean values and standard deviation of debt-equity ratio, quick ratio, fixed assets ratio, return on capital employed, and fixed assets turnover ratio as shown in Table 5.6.

Table 5.6

Descriptive Statistics of Air India

Ratios	**Mean**	**Std. Deviation**
Debt -equity Ratio	0.93	20.17
Quick ratio	1.13	0.55
Fixed assets ratio	1.18	0.43
Return On Capital Employed ratio	0.38	6.75
Fixed assets turnover ratio	1.70	1.12

Table 5.7

Correlations of Air India

Ratios	Debt - equity ratio	Quick ratio	Fixed assets ratio	Return On Capital Employed	Fixed assets turnover ratio
Debt - equity Ratio	1.000				
Quick ratio	.003**	1.000			
Fixed assets ratio	.009**	.001**	1.000		
Return On Capital Employed	.064	.142	.004**	1.000	
Fixed assets turnover ratio	.028*	.182	.116	.328	1.000

** Highly Significant

The above matrix represents the correlation coefficients of Air India. The significance of these correlations is tested through the table value of 't' distribution with degrees of freedom (n-2) = (15-2). The correlations co-efficients which are higher than the table value are the only significant correlations.

The correlation matrix of Air India represents the significant correlations, between quick ratio, debt - equity ratio, fixed assets ratio and return on capital employed. All other variables are not significantly

correlated with each other. The correlation co-efficient only predicts the association between the variables. The nature and the degree of association of these variables have further been tested through coefficient of multiple regression analysis.

R, the multiple correlation coefficients, is the linear correlation between the observed and predicted values of the dependent variable. It is found that the multiple correlations between the debt - equity ratio and other ratios are 0.86 which indicates that the model as fitted explains 74 percent variability in the debt - equity Ratio.

Table 5.8

Multiple Correlation of Air India

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.86	0.74	.636	12.17

The significance of correlation is tested and 'p' value is found to be 0.00. It indicates a positive correlation of a very high degree among the variables for Air India. The regression co-efficient and residual values are calculated and tested by ANOVA and shown in Table 5.9 and it is not significant.

Table 5.9

ANOVA for Air India

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	4212.73	4	1053.18	7.110	0.006**
Residual	1481.35	10	148.135		
Total	5694.07	14			

Table 5.10

Regression Coefficients of Air India

Ratios	B	Std. Error	t	p
(Constant)	69.98	30.55	2.29	0.045
Quick ratio	-29.71	9.95	-2.987	0.014
Fixed assets ratio	-33.90	21.15	-1.603	0.14
Return On Capital Employed ratio	1.21	0.50	2.42	0.036
Fixed assets turnover ratio	-10.63	3.60	-2.95	0.015

Dependent variable: Debt-equity ratio

The regression co-efficients for exogenous variables, quick ratio and fixed assets ratio indicates a negative correlation with dependent variable capital structure (debt -equity ratio). It implies that with the rise of 1 unit in proportion of quick ratio and fixed assets ratio will reduce 29.71 and 33.90 times in debt-equity ratio of Air India.

The regression co-efficient for independent variable return on capital employed (ROCE) indicates positive relationship with the dependent

variable debt-equity ratio of Air India. It implies that with the rise of Re.1 in profit margin and other variables remaining constant, there will be an increase of 1.21 times in the debt equity ratio, whereas in the case of fixed assets turnover ratio is negatively associated with debt equity ratio. It implies that with the rise of Re1 in fixed assets turnover ratio there will be a decline of 10.63 times in the debt-equity ratio of Air India

5.4 DISCRIMINANT FUNCTION ANALYSIS

5.4.1 Introduction

Discriminant analysis is a technique designed to characterize the relationship between a set of ratios, often called the response or predictor ratios, and a grouping variable with a relatively small number of categories. To do so, discriminant function creates a linear combination of the predictors that best characterize the difference among the groups. The technique is related to both regression and multivariate analysis of variance, and as such it is another general linear model technique. Another way to think of discriminant analysis is as a method to study differences between two or more groups of cases of several ratios simultaneously. From the discriminant function analysis, the study is able to find differences of the ratios, which significantly discriminate the ratios of one group (Indian Airlines) from the other group (Air India).

Discriminant function analysis results are calculated by using the following three steps namely

1. Construction of discriminant function
2. Classification and
3. Interpretation.

5.4.2 Construction of Discriminant Function:

Discriminant function analysis attempts to construct a function with these and other ratios so that the ratios belonging to either of these two groups are differentiated at the maximum. The linear combination of the ratios is known as discriminant function and its parameters are called discriminant function coefficients.

A typical discriminant function will be of the form,

$$Z = a_0 + a_1X_1 + a_2X_2 + ... + a_nX_n$$

Where, a_0 is constant and $a_1, a_2, ...a_n$ - are discriminant Function coefficients of the independent ratios $X_1, X_2, ...X_n$ respectively.

5.4.3 Variable selection method

In constructing the function all ratios which contribute to differentiate these two groups maximally are examined. Among the several methods available for selection of ratios, 'Mahalanobis minimum D squared' method was employed for this study. The Mahalanobis procedure is based on the generalized squared Euclidean distance that adjusts unequal variances in the ratios.

The major advantage of this procedure is that it is computed in the original space of the predictor (independent) ratios rather than as a collapsed version which is used in other methods. In general 'Mahalanobis Minimum D Squared' is the preferred procedure since the researcher is interested in the maximum use of available information.

5.4.4 Stepwise selection

In the process of constructing discriminant function, after deciding about Mahalanobis minimum D squared' method, the type of computation is also to be decided. One is simultaneous method and the other one is Stepwise Method. The simultaneous method involves computing the discriminant function so that all the independent ratios are considered

concurrently regardless of the discriminating power of each independent variable.

The stepwise method is an alternative to the simultaneous method. In involves entering the independent ratios in the discriminant function one at a time on the basis of their discriminating power. The stepwise approach begins by choosing the single best discriminating variable. The initial variable is then paired with each of the other independent ratios one at a time, and a second variable is chosen. The second variable is the one that is able to improve the discriminating power of the Function in combination with the first variable. The third and any subsequent ratios are selected in a similar manner.

As additional ratios are included, some already selected ratios may be removed if the information they contain about group differences is available in some combination of the other already included ratios (Multicollinearity). Eventually either all independent ratios will be included in the function or the excluded ratios will be judged as not contributing significantly to further discrimination. By sequentially selecting the next best discriminating variable at each step ratios that are not useful in discriminating between the groups are eliminated and a

reduced set of ratios is identified. The reduced set typically is almost as good as, and sometimes better than, the complete set of ratios.

Disciminant function in Table 5.11 shows the group means and standard deviations for each of the independent ratios identified for analysis based on the ratios of Indian Airlines and Air India. A glance at the mean scores reveals that Indian Airlines scores are low in many ratios.

Table 5.12 shows the One-way ANOVA used to assess the significance between the means of the two groups, for each of the independent ratios. It is seen from Table 5.12 that ratios 'current ratio, quick ratio, cash to current assets ratio, cash to current liabilities ratio, fixed assets ratio and inventory turnover ratio' contribute significantly in differentiating between Indian Airlines and Air India.

Table 5.11

Group Statistics of Indian Airlines and Air India

Ratios selected	Indian Airlines		Air India		Total	
	Mean	SD	Mean	SD	Mean	SD
Debt-equity ratio	4.37	9.25	0.93	20.17	2.65	15.51
Interest coverage ratio	0.15	1.45	0.27	1.62	0.21	1.51
Proprietary ratio	-0.29	0.96	0.17	0.10	-0.06	0.71
Capital turnover ratio	3.06	2.99	1.76	1.27	2.41	2.35
Current ratio	0.90	0.20	1.37	0.63	1.14	0.52
Quick ratio	0.65	0.22	1.13	0.55	0.89	0.48
Debt to total assets ratio	1.04	0.70	0.82	0.11	0.93	0.50
Working capital turnover ratio	-70.16	248.13	7.97	47.42	-31.10	179.96
Cash to current assets ratio	7.09	2.48	26.96	17.49	17.02	15.90
Cash to current liabilities ratio	0.07	0.03	0.40	0.39	0.23	0.32
Inventory to total current assets ratio	0.49	0.15	0.41	0.32	0.45	0.25
Inventory to working capital ratio	-19.13	70.57	0.41	11.45	-9.36	50.66
Funded debt to total capitalization ratio	1.03	0.70	0.82	0.12	0.93	0.50
Fixed assets ratio	2.21	1.51	1.18	0.43	2.8	1.725
Inventory turnover ratio	5.12	1.28	8.95	6.26	7.04	4.85
Fixed assets turnover ratio	1.56	1.13	1.70	1.12	1.63	1.11
Gross profit ratio	5.60	3.98	6.27	6.23	5.93	5.15
Net profit ratio	-3.55	5.70	-0.30	6.33	-1.93	6.15
Return on capital employed	-2.38	8.44	0.38	6.75	-1	11.815
Return on shareholders fund ratio	10.85	79.53	31.23	111.24	21.04	95.58
Return on total assets ratio	0.02	0.17	0.00	0.05	0.01	0.12
Operating profit ratio	12.41	5.29	10.34	6.55	11.37	5.95
Fixed assets to funded debt	2.21	1.51	1.18	0.43	1.70	1.21
Current liability to proprietors fund	3.25	6.23	0.62	0.40	1.93	4.54
Fixed assets to net worth	1.56	5.23	2.02	4.66	1.79	4.87

Table 5.12

Tests of equality of group means

Ratios	Wilks' Lambda	F	df1	df2	P
Debt-equity ratio	0.987	0.36	1	28	0.553
Interest coverage ratio	0.998	0.048	1	28	0.828
Proprietary ratio	0.892	3.399	1	28	0.076
Capital turnover ratio	0.921	2.411	1	28	0.132
Current ratio	0.791	7.387	1	28	0.011*
Quick ratio	0.738	9.955	1	28	0.004**
Debt to total assets ratio	0.95	1.489	1	28	0.233
Working capital turnover ratio	0.951	1.435	1	28	0.241
Cash to current assets ratio	0.596	18.989	1	28	0.00**
Cash to current liabilities ratio	0.729	10.43	1	28	0.003**
Inventory to total current assets ratio	0.974	0.755	1	28	0.392
Inventory to working capital ratio	0.962	1.12	1	28	0.299
Funded debt to total capitalization ratio	0.954	1.353	1	28	0.255
Fixed assets ratio	0.789	7.505	1	28	0.011*
Inventory turnover ratio	0.838	5.416	1	28	0.027*
Fixed assets turnover ratio	0.996	0.106	1	28	0.747
Gross profit ratio	0.996	0.122	1	28	0.73
Net profit ratio	0.928	2.179	1	28	0.151
Return on capital employed	0.886	3.586	1	28	0.069
Return on shareholders fund	0.988	0.333	1	28	0.568
Return on total assets ratio	0.997	0.096	1	28	0.759
Operating profit ratio	0.969	0.91	1	28	0.348
Fixed assets to funded debt	0.813	6.444	1	28	0.017**
Current liability to proprietors fund	0.913	2.679	1	28	0.113
Fixed assets to net worth ratio	0.998	0.064	1	28	0.802

Since the objective is to determine the ratios which discriminate most efficiently between Indian Airlines and Air India, all the ratios are retained for further analysis and the stepwise approach is used to remove any insignificant ratios. The stepwise procedure begins with examining all the ratios for inclusion in the function. The variable maximizes the Mahalanobis minimum D square between the groups is entered in to the function first. In order to restrict all the ratios being entered into the equation, a minimum F value of 1.00 is fixed as the entry criterion for inclusion in the discriminant function.

Table 5.13 gives the list of ratios considered for analysis at each step, with corresponding F-to-remove and D^2 values to examine the possible inclusion of ratios in the equation. A look at Table 5.13 will reveal that the entry criterion has eliminated the ratios 'capital turnover ratio' and 'cash to current assets ratio' from possible inclusion in the equation.

TABLE 5.13

Ratios in the Analysis

(At each step, the variable that maximizes the Mahalanobis distance between the two groups is entered.)

RATIOS	Tolerance	F to Remove	Min. D Squared
Cash to current assets ratio	.090	27.112	15.263
Operating profit ratio	.072	83.172	5.232
Fixed assets to funded debt	.137	71.053	6.388
Gross profit ratio	.149	15.058	21.279
Interest coverage ratio	.198	16.155	20.579
Cash to current liabilities ratio	.109	6.637	28.386

The table gives information as to which variable should be entered first. By examining D^2 value, which maximizes the distance between the two groups, it is seen that at each step a variable is entered, the D^2 value increases, thereby increasing the discrimination between the two groups. The variable which maximum discriminates between the two groups can be identified from the variable which is entered first. Here it is cash to current assets ratio score. At each step a variable is entered, the significance of the function is tested using Wilk's Lambda and D^2 values are arrived at for this function. Both the statistics show that the discriminant function is significant at 1% level. The results are given in Table 5.14.

TABLE 5.14

Wilks' Lambda

STEP	NUMBER OF VARIABLES	LAMBDA	DF1	DF2	DF3	EXACT F			
						Statistic	df1	df2	Sig.
1	1	0.596	1	1	28	18.989	1	28	0.00
2	2	0.416	2	1	28	18.987	2	27	0.00
3	3	0.313	3	1	28	18.987	3	26	0.00
4	4	0.163	4	1	28	32.198	4	25	0.00
5	5	0.116	5	1	28	36.496	5	24	0.00
6	6	0.09	6	1	28	38.663	6	23	0.00

Once entered in the equation, at each step, the ratios already entered are further examined for positive removal from the equation. A variable is removed if high multicollinearity exists between the included independent ratios included. Like entry criterion, the removal criterion is also fixed at 1.00. This process of selection, inclusion and removal continues until all the ratios satisfying the above entry and removal conditions are satisfied.

Table 5.15
Summary Table

Step	Entered	Min. D Squared				
		Statistic	Exact F			
			Statistic	df1	df2	Sig.
1	Cash to current assets ratio	2.532	18.989	1	28	0.00**
2	Operating profit ratio	5.251	18.987	2	27	0.00**
3	Fixed assets to funded debt	8.179	18.987	3	26	0.00**
4	Gross profit ratio	19.233	32.198	4	25	0.00**
5	Interest coverage ratio	28.386	36.496	5	24	0.00**
6	Cash to current liabilities ratio	37.655	38.663	6	23	0.00**

Table 5.15 provides the overall stepwise discriminant analysis which results after all significant ratios have been included in the discriminant function. The summary table indicates that out of 25 ratios considered for the analysis, 6 ratios are included in the model, leaving eighteen ratios namely 'debt - equity ratio, proprietary ratio, capital employed turnover ratio, debt to total assets, working capital turnover ratio, inventory to total current assets ratio, inventory to working capital ratio, funded debt to total, capitalization ratio, fixed assets ratio, inventory turnover ratio, fixed assets turnover ratio, net profit ratio, return on capital employed, return on shareholders' fund, return on total assets ratio, operating profit ratio, current Liability to proprietors fund and fixed assets to net worth' for dependents from the function. The significance

of the discriminating ratios is tested using Wilk's Lambda and Min D^2 values are given in the table.

5.4.5 Canonical Discriminant Function:

Table 5.16 provides the multivariate aspect of the model given under the heading 'Canonical discriminant function'. Note that discriminant function is significant at 1% level and displays a correlation of 0.954. By squaring it get (0.954)^2=0.91 and may be interpreted as 91 % of the variation in the dependent variable sector may be explained by all the discriminating ratios included in the model and the Wilk's Lambda and its chi-square value explains that the model is significant in discriminating between two sectors at 1% level.

TABLE 5.16

Canonical discriminant function

Canonical Correlation	Wilks' Lambda	Chi-square	df	Sig.
0.954	0.09	60.142	6	0.00**

5.4.6 Discriminant Function Coefficients

Table 5.17 gives the coefficients of the discriminating ratios finally derived for the discriminant function.

Table 5.17

Canonical Discriminant Function Coefficients

Ratios	Function
Interest coverage ratio	-.986
Cash to current assets ratio	-.206
Cash to current liabilities ratio	5.381
Gross profit ratio	-.326
Operating profit ratio	.579
Fixed assets to funded debt	2.217
(Constant)	-5.945

The Discriminant function (Z) for the problem under study can be written as,

$$Z = -5.945 - 0.986ICR - 0.206CCAR + 5.381CCLR - 0.326GPR + 0.579OPR + 2.217FAFDR$$

Where,

ICR - Interest coverage ratio

CCAR - Cash to current assets ratio

CCLR - Cash to current liabilities ratio

GPR - Gross profit ratio

OPR - Operating profit ratio

FAFDR - Fixed assets to funded debt

5.4.7 Classification

Once the discriminant function is arrived at, then the efficiency of the function as to how accurately it predicts the ratios into the respective groups must be assessed. For this a classification matrix is to be developed using 'original' and 'predicted' group membership of the ratios.

Before a classification matrix can be considered, several things must be decided beforehand. First, the group centroids (means), second cutting score and third prior probabilities of each group are to be decided.

5.4.8 Group Centroids

Using the discriminant function given in (A) the discriminant is calculated by substituting the values for discriminating ratios from the study data. Then mean scores for Indian Airlines (Z_0) and Air India (Z_1) are calculated, which are called Group Centroids. The results of these group centroids are given in Table 5.18.

Cutting Score

Using the sample sizes and centroids for these two groups cutting score is calculated as follows:

$$Z_c = \frac{N_0 \times Z_0 + N_1 \times Z_1}{N_0 + N_1}$$

where,

Z_c = Cutting Score

Z_0 = Centroids for Indian Airlines

Z_1= Centroids for Air India

N_0 = Sample size of Indian Airlines

N_1 = Sample size of Air India

Hence, substituting the respective values the cutting score is

$$Z = [15 * 3.068 + 15 * (-3.068)]/(15 + 15)$$

Against this Cutting Score, each respondent's discriminant score is examined. If his score is less than Z_c value, then he is classified in Indian Airlines group, otherwise in Air India group.

Table 5.18

Canonical discriminant functions evaluated at Group means

Airlines	Function
Indian Airlines	3.068
Air India	-3.068

5.4.9 Prior Probabilities

Prior probabilities are calculated for each group based on the proportionate size of the sample in the respective groups and the results are given in Table 5.19.

Table 5.19

Prior probabilities for groups

Airlines	Prior	Cases Used in Analysis
Indian Airlines	.500	15
Air India	.500	15
Total	1.000	30

Using these prior probabilities, centroids and cutting scores the classification matrix is formed. Table 5.20 is the classification matrix giving how many of the ratios are correctly classified into the respective groups and the overall correct classification percentage.

Table 5.20

Classification results

		Airlines	Predicted Group Membership		Total
			Indian Airlines	Air India	
Original	No	Indian Airlines	15	0	15
		Air India	0	15	15
	%	Indian Airlines	100.0	.0	100.0
		Air India	.0	100.0	100.0

100 % of original grouped cases correctly classified.

Thus it is seen that the discriminant function has predicted 100 percent of the cases correctly in the Indian Airlines group and 100 percent of the cases in the Air India group and on the whole classified 100 percent of the cases correctly.

5.4.10 Conclusion

From the calculations made, the following results are shown in Table 5.21.

Table 5.21
Structure matrix

Ratios	Function
Cash to current assets ratio	-.259
Cash to current liabilities ratio	-.192
Fixed assets to funded debt	.151
Operating profit ratio	.057
Gross profit ratio	-.021
Interest coveragerRatio	-.013

Table 5.21 gives the structural correlations which measure the simple linear correlations between each independent variable and the discriminant Function. The R^2 percentage gives the percent contribution of each variable to discriminant function. It is seen from the table that nearly 26 percent of the variation in the discriminant function is due to cash to

current assets ratio score, which contributes maximally, in discriminating between Indian Airlines and Air India in their opinion towards motivational measures. Next comes, cash to current liabilities ratio which contributes about 19.2 percent in discriminating between the two sectors followed by fixed assets to funded debt and operating profit ratio. Interest coverage ratio seems to contribute least in discriminating between Indian Airlines and Air India.

5.5 DETERMINANTS OF PROFITABILITY OF INDIAN AIRLINES AND AIR INDIA

5.5.1 Introduction

A business is considered to be more efficient only if it earns more profit. The question of determination of profit is of great importance because profit is a very important aspect of business. The task of management is maximisation of profits and the efficiency of a business is measured by the amount of profit earned. The profit of a business may be measured by studying the profitability of investments in it. Profitability is the ability of a given investment to earn a return from its use. This ability is referred to as learning power or operating performance of the investment concerned. Profitability is a relative term and its measurement can be

achieved by profit and its relation with the other objects by which the profit is affected. The profitability is the most powerful motivational factor in any business. It is the test of efficiency and the measure of control.

The profitability of a firm is determined mainly by three factors, namely structure of the firm and the market, goals of the management and government policies and other external constraints. There are a number of cross-sectional studies which provide direct evidence about the determinants of profitability. These studies broadly support the view that two variables, namely, growth rate of sales and vertical integration are important determinants of the profitability. However, in addition to the above cited and three more empirically tested variables, namely, the current ratio, operating expenses to sales ratio and inventory turnover ratio are taken into account.

5.5.2 Methodology

The objective of this study is to examine the determinants of profitability in select airline industries of India. Determinants of profitability are analysed using the technique of ordinary least squares. Based on existing theories and relevant econometric empirical works, variables are selected. While using regression technique, efforts are made

to reduce the problem of multicolinearity and auto-correlation. On the basis of the theoretical foundation, the present study aims at testing the following hypotheses.

1. There is a positive relationship between the growth rate of sales of the firm and profitability ratio.
2. There is a positive relationship between vertical integration and profitability.
3. Profitability is positively correlated with inventory turnover ratio.
4. Profitability is negatively correlated with the current ratio
5. Profitability is negatively correlated with the operating expenses to sales ratio.

Indian Airlines and Air India have been selected for the study. The basic data relating to a sample of Indian Airlines and Air India over the period 1992-93 to 2006-07 are collected from the airline's annual reports.

5.5.3 The variables and their measurement

Based on earlier empirical studies, certain variables are chosen for analysing determinants of profitability in the airlines industry of India. Since there are a number of factors which explain profitability and

measurements of variables employed are also different, it is important to mention the variables and how they are measured. Some of the variables may be significant over a period of time while others may be prominent in cross-sectional studies. The objective of this study is to identify the factors which explain profitability during the period 1993-2007. The analysis is based on simple linear models wherein the profitability of a firm is determined by a series of variables chosen both for their importance in our context and in the case of measurement. The variables occurring in the models and their measurement are described here.

a) Profitability

Return on assets and return on sales are widely used as measures of profitability. It is assumed that management may be concerned with effective utilisation of all resources and these two measures could be proper in this line of argument. The profit rates measured by sales will give a short-term perspective of profitability because sales are annual flows. On the other hand, the return on assets will give us long-term perspective of profitability. In this sense, both the measures of profitability are used in the study.

b) Growth rate of sales

Growth is essential to a firm even if it is not among major objectives of the firm. The reason is that growth helps in providing the firm finances for attaining its objectives by increasing the size of its profit growth, by providing room for initiative and exercise. Managerial ability stimulates managerial efficiency leading to a lower capital-output ratio and consequently a higher profit rate. It is thus likely to have a positive association with profitability. Growth rate is measured in this study by the ratio of simple growth rate of sales of the firm and management.

c) Vertical integration

Firm-specific vertical integration, motivated by considerations such as the avoidance of costs incurred in using the market of organised production, government policies and also consideration of market power are the important determinants of profitability. The costs of using the market alternatively known as transaction costs include search cost, cost of drawing up contracts, monitoring costs, etc. The government policies are assuming an important role in determining vertical integration. The degree of vertical integration is sought to be measured by the value-added sales

ratio in the analysis. Value added is defined as total sales revenue less costs of purchased inputs, repair charges, and customs and excise duty.

d) Current ratio

The management of working capital involves decisions about the amount and composition of current assets and how they are financed. Such decisions involve a tradeoff between solvency and profitability. In inter-firm comparison, the firm with higher current ratio has better liquidity. A high ratio of current assets to current liabilities may be indicative of slack management practices, as it may signal poor credit management in terms of overextended account receivables. A low ratio is also not desirable since there will be an inadequate margin of safety.

e) Inventory Turnover Ratio

Another variable which can influence the profitability is the inventory turnover ratio. It is the ratio of sales to inventory which indicates the number of times inventory is replaced during the year. A high ratio implies good inventory management. But low inventory will adversely affect the ability of a firm to meet customer demand and in turn will affect profitability. On the other hand, a very low inventory turnover ratio

signifies excessive inventory or over investment in inventory and high carrying cost. The sign of inventory co-efficient is ambiguous.

f) Operating expenses to sales ratio

Apart from the factors discussed above, operating expenses ratio is included as an explanatory variable in this study. A low operating ratio is by and large a test of operational efficiency. The implication of low operating expenses ratio is that relatively a high percentage share of sales is available for meeting financial liabilities like interest, taxes and dividends. Therefore, a negative relationship is expected with operating expenses and profitability.

5.5.4 The Models

The models to be estimated using firm specific cross-section data are proposed as follows:

$$\hat{P}_1 = b_0 + b_1GROS + b_2VI + b_3CR + b_4OPES + b_5ITR + e \qquad (1)$$

$$\hat{P}_2 = b_0 + b_1GROS + b_2VI + b_3CR + b_4OPES + b_5ITR + e \qquad (2)$$

Where

$\hat{P}_1$ is the ratio of net profits to total sales revenue

$\hat{P}_2$ is the ratio of net profits to total assets

GROS is the simple growth rates of sales revenue

VI is the degree of vertical integration

CR is the current ratio

OPES is the operating expenses to sales ratio

ITR is the inventory turnover ratio

e is the error component

The models are estimated using the ordinary least squares method, while estimating checks are made for model violations such as multicollinearity.

Model: 1

$$\hat{P}_1 = b_0 + b_1 \text{GROS} + b_2 \text{VI} + b_3 \text{CR} + b_4 \text{OPES} + b_5 \text{ITR} + e$$

Where, $\hat{P}_1$ = net profit to total assets

b_0 = constant

b_1, b_2, b_3, b_4 & b_5 = regression co-efficients.

e = error component

By using model 1 the regression analysis is examined and presented.

In this model profitability is measured as net profit to total assets.

Table 5.22

Determinants of profitability of Air India (Model 1)

S. No.	Variables	Beta Co-Efficient	'T' Value	Result
	Constant	-0.0621		
1	Growth rate of sales	0.1421 (0.001)	8.214	1% level
2	Vertical integration	-0.910 (0.0610)	4.718	1% level
3	Current ratio	0.0122 (0.043)	0.013	Not Sig.
4	Operating expenses to sales ratio	0.612 (0.0427)	2.947	5% level
5	Inventory turnover ratio	0.111 (0.065)	1.982	Not Sig.
	R^2 value	**0.973**		
	Adj. R^2 value	**0.944**		
	Overall F	**13.580**		

Source: Computed Note: Figures in parentheses are standard errors.

Correlation Analysis

Variables	F1	F2	F3	F4	F5
F1	1.000				
F2	-0.058	1.000			
F3	-0.391	0.239	1.000		
F4	0.144	0.215	0.173	1.000	
F5	0.152	-0.329	-0.259	-0.261	1.000

Source : Computed F1 – Current ratio; F2 – Inventory turnover ratio;
F3 – Growth rate of sales; F4 – Vertical integration;
F5 – Operating expenses to sales ratio

Results

The profitability function $\hat{P}_1$ is defined as

$$\hat{P}_1 = -0.0621 + 0.1421 \text{ GROS } -0.910 \text{ VI} + 0.0122 \text{ CR} + 0.610 \text{ OPES} + 0.111 \text{ ITR}$$

The estimated regression coefficients, their standard error and 't'-values are presented in Table 5.22.

The value of the regression co-efficient of growth rate of sales is positive and its 't' value is significant at 1 percent level. Therefore, the null hypothesis which states that there is no relationship between growth rate of sales and profitability is rejected. Hence, this variable is one of the important variables to influence the profitability of the concern.

It is evident from the results that the null hypothesis that there exists no relationship between the second independent variable namely, vertical Integration and profitability is rejected at 1 percent level of significance. It is clear from the results that the co-efficient also shows a decrease of 91.0 percent points in the degree of vertical integration. Thus, the more integrated the firms are, the more profitable they will be. However, the vertical integration is very strong.

The third independent variable is current ratio. It is found from the results that the current ratio has only a small effect on profitability although its co-efficient is not significant at 5 percent and 1 percent level. The co-efficient of current ratio where it is not significant shows that for a 1 percentage point increase in profitability, 1.22 percentage point increase in current ratio would be necessary.

The value of the regression co-efficient of operating ratio is positive and its 't' value is significant at 5 percent level. The null hypothesis that there is no relationship between operating expenses to sales ratio and profitability is rejected. It is apparent from the results that the strongest structural determinant of profitability appears to be operating ratio. The co-efficients also show that an increase of 61.2 percent points in the operating ratio can result in a 1 percent point increase in profitability.

The final variable, inventory turnover ratio is found to have only a small effect on profitability and its co-efficient is not significant at 5 percent and 1 percent level. The co-efficient is positive which indicates that as a result of the high inventory turnover, profitability has increased during this period.

The overall explanatory power of the regression appears to be high. It is inferred from the co-efficient of determination (R^2), which is a measure of the extent of movement in the dependent variable is explained by the independent variables. It is quite high i.e. 97 percent and the adjusted explanation is around 94 percent which is highly significant.

Here, it is important to state that the estimators of the co-efficient would not be biased with the problem of multicolinearity. This problem arises when at least one of the independent variables is a linear combination of the others. A high degree of multicolinearity will result in low 't' - ratios and, hence, it adversely affects the precision of the estimators. Therefore, this problem is examined by construction of par-wise correlation matrix of all the five independent variables. It shows that none of the selected variable is highly correlated with other independent variables.

Conclusion

The regression analysis shows that growth rate of sales, vertical integration, current ratio, operating expenses to sales ratio and inventory turnover ratio are prominent variables in explaining profitability of firms in this industry. The significance of operating expenses ratio with a positive

co-efficient and vertical integration with a negative co-efficient indicates the firms which are operationally inefficient are able to earn more compared to the others. It is important to note that efficiency in inventory management and current assets are very essential to improve profitability. The five independent variables are able to account for over 97 percent of the variation in the observed values of profitability in Air India. In a nutshell, it can be noted that the company has to consider all these possible determinants while considering its profitability.

5.5.5 Determinants of Profitability in Indian Airlines

Table 5.23

Determinants of Profitability in Indian Airlines (Model 2)

S. No.	Variables	Beta Co-efficient	't' value	Result
	Constant	-0.265		
1	Growth rate of sales	0.00031 (0.000)	1.164	Not Sig.
2	Vertical integration	0.225 (0.147)	1.528	Not Sig.
3	Current ratio	0.0095 (0.021)	0.462	Not Sig.
4	Operating expenses to sales ratio	2.106 (1.510)	4.695	1% Sig.
5	Inventory turnover ratio	0.0068 (0.021)	0.328	Not Sig.
	R^2 value	**0.928**		
	Adj. R^2 value	**0.837**		
	Overall F	**10.235**		

Source: Computed Note: Figures in parentheses are standard errors.

Correlation Analysis

Variables	F1	F2	F3	F4	F5
F1	1.000				
F2	-0.033	1.000			
F3	-0.125	0.092	1.000		
F4	-0.197	0.381	0.161	1.000	
F5	-0.273	0.245	0.159	-0.357	1.000

Source: Computed

F1 – Current ratio; F2 – Inventory turnover ratio;

F3 – Growth rate of sales; F4 – Vertical integration;

F5 – Operating expenses to sales ratio

Results

The profitability function $\hat{P}_1$ is defined as

$$\hat{P}_1 = -0.265 + 0.00031\ GROS + 0.225\ VI + 0.0095\ CR + 2.106\ OPES + 0.0068\ ITR$$

The estimated regression coefficients, their standard error and 't'-values are presented in Table 5.23.

The value of the regression co-efficient of growth rate of sales is positive and its 't' value is not significant at 1 percent level. Therefore, it is noted that the null hypothesis that there is no relationship between growth rate of sales and profitability is accepted. Hence, this variable turns out to be of no importance for determinants of profitability.

From the results, it is seen that the null hypothesis that there exists no relationship between vertical integration and profitability is accepted at 5 percent level and 1 percent level. It is evident from the results that the co-efficient also shows a decrease of 2.2 percentage points in the degree of vertical integration. Profitability depends on the integration of the firms but the vertical integration is not very strong.

The current ratio has only a small effect on profitability although its co-efficient is not significant at the 5 percent and 1 percent level. It is seen that for a 1 percentage point increase in profitability, 0.90 percentage point increase in current ratio would be necessary.

The value of the regression co-efficient of operating ratio is positive and its 't' value is significant at 1 percent level. Therefore, the null hypothesis that there is no relationship between operating expenses to sales ratio and profitability is rejected. It is evident from the results that the strongest structural determinant of profitability is operating ratio. Further it is seen that an increase of 2.1 percentage points in the operating ratio can result in a 2 percent increase in profitability.

It could be seen that inventory turnover ratio is found to have only a small effect on profitability and its co-efficient is not significant at 5

percent and 1 percent level. Profitability has increased during this period and therefore the co-efficient is positive which indicates high inventory turnover ratio.

Further, the overall explanatory power of the regression appears to be high. It is inferred from the co-efficient of determination (R^2) that a measure of the extent of movement in the dependent variable is explained by the independent variables. It is quite high i.e. 93 percent and the adjusted explanation is around 84 percent which is highly significant.

It is important to state that the estimators of the co-efficient would not be biased with the problem of multicolinearity. This problem arises when at least one of the independent variables is a linear combination of the others. A high degree of multicolinearity will result in low 't' - ratios and, hence, it adversely affects the precision of the estimators. Therefore, this problem is examined by construction of par-wise correlation matrix of all the five independent variables. It shows that none of the selected variable is highly correlated with other independent variables.

Conclusion

The regression analysis shows that growth rate of sales, vertical integration, current ratio, operating expenses to sales ratio and inventory turnover ratio are prominent variables in explaining profitability of firms in this industry; the significance of operating expenses ratio with a positive co-efficient and vertical integration with a positive co-efficient indicates that the firms which are operationally efficient are able to earn more compared to others. It is important to note that efficiency in inventory management and current assets are very essential to improve profitability. The five independent variables are able to account for over 93 percent of the variation in the observed values of profitability in Indian Airlines. In a nutshell, it can be noted that the company should consider all these possible determinants while considering its profitability.

Model : 2

$$\hat{P}_2 = b_0 + b_1 \text{ GROS} + b_2 \text{ VI} + b_3 \text{ CR} + b_4 \text{ OPES} + b_5 \text{ ITR} + e$$

where, $\hat{P}_2$ = Net profit to total sales

b_0 = Constant

b_1, b_2, b_3, b_4 & b_5 = Regression co-efficients

e = error component

By using model 2, the regression analysis is examined and presented. In this model, profitability is measured as net profit to total sales.

Table 5.24
Determinants of Profitability in Air India (Model 2)

S. No.	Variables	Beta Co-efficients	't' Value	Result
	Constant	0.138		
1	Growth rate of sales	0.001697 (0.001)	2.919	5% Level
2	Vertical integration	-0.430 (0.284)	1.510	Not Sig.
3	Current ratio	-0.0124 (0.154)	0.080	Not Sig.
4	Operating expenses to sales ratio	0.668 (1.131)	0.591	Not Sig.
5	Inventory turnover ratio	-0.0150 (0.026)	0.571	Not Sig.
	R^2 value	**0.837**		
	Adj. R^2 value	**0.634**		
	Overall F	**4.113**		

Source: Computed Note: Figures in parentheses are standard errors.

Results

The profitability function $\hat{P}_2$ is defined as

$$\hat{P}_2 = 0.138 + 0.001697\ GROS - 0.430\ VI - 0.0124\ CR + 0.668\ OPES - 0.0150\ ITR$$

The estimated regression coefficients, their standard error and 't'-values are presented in Table 5.24.

As the value of the regression co-efficient of growth rate of sales is positive and its 't' value is significant at 1 percent level, the null hypothesis that there is relationship between growth rate of sales and profitability is rejected. Therefore, this variable turns out to be one of the important determinants of profitability.

The co-efficient also shows a decrease of 43.0 percentage points in the degree of vertical integration. The null hypothesis that there is no relationship between vertical integration and profitability is accepted at 5 percent level and 1 percent level. It is clear from the results that given price ceilings, firms will have to internalize production to improve their profit on sales.

The current ratio has no effect on profitability although its co-efficient is not significant at the 5 percent and 10 percent level. The co-efficient of current ratio where it is not significant to profitability, 1.2 percentage point decrease in current ratio would be necessary.

The value of the regression co-efficient of operating ratio is positive and its 't' value is not significant at 5 percent and 1 percent level. Therefore, the null hypothesis that there is no relationship between operating expenses to sales ratio and profitability is accepted. It is apparent from the results that the strongest structural determinant of profitability appears to be operating ratio. The co-efficients also show that an increase of 66.8 percent points in the operating ratio can result in a 1 percentage point increase in profitability.

It is found that the inventory turnover ratio has no effect on profitability and its co-efficient is not significant at the 5 percent and 1 percent level. The co-efficient is negative which indicates that due to low inventory turnover ratio, profitability has decreased during this period.

The overall explanatory power of the regression is quite high i.e. 84 percent and the adjusted explanation is around 63 percent which is significant.

Conclusion

The regression analysis shows that growth rate of sales, vertical integration, current ratio, operating expenses to sales ratio and inventory

turnover ratio are found to be prominent variables in explaining profitability of firms in this industry. The significance of growth rate of sales with a positive co-efficient and vertical integration with a negative co-efficient indicates that the firms which are operationally efficient are able to earn more compared to the others. Further, efficiency in inventory management and current assets are important to improve profitability. The five independent variables are able to account for over 84 percent of the variation in the observed values of profitability in Air India.

5.5.6 Determinants of Profitability in Indian Airlines

TABLE 5.25

Determinants of Profitability in Indian Airlines (Model 2)

Sl. No.	Variables	Beta Co-efficients	't' Value	Result
	Constant	-0.295		
1	Growth rate of sales	0.000397 (0.001)	0.787	Not Sig.
2	Vertical integration	0.338 (0.282)	1.201	Not Sig.
3	Current ratio	-0.0143 (0.040)	0.363	Not Sig.
4	Operating expenses to sales ratio	3.020 (2.882)	4.048	1% Sig.
5	Inventory turnover ratio	0.01433 (0.040)	0.361	Not Sig.
	R^2 value	**0.927**		
	Adj. R^2 value	**0.835**		
	Overall F	**10.111**		

Source: Computed Note: Figures in parentheses are standard errors.

Results

The profitability function $\hat{P}_2$ is defined as

$$\hat{P}_2 = -0.295 + 0.000395\ \text{GROS} + 0.338\ \text{VI} - 0.0143\ \text{CR} + 3.020\ \text{OPES} + 0.01433\ \text{ITR}$$

The estimated regression coefficients, their standard error and 't'-values are presented in Table 5.25.

The value of the regression co-efficient of growth rate of sales ratio is positive and its 't' value is not significant at 5 percent and 1 percent level. And therefore the null hypothesis that there is no relationship between growth rate of sales ratio and profitability is accepted.

The null hypothesis that there is no relationship between vertical Integration and profitability is accepted at 5 percent level and 1 percent level. It is clear from the results that the co-efficient also shows an increase of 33.8 percentage points in the degree of vertical integration.

It is found from the results that the current ratio has no effect on profitability although its co-efficient is not significant at the 5 percent and 1 percent level. 1.4 percentage point decrease in current ratio would be necessary to show profitability.

Since the value of the co-efficient of operating ratio is positive and its 't' value is significant at 1 percent level, the null hypothesis that there is no relationship between operating expenses to sales ratio and profitability is rejected. The strongest structural determinant of profitability appears to be operating ratio. The co-efficients also show an increase of 302 percentage points in operating ratio.

Inventory turnover ratio is found to have no effect on profitability and its co-efficient is not significant at the 5 percent and 1 percent level. The co-efficient is positive which indicates that with high inventory turnover ratio, profitability increases during the study period.

The overall explanatory power of the regression appears to be high. It is inferred from the co-efficient of determination (R^2), which is a measure of the extent of movement in the dependent variable that is explained by the independent variables. It is quite high i.e. 93 percent and the adjusted explanation is around 84 percent which is highly significant.

Conclusion

The significance of operating expenses ratio with a positive co-efficient indicates that the firms which are operationally efficient are able to earn more compared to others. It is important to note that efficiency in

operating expenses is important to improve profitability. The five independent variables are able to account for over 93 percent of the variation in the observed values of profitability in Indian Airlines.

5.6 Z-SCORES SHOWING THE RESULTS OF MULTIPLE DISCRIMINANT ANALYSIS

5.6.1 Introduction

A number of empirical studies have tested the predictive power of financial ratios. In most of the studies, financial ratios are used to predict the business failure. Others have tested the power of financial ratios to predict corporate bond ratings. Keeping these ratios as dependent variables, regression analysis and discriminant analysis have been employed, using various financial ratios of the select airline industries. The best ratios for predictive purposes are funded debt to total capitalisation ratio, total assets turnover ratio, working capital turnover ratio, gross profit ratio, net profit ratio and return on capital employed.

In a similar type of analysis, Edward I Altman employed multiple discriminant analysis to predict bankruptcy, using various financial ratios.[121] In this context, an attempt is made in the present study using

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121 Edward, I Altman, "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy", Journal of Finance, 23rd September 1968.

Altman's model of Z-scores showing the results of multiple discriminant analysis of the financial health of select airline industries for a period of fifteen years starting from 1992-93 to 2006-07, which is presented in Table 5.26.

Table 5.26

Z-scores showing results of multiple discriminant analysis of Indian Airlines and Air India

Years	Air India	Indian Airlines
1992-93	2.03	0.65
1993-94	-0.31	0.18
1994-95	-2.75	0.35
1995-96	-1.42	0.56
1996-97	-0.68	1.39
1997-98	0.18	1.35
1998-99	-0.62	1.44
1999-00	-0.67	0.50
2000-01	-0.22	2.01
2001-02	-0.97	0.46
2002-03	-0.83	-2.57
2003-04	-1.04	-1.30
2004-05	-1.41	-0.35
2005-06	1.66	0.99
2006-07	3.93	9.07

Source: Computed from annual reports

Note : If Z-Score < 1.81 → always went bankrupt
If Z-Score > 2.99 → healthy firms, and
If Z-Score ≥ 1.81 and ≤ 2.99 → grey

5.6.2 Conclusion

It is evident from the above table that in the selected airline industries, Z score is less than 1.81 in all the years of study in Air India except the years 1992-93, 1994-95 and 2006-07. In the case of Indian Airlines, except the year 2000-01, 2002-03 and 2006-07, all the years of the study period, the Z score is less than 1.81. Altman found that the companies with Z scores below 1.81 always went bankrupt whereas Z scores above 2.99 represent healthy firms. It implies that the Indian Airlines and Air India have opted for more borrowings to meet their financial requirements. In spite of the growth in production, sales and profit, its loan funds also show an increasing trend in the recent years which implies that it is not a good sign for a healthy firm in long term perspective.