A DISCRIMINANT ANALYSIS AND PREDICTION OF LIQUIDITY-PROFITABILITY

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ABSTRACT
This paper examines predictive ability in respect of liquidity and profitability position of a company through discriminant analysis. Using two liquidity and profitability ratios each as input, the study has developed an index through the technique of discriminant analysis and at the same time liquidity and profitability performance have been tested on the basis of D-score and cut off score. For the purpose of analysis Indian private sector pharmaceutical companies have been used.

Introduction

In the changing economic scenario, every business strives hard for survival of the business competence. Survival of the business in the modern world is possible, only when apart from other things, it has sufficient finance. The financial requirements of a business must be sufficient to meet its long-term and short-term commitments. To meet long-term commitment, it needs permanent capital and short-term commitment, it needs working capital. Thus, finance is a significant facet of every business. Both excessive as well as inadequate finance positions are dangerous from the business point of view. In other words, finance is the backbone of any business. Any business without finance is a wingless bird. Therefore, the financial analyst is responsible to monitor the financial position of the business regularly. The performance of the company is judged through its financial statements, which throws light on the operational efficiency and financial position of the company.

Due to intense competition among the business community, everyone is doing something better than others to capture the business, therefore monitoring the financial health of a company by checking its sales and profit growth which may not be sufficient today. It is necessary to benchmark the efficiency of utilisation of capital and assets, return to shareholders as well as predicting financial distress. The prediction and prevention of financial distress is one of the major factors, which will help to avoid bankruptcy. There are several indicators and information sources that can help in the prediction and prevention of

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financial distress. Financial statement analysis is one of the methods that can be used in predicting financial distress, which focuses on financial variables.

Discriminant analysis is a statistical technique supportive for taxonomy principles. It has relevance in several areas of financial analysis. To express a fundamental considerate of discriminant analysis, we shall take up the assumptions : (i) There are two discreet groups; (ii) Two variables combined in a linear mode would be used for discriminating two discreet groups (i.e., discriminant function: $D = a_1X_1 + a_2 X_2$) and (iii) These two variables arise from multivariate normal populations.

To evaluate the liquidity and profitability conditions of a company, the financial analyst needs certain yardsticks. Among the various tools employed in analysing the pecuniary information contained in the financial statements, ratio analysis is a widely used tool, which is relevant in assessing the predictive ability of a firm in respect of liquidity and profitability. In addition to this, it helps to predict the financial distress of the business. An attempt has been made in the present study to have an insight into the examination of financial health of pharmaceutical company in India.

Healthcare is one of the basic needs of humanity at large. The neglect of healthcare reduces a person's capacity to take part in the various activities within the society. Besides this, such neglect reduces the capacity of the whole society in the future. Therefore, healthcare is not only an object of development by itself, but a pre-requisite for the development of future generations.

This is the time to evaluate and analyse the predictive ability in respect of liquidity and profitability of pharmaceutical companies and it will help the policy makers to take on further development of these banks. In this paper, an attempt has been made to understand the liquidity and profitability position of the selected private sector pharmaceutical companies in India.

Objectives of the Study

The main objective of the present work is to make a study on the predictive ability in respect of liquidity and profitability in operating selected twenty (ten profit-making and ten loss-making) private sector pharmaceutical enterprises in India. More specifically, it seeks to dwell upon mainly the following issues:

- To assess the liquidity and profitability position with the help of discriminant score of the selected companies under the study;
- To assess the financial performance of the selected pharmaceutical companies under the study;
- To observe the financial health of the operational companies.

Methodology of the Study

We select twenty (ten profit-making and ten loss-making) private sector pharmaceutical companies operating in India in the study. For the purpose of study, data have been collected only for those companies which are available in the database software of Centre for Monitoring Indian Economy (CMIE). Only those companies are considered for which

balance sheet figures as on 31st march, 2008, as published in the data book (CMIE) on 8th January 2008 are available. Thus, 20 companies are selected. Out of these, based on operating profit, 10 companies are profit-making and 10 are loss-making. In the course of analysis in this study, twelve financial ratios are selected which cover liquidity and profitability viz. current ratio (CR), cash position ratio (CPR), return on investment ratio (ROIR), earning per share (EPS). Among statistical tools, Arithmetic Mean, D-score-discriminant analysis (DA), etc. have been applied. The values of the ratios are taken as published or calculated from the figures published. The uses of all these tools at different places have been made in the light of requirement of analysis.

Limitations of the Study

The study suffers from certain limitations. These are written as follows :

- Study solely depends on the published financial data, so it is subject to all limitations that are inherent in the condensed published financial statements.
- We have selected twenty private sector pharmaceutical companies only.
- Again our study is based on the data and information relating to the year 2006-07.

Findings of the Study

Liquidity Position based on Discriminant Analysis

- The purpose of discriminant analysis is to identify liquidity position from two liquidity ratios (*i.e.,* CR and CPR) as inputs which are relevant in distinguishing between profit-making and loss-making companies. The mean values of the ratios for both the groups are shown in Tables 1 and 2.
- Table 3 reveals the coefficients of discriminant function for the selected two ratios. It is thus expressed as : $D = 1.18 X_1 - 0.91 X_2$.

Table-1: Liquidity Indicators of Selected Profit-making Companies

Profit-making companies	Liquidity ratios	
	CR	CPR
1. Cadila Healthcare Ltd.	1.41	0.03
2. Cipla Ltd.	2.78	0.25
3. Glaxosmithkline Pharma Ltd.	1.30	0.14
4. Ipca Laboratories Ltd.	1.89	0.05
5. Lupin Ltd.	2.47	0.99
6. Nicholas Piramal India Ltd.	1.05	0.09
7. Panacea Biotec Ltd.	2.50	1.12
8. Ranbaxy Laboratories Ltd.	1.11	0.04
9. Torrent Pharmaceuticals Ltd.	2.42	0.07
10. Wockhardt Ltd.	3.46	2.22
Mean	2.04	0.50
S.E. of mean	0.26	0.23

Table-2: Liquidity Indicators of Selected Loss-making Companies

Loss-making companies	Liquidity ratios	
	CR	CPR
1. Matrix Laboratories Ltd.	1.08	0.19
2. Ambalal Sarabhai Enterprises Ltd.	0.64	0.03
3. Gujarat Themis Biosyn Ltd.	0.23	0.03
4. Karnataka Malladi Biotics Ltd.	0.21	0.00
5. Lyka Labs Ltd.	0.96	0.25
6. Morepen Laboratories Ltd.	0.91	0.43
7. Pharmaids Pharmaceuticals Ltd.	3.91	0.04
8. Torrent Gujarat Biotech Ltd.	1.85	1.60
9. Unjha Formulations Ltd.	1.85	0.01
10. Vista Pharmaceuticals Ltd.	0.80	0.08
Mean	1.09	0.35
S.E. of mean	0.35	0.15

Table-3: Statistical results and discriminant Function of liquidity

		$d^2 x_1$	$d^2 x_2$	$dx_1 x_2$	dx_1	dx_2
Liquidity ratios	CR (X_1) and CPR (X_2)	1.042	0.378	0.302	0.95	0.01
	Function	$D = 1.18 X_1 - 0.91 X_2$				

- The discriminant score is designed for each company to classify it as profit-making or loss-making company and it is given in Table-7. The cut off point on discriminant score is taken as the mean value of the mean discriminant score of each group for the purpose of classification. The simple A.M. of the two scores *i.e.,* the cut off score is 1.9054. Any company having a D-score higher than the cut off score is identified as a profit-making company with sufficient liquidity, at the same time a company with a D-score less than the cut off score will be classified as a loss-making company with poor liquidity.
- The discriminant analysis along with providing a single index for classifying companies as profit-making and loss-making brings to light the most important indicators of liquidity. The results of discriminant analysis can be used as a predictor of future liquidity. Therefore, an upward trend in the discriminant score predicts higher liquidity and a downward trend predicts ill-liquidity.

Profitability Position based on Discriminant Analysis

- The purpose of discriminant analysis is to identify profitability position from two profitability ratios (ROIR and EPS) as inputs which are relevant in distinguishing between profit-making and loss-making companies. The mean values of the ratios for both the groups are shown in Tables 4 and 5.
- Table 6 reveals the coefficients of discriminant function for the selected two ratios. It is thus expressed as $D = - 0.0468 X_1 + 0.0662 X_2$.
- The discriminant score is deliberated for each company to classify it as profit-making or loss-making company and it is given in Table-7. The cut off point on discriminant score is taken as the mean value of the mean discriminant score of each group for the purpose of classification. The simple A.M. of the two scores *i.e.,* the cut off score is 1.0362. Any company having a D-score higher than the cut off score is identified as a profit-making company, at the same time a company with a D-score less than the cut off score will be classified as a loss-making company.

Table-4: Profitability Indicators of Selected Profit-making Companies

Profit-making companies	Profitability ratios	
	ROIR	EPS
1. Cadila Healthcare Ltd.	22.50	33.03
2. Cipla Ltd.	31.12	42.45
3. Glaxosmithkline Pharma Ltd.	49.60	33.97
4. Ipca Laboratories Ltd.	30.94	73.09
5. Lupin Ltd.	21.93	14.92
6. Nicholas Piramal India Ltd.	27.09	39.23
7. Panacea Biotec Ltd.	30.63	22.29
8. Ranbaxy Laboratories Ltd.	13.81	17.98
9. Torrent Pharmaceuticals Ltd.	21.36	23.42
10. Wockhardt Ltd.	19.50	49.34
Mean	26.85	34.97
S.E. of mean	3.10	5.50

Table-5: Profitability Indicators of Selected Loss-making Companies

Loss-making companies	Profitability ratios	
	ROIR	EPS
1. Matrix Laboratories Ltd.	-10.55	--22.56
2. Ambalal Sarabhai Enterprises Ltd.	-15.54	-3.86
3. Gujarat Themis Biosyn Ltd.	-223.25	-10.36

4. Karnataka Malladi Biotics Ltd.	0.00	-3.87
5. Lyka Labs Ltd.	-22.26	-11.56
6. Morepen Laboratories Ltd.	-18.64	-29.21
7. Pharmaids Pharmaceuticals Ltd.	-13.55	-1.42
8. Torrent Gujarat Biotech Ltd.	-33.76	-14.99
9. Unjha Formulations Ltd.	-12.29	-1.36
10. Vista Pharmaceuticals Ltd.	-8.00	-0.66
Mean	66.47	9.80
S.E. of mean	21.02	3.10

Table-6: Statistical results and Discriminant Function

		$d^2 x_1$	$d^2 x_2$	$d x_1 x_2$	$d x_1$	$d x_2$
Profitability ratios	ROIR (X_1) and EPS (X_2)	3170.94	720.74	782.65	- 39.62	25.17
	Function	$D = - 0.0468 X_1 + 0.0662 X_2$				

Table-7: D-score and ranking of selected companies under the study

Name of the Companies	On the basis of			
	Liquidity	ranking	Profitability	ranking
Profit-making companies				
1. Cadila Healthcare Ltd.	1.6365	10	1.1336	6
2. Cipla Ltd.	3.0529	3	1.3538	4
3. Glaxosmithkline Pharma Ltd.	1.7056	9	- 0.0725	17
4. Ipca Laboratories Ltd.	2.6194	5	3.3906	2
5. Lupin Ltd.	2.5818	7	- 0.0386	16
6. Nicholas Piramal India Ltd.	1.3986	12	1.3292	5
7. Panacea Biotec Ltd.	2.5058	8	0.0421	15
8. Ranbaxy Laboratories Ltd.	1.5287	11	0.5440	9
9. Torrent Pharmaceuticals Ltd.	3.3485	2	0.5507	8
10. Wockhardt Ltd.	2.8584	4	2.3537	3
Mean	**2.3236**		**1.0587**	
Loss-making companies				
1. Matrix Laboratories Ltd.	1.1015	15	- 0.9998	10
2. Ambalal Sarabhai Enterprises Ltd.	0.8751	18	0.4718	12
3. Gujarat Themis Biosyn Ltd.	0.2970	19	9.7623	1
4. Karnataka Malladi Biotics Ltd.	0.2961	20	- 0.2562	18
5. Lyka Labs Ltd.	1.1261	14	0.2765	14

6. Morepen Laboratories Ltd.	0.8918	17	- 1.0613	20
7. Pharmaids Pharmaceuticals Ltd.	5.4767	1	0.5401	10
8. Torrent Gujarat Biotech Ltd.	1.1525	13	0.5877	7
9. Unjha Formulations Ltd.	2.5994	6	0.4852	11
10. Vista Pharmaceuticals Ltd.	1.0552	16	0.3307	13
Mean	**1.4871**		**1.0137**	

- The discriminant analysis along with providing a single index for classifying companies as profit-making and loss-making brings to light the most important indicators of profitability. The results of discriminant analysis can be used as a predictor of future profitability. Therefore, an upward trend in the discriminant score predicts higher profitability and a downward trend predicts incipient sickness.

Table-8: Mean discriminate score of each group

	On the basis of	
	Liquidity	Profitability
Profit making companies	2.3236	1.0587
Loss making companies	1.4871	1.0137
Cut-off point =	1.9054	1.0362

Conclusions of the Study

- The 'D' score of discriminant analysis revealed a significant variation concerning the extent of liquidity standing of different companies during the study period. It was concluded to be efficient and inefficient liquidity management on the basis of cut off score.
- The 'D' score of discriminant analysis disclosed a noteworthy disparity concerning the size of profitability standing of different companies during the study period. It was concluded to be efficient and inefficient liquidity management on the basis of cut off score.

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