CHAPTER V

CROSS INDUSTRIAL PERFORMANCE ANALYSIS
AND DISCRIMINANT ANALYSIS

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CHAPTER - V

CROSS INDUSTRIAL AND DISCRIMINANT ANALYSIS

5.1. Introduction
To find out the relative performance of the companies across the industries a cross sectional comparative analysis was made in this chapter. Under each heads of the performance, the best performance and the worst performance were identified along with their volatility.

Different ratios would provide differing trends and may confuse. So to identify the combined effect of all these ratios, discriminant analysis models were constructed for each head of analysis and their significance and classifying powers were also found out. Further to combine all the vital ratios, a comprehensive and composite index was constructed and suitably analysed.

5.2. Cross Industrial Performance Analysis
The overall comparative performances of all the companies were listed below. The best and worst performances were identified under Stability, Credit, Turnover, Profitability, Capitalisation, Appropriation, Per Share Related, Capital Market Related, Other Equity Related, Other Financial Related, Growth and Beta Performance Measures. Finally the most influencing internal variables of EBIT and MPS of all the companies put together were identified.
5.2.1. Stability Performance

Net Worth to Total Assets ratio of 60.8 per cent of Hindalco was the highest among all the companies analysed and the least was that of TELCO with a ratio of 27.5 per cent. This shows that the highest stability was provided by Hindalco and the least stability was provided by Telco. Net Block to Net Worth ratio of 309.8 per cent of the Madras Cements was the highest and the least was for Ingersol Rand with a ratio of 22.90 per cent. So, on this measure, Madras Cements proved to be more stable and Ingersol Rand proved to be less stable. Total Liabilities to Net Worth was the least for Hindalco with a ratio of 71.5 per cent and the highest was for Madras Cements with a ratio of 320.90 per cent. On this, Hindalco proved to be more stable and Madras Cements proved to be least stable. The results of stability ratios were mixed and did not point out any clear trend in ascertaining the stability of companies.

5.2.2. Credit Performance

Current Assets to Current Liabilities of 3.430 of Hindalco was the highest and 1.03 of East India hotels was the least. This shows the greatest liquidity performance of Hindalco and the least liquidity maintained by East India Hotels. Liquid Assets to Current Liabilities of 2.580 of Hindalco was the highest and 0.81 of the Bombay Dyeing was the least. It brings out the fact that among the companies analysed Hindalco and Bombay Dyeing had been maintaining the highest and least liquidity respectively.

5.2.3. Turnover Performance

Net Sales to Total Assets ratio of 2.04 of Hindustan Lever was the highest, and 0.313 of East India
Hotels was the least. This shows the highest turnover of total assets by Hindustan Lever. Net Sales to Net Worth and Debentures of 3.079 of Mahindra and Mahindra was the highest and 0.448 of East India Hotels was the least. Net Sales to Plant and Machinery at cost of 8.516 of Ingersol Rand was the highest and 1.113 of Madras Cements was the least. Sundry Debtors to Average daily sales of 29.4 days was the least for Hindustan Lever and the highest was for Kirloskar with a ratio of 165 days. Among the companies analysed Hindustan Lever had the two highest favourable ratios and East India Hotels had the two lowest ratios. Most of the high ratios were from General Engineering Companies. But for the debtors velocity a higher ratio would be better. So on this ground, it can be inferred that Hindustan Lever has the greatest turnover ability and East India Hotels had the least turnover ability.

5.2.4. Profitability Performance

Return on Capital Employed of 18.77 per cent of Ingersol Rand was the highest and 4.1 per cent of Arvind Mills was the least. Net Profit and Interest to Net Worth and Debentures of 28.8 per cent of the Hindustan Lever was the highest and 5.8 per cent of the East India Hotels was the least. Net Profits to the Total Assets of 14.52 of Bombay Dyeing was the highest and 2.90 per cent of the Ballarpur Industries was the least. Different measures of proficiencies show differing trends.

5.2.5. Capitalisation Performance

Preference Capital and Debentures to Equity of 825.9 per cent of the Grasim was the highest and the least was for MICO with a ratio of 26 per cent. This shows the highest leverage and risk of Grasim. Debentures to Net
Worth and Debentures of 72.60 per cent of TELCO was the highest and this ratio was the least for Hindustan Lever with a ratio of 0.60 per cent. This shows the higher borrowings through Debentures of TELCO in comparison to others. Equity Capital and Reserves to Net worth and Debentures of 100% per cent of the Ingersol Rand was the highest and the least was for Ranbaxy with a ratio of 58.5 per cent. This shows the complete dependence of Ingersol Rand on owners' funds alone. Put together General Engineering Companies seem to depend more on owners' funds.

5.2.6. Appropriation Performance

Depreciation Reserves to Gross Block of 71.3 per cent was the highest for MICO and the least for East India with a ratio of 12.6 per cent. This shows greater accumulation of depreciation funds by MICO than all the others. The highest taxation provision was made again by MICO with a ratio of 49.10 per cent, at the same time the least provision was made by Arvind Mills with a ratio of 4.7 per cent. This shows that MICO had been appropriating more for depreciation and taxation, by properly planning the tax liabilities this had to be reduced.

5.2.7. Per Share Related Performance

Per Share related performance for all the measures were the highest for Madras Cements as shown below; Net Sales Per Share Rs. 3012.5; Earnings Per Share Rs. 261.36; Book Value Per Share Rs. 992.4; Market Price Per Share Rs. 5715.1 and Dividend Per Share Rs. 21.6. In terms of least values, Net sales per Share (Rs. 47.26) and Dividends Per Share (Rs. 2.27) were the least for East India Hotels. Book value per Share (Rs. 28.31) and Market Price Per Share (Rs. 89.20) were the least for Reckitt and
Colman. Earnings Per Share was the least for Glaxco with a value of Rs. 4.895.

5.2.8. Capital Market Related Performance

Price Earning Ratio of 1008.3 of ACC was the highest and the least was for TELCO with a value of 8.48. The very high Price Earning Ratio of ACC was due to outliers in 1987 and 1988. Dividend to Earnings ratio of 6.356 per cent of ACC was again the highest and it was the least for Ranbaxy with a ratio of 4.627 per cent. The very high ratio of ACC was due to the dividend payout from past earnings. Dividend to Market Price of 4.50 of Reckitt and Colman was the highest and it was the least for Hindalco with a ratio of 1.25. This shows the highest yield ratio of Reckitt and Colman. Market value to Book Value of 6.07 of Hindustan Lever was the highest and the same was the least for Ballarpur industries with a ratio of 1.22. Discounting the outsider's effect the overall trend had been mixed among the companies analysed.

5.2.9. Other Equity Related Performance

Net Sales to Equity of 926.77 per cent of East India Hotels was the highest and the least was for Tata Chemicals with a ratio of 97.45 per cent. Cash Flow to Equity of 46.89 per cent was the highest for Madras Cements and it was the lowest for Hindalco with a ratio of 15.67 per cent. Earnings to Equity of 27.34 per cent of Ingersol Rand was the highest and the least was for Ballarpur Industries with a ratio of 6.70 per cent. Dividends to Equity of 8.17 per cent of Reckitt and Colman was the highest and the least was for Ballarpur Industries with a ratio of 1.97 per cent. Ballarpur Industries alone has got the lowest ratios in two out of four ratios. In other cases
the minimum and maximum ratios were spread across all the companies.

5.2.10. Other Financial Related Performance Measures

The Weighted Average Cost of Capital of the Ingersol Rand was the highest with a cost of 31.39 per cent. The least was for industries with a ratio of 9.54 per cent. This shows the highest expected rate of return of Ingersol Rand's share holders.

Combined Leverage of 19.19 was the highest for Arvind Mills and the lowest was for Ingersol Rand with a ratio of 0.968. This proves that Indian Rayon has got the highest ability to magnify its earnings for a given level of sales. At the same time Ingersol Rand has got the least Earnings magnifying power.

Operating Cycle of the -102.83 days of the Indian Rayon was the least of all; at the same time it was maximum for Ingersol Rand with 182.99 days.

In terms of Other Financial Variables, Ingersol Rand had the most unfavourable ratios in all the three and Ballarpur had the most favourable ratios in two out of three ratios. This shows the favourable financial and operating structure of the Ballarpur Industries.

5.2.11. Growth and Beta Performance

Sustainable Growth Rate of 99.86 per cent of ACC was the highest among all the companies and the least was for Indian Rayon with a rate of -94.8 per cent growth rate.

Annual Compound Growth Rate of Assets of 37.42 per cent of Arvind Mills was the highest whereas the least
growth rate of assets was for ACC with a ratio of 10.31 per cent.

Annual Compound Growth Rate of Sales of 25.79 per cent was the highest for Ranbaxy; whereas the least rate was for ACC with a ratio of 9.81 per cent. Even though ACC had the highest potential, its performance was the least in terms of sales growth. Companies which had greater potential to grow did not grow to that level, on the other hand companies with less potentials such as Arvind mills and Ranbaxy had done better. Sustainable Dividend Growth Rate was the highest for Indian Rayon with a ratio of 63.08 per cent. On the other hand ACC had a negative growth rate of dividends of -940 per cent. This indicates the greater potential of Indian Rayon and the dismal potential of ACC. Annual Compound Rate of Dividend of Hindustan Lever was the highest with a growth rate of 20.08 per cent, at the same time it was the least for Ingersol Rand with a negative growth rate of -1.32 per cent. This shows the high performance of Hindustan Lever compared to others.

In terms of Beta, Reliance had the highest Beta of 1.67 and the lowest Beta was for Ranbaxy and Ballarpur Industries with Beta value of 0.4. This shows the high aggressiveness of the Reliance shares in the capital markets, in comparison to others and the defensiveness of Ranbaxy and Ballarpur shares in the capital market.

5.2.12 Determinants of Earnings Before Interest and Taxation and Market Price Per Share

Among all the variables selected, Profits Retained had influenced the EBIT for more companies than any other variables. This was followed up by Current Liabilities.
MPS of the companies were influenced more by the Net Sales Per Shares for most of the companies followed up by Book Value Per Share.

5.3. Discriminant Analysis

To find out the combined effect of the various ratios under different heads, discriminant values (Z values) were computed for all the companies under eight different heads. Based on these Z values, companies were ranked to find out whether these parameters could classify the companies into efficiently performing companies and less efficiently performing companies. For this discrimination, a priori groupings was already made. Companies whose Returns on Capital Employed were higher than their respective industries' Returns on Capital employed, were classified as efficiently performing companies. This had helped in identifying 16 out of 26 companies as efficiently performing companies and the rest of 10 companies were classified as less efficiently performing companies.

The discriminant model under different heads were also tested for their statistical significance at 0.05 level of significance by using Analysis of Variance. Z values thus computed were analysed for ascertaining the performance of such companies under different heads. By combining fifteen vital ratios under different heads, an overall index of Z values was also constructed to identify the ultimate performance ranking of these companies. The medians and co-efficient of variations of Z values were also computed to find out the central tendency and the variability of the Z values. The results arrived at were then analysed. Table 5.1 shows Z values of the discriminant analysis under different heads.
TABLE 5.1

Discriminant $Z_1$ values of the companies under different heads of Performance

<table>
<thead>
<tr>
<th>Efficiently Performing Companies</th>
<th>Stability</th>
<th>Credit</th>
<th>Turnover</th>
<th>Profitability</th>
<th>Capitalisation</th>
<th>Equity related</th>
<th>Other Financial Performance</th>
<th>Over all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Associated Cement Companies</td>
<td>0.0020</td>
<td>0.0320</td>
<td>0.0171</td>
<td>0.0696</td>
<td>-0.0017</td>
<td>0.0249</td>
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<td>2. Bajaj Auto</td>
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<td>0.0137</td>
<td>0.0235</td>
<td>0.0732</td>
<td>0.0166</td>
<td>0.1284</td>
<td>0.0525</td>
<td>0.0005</td>
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<td>3. Bombay Dyeing</td>
<td>0.0049</td>
<td>0.0146</td>
<td>0.0165</td>
<td>0.0736</td>
<td>0.0108</td>
<td>-0.0166</td>
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<td>4. Crisil</td>
<td>0.0012</td>
<td>0.0328</td>
<td>0.0218</td>
<td>0.0963</td>
<td>0.0044</td>
<td>-0.0292</td>
<td>-0.0047</td>
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<td>5. Hindustan Lever</td>
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<td>0.0215</td>
<td>0.0120</td>
<td>0.0752</td>
<td>0.0115</td>
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<td>6. Indian Rayon</td>
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<td>0.0042</td>
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<td>-0.8073</td>
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<td>7. Ingersol Rand</td>
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<td>0.0218</td>
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<td>0.0100</td>
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<td>8. Kirloskar</td>
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<td>-0.0142</td>
<td>0.0888</td>
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<td>9. Larsen and Toubro</td>
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<td>0.0253</td>
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<td>10. Madras Cements</td>
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<td>12. Mico</td>
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<td>0.0230</td>
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<td>13. Reckitt &amp; Colman</td>
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<td>0.0185</td>
<td>0.0635</td>
<td>0.0361</td>
<td>0.0160</td>
<td>-0.0086</td>
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<td>14. Tata Chemicals</td>
<td>-0.0615</td>
<td>0.0093</td>
<td>0.0908</td>
<td>0.0378</td>
<td>0.0184</td>
<td>0.0008</td>
<td>-0.0259</td>
<td>0.0221</td>
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<td>15. Telco</td>
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<td>0.0305</td>
<td>0.0095</td>
<td>0.0580</td>
<td>0.0001</td>
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<td>16. Reliance</td>
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<td>0.0759</td>
<td>0.0350</td>
<td>0.0263</td>
<td>0.0178</td>
<td>-0.0005</td>
<td>-0.3425</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Less Efficiently Performing Companies</th>
<th>Stability</th>
<th>Credit</th>
<th>Turnover</th>
<th>Profitability</th>
<th>Capitalisation</th>
<th>Equity related</th>
<th>Other Financial Performance</th>
<th>Over all</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Arvind mills</td>
<td>0.0027</td>
<td>0.0395</td>
<td>0.0101</td>
<td>0.0495</td>
<td>0.0012</td>
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<td>18. Ballarpur Industries</td>
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<td>0.0325</td>
<td>0.0169</td>
<td>0.0772</td>
<td>0.0110</td>
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<td>19. Century Textile</td>
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<td>0.0213</td>
<td>0.0163</td>
<td>0.0793</td>
<td>0.0019</td>
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<td>0.0007</td>
<td>0.6535</td>
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<td>20. East India Hotels</td>
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<td>0.0261</td>
<td>0.0209</td>
<td>-0.0032</td>
<td>-0.0570</td>
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<td>21. Glaxo</td>
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<td>0.0107</td>
<td>0.0282</td>
<td>0.0503</td>
<td>0.0093</td>
<td>0.0134</td>
<td>0.0568</td>
<td>0.5651</td>
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<td>22. Indalco</td>
<td>-0.0554</td>
<td>-0.0093</td>
<td>0.0245</td>
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<td>0.0110</td>
<td>-0.0137</td>
<td>0.0639</td>
<td>-0.6415</td>
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<td>23. Indian Hotels</td>
<td>0.0171</td>
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<td>0.0119</td>
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<td>0.0146</td>
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<td>24. ITC Badachalam</td>
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<td>25. Ranbaxy</td>
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<td>0.0275</td>
<td>0.0003</td>
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<tr>
<td>26. Hindalco</td>
<td>0.0029</td>
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<td>0.0465</td>
<td>0.0400</td>
<td>0.0077</td>
<td>-0.1172</td>
<td>0.0091</td>
<td>-1.5333</td>
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</tbody>
</table>

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5.3.1. Discriminant model for Stability Ratios:

To test the discriminating power of the stability ratios, a model was constructed out of the stability ratios, the model is

\[ Z = 1.3990 \times 10^{-4} NWTA + 9.2521 \times 10^{-5} NBNW - 1.7845 \times 10^{-4} TLNW \]

The computed F value of the model was 0.27566, and this was lower than the critical value of 3.05 at 0.05 level of significance, hence this model is not statistically significant. So it can be inferred that this model is not significantly discriminating efficiently performing companies from less efficiently performing companies. The Z values based on stability classifies 62.57 per cent of the efficiently performing companies and 40 per cent of less efficiently performing companies correctly.

The median Z value of 0.00278 for the less efficiently performing companies was the highest. At the same time the coefficient of variation of the efficiently performing companies was higher at 3607 per cent. This shows the greater variability of the Z values of the efficiently performing companies.

5.3.2. Discriminant Model for Credit Ratios

Based on Credit Ratios, Discriminant Analysis has identified the following model.

\[ Z = 2.35161 \times 10^{-2} CACL - 7.0168 \times 10^{-3} QACL \]

The computed F value of this model was 0.2715, this was lower than the critical value of 3.42 at 0.05 level of significance, hence this model is not
statistically significant. This model can not effectively discriminate efficiently performing companies. The z values based on credit performance has classified 50 percent of the efficiently performing companies and 20 percent of the less efficiently performing companies correctly.

The median credit Z value of 0.0200 of efficiently performing companies and the co-efficient of variation of the Z values of 74.151 percent of the less efficiently performing companies were the highest. This shows that the Z values of the less efficiently performing companies had been greatly volatile.

5.3.3. Discriminant model for Turnover Ratios

Based on Turnover Ratios the following model was identified by the discriminant analysis.

\[ Z = 7.061 \times 10^{-4}NSTA + 8.8707 \times 10^{-3}NSND + 6.6495 \times 10^{-3}NSPC \]

The computed F value is 0.4511, this is lower than the critical value of 3.05 at 0.05 level of significance, hence this model is not statistically significant. This model does not discriminate efficiently performing companies. The Z values based on the Turnover ratios has classified 50 percent of the efficiently performing companies and 20 percent of the less efficiently performing companies correctly.

The median Z value of 0.00278 was the highest, for less efficiently performing companies, but at the same time the co-efficient of variation of Z value of the efficiently performing companies was the highest with a value of 3607.8 percent. This shows that efficiently performing companies' Z values had been highly volatile.
5.3.4. Discriminant Model for Profitability Ratios:

Based on the profitability Ratios, the following model was identified by the discriminant analysis.

\[ Z = 6.9144E-4RTCE + 0.00268NIND + 1.605E-3NPTA \]

The computed F ratio of this model was 0.8339, and this is lower than the critical value of 3.05 at 0.05 level of significance, hence this model is not statistically significant. This model could not discriminate efficiently performing companies from others. The Z values based on profitability performance has classified 50.25 per cent of the efficiently performing companies and 30 percent of less efficiently performing companies correctly.

The median Z value of the efficiently performing companies was the highest with a value of 0.734, but the co-efficient of variation of all the companies put together was high with a value of 47.124 percent. This shows the higher variability of the Z values of all the companies put together.

5.3.5. Discriminant Model for Capitalisation Ratios:

Based on Capitalization Ratios, Discriminant Analysis has identified the following model.

\[ Z = 3.858E-4DND - 1.983E-4ERND \]

The computed F value of this model was 0.174, this was lower than the critical value of 3.44 at 0.05 level of significance, hence this model is not statistically significant. The model could not discriminate efficiently
performing companies. The Z values based on capitalization ratios has classified 50 percent of the efficiently performing companies and 20 percent of the less efficiently performing companies correctly.

The median Z value of efficiently performing companies of 0.0112 was the highest, but the co-efficient of variation of all the companies put together was high at 751.21 percent. This shows the higher variability of all the companies' group.

5.3.6. Discriminant Model for Equity Related Variables

Discriminant analysis has identified the following model based on Equity Related Variables.

\[ Z = 2.64E-5NSPS - 7.399E-5EPS - 3.204E-5MPS + 8.9087E-5PER + 2.899E-4MVBV - 5.035E-4NSE \]

The computed F value of this model was 0.820, this was lower than the critical value of 2.63 at 0.05 level of significance, hence this model is not statistically significant. This model could not discriminate the efficiently performing companies. The Z values based on Equity Related Variables has classified 37.5 percent of the efficiently performing companies and 10 percent of the less efficiently performing companies correctly.

The median Z value of the efficiently performing companies was high at 0.00311, at the same time the co-efficient of variation of this was high for less efficiently performing companies with 74.151 per cent. This shows the greater variability of Z scores of less efficiently performing companies.
5.3.7. Discriminant Model for Other Financial variables’ Performance

Based on the other financial variables, Discriminant Analysis has identified the following model.

\[ Z = 2.067E-4WACC - 1.525E-3CL + 1.954E-3OC - 8.394E-4SG + 1.7366E-4AG + 5.766E-4Beta \]

The computed F value of 2.555 was lower than the critical value of 2.63 at 0.05 level of significance, hence this model is not significant. This model could not discriminate the efficiently performing companies. The Z values based on other financial variables has classified 56.25 per cent of the efficiently performing companies and 0.30 per cent of less efficiently performing companies correctly.

The median Z value of 0.0108 was the highest for efficiently performing companies, but at the same time the co-efficient of variation of this was high for less efficiently performing companies with a value of 353.34 percent. This shows the greater variability of the Z scores of the less efficiently performing companies.

5.3.8. Discriminant Model for all the Ratios and Variables

Discriminant analysis has identified the following model based on overall ratios. For identifying the overall performance 15 vital ratios and variables were included in the model.

The computed F value of this model was 1.8367. This is lower than the critical value of 2.85 at 0.05 level of significance, hence this model is not statistically significant. This model also cannot discriminate efficiently performing companies from others. The Z values based on overall performance measures has classified, 37.5 percent of efficiently performing companies and none of the less efficiently performing companies correctly.

The co-efficient of variation of Z values of overall ratios of less efficiently performing companies was 111.39 per cent. The median value of efficiently performing companies was also very high with a value of -0.5640. This shows the greater variability of the Z scores of less efficiently performing companies.

5.3.9. Cross Discriminant Score Analysis

The Stability Performance was the highest for Mahindra and Mahindra with a value of 0.0294 and the least stable company was Indalco with a Z value of -4.0554. sixty three percent of the companies had negative Z values. Credit Performance of the Mahindra and Mahindra was the highest with a Z value of 0.431, at the same time the least credit performance was for Larsen and Toubro with a Z score of -0.0098. Turnover Performance Z value was the highest for Tata Chemicals and the lowest for Indian Rayon with values of 0.0908 and 0.0042 respectively. Profitability Performance of Madras Cements was the highest with a Z value of 0.1216 at the same time it was the lowest for ITC Bhandrachalam with a Z value of 0.0157. Capitalisation Performance of Reliance with a Z value of 0.0263 was the highest but at the same time capitalisation performance was the least for Indian Rayon with a Z value of -0.8073.
Equity Related Performance was the highest for Bajaj Auto with a Z value of 0.1284 but at the same time the equity related performance was the least for Hindalco with a Z value of -0.1172. Fifty four percent of the companies had negative equity related Z values. In Other Financial Performance Measures Kirloskar, had the highest Z value of 0.0911 and the least Z value on this was for East India Hotels with a value of -0.8996.

All the 15 vital variables put together the overall performance of Z value was the highest for Reckitt and Colman with a value of 0.0637 and the least was for Madras Cements with a value of -0.9210. This brings out the point that Reckitt and Colman had been doing better than all the companies analysed.

5.3.10. Summary Analysis of Z values

Discriminant model based on Stability Ratios could classify the highest number (62.57%) of efficiently performing companies and 40 per cent of the less efficient companies correctly. The co-efficient of variation of Z scores was the highest (3607.8 per cent) for the discriminant model based on stability ratios, at the same time the least co-efficient of variation of Z values (33.73%) was for the less efficiently performing companies based on all the ratios put together.

The median Z value of the discriminant model based on profitability ratios was the highest with a value of 0.0678, at the same time the median Z value based on Equity related variables was the lowest for all the companies with a value of -1.859E-3. None of the discriminant models arrived at were statistically significant at 0.05 level. When vital 15 variables were included that model came closer to statistical significance.