CHAPTER-VIII
SUMMARY, FINDINGS AND CONCLUSIONS
The magnitude of sickness has consistently increased in Indian economy. The last decade has witnessed a sudden upsurge in the incidence of sickness in the industrial horizon of India. Due to this, owners, financial agencies, employees, government and those who are directly or indirectly associated with the industrial units have been put under severe strain. The major setback to the economy as a consequence of industrial sickness is the loss of production, capital and employment. Further, it adversely affects the industrial climate and retards industrial growth.

It is evident from a report of the Reserve Bank of India that industrial sickness has engulfed 3,261 large/medium industrial units and 1,77,336 small scale industrial enterprises upto March, 2002. These units have outstanding credit of Rs. 26064.59 crores, and there are very little chances of recovery. However, more than 4,700 non-SSI units have been registered with BIFR (Board for Industrial and Financial Reconstruction) for sickness, causing the loss of jobs of more than 23 lakhs employees. In the beginning, the wave of industrial sickness was confined to only the eastern region specially in textile industry. But today the spread of this wave is so fast and severe that it is sorely affecting the old and new as well as large, medium and small scale industrial units in all the industrial regions of the country.

The government has been very keen to detect and prevent industrial sickness by announcing various policy measures to acquire a comprehensive and effective information system for monitoring industrial sickness. The Board for Industrial and Financial Reconstruction (BIFR) was constituted to deal with the menace of industrial sickness, accordingly the government has passed Sick Industrial Companies (Regulation) Act (SICA) 1985.
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Considering the magnitude of industrial sickness (specifically after the new economic policies were announced in early nineties to globalise and liberalise the Indian economy), the government passed the Securitisation Reconstruction of Financial Institutions Interest Ordinance, 2002 and constituted the National Company Law Tribunal (NCLT) to replace the existing three forums which dealt with sick companies i.e. Company Law Board (CLB), Board for Industrial and Financial Reconstruction (BIFR) and High Courts (concerned with winding up companies). Further a new clause i.e. 46 (AA) has been incorporated in Section 2 of the Companies Act 1956 to redefine a sick company. As per the new definition, a company with accumulated losses equal to 50 per cent of its average net worth during four years immediately preceding each financial year, or, a company which has failed to repay its debts within any three consecutive quarters on demand made by any creditor for repayment, will be considered as a potentially sick company. Corporate failure is viewed differently by different groups and various definitions of the terms have been given by various institutions. But in financial terms, a sick unit initially shows signs of financial distress starting with a short term liquidity problem, disturbing production cycle, decline in efficiency in utilisation of assets, slow movement of inventory and decrease in sales followed by revenue and operating losses. Consequently, the unit inclines towards excessive use of external fund/debt. Thus, finally, reaching at a stage where it is overburdened with debts and is unable to generate sufficient funds to meet its obligations. Consequently, its working capital and net worth become, gradually, negative.

Corporate failure in a company does not come all of a sudden, but, it is a process which evolves over a considerable period of time and passes through various stages. It begins to emit some signals
in the very early stage which need to be identified and monitored before a company becomes gravely sick, because the earlier the problem is detected, the more easily and economically it can be solved. Early detection of corporate failure may enable the management to take timely and necessary corrective measures to avert the crises of such occurrences, because 'a stitch in time saves nine.'

Thus, an effective forewarning system or model which can detect and monitor the incipient sickness in an organisation, can alert the management in advance to avoid the irreparable losses to the interested parties caused by corporate failure.

Financial statements such as balance sheet and profit and loss account are significant in indicating the current and past financial position and the inherent strengths and weaknesses of a company. Financial statements and the informations contained therein serve for different purposes to different interested users such as investors, creditors, banks, financial institutions, financial and investment analysts, portfolio managers, employees and the government. Whereas, the analysis of financial statements helps in diagnosing, explaining and evaluating the various informations given in these statements, they serve as well to reveal the mystery behind these statements that aid in decision making by various users of these statements.

There are many tools and techniques to evaluate financial statements, but, the ratio analysis is the most widely used tool to evaluate the various aspects of a company's financial performance.

In the past, a large number of studies in the area of corporate failure have been carried out by researchers giving due importance to the financial ratios and using them as an effective indicator of.
corporate health. Ramser and Foster (1932), Patrik (1932) Winaker or Smith (1935) and Beaver (1966) have analysed several financial ratios univariately to predict the bankruptcy/corporate failure. They examined the significant difference in the various ratios of failed and non-failed firms at least three to five years prior to failure of the former.

Altman (1968) carried out a pioneering work on bankruptcy by improving upon conventional ratio analysis. He combined several financial ratios into a single index i.e. 'z-score'. The 'z-score' model was based on 'multiple discriminant analysis.' Later on, many predictive models were developed as an alternative to Altman's model. These include Meyer and Pifer (1970), Wilcox (1971), Deakin (1972), Edminster (1972), Chessor (1974) and Blum (1974). Other important studies which dealt with the discriminant models are Elum (1975), Taffler and Tisshaw (1977) and Frederikslust (1978). Walker, Stow and Morriarity (1979) applied decomposition analysis on financial statements and observed that in failing firms decomposition measures are generally larger than in non-failing firms. Norton and Smith (1979) tried MDA on general price level data as well as on historical data. Both the data exhibit almost equal ability to predict bankruptcy. Dambolena and Khoury (1980) incorporated the concept of stability of financial ratios and adjudged that stability of the ratios considerably improves the predictive accuracy of the discriminant model. Casey and Bartczak (1985) applied various statistical tools i.e. Canonical Correlation, MDA, Logit and Probit Models (LPM) to assess the predictive power of various financial ratios and justified the omission of cash flow ratios by Altman. Ohlson (1980), Plat and Plat (1990) and Hatzigagios (2002) are the other pioneers who have successfully applied the financial ratios as an important indicator to predict the corporate health of the companies.
Various studies on prediction of industrial sickness have been carried out in India also. Some of the important studies include Gupta (1983) who made a comprehensive attempt by testing 56 financial ratios in textile and non-textile companies and found that the predictive power of liquidity ratios was very poor and OCF/NS ratio was the most important indicator. Kaveri (1980) confined his study to small scale industries. Sarma and Rao (1971), Srivastava and Yadav (1986), Bhatacharya (1982), Aggarwal and Joshi (1992), Sahoo Misra and Satpathy (1996), Singla (2001) and Chandra (2002) have also attempted to analyse the predictive power of financial ratios in India.

In most of these studies, no systematic attempt has been made to specify and quantify the best set of ratios which can be used as an effective indicator of corporate failure. In their studies, they applied different methods to select the best set of ratios through t-test, dichotomous classification test and factor analysis. In the present study all these methods were applied but these methods could not provide the best set of ratios. Moreover, the scope of these studies were limited to a particular industry only and can not be applied to other industries to monitor the sickness in these industries. Further, in most of the earlier empirical works, a single discriminant function model has been applied in all the years to forecast the future of a company based on discriminant score. These studies ignore the fact that the predictive power of the ratios keeps on changing with prevailing business environment; that is why, the predictive accuracy of these models follows a sharp declining trend as the lead time before the sickness exceeds more than two or three years.

In the present study an attempt has been made to identify the best set of ratios which can be used as an effective indicator of corporate failure in a particular industry as well as to develop a
forewarning model in the Indian context which can successfully predict the corporate health of a company at least five years before it becomes bankrupt.

The main objectives of the study are as follows:

(i) To ascertain prominent profitability, cash flow, liquidity, turnover and solvancy ratios which can significantly discriminate between sick and non-sick companies. Further, to find out the best set of ratios which can predict sickness within an industry.

(ii) To study the discriminating power of predictors (Financial Ratios) of sickness over a period, within an industry and among industries, whether predictors change over a period of study within an industry or not.

(iii) To study the accuracy of multiple discriminant model in predicting sickness in the preceding five years within an industry, as well as to suggest a forewarning model against corporate failure for each industry based on financial ratios.

Keeping in view the objectives of the study, the following hypotheses have been tested:

1. $H_0$ - Financial ratios used univariately and multivariately can not discriminate between the financial state of health of sick and non-sick companies.

2. $H_0$ - There is no difference in the predictive power of financial ratios over the time period as well as in various industries.
3. $H_0$ - Financial ratios used univariately/multivariately cannot predict the chance of survival or failure of a company.

In order to test the hypotheses the financial ratios of sick and non-sick companies of four different industries i.e. Basic Goods Industry, Capital Goods Industry, Intermediate Goods Industry and Consumer Goods Industry (as per use base classification of industries given by RBI) have been computed for five years i.e. from 1997-98 to 2001-2002. The study is based on secondary data collected from 'PROWESS' Centre for Monitoring Indian Economy (CMIE). Twenty-five financial ratios have been selected for the study on the basis their usage in earlier empirical works as well as their potential relevance for the study. These ratios have been divided into five groups, namely, profitability, cash flow, turnover, liquidity and solvency group.

Profitability ratios have been used to evaluate the operational performance/efficiency and earning capacity of the sample companies. Cash generating capacity has been measured with the help of cash flow ratios. Turnover ratios highlight efficiency and effectiveness in utilising their assets. To analyse the short term financial standing of a company the liquidity ratios have been computed and long term financial strength has been adjudged with the help of solvency ratios.

These ratios have been analysed univariately as well as multivariately. In the univariate analysis (univariate analysis involves the use of a single ratio in a failure model), mean values of the 25 financial ratios of sick and non-sick units have been studied to detect whether there is any difference between the mean values
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of both the groups or not. It is tested with the help of student t-test on independent sample test. Co-efficients of variation have also been analysed to observe the consistency or regularity or stability in the financial performance of the companies.

The univariate analysis is a crude measure to predict the chances of corporate failure because each ratio is considered individually. Interdependencies among various ratios or when ratios are interpreted in totality give entirely different results. Hence, the ratios are combined together to get the best results. The main idea of the multivariate analysis is to combine the information of several financial ratios into a single weighted index. In the present study, ratios have also been analysed multivariately with the help of Multiple Discriminant Analysis (MDA) for predicting the corporate health/sickness. The multiple discriminant analysis determines the coefficients for a linear combination of discriminating variables (i.e. financial ratios). These coefficients help in computing the discriminant score or z-score which gives base for group classification to a particular company.

To develop the multiple discriminant model, the best set of ratios out of a total of 25 financial ratios has been selected with the help of 'Step Wise Multiple Discriminant Analysis.' This technique has been found to be more systematic than the other techniques which have been applied in most of the earliest studies. This technique has been applied in all the five years covered in the study. The ratios which have been found significant in most of the years (i.e. either in three or more than three years) have finally been retained for the development of discriminant model. The unstandardized discriminant coefficients are then assigned to the selected ratios, which helps in computing the discriminant scores of
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the sample companies. A separate discriminant function has been derived for each year. In all the four industries a separate set of financial ratios has been selected and separate discriminant functions have been derived, keeping in view the fluctuation in the predictive power of the ratios over the time period as well as across the industries. The predictive power of the ratios has been tested with the help of relative coefficients. Whereas, the discriminating power of the discriminant functions have been tested with the help of eigen value, eta value, wilk’s lambda value and chi-squares value.

The companies have been classified into sick and non-sick groups on the basis of their z-scores by comparing them with the cut-off z-score. The cut-off z-score has been calculated as given below:

\[ Z_c = \frac{Z_s + Z_{ns}}{2}, \]

where

- \(Z_c\): Cut-off Z-score
- \(Z_s\): Discriminant score computed from the mean values of the selected financial ratios of sick units
- \(Z_{ns}\): Discriminant score computed from the mean values of selected financial ratios of non-sick units

A separate cut-off point has been computed for each year. Companies with z-scores higher than the cut-off point are classified as healthy units and below the cut-off point as sick units. The accuracy of the discriminant models has been presented in the form of accuracy matrix.

The univariate analysis of basic goods industry reveals that most of the financial ratios have significant difference in sick and non-sick companies. The highest difference is observed in case of profitability ratios (as evident from t-values) followed by cash flow...
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ratios and liquidity ratios. Among the profitability ratios ED/PAT ratios possesses the highest discriminating power followed by PAT/TA, ED/EC, PBDIT/TA and RE/TA ratio. Current ratio in liquidity group, OCF/NS ratio in cash flow group and inventory turnover in ratio turnover group turned out to be the significant determinants of financial health. TL/TA ratio among solvency ratios has been found to be best indicator.

Univariate analysis does not provide a clear cut demarcation as most of the ratios turn out significant in most of the years in all the industries. Further the significance of ratios keeps on changing over the time period within industry and between industries. Moreover, some of the ratios improve and some deteriorate during the study period and it becomes difficult to derive an overall conclusion to classify a company into sick or healthy group. Hence, it becomes necessary to compute an overall index on the basis of the best set of ratios which have the maximum discriminating power.

The best set of ratios computed through stepwise multiple discriminant analysis in basic goods industry includes three profitability ratios, two from cash flow group and one each from turnover and solvency ratios. In most of the empirical works profitability ratios have been observed as the best indicators of corporate health. The present study also supports this viewpoint.

The unstandardised coefficients of the selected seven variables, for the five years selected in the study, have different values. It seems that the relative importance of the selected ratios keeps on changing as is also evident from the relative coefficients. It appears that the economic, social, political, cultural, technological
and international events which keep on changing, influence the relative significance of these ratios. This questions the reliability of applying one particular year's discriminant function values in predicting the sickness two to five years prior to the event of failure as is applied in most of the earlier empirical works.

In the present study, a separate discriminant function has been derived for each year and all these functions have been found statistically significant in discriminating between financial health of sick and healthy companies. Similarly, a significant difference has been observed between the discriminant scores of sick and non-sick units even five years before the sickness. 52 units in 2001-2002 i.e. one year prior to sickness, out of a total of 54 units have been correctly classified, which amounts to 96.30 per cent accuracy. Models achieve 94.40, 92.60, 90.70 and 88.90 per cent accuracy in classifying the units in two, three, four and five years prior to failure respectively. The accuracy rate of the study is comparatively much higher than the accuracy rate achieved in earlier empirical works.

In the present study, an attempt is also made to test the predictive power of the latest year's discriminant functions i.e. 2001-2002 in the preceding years to predict the chances of failure or survival of a company. The results have more than 85 per cent accuracy in the previous four years. This means that discriminant function is quite significant to predict the corporate health even five years before the event. Though the predictive accuracy of the model has follow a declining trend (because the indicators of corporate health become less and less clear as the lead time before the sickness increases), but still the accuracy is quite satisfactory as compared to other empirical models and it can be concluded that
the latest year's discriminant function can safely be applied to monitor sickness in the preceding years and can forewarn the interested parties regarding the financial health of a company. In the present study, the following discriminant function is derived to predict the financial soundness or sickness of the companies in basic goods industry:

\[
Z\text{-score} = -0.831 + 0.084 \text{ (PAT/TA)} + 0.064 \text{ (ED/PAT)} + 0.025 \text{ (ED/EC)} + 0.003 \text{ (ITR)} - 0.011 \text{ (OCF/NS)} - 0.007 \text{ (OCF/TA)} - 0.025 \text{ (D/E)}
\]

A company having discriminant score above 0.988 (i.e. cut-off z-score) should be classified as a healthy unit, whereas, the company with discriminant score below 0.0988 is a potentially sick unit. The trends of discriminant scores of previous years will help in understanding the future of the company. Increasing or constant positive trend of discriminant scores above the cut-off point predicts the sound financial health of a company where as a downward trend depicts the incipient sickness in that company. The moment, the discriminant scores of a company come below the cut-off point i.e. 0.0988, the management should monitor the situation judiciously to find out the causes which are responsible for it and should take the required corrective measures to prevent the disastrous consequences of corporate collapse.

A similar attempt has been made to develop a forewarning model to predict the sickness in capital goods industry. The mean values of the selected 25 financial ratios of 32 sick and 31 non-sick units in capital goods have been analysed univariately as well as multivariately to find out the best set of ratios which can be used as an effective indicator of corporate health.
Like basic goods industry, the significant difference has been noticed in most of the financial ratios of sick and non-sick units. Profitability ratios have depicted the highest discriminating power. ED/EC, ED/PAT, PAT/TA, RE/TA, PBIT/CE and PBIT/TA, ratios turn out to be the best predictors in univariate analysis. Most of these ratios have also been adjudged as the best predictors in basic goods industry. But in the multivariate analysis, only three profitability ratios, namely ED/PAT, ED/EC and RE/TA ratio, are found as the best predictors of corporate health in Capital Goods Industry. Except ED/PAT and ED/EC ratio all other five ratios (which were found as the best ratio in basic goods industry) have been found insignificant ratio in the multivariate analysis of capital goods industry. This means that the predictive power of the ratios not only varies from year to year but also differs from industry to industry.

The unstandardized discriminant coefficients, standardized, structure and relative coefficients of the ratios keeps on changing during the study period in this industry as well. A significant difference has been observed between the mean discriminant score of sick and non-sick companies computed with the separate discriminant function values in all the five years. The discriminant functions have successfully classified the sample companies into sick and non-sick groups with more than 90 per cent accuracy upto four years prior to sickness and 85.70 per cent accuracy even five years prior to failure. The current year's discriminant function (2001-2002) has also been found equally competent to predict the corporate health in the previous years and has achieved more than 82 per cent accuracy even five years before the sickness. The discriminant function model which can be applied as forewarning model in this industry is as given below:
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\[ Z\text{-score} = -1.164 + 0.067 (ED/PAT) + 0.005 (ED/EC) + 0.077 (RE/TA) \] and the cut-off z-score is 0.034.

An attempt has also been made to develop a forewarning model to predict the chances of survival or failure of a company in intermediate goods industry. Financial ratios of 29 sick and equal number of non-sick units in this industry have been analysed. The univariate analysis of intermediate goods industry reveals that most of the financial ratios are quite significant to discriminate between the financial health of sick and non-sick companies, having significant difference between the mean values of both the groups. Profitability ratios have depicted the highest segregating power in this industry also and ED/PAT, PBIT/TA, PBDIT/TA, PAT/TA, PBIT/CE and RE/TA ratios are the best predictors of corporate health. OCF/TA, ITR, quick ratio and TL/TA ratios are the best ratios in their respective groups.

But in multivariate analysis only five ratios consisting of three profitability (i.e. ED/PAT, PBIT/TA, PBIT/Int) one turnover (ITR) and one solvency (D/E) ratio have been found significant predictors of corporate health. Cash flow and liquidity ratios have not made any substantial contribution in multivariate analysis. Whereas, profitability ratios have maximum contribution and ED/PAT ratio is found as the best indicator followed by PBIT/TA ratio.

The best combination of ratios in this industry is different from basic goods and capital goods industry. PBIT/TA and PBIT/Interest ratios did not appear in the set of these industries but these ratios have been found significant in intermediate goods industry proving the variations in the predictive power of the ratios across industries.
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The discriminant functions derived with the help of the above mentioned five ratios have differentiated the financial status of sick and non-sick companies with more than 90 per cent accuracy in all the five years covered in the study and significant difference has been observed between mean discriminant scores of both the groups.

The predictive power of the latest year's discriminant function in the previous four years has also been found quite satisfactory as it has predicted the sickness in sick units even five years in advance with more than 85 per cent accuracy. It means that the latest year's function given below is quite significant to monitor the industrial sickness in intermediate goods industry and can alert the management five years in advance to avoid the failure of the companies. The discriminant function is:

\[ Z = -2.295 + 0.136 \frac{\text{PBIT}}{\text{TA}} + 0.071 \frac{\text{ED}}{\text{PAT}} + 0.015 \frac{\text{PBIT}}{\text{Int}} + 0.023 \text{ITR} - 0.044 \frac{\text{D}}{\text{E}} \] and the cut-off z-score has been set at -0.0015.

Lastly, in order to test the predictive power of the financial ratios in consumer goods industry, the financial ratios of 25 non-sick and 21 sick companies in this industry have been analysed and a significant difference has been noted between the mean value of financial ratios of sick and non-sick units in all the five years covered in the study when used univariately. The predictive power of the ratios (based on t-values) has followed a fluctuation trend. Like in the previous three industries and in most of the empirical studies, profitability ratios have dominated in this industry and establish the fact that the profitability ratios are the best indicators of corporate health. In this industry PBIT/CE ratio has been found
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to be the most important ratio followed by PBIT/NS, PBIT/TA, ED/PAT and ED/EC ratio. OCF/NS ratio in cash flow, ITR in turnover and TL/TA ratio in solvency group are the other good indicators.

However, in the multivariate analysis only three profitability ratios have been found significant discriminator/predictor. These ratios are ED/PAT, PBIT/CE and PBIT/NS ratio. The relative coefficients of these ratios keeps on changing during the study period denoting that the predictive power of the ratios varies as per the prevailing situations in the markets over the time period.

The separate discriminant function in each year derived with the help of the above ratios, have discriminated between the financial health of sick and healthy units even five years prior to the event of failure with more than 90 per cent correct classification rate. The success rate of the model is comparatively much higher than the success rate achieved in earlier models.

The discriminant function derived for the year 2001-2002 has been adjudged equally successful to predict the sickness in consumer goods industry. It has achieved more than 97 per cent classification accuracy upto four years and 90.90 per cent accuracy in the fifth year prior to failure. Thus, this discriminant function can safely be applied to check the menace of corporate failure in consumer goods industry. The function is:

\[ Z = -2.084 + 0.078 \times (PBIT/NS) + 0.044 \times (ED/PAT) + 0.059 \times (PBIT/CE) \]

and the cut-off z-score is - 0.181.
Major Findings of the Study:

1. Financial ratios of sick and non-sick companies differ significantly:

   In the univariate analysis, a significant difference has been found in most of the ratios of sick and healthy companies in all the four industries during the periods of the study.

   A significant difference has been observed in all the profitability and cash flow ratios. The profitability and cash flow ratios of non-sick companies was comparatively much higher than the sick units and are quite suggestive of the ability of the non-sick companies to plan, organise, execute and control their operations in a far more effective manner than the sick companies. An analysis of inventory turnover ratios depicts that non-sick companies have a high rate of inventory conversion into sale, whereas sick companies have an excessive inventory level than warranted by the volume of their operations. Similarly, the mean value of other turnover ratios of non-sick units were comparatively much higher than that of sick units, which depicts that healthy companies are managing/utilizing their assets properly. Liquidity ratio depicts the satisfactory liquidity position of non-sick companies as compared to the unsatisfactory liquidity position of sick companies. Further, solvency ratios highlight the unbalanced capital structure of sick companies, which are over burdened with debt and experience a complete erosion of net worth but it is not so in the case of non-sick companies.

   Thus, the financial ratios of sick and non-sick units differ significantly.
2. **A trend of ratios is considered to be a better predictor of financial health of the companies:**

   It has been observed in the univariate as well as in multivariate analyses based on the five years data prior to sickness that a trend of ratios is different in sick and non-sick companies. The study of individual ratio under univariate analysis reveals that the mean value of most of the ratios had a tendency of gradual deterioration when actual sickness was approaching in the sick companies. Similarly, in multivariate analysis declining trend has been noticed in the predictive power of the ratios as the lead time before the sickness increases. It happens because the indicators of the financial ratios become less and less clear as the lead time before the sickness increases. Thus, it has been proved under both types of analyses that the trend of the ratios is a useful tool for predicting corporate health.

3. **Financial ratios can predict the corporate health:**

   It has been observed in the study that financial ratios can predict the corporate health at least five years before the sickness. In the multivariate analysis, the discriminant functions derived with the help of selected financial ratios has predicted the event or classified the companies into either sick or non-sick groups, with more than 80 per cent accuracy during the study period.

4. **All the financial ratios are not equally significant to identifying the corporate failure:**

   In the present study 25 financial ratios were analysed to test whether all these ratios can predict the health of a company or not. It has been observed that some of the ratios are statistically insignificant to discriminate between sick and non-sick companies and most of them belong to turnover, liquidity and solvency ratios. However, in the multiple discriminant analysis only some of the
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ratios have been found as significant. Seven ratios in basic goods industry, five ratios in intermediate goods industry and only three ratios in case of capital goods and consumer goods industry, have been selected by step wise multiple discriminant analysis.

5. **There is a relative difference in the discriminating power of financial ratios:**

The results of t-test reveal that there is a difference in the differentiating power of the financial ratios among themselves on the basis of t-values as all the ratios have different t-value. Some of the ratios have been found with very high t-values and some with very low t-values. Similarly, in multiple discriminant analysis, the standardized, structure and relative coefficients of the selected financial ratios were not equal. Profitability ratios have been recorded with very high discriminating power and among the profitability ratios, ED/PAT, PAT/TA, ED/EC, PBIT/TA and PBIT/NS ratios have been adjudged as the best predictors. Thus both types of analyses confirm the presence of relative difference in the discriminating power of financial ratios.

6. **Predictive power of the financial ratios differs from Industry to Industry as well as over a time period:**

The multivariate analysis of financial ratios reveals that the predictive power of the ratios varies from industry to industry as the combinations of best set of ratios were different in each industry as well as their relative coefficients were different in separate industries.

It has been further observed that the relative contributions (depicted by the relative coefficients of the selected ratios) of ratios kept on changing during the study period. A ratio, which was found most significant in a particular year, was not found equally important in the other years. This means that the predictive power of the ratios fluctuates with the prevailing market conditions.
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7. Profitability Ratios are the best predictors of corporate health:

Like most of the early empirical works, the profitability ratios have displayed very high discriminating as well as predictive power to predict the corporate health in univariate as well as in multivariate analyses. In univariate analysis, most of the profitability ratios have been found highly significant to discriminate, having highest t-values in all the five years as well as in all the four industries.

In multivariate analysis, these ratios have depicted very high discriminating power. In capital goods industry and consumer goods industry only profitability ratios have been found significant ratios. Further, three out of a set of seven ratios in basic goods industry and three out of five in case of intermediate goods were profitability ratios. Even, in the discriminant functions, the contribution of these ratios was maximum as the unstandardized coefficients, standardized coefficients, structure coefficients and relative coefficients values of these ratios were very high as compared to other ratios. Cash flow ratios, ITR and D/E ratio are the other good indicators of corporate health. Liquidity ratios have been found poor predictors of the financial health of a business organisation.

Thus, profitability ratios, in general, measure the operational health of a company and need greater importance because sharp swings occur from time to time in general business conditions causing a violent oscillation in the profitability level of the companies.

Steep fall in profitability, irregularity in payment of dividend and interest, low cash earning, slow movement of inventory, inefficient credit and collection policies, unsatisfactory liquidity and
unbalanced capital structure (i.e. excess use of debt and negative net worth) are important indicators of the failure of a company.

The best financial ratios and discriminant function:

Finally, the following financial ratios and the discriminant functions have been recommended to forecast the future of the companies:

For Basic Goods Industry
- Profit after Tax / Total Assets (PAT/TA)
- Equity Dividend / Profit after Tax (ED/PAT)
- Equity Dividend / Equity Capital (ED/EC)
- Operating Cash Flow / Net Sale (OCF/NS)
- Operating Cash Flow / Total Assets (OCF/TA)
- Inventory Turnover Ratio (ITR)
- Debt/ Equity Ratio (D/E)

\[
Z\text{-score} = -0.831 + 0.084 (\text{PAT/TA}) + 0.064 (\text{ED/PAT}) + 0.025 (\text{ED/EC}) + 0.003 (\text{ITR}) - 0.011 (\text{OCF/NS}) - 0.007 (\text{OCF/TA}) - 0.025 (\text{D/E}) \{0.988 as the cut-off z-score\}
\]

For Capital Goods Industry
- Equity Dividend / Profit after Tax (ED/PAT)
- Equity Dividend / Equity Capital (ED/EC)
- Retained Earning/Total Asset (RE/TA)

\[
Z\text{-score} = -1.164 + 0.067 (\text{ED/PAT}) + 0.005 (\text{ED/EC}) + 0.077 (\text{RE/TA}) \text{ and the cut-off z-score is 0.034.}
\]

For Intermediate Goods Industry
- Equity Dividend / Profit after Tax (ED/PAT)
- Profit before Interest and Tax/Total Asset (PBIT/TA)
- Profit before Interest and Tax/Interest (PBIT/Int.)
- Inventory Turnover Ratio (ITR)
- Debt/ Equity Ratio (D/E)

\[
Z = -2.295 + 0.136 (\text{PBIT/TA}) + 0.071 (\text{ED/PAT}) + 0.015 (\text{PBIT/Int}) + 0.023 (\text{ITR}) - 0.044 (\text{D/E}) \text{ and the cut-off z-score has been set at -0.0015.}
\]
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For Consumer Goods Industry

Equity Dividend / Profit after Tax (ED/PAT)
Profit before Interest and Tax/Capital Employed (PBIT/CE)
Profit before Interest and Tax/Net Sale (PBIT/NS)

\[ Z = -2.084 + 0.078 \times (PBIT/NS) + 0.044 \times (ED/PAT) + 0.059 \times (PBIT/CE) \]

and the cut-off z-score is -0.181.

The z-scores of the companies computed with the help of above mentioned discriminant function will help in predicting corporate health. The higher the z-score of a company than the cut-off point the better is its financial health and vice-versa. Whereas, the trend of the z-scores will predict the way or direction in which that company is moving i.e. whether it is moving towards sickness or not. The moment z-scores of the company follow a declining trend, the management should diagnose the situation at this juncture and monitor the causes responsible for it and then required corrective initiative must be adopted to avoid the irreparable losses of corporate failure.

Practical Application of the Study:

It is evident that the model predicts corporate failure/sickness at least five years in advance, though with decreasing probability. Such a forewarning system obviously has important uses for the management, lenders and investors.

First, the model, if used periodically to assess the company's position, has the ability to predict corporate problems early enough to enable the management to realise the gravity of the situation in time and take timely action to stem further sickness.

Second, the lenders i.e. commercial banks and other financial or lending institutions, may use the models in the process of credit evaluation. The model will assist the lenders to classify the
SUMMARY, FINDINGS AND CONCLUSIONS

borrowing units into a potentially sick, or tending towards sickness, or potentially sound category. However, it should not be used as the only means of credit evaluation. The other important non-accounting variables such as the purpose of loan, its maturity, the security involved and the deposit status of the applicant should also be considered along with the z-score of the borrowing unit. It could be used as a guide in efforts to lower the cost of investigation of loan applicants. It may also be used for evaluating the repayment behaviour of a borrower. It will assist the lending institutions in monitoring the concerns which have already been granted loans by taking timely actions. The early stages of sickness, if detected, will enable the lending institutions to tighten their grip of inspections to force the units to improve their performance.

Third, the model may be used by potential investors for screening out undesirable investments. Since the model is basically predictive, the investors may use it for portfolio selection.

Fourth, the model may also help the development banks in making judicious use of their technical consultancy services. These services should be given only to reprimand and repair the latent and temporary sickness and not the manifest and permanent sickness.

Lastly, the government can use the findings of the study for deciding turn-around strategies, like, mergers, take-over etc. to check the growing incidence of industrial sickness in India.

Thus, by using the findings of this research work, the government, the investors, the money lenders and the management can at least check the malady of corporate failure and conserve the scarce resources of the nation.
Scope for Further Research:

Although, financial ratio analysis in the model developed shows a high degree of accuracy, it is necessary to emphasize that continuing research is also needed in this area to achieve greater refinement. At this point, there appears to be scope for further research in the following areas:

(a) Perhaps the most important area for further research is to extend the model to each industry separately as well as to public sector units, private limited companies and unincorporated entities. An attempt can also be made to extend the analysis to relatively smaller firms, where the incidence of failure is greater than in big corporations.

(b) The inclusion of non-financial measures like operational and technical parameters might improve the results of the present study. A combination of operational, technical and financial parameters may prove a better indicator between sick and healthy units for early detection of sickness.

(c) The research in the direction of analysing the impact of price level adjustments on predictive ability of financial ratios is also called for.

(d) The limitation of secondary data has remained within this study. A more useful and practical study can be undertaken by collecting data from primary sources. Further, the model should be updated after four or five years in the light of the additional informations or changes in the overall economic environment as the predictive power of the ratios keeps on changing with the environment.
Thus, since 1932 researchers have been attempting to enhance the quality of the financial ratios by applying various quantitative techniques. In the present study a similar attempt has been done to widen the usefulness of financial ratios to predict the corporate health of the companies.