Chapter-2
Industrial Sickness
2.1 Industrial Sickness

Industrial sickness appears to be one of the serious problems faced by the country. Industrial sickness is everywhere, even in the most vibrant industrial countries of the world. The major problem is that its range and spread is far greater in India. It has assumed alarming proportion in the recent years.

It is evident from the statistics available that the number of large industrial units enjoying bank credit of Rs. One crore and above and identified as sick, increased to 463 at the end of June 1983 from 289 as at end June, 1978. The bank loan locked up in these units amounted to Rs. 1913.10 crores at the end of June 1983 as compared to Rs. 858 crores as end of June, 1978, showing an increase of Rs. 1055 crores within a period of five years. The number of sick industrial units in the small scale sector increased to 64,388 at the end of June, 1983 from 16885 units at the end of June 1979, a four times increase in number. The bank credit outstanding against these units rose to Rs. 626.52 crores from is 101.71 crores during the same period. The blockage of bank and financial institutional's funds is not a true index of social loss. The real loss is much more because of decrease in production and increase in employment, which industrial sickness necessarily bring about.

This chapter is divided into three parts. Part 1 is concerned with the definition of sick unit. In part 2, an attempt is made to identify causes and symptoms of sickness of the units of small scale industry. Part 3 examines the different methods or models of prediction of sickness.

2.2 Sick Unit

To identify a sick unit, one should have a thorough understanding of definitions of a sick unit. The definition of a sick unit has different meanings to different people, depending upon the context in which they are using it. A good number of definitions have been given by the financial institutions, banks, professional associations, research institutes and government. A few important definitions are discussed and examined below:
The criteria adopted for identifying a sick unit by the industrial development bank of India¹, a primary financial institute of the country is as under:

1. Continuous cash loss for a period of two years.

2. Continuous erosion in the net worth, say by 50% as related to last balance sheet of the company.

3. Continuous defaults in meeting four consecutive half-yearly installments of interest or principal on the institutional loans and

4. Mounting arrears on account of statutory and other liabilities for, a period of one or two years.

In the group of financial institutions other definition has been given by the industrial credit and investment corporation of India Ltd². It has defined sickness of a unit as, “a problem project is one whose financial viability actually and potentially, is threatened by adverse factors, present and continuing. The adverse factors might relate to management, market, fiscal burden, labour relations or another factors. When the impact of these factors reach a point where a company begins to incur cash losses leading to an erosion of its funds, there is threat to its financial viability.”

From the banking sector, the two important definitions came from State Bank of India and Reserve Bank of India³. The State Bank of India defined a sick units as, “a unit which fails to generate internal surplus on a continuing basis and depends for its survival on frequent infusion of external funds.” This definition has considered only the inadequacy of generation of internal surplus, which is based on the operational performance of the unit.

Whereas the reserve bank of India⁴ has defined a sick unit as “a unit may be considered sick, if it has incurred cash loss for one year and in the judgement of the bank, it is likely to continue to incur cash losses for the current year as well as the following year and which has an imbalance in its financial structure such as current ratio of less than 1 and worsening debt-equity ratio.” The definition of reserve bank of India can be divided into three pats to review the working of a concern to declare it as a sick unit.
i) **Operational efficiency and profitability:** a unit should incur cash losses during the last three years. It means that cash generated from operation is inadequate to meet operational commitments.

ii) **Liquidity:** A unit should show a declining trend i.e. less than 1 of the current ratio. It means that there is continuous increase in current liabilities over current assets, which may lead to negative working capital.

iii) **Solvency:** A unit should show a increasing trend towards debt equity ratio. It means that there is continuous elimination of owner’s fund or cumulative loss exceeds the total amount of capital and reserves.

In the third group of professional and research institutes, the definitions have been developed by the Federation of Indian Chamber of Commerce and Industry (FICCI) and the National Council of Applied Economic Research (NCAER). The FICCI gives the following guidelines for determining sickness:

1) Cash inflow during the last three years have been progressively going down in relation to revenue commitments.

2) When cash inflow is less than operational commitments and debt servicing;

3) When debt servicing liabilities is equal to or less than one;

4) When the company has negative working capital and the unit continues to make losses, cumulative losses exceed capital and reserves.

A definition of great importance came from the NCAER. It has defined the sickness of a unit as “The weakening of financial viability leading to its loss and finally its extinction”. The underlying assumption for this definition is that sickness is an organic process which has an origin, a sickness path, stage and if there is no revival then it leads to company collapse.

The last group consists of definitions, which have been given under various acts, framed on even dates by the government. The first definition came at the time of taking over the management of sick units. The act provides the six criteria for determining whether a unit was sick or not. If any one or more of the below criteria is applicable to the unit, it will be declared as sick unit.
i) Units which have been ordered to be liquidated.

ii) Units which have been lying closed for a period of three months or more and which can be restarted with reasonable inputs.

iii) Units which have been either leased out to government or to any other party or which are run on a ‘leave any licence’ arrangement with the permission of the government.

iv) Units in respect of which orders had already been passed by the central government under sec. 18-A or 18FA of the industries (development and regulation Act), for taking over of management of the undertakings, but management could not actually be taken over by the authorized body of persons.

v) Units whose affairs had been got investigated under the industries (Development and Regulation) act but government had not yet passed orders under sec. 18-A or 18 FA of the act.

vi) Units which had been showing serious symptoms of sickness including fall in production and employment and were ordered to be investigated under the industries (Development and Regulation) act.

The principal reasons underlying framing of the Act was that, in government’s version, the long term rehabilitation of sick undertakings, in order to maintain production and employment and further to ensure maximization of production and distribution of cheaper varieties of products at fair prices and to give a relief to those who are directly or indirectly affected by closure of these undertakings.

Another legal version of sick unit is available under section 72A⁷, which was introduced in the taxing statute as a fiscal incentive to encourage the revival and rehabilitation of sick units through amalgamation by healthy units. The act classified sick units as those units where the losses, past and present, have eroded 50% of capital and reserves. The principal incentive provided by the section 72-A is to carry over and set off of business losses and unabsorbed depreciation of the amalgamating company by the amalgamated company.
All the above mentioned definitions can be divided into three categories i.e. conceptual, legal and monitoring. The definition of ICICI, NCAER, SBI are conceptual definition which have been developed to make a conceptual framework in the context of the revival of sick units. The purpose is to draw broad outlines to conclude whether a particular unit is sick or not. Whereas the government definitions under different acts are legal definitions. The definitions are developed in context of social welfare, safeguarding public interest and to give incentives to such units which take over sick units. The monitoring category includes the definitions of RBI, IDBI. These definitions are drafted to identify and monitor the sick units and to make guidelines to evaluate the financial performance for sanctioning of a loan under different schemes.

Out of all the above mentioned definitions, the definitions of monitoring category are more practical to identify sick units. Number of years of cash loses and erosion of net worth are considered to be the two primary yardsticks for identifying sick units in these definitions. The cash losses should be over a continuous stretch of three years as per R.B.I.'s definition. On the issue of erosion of net worth, only IDBI has specifically mentioned a certain percentage i.e. 50% to declare a unit as sick.

Under the prevailing conditions it is desirable to lay more emphasis on prevention of sickness at an early stage instead of giving more importance to revival of sick units. Prevention is always better than cure. Therefore, the banks should not go on counting the number of years of cash losses and waiting for the maximum period of three years of cash losses to be completed. By the time the number of years of cash losses is completed, the financial viability of the firm is so adversely affected that it becomes difficult to get rid of sickness.

It may, therefore, be suggested that on happening of the any one of the following conditions whichever is earlier, the firm should be considered as sick unit.

i) continuous cash losses are suffered by the firm for a period of two years; or

ii) If net worth has been eroded to the extent of 50% or more whether because of cash losses or post depreciation losses.

To sum up, a sick unit is one which has incurred cash losses on continuous basis for a specific number of years. The cash losses have eroded the major proportion
of net worth and current ratio is less than 1:1. The definitions of sick unit can be grouped into three categories vis. Conceptual, legal and monitoring. The definitions under monitoring category are more practical to identify sick units.

2.3 Causes and Symptoms of Industrial Sickness

There are certain causes and symptoms of industrial sickness. Not a single cause or symptom itself would lead to sickness of the industrial unit. The sickness of the unit will be there only when several of these causes and symptoms appear simultaneously.

Many studies have been undertaken to find out the causes and symptoms of industrial sickness in general. The causes and symptoms of sickness of small scale industry in particular for the Punjab have not been identified on the basis of extensive research. In this study, an attempt is made to find out the causes of sickness for small scale industries in Punjab on the basis of extensive case studies of 60 small scale units. Out of 60 small scale units which are covered under the study, all have responded and expressed their opinion.

Before examining the different causes and symptoms of sickness of sick small scale industry the distinction between a cause and a symptom must be cleared. A cause is a situation that produces a result or effect whereas a symptom is a visible indicator that a problem exists. The result produced by different causes is known as a problem. In our case, problem is sickness, which is the result of different causes.

Causes: A unit can become sick due to variety of reasons. These can be broadly classified into three groups, internal, external and both.

Internal causes arise due to internal disorder in the functional system of an industrial unit. However these disorders are of controllable nature to a great extent, provided the corporate management is effective. External causes arise due to changes in the general environment or the social, political and international environment and are beyond the control of the unit. The third group is a combination of internal and external causes.
Table 2.1
Showing the Number of Respondents, who have Expressed their Views on
Different Kinds of causes which are Responsible for Sickness of Small
Scale Industries

<table>
<thead>
<tr>
<th>No. of samples 100</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
<td>I</td>
</tr>
<tr>
<td>Kinds</td>
<td>Internal</td>
</tr>
<tr>
<td>No. of respondents</td>
<td>4</td>
</tr>
</tbody>
</table>

On the basis of the study conducted, it is found that a large majority of respondents to the questionnaire is of the view that the sickness of small scale industries is the outcome of both the causes. Out of the total population of the sample, about 90% percent are of the view point that both internal and external causes are equally responsible for sickness. It is difficult to measure the degree of their effectiveness.

Internal causes are those which are within the control of management of the unit. The different internal causes are mentioned under different studies conducted by different institutes and researchers. These include choice of location, under-estimation of capital cost and over-estimation of demand, delay in implementing the project and the resultant escalation in the cost, faulty accounting system, failure to introduce proper financial control, and cost reduction methods, lack of adequate planning in key areas, diversion of funds from business or diversion of funds from short terms to long term uses resulting in liquidating crisis, rise in cost of production unmatched by a rise in selling price, low capacity utilization due to lack of modernization and negligence in maintenance and repairs, lack of market research, uneconomic wage levels and surplus work force etc.

A consolidated list of internal causes was prepared keeping in mind the above mentioned factors.

**List of Internal Causes**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Inappropriate financial structure.</td>
</tr>
<tr>
<td>b.</td>
<td>Poor utilization of assets and poor working capital management.</td>
</tr>
</tbody>
</table>
c. Absence of costing system and pricing policy.
d. Wrong location.
e. Under-utilization of installed capacity due to lack of modernization/obsolete machinery.
f. Inadequate material management.
g. Absence of product planning.
h. Lack of market research.
i. Inappropriate wage and salary administration.
j. Absence of manpower planning.

External causes are those which are beyond the control of the management of the unit. The commonly cited external causes under different studies are government policies regarding production, price and distribution, inadequate availability of essential inputs like raw material, power, transport etc. market recession, unfavourable investment climate, labour unrest, strict credit policy and less incentives in taxation policy shortage of technical/proper manpower etc.

External causes are

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Strict credit policy</td>
</tr>
<tr>
<td>b.</td>
<td>Unfavourable investment climate</td>
</tr>
<tr>
<td>c.</td>
<td>Fear of nationalization</td>
</tr>
<tr>
<td>d.</td>
<td>Non-availability of new material and power shortage.</td>
</tr>
<tr>
<td>e.</td>
<td>Restraints/restriction on purchases.</td>
</tr>
<tr>
<td>f.</td>
<td>Excessive taxation policy</td>
</tr>
<tr>
<td>g.</td>
<td>Market recession</td>
</tr>
<tr>
<td>h.</td>
<td>Non-availability of power manpower</td>
</tr>
<tr>
<td>i.</td>
<td>Labour unrest</td>
</tr>
</tbody>
</table>

2.4 Symptoms of Industrial Sickness

If the symptoms of the industrial sickness are noticed at an early stage then a company can prevent itself falling in the prey to sickness. What is unfortunate is that the companies do not bother at early stage they realize sickness only when their profits get completely eroded.
An exhaustive list of symptoms cannot be prepared but we have examined major and common symptoms of sickness with special reference to small scale industries of Punjab. The following list of symptoms was prepared on the basis of different studies.

**List of Symptoms**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Continuous irregularity in cash credit accounts.</td>
</tr>
<tr>
<td>b.</td>
<td>Profit fluctuation, forward trend in sales and stagnation.</td>
</tr>
<tr>
<td>c.</td>
<td>Failure to pay statutory liabilities.</td>
</tr>
<tr>
<td>d.</td>
<td>Higher rate of rejection of goods manufactured by the company which often allows higher discount.</td>
</tr>
<tr>
<td>e.</td>
<td>Failure to pay timely installments of the principle and interest in respect of term loans etc.</td>
</tr>
<tr>
<td>f.</td>
<td>Weak equity base and decrease in working capital.</td>
</tr>
<tr>
<td>g.</td>
<td>Rapid turnover of the key personnel and sudden/frequent changes in management.</td>
</tr>
<tr>
<td>h.</td>
<td>Diversion of funds for purpose other than running the unit.</td>
</tr>
</tbody>
</table>

To sum up, causes of sickness can be grouped into two categories viz. internal (controllable) and external (uncontrollable). The sickness in small scale industries in Punjab is a outcome of both the internal and external causes.

The prominent internal causes responsible for sickness of small scale industries covered under the study are (i) under-utilization of installed capacity, (ii) inappropriate financial structure (iii) poor fixed assets management and working capital management, absence of costing system and pricing policy, and (iv) lack of market research and absence of manpower planning. Whereas market recession, (2) labour unrest (3) shortage of raw material and power and (4) strict credit policy or excessive taxation policy are considered to be major external causes.

The main symptoms which can be helpful to notice sickness at an early stage are 1) poor profitability, 2) weak equity and working capital base, 3) failure to pay timely installment of the principal and interest, 4) higher rate of rejection of goods.
manufactured and 5) rapid turnover of the key personnel and sudden changes in management.

2.5 Prediction of Sickness

Symptoms can give an indication of sickness but to be more specific it is necessary to go for prediction of the sickness of a firm. It is realized that there is a need for a technique/model which will enable analysis to predict the potential business failure/sickness as early as possible, to reduce such losses and hardship by providing an early warning to all the concerned parties.

This need has been a source of motivation for various researchers to develop models, with different inputs to make more correct and accurate predictions for the business failure.

Attempts have been made to predict the failure of companies by Beaver W.H. (1966), Altman E.I. (1968), Deakin B.B. (1972), Wilcox J.W. (1973), Blum in (1974), Libby R. (1975) either by considering the predictive ability of individual financial ratios or using discriminant analysis to combine several predictors into a model. Earlier to the above mentioned attempts, the studies were made on the efficiency of ratios as predictors of business financial difficulties by Fitzpatrick P.J. (1931), Winakor AH, Smith R.F. (1935), Merwin CL (1942). In India, a useful attempt has been made by Gupta L.C. (1979).

The purpose of the study is not to develop a model for prediction of failure but it is a humble attempt to review briefly and critically the existing literature on prediction of failure of business firms to find out the best suitable model which can be applied in the Indian context.

The whole empirical work on prediction of failure of firms has been divided into two periods for presentation purpose. It will follow the following chronological scheme;

i) From the year 1930 to 1960


These demarcations in time are somewhat arbitrary. The purpose of this division is to cover all the important developments in the use of financial ratios before
and after Beaver’s model. Because Beaver’s model is considered as a big landmark in
the history of financial ratio analysis, to predict the failure of business firms.

In the early 1930’s, under mentioned\(^\text{10}\) studies were made to watch the
behaviour and judge the efficiency of financial ratios as predictors of business failure.

Fitzpatrick analysed thirteen ratios on a sample of 20 firms for a period of
three to five years prior to the failure of the firm. He concluded that the ratios of net
profit to net worth, net worth to fixed assets and net worth to debt were the best
indicators of prediction of failure.

Winakor and Smith started the use of financial ratios as a potent tool for
predicting financial difficulties in their analysis of a sample of 183 firms. They
analysed twenty one ratios for a period of 10 years, prior to the failure of the firms.
They concluded on the basis of the data analysed that the ratio of net working capital
to total assets was most accurate and reliable indicator of failure, with its decline
beginning ten years before the occurrence of business failure.

Marwin studied the trend of unspecified number of ratios on a sample of 939
firms. He concluded that three ratios 1) Net working capital to total assets, 2) Net
worth to debt and 3) The current ratio, were very sensitive predictors of
discontinuance of business 4 to 5 years prior to actual discontinuance.

All the above mentioned studies, no doubt were quite useful in analysing and
predicting the financial difficulties of business, but none of them could lend the
desired accuracy and perfection to the model because i) Fitzpatrick’s sample of 20
firms only was small  ii) Whereas Winakor and Smith had studied a big sample of 183
firms but their study suffered the weakness of not covering the successful firms. They
analysed the data of unsuccessful or likely to be unsuccessful firms only. iii) Marwin
tried unspecified number of ratios on a very large sample of 939 firms.

The shortcomings of the above mentioned three studies can be ignored while
considering the importance of their contribution in the development of financial ratio
analysis as a potent tool of predicting the business difficulties. Moreover the ratios
which they had chosen as their best ratios are still credible.
A direct study to discover how well financial ratios could predict failure of business firms relative to random prediction was made by William H. Beaver\textsuperscript{11} entitled ‘Financial ratios as predictors of failure’ published in 1966. Beaver studied the predictive power of 30 different financial ratios grouped into six categories i.e. cash flow, net income, debt to total assets, liquid assets to current debt and turnover ratios. He tested each of these ratios to find out the relative efficiency to predict its value in discriminating between two set of data of 79 failed and 79 unfailed companies for the period of 5 years prior o failure during 1954-64.

The major finding of the study was that the ratio of each flow to total debt was the best single predictor of failure because it showed the least percentage of error in prediction in his sample. This ratio misclassified 13\% of the companies one year prior to failure and the rate of misclassified was only 22\% of the companies five years prior to failure. In addition to cash flow to total debt, the other five ratios which were found to have the greatest predictive power were:

1. Net income to total assets
2. Total debt to total assets
3. Working capital to total assets
4. Current ratio and
5. No credit interval

The other findings of the study were; based solely upon a knowledge of the financial ratios, the failure status of firms can be expected from random prediction. This evidence, together with other test conducted, suggested that financial ratios can be useful in the prediction of failure for atleast five years prior to the event.

Altman\textsuperscript{12} in his ‘Z Score model’, tried to improve upon the traditional ratio analysis under the theory that ratios, if analysed with a multivariate frame work, will taken on greater statistical significance than the common technique of sequential ratio comparisons. In simple words, when several ratios are combined they provide best predictive ability as compare to the best single predictor of failure. He applied ‘multiple discriminant analysis’ (MDA) a statistical technique to distinguish between bankrupt and non-bankrupt companies prior to actual bankruptcy and tested a set of
22 ratios financial and economic ratios classified into five categories; activity, liquidity, leverage, profitability and solvency ratios. The data used in the study were limited to manufacturing companies. Finally, five ratios were used from a set of 22 ratios and a model developed as under;

\[ Z = 0.012X_1 + 0.014X_2 + 0.0033X_3 + 0.0064X_4 + 0.999X_5 \]

Whereas-

\[ X_1 = \frac{\text{Working capital}}{\text{total assets}} \]  
It measures the net liquid assets of the firm relative to the total capitalization.

\[ X_2 = \frac{\text{Retained earnings}}{\text{total assets}} \]  
It measures the cumulative profitability over the time. The age of a firm is implicitly considered in the ratio.

\[ X_3 = \frac{\text{Earnings before taxes and interest}}{\text{total assets}} \]  
It measures the true productivity of the firm’s assets.

\[ X_4 = \frac{\text{Market value of equity}}{\text{book value of total debt}} \]  
It measures that how much the firm’s assets can decline in value before the liabilities exceed the assets and the firm becomes insolvent.

\[ X_5 = \frac{\text{Sales}}{\text{Total assets}} \]  
It measures the turnover ability of the firm’s assets.

\[ Z = \text{Over all index.} \]

The value of \( Z \) is calculated on basis of these five ratios. Altman marked the range of ‘z Score’ between 1.81 to 2.99 for making a classification of companies into the bankrupt or non-bankrupt group. The companies with scores below 1.81 are classified as non-bankrupt or healthy companies. A cut off point of 2.675 was determined as the most efficient value for bankrupt and non-bankrupt groups. If the value of z score is between 1.81 and 2.675 it is treated as ‘area of ignorance’.

The accuracy of the model for prediction of failure was over 95 percent one year prior to bankruptcy. The accuracy of the model deceased to 72 percent two years prior to bankruptcy date. The predictive power of the model fall sharply as the financial data became more remote from the bankruptcy date.

Deakin\textsuperscript{13} used all the fourteen ratios which had been used by Beaver, to construct an overall indicator on the lines of Altman’s analysis. He studied 32 failed firms, which experienced either bankruptcy, or liquidated for the benefit of creditors. To convert the results of various ratios into a single summary number, he used a series
of letter and sign of plus and minus to communicate the conditions and trend of the firm’s health. He used different ‘letter’ to represent the level of the ratios and ‘a plus or minus’ sign to project the direction of the trend in the ratio.

The major differences of his study from the Beaver’s study are; 1) he studied the financial statements of bankrupt firms only, whereas Beaver included in his study the firms which had either defaulted on loan obligations or missed preferred divided payment also, 2) his analysis can be converted into single summary to predict corporate failure whereas Beaver had not tried for this type of conclusion.

Wilcox\textsuperscript{14} developed the model for prediction of failure in his study entitled ‘a prediction of business failure using accounting data’ on the assumption that, at any moment, the corporate financial state can be known by its ‘net liquidation value’. The net liquidation value of the firm can be calculated by deducting liquidation value of liabilities from the liquidation value of assets.

He concluded that the value of $1-x/1+x$ will be negative for good company, which varies between .00 to 1.00.

Blum\textsuperscript{15} developed the ‘failing company model’ to assess the probability of business failure. He tried 12 variables divided mainly into three groups; 1) Liquidity ii) profitability and iii) variability and trends.

In liquidity group, the ratios were divided into two categories a) short term liquidity flow b) long term liquidity flow. Short term liquidity flow include i) quick flow ratio related to reserve size and resources inflow to resources outflow, ii) not quick assets/inventory shows the relationship of inventory to highly liquid assets. Whereas long term liquidity flow includes (i) cash flow to total liabilities indicates resources inflow to total claims to be fulfilled, (ii) net worth at fair market value/total liabilities and net worth at book value/total liabilities shows net worth both at market value to total claims. The profitability group, it measure rate of return to shareholders (who invest their money at least for the period of three years) reflects percentage of return available to shareholders. The last group includes standard deviation over a period of time, trend breaks, and slope for net income and for net quick assets to inventory shows the variability and trend of net income and to net quick assets to inventory.
He evaluated the predictive accuracy of his model by using the discriminant analysis. By applying his model, he distinguished failing firms from non-failing firms with more accuracy. The accuracy of the model was 94 percent one year prior to failure date. The accuracy was 90 percent when the failure occurred within two years from the date of prediction. Later on up till 5 years prediction rate of the model was approximately 70 percent.

Libby\textsuperscript{16} analysed all the 14 ratios used by Beaver and Deakin in their studies, to come up with most important ratios. In his analysis to identify five independent source of variation within the set of 4 ratios, he applied a varimax rotation to the financial data. These five variations were covered on 1) profitability 2) activity, 3) liquidity, 4) asset balance and 5) cash position. The five ratios are A) Net income/total assets, b) current assets/sales, c) current assets/current liabilities, d) current assets/total assets and e) cash/total assets were selected to represent the above mentioned five financial dimensions, through analysis of the rotated factor matrix.

All the attempts made outside India to predict the failure of firms at the different time period, on different samples of firms by using a big number of financial ratios and other statistician techniques are based on two basic studies, one is by Beaver and other is by Altman. Beaver is the pioneer in studying the predictive power of individual financial ratios to forecast the failure of firms. Later on Altman developed his model based on the theory that ratios, if analysed with a multivariate frame work, will take on greater statistical significance than the common technique of sequential ratio comparison. His idea gave him a big fame. The biggest shortcoming of his model is that it tends to be accurate only for the year before failure. The accuracy race of the model falls sharply as the data became more remote from the bankruptcy date. This shortcoming of the model has decreased its practical utility to predict failure of the firms. Generally the firm which are in red, either their financial data is not available or they delay in preparing the annual reports. Moreover to predict an event which is of utmost importance is of no use when there is no time left to take remedial measures. Whereas Beaver’s method is certainly more reliable than Altman’s because he showed the less percentage of error in prediction in his study. The rate of misclassification is only thirteen percent one year prior to failure and ranged between twenty one to twenty four percent for the period two to five years prior to failure.
After these two basic studies, there have been studies conducted by Deakin, Blum and Libby by using the technique of multiple discriminant analysis to improve upon the earlier studies. Deakin used all the 14 ratios of Beaver and obtained improved predictability upto 2 years prior to the date of failure. Blum used 12 variables and got success to achieve higher rate of accuracy and Libby factor analysed the 14 ratios used by the Beaver and Deakin and presented a reduced model based on less number of ratios, which had almost same rate of accuracy in prediction as that of Deakin’s model. No doubt that all the above mentioned studies had shown a higher rate of accuracy for prediction of firm’s failure than the Altman’s model but there is one common limitation in these studies that all the studies have a separate discriminant function for each of the five years before failure whereas Altman has only one discriminant function. Because of this limitation that the discriminant function varies according to the number of years before failure, it become difficult to know which particular discriminant function is to apply in a particular case. That is why; these models could not fetch more popularity. The limitation of Wilcox’s model is that it is based on too many arbitrary assumptions for calculating the net liquidation value. Moreover all the arbitrary assumptions which he had considered are neither logical nor realistic.

The problem is that none of these models can be applied to Indian industries to predict sickness at the earliest because of certain difference in basic concepts. In most of the empirical researchers on prediction of firm failure conducted outside India, firm failure has been regarded as synonymous with bankruptcy, which is not correct. At this point the relationship between failure of a firm and bankruptcy of a firm becomes evident. Prof. L.C. Gupta in his book financial ratios for monitoring corporate sickness writes: “Bankruptcy is a clearly defined legal event taking place at a definite point of time, and is undoubtedly conclusive evidence of the firm having failed. However in reality bankruptcy is only the culmination of failure, like a tomb-stone after death. Failure, in the true economic sense, might in fact have occurred several years prior to bankruptcy proceedings.

He further observed that the bankrupt/non-bankrupt classification did not seem to us very relevant in Indian context, for one thing, the failure of an enterprise in India usually culminates; now a day’s atleast, not in a bankruptcy petition but in government take over of the failed enterprise. Moreover every failure of the firm does
not lead to bankruptcy of the firm. Therefore, failure of a concern can be regarded as sickness, whereas bankruptcy is to be considered as last ritual of the concern.

Secondly, we have to calculate those financial ratios for predicting sickness, which are more relevant to our own criteria for deciding whether the unit is sick or non-sick. The most acceptable criteria for declaring a unit as a sick unit in India is the definition given by Reserve Bank of India. In this definition more emphasis is put on cash losses suffered by a firm. So in our model more weightage should be given to cash flow/cash losses after reconsidering all the non-cash transactions.

Thirdly, there is a need for suitable model which should be more useful to predict the health of the enterprise rather than the collapse of the enterprise because the companies do not close down their operations, even after several years of continuous losses. They run their business inspite of accumulated losses with the help of financial assistance from commercial banks and financial institutes.

In India, attempts have been made to apply the different models to Indian data by Sharma L.N. and Rao G.B, Pande K.M. and Bhattacharya C.D, Satyanarayana P.V, and Banerjee Bhaskar. None of the them could make either any improvement or any change while applying these models to Indian data. Notable among these studies is a study done by V.S. kaveri entitled ‘Financial ratios as predictors of borrowers’ health. He developed a discriminant model on the line of the multiple discriminant model of Prof. Edward Altman. Kaveri studied the data of 524 small scale units, being drawn from the lending banks for a period of 1965-1973.

In India, a study of great importance is made by Dr. L.C. Gupta entitled ‘Financial Ratios as forewarning indicators of corporate sickness published in 1979. He examined both Altman’s model and Beaver’s method for predicting corporate failure and concluded that Beaver’s method would be more suitable for preparing a practical forewarning system.

He studied the predictive power of 56 financial ratios grouped into two broad categories i.e. (i) profitability ratios and (ii) balance sheet ratios. Under the profitability ratios category he covered the ratios based on:

a) Earnings before depreciation interest and taxation as the numerator;
b) Earnings before interest and taxation but after depreciation on as the
numerator;
c) Operating cash flow;
d) Measuring profitability of net worth; and
e) Profit retention and distribution ratio and he studied the under mentioned
ratios in his second category of balance sheet ratios which measure-
(a) Directly of indirectly, the strength of equity,
(b) Liquidity,
(c) Operating efficiency in asset utilization and
(d) Assets condition.

He applied all the above mentioned ratios on a sample of 38 sick and 42 non-
sick units from 41 textile and 39 non-textile companies during 1962-74.

The major finding of the study was that the ratios of earnings before
depreciation, interest and taxation/ sales (net of excise) and operating cash flow are
two best ratios of about equal merit and next best to the above two ratios, were the
following three ratios:

a) Earnings before depreciation, interest and tax/total assets + accumulated
depreciation.
b) Operating cash flow/total assets + accumulated depreciation; and
c) Earnings before depreciation, interest and tax/interest + 0.25 debt.

The author found that all the five ratios have a high degree of predictive
power, atleast 2 to 3 years before a near bankruptcy stage. The classification of error
for the two best ratios was 11 to 13 percent in 1962 and about 8 percent in 1964 and
still less thereafter whereas in the case of net best three ratio, the classification of error
was 11 to 16 percent in 1962 and 11-13 percent in 1964 but thereafter it fell to just
around 5 percent or less.

Among the balance sheet ratios, he found that the ratios of new worth/total
debt and all outside liabilities/tangible assets had the least classification of error, no
doubt the predictive accuracy of these two ratios were found to be much less than that
of the best profitability ratios. But even then these two ratios can be used for
prediction of the existence of definite association between incidence of sickness and inadequacy of equity base.

Another good attempt is made by Dr. Yadav\(^2\). He developed a multi-ratio discriminant model containing four independent ratios serving as the best predictive variables by using various statistical techniques. In his study, he tested thirty six financial ratios invariably as well as multi-variately on a sample of 78 companies (39 failed companies and 39 non-failed companies).

He found that the cash flow to total tangible assets ratio has the highest predictive power followed by the earning before interest and taxes to total tangible assets ratio. Among the solvency and liquidity ratios, he concluded that solvency ratios are more reliable predictors of corporate health than the liquidity ratios. All liquidity ratios proved to be very poor in predicting corporate health. The companies with heavy debt and inadequate equity base are more prone to failure/sickness. The similar observations were made by Prof. L.C. Gupta.

The best discriminant function investigated by him is as under:

\[
Y = 19.8927V_9 + 0.0047 V_{25} + 0.7141 \ V_3 + 0.4860 \ V_{35}
\]

Where

- \(Y\) = Overall discriminant score.
- \(V_9\) = Earning before interest and tax/total tangible assets.
- \(V_{25}\) = Current assets/current liabilities.
- \(V_{31}\) = Net sales/total tangible assets.
- \(V_{35}\) = Defensive assets/total operating expenditures.

The discriminant score \(Y = 1.425\) has been determined as the best cut off point to classify the firm either into potentially failed/sick or non-failed/non-sick group of companies. The researcher concluded that if the individual discriminant score of any company is below \(Y = 1.425\), it is to be classified as a potentially failed/sick company and vice-versa. He claimed that the accuracy of the model amount to 95 percent, 86 percent, 82 percent and 79 percent and 78 percent in predicting corporate failure in the initial sample, one to six years respectively prior to failure, which is much more than the most widely discussed foreign studies-Altman, Beaver and March Blum-in the same area.
To sum up, that in Indian industries, for prediction of sickness only that model should be used, which is more relevant to our conditions. There is no point in trying to use foreign models because we are more interested to predict the health of a company rather than the collapse of a company. The model developed by Prof. Gupta on the basis of Prof. Beaver’s model and multi-ratio discriminant model of Dr. Yadav are most suitable under present circumstances to predict the sickness of a company.

2.6 Industrial Sickness in India

The extent of sickness in small scale industries is given in table 2.2.

Table -2.2

<table>
<thead>
<tr>
<th>As at end of March</th>
<th>Total sick units No.</th>
<th>Total sick units Amount (Rs. Crores)</th>
<th>Potential viable No.</th>
<th>Potential viable Amount (Rs.crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>218828</td>
<td>2426.94</td>
<td>16451</td>
<td>590.50</td>
</tr>
<tr>
<td>1991</td>
<td>221422</td>
<td>2792.00</td>
<td>16140</td>
<td>693.12</td>
</tr>
<tr>
<td>1992</td>
<td>245575</td>
<td>3100.00</td>
<td>19210</td>
<td>728.80</td>
</tr>
<tr>
<td>1993</td>
<td>238176</td>
<td>3442.97</td>
<td>21649</td>
<td>798.79</td>
</tr>
<tr>
<td>1994</td>
<td>256452</td>
<td>3690.37</td>
<td>16580</td>
<td>685.93</td>
</tr>
<tr>
<td>1995</td>
<td>268815</td>
<td>3547.16</td>
<td>15539</td>
<td>597.93</td>
</tr>
<tr>
<td>1996</td>
<td>262376</td>
<td>3721.94</td>
<td>16424</td>
<td>635.82</td>
</tr>
<tr>
<td>1997</td>
<td>235032</td>
<td>3909.201</td>
<td>16220</td>
<td>479.31</td>
</tr>
<tr>
<td>1998</td>
<td>221536</td>
<td>3856.64</td>
<td>18686</td>
<td>45596.</td>
</tr>
<tr>
<td>1999</td>
<td>306221</td>
<td>4313.48</td>
<td>18692</td>
<td>376.90</td>
</tr>
<tr>
<td>2000</td>
<td>304235</td>
<td>4608.43</td>
<td>14373</td>
<td>369.45</td>
</tr>
</tbody>
</table>

The number of sick units has increased many times during the period 1990-2000. The number of sick units was 218828 in 1990, whereas in 2000 it increased to 304235.

2.7 Industrial Sickness in Punjab

As pointed out earlier that small industrial sector is playing vital role in the economic development of the state and this sector is not free from industrial sickness.
The total number of units declared sick in the state up to March 2006 are given in Table 2.3.

**Table: 2.3**

**District Wise Breakup of Industrial Units Declared Sick**

**upto March, 2006**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the district</th>
<th>No. of units declared sick</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ludhiana</td>
<td>723</td>
</tr>
<tr>
<td>2.</td>
<td>Amritsar</td>
<td>577</td>
</tr>
<tr>
<td>3.</td>
<td>Jalandhar</td>
<td>237</td>
</tr>
<tr>
<td>4.</td>
<td>Muktsar</td>
<td>123</td>
</tr>
<tr>
<td>5.</td>
<td>Bathinda</td>
<td>324</td>
</tr>
<tr>
<td>6.</td>
<td>Faridkot</td>
<td>163</td>
</tr>
<tr>
<td>7.</td>
<td>Sangrur</td>
<td>113</td>
</tr>
<tr>
<td>8.</td>
<td>Batala</td>
<td>76</td>
</tr>
<tr>
<td>9.</td>
<td>Hoshiarpur</td>
<td>97</td>
</tr>
<tr>
<td>10.</td>
<td>Ferozepur</td>
<td>95</td>
</tr>
<tr>
<td>11.</td>
<td>Mansa</td>
<td>174</td>
</tr>
<tr>
<td>12.</td>
<td>Moga</td>
<td>74</td>
</tr>
<tr>
<td>13.</td>
<td>Gurdaspur</td>
<td>88</td>
</tr>
<tr>
<td>14.</td>
<td>Kapurthala</td>
<td>43</td>
</tr>
<tr>
<td>15.</td>
<td>Patiala</td>
<td>105</td>
</tr>
<tr>
<td>16.</td>
<td>NawanShahr</td>
<td>21</td>
</tr>
<tr>
<td>17.</td>
<td>Ropar</td>
<td>20</td>
</tr>
<tr>
<td>18.</td>
<td>Fatehgarh Sahib</td>
<td>46</td>
</tr>
<tr>
<td>19.</td>
<td>Chandigarh</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>3134</strong></td>
</tr>
</tbody>
</table>

**Source:** R.B.I. Report
INDUSTRIAL SICKNESS

It is clear from the table the large number of industrial sick units are located in Ludhiana followed by Amritsar, Jalandhar, Bathinda districts. About 23% of total sick units have been found in Ludhiana. This study was undertaken by Reserve Bank of India and was limited to find out industrial sick units in the state, no other study has been conducted to examine the extent of industrial sickness in Punjab since 1995. Therefore, present study is an attempt to analyse the causes of industrial sickness in Punjab.
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