

**PREDICTABILITY OF FINANCIAL RATIOS
TO MONITOR CORPORATE FINANCIAL HEALTH
IN TEA INDUSTRY.**

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THESIS

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P R E F A C E

It is well established in the literature that as an instrument of forewarning the Ratio Analysis Technique associated with sophisticated statistical and mathematical tools is helpful in predicting various aspects of the financial distress of corporate units. Prediction of different degrees/statuses of corporate financial health, in an objective manner, is very important as well as necessary as this can be used as a vital device for monitoring the financial distress and can help to take corrective actions to remove the maladies of financial distress. Identification of different degrees/statuses of corporate financial health in general can satisfy a wide range of parties interested in corporate units. The context necessitates investigation as to whether financial ratios can reflect different degrees of financial health; and if they do, an assessment of the predictive ability of the ratios in identifying different degrees of firm's financial health becomes inevitable.

Assessment of the predictability of financial ratios can be approached in a variety of ways — both theoretically and empirically using simple/sophisticated quantitative techniques. In the latter approach, the ratio-trend and the ratio magnitudes could be studied using a variety of sophisticated statistical and mathematical tools like, Multiple Discriminant Analysis, Probability Analysis, Maximum Likelihood Analysis, etc.

In this study, the effectiveness of the financial ratios in identifying different degrees of corporate financial health were assessed, and the classification accuracy of the 'Sets' of ratios were compared with a view to determine the best 'ratio set' for such identification/prediction using Multiple Discriminant Analysis technique having the Tea Industry as the base. In response to the above, this study has been divided into following five chapters:

- (i) the 1st Chapter introduces with the problem;
- (ii) the 2nd Chapter examines, in the light of the previous study, the areas for further research;
- (iii) the 3rd Chapter examines the significance and predictability of the financial ratios in discriminating different degrees of corporate financial health of tea units;
- (iv) the 4th Chapter examines the relevance of the findings of the present study (in terms of classification accuracy of the 'Set of ratios' selected) in the light of the results of the models suggested by the previous researchers in this context; and
- (v) the last Chapter summarises the study along with this author's views.

The definition of 'Sickness' provided by the Indian authorities was followed in this study and data for both the 'initial' and 'secondary' sample were collected from the public limited companies of West Bengal. Multiple Discriminant Analysis technique (linear form) was used to derive prediction models.

Thirty-six (36) financial ratios (out of 52 sample ratios) were identified by using statistical significance tests and were selected as the independent variable in the discriminant analysis. The simultaneous method was used to derive discriminant functions. On the basis of the discriminating power of financial ratios (i.e. independent variables) small 'sets' of ratios were formed to assess the predictability of those ratios through the comparison of the classification accuracy of the derived small 'sets' of ratios. The results were tested on the 'secondary' data sample also.

The statistical significance tests and the classification accuracy of the 'sets' indicated that financial ratios from published annual accounting data were useful in identifying/predicting different degrees of corporate financial health of tea units. The findings of the study revealed that the magnitudes of the financial ratios (at least the 36 ratios highlighted in this study) of tea units having dissimilar financial health differed from one another, and it was possible to identify quantitatively the various degrees of financial health of corporate tea units. The 'set' of financial ratios containing 'OCF/Total Debts', 'Retained Profit + Depreciation Charge/Total Debts', 'Retained Profit + Depreciation Charge/Tangible Assets + Accumulated Depreciation' and 'Net Worth/Total Debts' was the

best 'set' to indicate corporate financial health in Tea Industry.

This humble study may provide help (along with other theoretical analyses) to financial analysts, investors, agencies including the Government, lending institutions, the management and others interested in tea units for their step of actions to be persuaded.

Raiganj,
2nd March, 1990.

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ABBREVIATIONS USED

Depreciation	..	Dep.
Earning Before Depreciation Interest and Taxes	..	EBDIT
Earning Before Interest and Taxes		EBIT
Foreign Exchange Regulation Act		FERA
National Bank for Agriculture and Rural Development	..	NABARD
Not Available	..	NA
Net Worth	..	NW
Operating Cash Flow	..	OCF
Profit After Taxes	..	PAT
Profit Before Taxes	..	PBT
Working Capital	..	WC

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I N T R O D U C T I O N

INTRODUCTION

Prediction of different degrees of corporate financial health in an objective manner is very important as well as necessary as this can be used as a vital device for the total monitoring system to save an unit - and thereby the economy of a country from being sick. As an instrument of forewarning, the 'Ratio Analysis Technique' associated with some sophisticated statistical or mathematical tools though helps a lot in predicting corporate financial health but owing to lack of experimental verification widely accross the industry-categories, there is no clear idea as to which of the financial ratios, either individually or in a set, are in fact critical from the view point of prediction of the different degrees of corporate financial health. There are large number of financial ratios in use but little progress has been made in empirical testing of financial ratios with a view to showing which one or which set of ratios really reflects a firm's state of financial health. Therefore, it is necessary to investigate whether a reasonable connection exists between the financial ratios and different degrees of corporate financial health, and to assess the relative predictive ability of the financial ratios in predicting firm's future financial health.

Assessment of the predictive ability of the financial ratios in forewarning the different degrees of financial health of the corporate bodies has attracted serious attention of numerous researchers as the corporate 'sickness'¹ is a global problem, specially in the developing countries. Sporadic closure of industrial units and bankruptcies are normal phenomena in the developing countries all over the world². A general pattern of the developing countries disclose that there are sectoral imbalances, and even within the sectors the position of the individual units, irrespective of their sizes and organisational structures, are not a balanced one; rather, peculiar co-existence of different degrees of financial health of these individual units could be observed. But, the problem of 'corporate/industrial sickness' is not only confined to developing countries like India, it is also very much prevalent in the industrially advanced nations like U.S.A., U.K. and Japan³. The 'Dun & Bradstreet Business Failure Records' of U.S.A. showed a preliminary reporting of 11432 commercial and industrial enterprises filing for bankruptcy during the year 1975 and 31334 during the year 1983⁴. "Industrially developed countries, with their well established social security system, easily absorb the ripples caused by industrial sickness whereas developing countries cannot. The result may lead to significant socio-economic consequences"⁵ like decrease in GNP, loss in physical and human resources (i.e., social wealth), law and order problems,

inflation, etc., i.e., overall instability in the total socio-economic condition and structure of a country. The things very needful to get rid from such socio-economic hazards of course are the identification, prediction, and monitoring the different degrees of corporate financial health in an objective manner. But the task of monitoring entails proper assessment of the predictability of the factors (here the financial ratios) that determine the said prediction.

In India, it could be observed, the governmental policy for social reform and progress has laid down the health base of modern, self-reliant and self-generating economy on the one hand and on the other, it has generated a number of new social and economic problems of which 'industrial sickness' is most important. The wave of 'industrial sickness' could be observed from the beginning of the sixties when the country first witnessed 'industrial sickness' in 'Engineering' industry'⁶. At the initial stage, the wave was confined to 'Eastern region' only (mainly in older units)⁷. But gradually, sickness struck units in the various sectors and regions. The thrash of the wave was so severe and fast that it bitterly affected the old and the new as well as large, medium and small enterprises. During the last decade, the sickness has become more and more common and is being discussed widely not only by the 'banks and financial institutions which are obliged to bear the brunt of the financial problems faced by sick industrial units'⁸ but also by the

academicians, the Dailies, the State Assemblies and the Parliament. Every day there are news about the 'sickness'; and the units irrespective of their sizes, organisational structures or industry-categories, have been engulfed by the sickness in one form or the other.

Industrial sickness has assumed, 'the endemic proportions in India'¹¹. A number of units under the major agro-based industrial groups of the country, viz., cotton textiles (106 units have taken over by the National Textile Corporation)¹², sugar (the recent sugar units takeover legislation authorising the Govt. to take-over the management of chronically ill sugar units)¹³, Jute textile¹⁴, tea units (11 Gardens taken-over by the West Bengal Tea Development Corporation, till date)¹⁵, and also the units under the non-traditional sectors such as 'mini-steel, fertilizers, cement'¹⁶, 'engineering, chemicals, rubber'¹⁷ paper & paper pulp¹⁸ etc, have fallen prey to 'sickness'. Governmental authority¹⁹ and the experts in the subject²⁰ have also realised the severeness of this problem and pleaded for better and efficient management of the economy so urgent for the convalescence of these units.

According to the findings of the Reserve Bank of India (at the end of the year 1977) 289 big industrial units enjoying credit facilities of Rs. 1crore and above were sick and the outstanding credit to these units were around Rs. 858 crores; Rs. 200 crores were locked up in 800 sick accounts of the small

scale industries²¹. The enormity of the problem could be correctly judged only when the outstanding dues of the sick units enjoying "credit limits of less than Rs. 1 crore were also added to the above figure. The financial experiences of Commercial Banks, State Industrial Development Corporations, term-lending Financial Institutions (both at State and all-India level) showed that huge funds were involved in sick units and 15 percent 'accounts' of these units have become 'sticky and irregular' on account of the continuing cash losses²². "Some of the agencies have put the sickness in Small-Scale-Sectors at about 60 percent or over 2.2 lakh units"²³. The situation has been growing unabated over the years. By June 1982, around 25342 small units became sick blocking around Rs. 400 crores as outstanding; and by December 1986, around 147740 units came to be sick blocking around Rs. 4874 crores as outstanding bank dues²⁴. The number of sick units in large, medium and small-scale-sector and the bank dues to each of them are shown in Table - I.1 and Table-I.2, respectively.

Table - I.1

Number of Sick Units (1982-86)

Date	Large-sector	Medium-Sector	Small-Scale Sector	Total
End of Dec, 1982	444	1178	58551	60173
End of Dec, 1984	545	1287	91450	93282
End of Dec, 1986	714	1250	145776	147740

Source: Economic Survey-1986-87.

Govt. of India, Ministry of Finance, New Delhi, 1987.

Table - I.2Outstanding Bank-dues of the Sick-Units (Rs. Crores)

Date	Large-Sector	Medium-Sector	Small-Scale Sector	Total
End of Dec, 1982	1791	226	569	2585
End of Dec, 1984	2330	428	880	3638
End of Dec, 1986	3287	281	1306	4874

Source : Economic-Survey, 1986-87;
Govt. of India, Ministry of Finance, New Delhi, 1987.

Industrial sickness and its attending problems are not only a burning question of the day but also a menace to the making of modern and self-reliant India - so much so that the national planners, practising professionals, academicians, managers of the sick units, banks and financial institutions simply could not remain blind to the issues. The initial problem, however, is one of definition : the term 'industrial sickness' 'meant different things to different people'²⁵. A number of study groups have attempted to define it but, they are not yet unanimous about any common definition to identify the 'industrial sickness'²⁶. Rather, what industrial sickness means has been contested by the experts in the academic and corporate world. Even the Parliament and the Government of India (through its various departments) have provided different sorts of ways and

means to identify this important aspect. Although the ways and means of identification by these authorities are almost similar, yet when formulated their definitions remain partially disparate.²⁷ Moreover, they practically only indicate some partial aspects of financial health (i.e., some particular degrees of corporate financial health) of an enterprise.

It is apparent from a number of studies²⁸ that, the condition of majority of the units of Tea industry in India was not good and were suffering from a number of anomalies inherent in them. The growing incidence of sickness is a devastating one involving losses in : production, opportunities of employment, physical assets, social wealth, state revenue, as well as non-utilisation, under-utilisation and mis-utilization of imported and/or indigenous technology. It has crippled the health base of industrial development, social fabrics, and economic system (specially rural economic system of the country). Besides, it locks up the savings and the surpluses of the community by preventing recycling of funds. Moreover, such losses create or have created dampening effect in the growth of National Income.

The financial efficacy of the Indian Tea Industry in general, and West Bengal Tea Industry (popularly known as the North Bengal Tea-Industry) in particular, is deteriorating progressively and steadily. "The incurring of losses, non-payment of dividends deterioration in the financial efficiency,

dis-inclination of the management towards introvertive measures, ... in-coherences in the management of funds by improper planning and controlling"²⁹, defaults in repaying the dues to banks, labourers, financial institutions etc., and even selling the products below the cost of production — are very common in the units of North Bengal. A number of tea-units of North Bengal have been taken over by the Govt. of India owing to their chronic financial illness and also because of the fact that these tea-companies have been declared sick³⁰.

A brief analysis of the Indian Tea Industry discloses that it is the largest agro-based industry in our agro-industrial-economy and it alone provides more than a million of workers directly³¹ and supports a number of ancillary industries and services where about 1 million workers are also employed³². Earning of foreign exchange from the export of tea is around 10% of Gross National Product, at present (April, 1989)³³. Besides, though India is the largest producer of tea (Table-I.3), her comparative share in the world export market has come down from 45% in 1951 to 24% in 1982⁽³⁴⁾ and compared to the other competing tea-producing countries like Kenya, China etc., she is failing to maintain the quantum of export in the world tea market (Table - I.4).

The Indian tea industry is mainly dependent on the international demand factor for its prices and a close analysis of the price factors indicates that though the industry enjoyed the benefits of international price-boom yet the period of

Table - I.3

Production of Tea (World)

(Qty. in Tonnes)

Country	1947	1977	1982	1987
India	254801 54.97%	556267 32.19%	560562 29.04%	674208 30.20%
Srilanka	135409 29.21%	208572 12.07%	187816 9.73%	213327 9.55%
Kenya	6071 1.30%	36291 4.99%	96033 4.97%	155807 6.97%
China	NA	252000 14.58%	397000 20.57%	460468 20.62%
Indonesia	1496 0.32%	80068 4.63%	90158 4.67%	97000 4.34%
Turkey	98 0.02%	97592 4.4917%	68038 3.52%	143849 6.44%
Other Countries	65590 -	466792 27.05%	530076 27.50%	487784 21.88%
All Country	463465	1727582	1929683	2232443

Source : CHAKI BAT, April 1989.

Table - I.4India's Share in World Tea Export

(Qty in Tonnes)

Country	1977	1980	1985	1987
India	226548 27.78%	224026 26.08%	214021 22.48%	209150 21.44%
Srilanka	185542 22.75%	184493 21.48%	197580 20.76%	201138 20.62%
Kenya	70222 8.61%	74799 8.70%	126086 13.24%	134779 13.82%
China	81820 10.04%	107965 12.57%	136864 14.37%	165000 16.92%
Other Countries	200013 24.54%	199952 23.29%	187105 19.69%	228172 23.40%
Total	815417 100%	858897 100%	951777 100%	975234 100%

Source : CHAKI BAT, April, 1989.

enjoying the same (i.e. when the boom will occur again) were quite irregular and unpredictable (e.g., the price-boom occurred in 1952-53, 1966-67, 1976-77 and 1986-87)³⁵. However, this price-boom also brought a number of troubles and difficulties into the tea enterprises. During the last boom of 1976-77 (albeit of short duration), almost all the Indian tea-units triggered a massive increase in tea production³⁶ to take the advantage of fair and high remunerative prices; but, most of these units, specially those operating in Terai, Duars and Hill tracts of Darjeeling (i.e. in West Bengal) suffered much during the slump of 1979-82 owing to the lag-effect of this excess production and supply. "A large percentage of these increased production could not be exported due probably to unremunerative prices and slack demand"³⁸. Besides, the home consumptions was also very poor then. The large quantity produced by the individual units could not be sold in the home market. All these led to higher retention through stock piling and on an average it took 3 to 4 years to liquidate³⁹. All these factors forced the units, majority of them operating in West Bengal, under this industry to face severe financial strains and thus drove the units to a situation of financial sickness.

The internal (financial) and the external (non-financial) causes of 'sickness' and its symptoms are many and they could be classified in various ways [Annexure -I(1) and I(2)]₇. However, there are some causes [Annexure - I(3)]₇ which are peculiar and relevant to the tea-industry only and of them the

major (common to all units) ones relate to the (i) higher labour-cost and labour unrest, (ii) lack of modernisation, (iii) low yield (iv) non-availability of tea-cultivable land (v) age-old tea-bushes and lack of re-plantation works (vi) keen market competition, etc.

(i) Relatively higher rate of wages to the tea-labourers increase the cost of the produced tea and as the tea-industry is always subject to the vagaries of 'Nature' as well as dependent on the international market fluctuations, the increased cost is not compensated by the market price of the products. Besides, the tendency to placet the workers rather than to advise them, as well as the multiplicity of the labour-unions including the inter-union rivalry affects the total production considerably.

(ii) The lack of proper knowledge in the fields of relevant technological advancements, non-availability of adequate funds for modernisation, lack of adequate provisions to generate internal financial facilities/funds, and the heavy taxation (direct and indirect taxes levied by the Central or State Governments) which leave only a little balance in the hands of the producers — all these factors have made the units unable to keep pace with the modern technological advancements. Moreover, the unwillingness of some units and its management to initiate steps for modernisation were also noticed.

- (iii) Yield per hectare of land is comparatively low owing to factors like poor fertility of the lands under the industry, carrying the business with non-stop plucking of 'tea-leaves' from the same piece of tea-bushes, lack of effective guidance to use fertilizers, pesticides, leaf-growers (leaf-prompters) etc, use of inadequate volume of fertilizers, pesticides etc, and the vagaries of 'Nature' (this could be observed particularly in times of climatic draught).
- (iv) Land is absolutely vital to achieve increase in production. Fresh and fertile lands are not being made available to the units by the State Governments. Moreover, the frequent changes in the courses of rivers are destroying land. Thus, the units are unable to meet their requirements for land. Further, at present, cultivation is increasingly carried on the marginal lands in 'draught prone areas' (from the viewpoint of tea-cultivation) by using the lift-irrigation-technique which is very expensive.
- (v) Majority of the tea bushes are over 50 years of age⁴⁰ and the replantation and replacement works done by the entrepreneurs are negligible⁴¹. Hence, the total leaf-output is decreasing which inevitably lead to the decrease in production itself leading to the ultimate financial sickness of the units themselves.

Though, transfer of ownership due to the partition of the country may be identified as one of the basic reason for this poor replantation (Partition of India leads to transfer of ownerships from the Britishers to the Indians belonging to the trading community), even a long period after the partition, necessary steps for the required replantation and rejuvenation have not yet been taken place. The new owners are more interested in more profits than the survival and growth of the industry itself.

- (vi) The industry is facing keen competition in the international market with a number of countries which were not in the earlier tea-maps of the world⁴².

There are a host of other reasons for (which can also be identified as causes of) sickness of the units under the tea-industry. Amongst others, the stagnant and declining tea-prices, production fluctuations, rising input costs, irregular supply of inputs to the units, Govt. policies, unhealthy price-gap between the prices in the auction centres and the prices paid by the final customers, lower per unit domestic consumption⁴³, manipulations by the different interested parties through distortion of accounts, attempts for short-run gains by sacrificing the long-term goal of the units, undue extention of welfare measures under the pressure of the employees-unions/union-leaders and thereby corruptions done by another set of employees or

management etc., and the cumulative consequential effects of all these factors make a tea-unit sick [vide, Annexure - I(3)]7.

RATIONALE

The incidence of sickness in tea industry is a matter of great concern. It is one of the most important agro-based industries in our country. The tea industry is a labour intensive industry which alone provides several millions of workers (directly and indirectly)⁴⁴. A large number of ancillary industries are also dependent on it. Sickness in tea unit is sure to hit a huge number of workers directly if it leads (and that is not very unlikely) to liquidation or closure. In the cases of take-overs or rehabilitations of the sick tea-units, the workers, again, are to suffer the consequences. The fear in the mind of workers and the ultimate retrenchment leads to industrial disputes and aggravates the law and order problems.

Industrial sickness do not occur in an unit all of a sudden⁴⁵. It is the multifarious effect of a number of factors. The sickness and the failure thereafter is the ultimate result. As the corporate bodies are mainly assisted, guided and run by the professionals, only the decision-making bodies can not be held responsible for such sickness. Had the other gearing factors that ultimately translate a decision into reality been available and applied carefully, the objective of the decision making could have attained its proper shape. In tea industry the ill financial health or the sickness can also be examined/monitored

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if the different information and the warning signals which are being reflected through the relationships of the different financial variables could be analysed properly and timely. If the ill-financial health or the sickness of an unit could have been predicted well before its actual happening, the decision making could have been made effective and corrective measures could also have been possible by the management/appropriate authority for growth and vitality.

The financial health of a number of units of West Bengal tea industry in particular is fast deteriorating. A number of units have been taken over by the Government⁴⁶ on health grounds. Besides, a number of studies⁴⁷ claimed that the majority of the tea units in West Bengal are sick.

The erosion in the traditional pillar of our agro-industrial-economy, in terms of growth and earnings, has evoked our interest in tea-industry. Besides, "there are some structural inconsistencies in finance functions of this (tea) industry"⁴⁸ which call for a searching and an indepth study of the financial variables that reflect/represent the financial health. Thus, it warrants our attention to make a detailed study of the different degrees of financial health of the tea units in West Bengal and to search the financial ratios which reflect and represent (monitor) better the different degrees of corporate financial health.

The present study attempts to analyse the effectiveness of financial ratios in disclosing/identifying the different degrees of corporate financial health of the units in Tea industry.

Precisely, this study aims at:

- (i) Finding the financial ratios able to identify the different degrees of financial health of tea units; and
- (ii) Evaluating the effectiveness of the 'significant' financial ratios in predicting different degrees of financial health of tea units (i.e. in other words, selecting the 'set of ratios' which reflect or predict the different degrees of financial health, in a better way).

HYPOTHESES

The present study attempted to test the following hypotheses:

- (i) The magnitudes of financial ratios of the tea units having dissimilar financial health differ from one financial status to the other;
- (ii) Financial ratios are the predictors of the degrees of financial health of the corporate units in tea industry; and
- (iii) The classification accuracy of the financial ratios (in 'sets') in identifying different degrees of financial health of tea units differ from one to the other.

SCOPE OF THE STUDY

The tea units in India are mainly concentrated in two regions — the North-Eastern region and Southern region. The

units of the industry in the North-Eastern region are located mainly at the foot-hills and in the hilly regions; and are owned and managed by different types of organisations, namely, public limited company, FERA and Group Companies of public limited form, private limited company, co-operative society, government company, partnership and proprietorship firms.

The present study considers the tea units of West Bengal (i.e. in the North-Eastern region of India). The tea estates in West Bengal are mainly located in three parts - (i) the Hill-tracts of Darjeeling, (ii) the plains of Terai, and (iii) the plains of Duars. Our study considers the tea estates in Terai and Duars only. The exclusion of tea estates/firms in the Hill-tracts of Darjeeling is owing to - (i) unlike the estates in Terai and Duars, the estates in the Hill-tracts of Darjeeling obtain a variety of grants and subsidies from different sources⁴⁹ and the consequential effects of these affect the comparability of the estates' financial performances, (ii) this area (i.e. the Hill-tracts of Darjeeling) is dominated by the estates owned and controlled by proprietorship firms, partnership firms, private limited companies, FERA and 'Group' Companies (all these firms dominate the area with respect to number of estates (63.83%), number of firms (57.2%) tea grant area (60.1%), actual area under tea (62.35%) and the volume of production (56.79%), vide Annexure-I.4), and (iii) the political disturbances in this hilly-region affected the financial performances of its tea estates seriously.

The present study covers the public limited companies only as such firms dominate the tea industry in West Bengal not only with respect to number of estates (69.7%) and number of firms (62.4%) but also with respect to 'tea grant area' (80.2%) 'actual area under tea' (82.4%) and volume of production (86.3%) (vide Annexure - I.5). The financial data from the proprietorship and partnership firms are not made available as they (the firms) maintain such data as closely held and secret; however, whatever meagre data are made available, can not be relied upon for want of its authenticity. The private limited companies "are very much conservative in disclosing information relating to their financial activities"⁵⁰ and their published accounts are not made available to others save in case of statutory obligations. The FERA and the 'Group' Companies (only 8 (6.3%) such companies controlling 45 (22.7%) estates and covering 33.12% of 'tea grant area', 32.68% of 'actual area under tea' and 37.39% of the volume of production of the total estates in Terai & Duars tea-belts, vide Annexure - I.6) are also not included in our study because the published financial data of such companies include the performances of tea gardens situated in the different parts of India and separate data for their activities only in Terai and Duars are not available.

The present study, thus, rests on the financial data and information of the public limited tea companies whose tea estates are located only in Terai and Duars tea-belts in West Bengal.

Time period

The present study covers the time period from 1979 to 1984 (the period of slump, recovery from slump and prosperity)⁵¹. This time period provides us a scope to study the period of 'trade cycle' in tea business.

Sample

The present study selects 26 public limited companies (controlling 30 tea estates) in Terai and Duars tea-belts of West Bengal. The variables for selecting the sample firms are the location, the organisational structure and the size (represented by the net tangible assets not exceeding Rs. 35,000 per hectare of 'tea grant area') of the tea estates.

It has been claimed by different authorities/studies⁵² that majority of the tea units in West Bengal are 'sick'. Therefore, keeping in view with the aims of this study (page 17) the present study:

firstly, followed the 'random sampling technique' to pick up the sample firms; and finally, on the basis of the amalgum of definitions of sickness (i.e. one extreme degree of the financial health of corporate units defined by the Indian authorities concerned) regrouped the sample firms into two health groups - 'good' and 'sick'.

The sample firms, in a particular accounting year, that disclose negative value in operating Cash Flow, Net Worth and Working Capital (i.e. (-) OCF, (-) NW and (-) WC) are grouped as 'sick' units; and those disclose positive value of all the above three parameters [i.e. (+) OCF, (+) NW and (+) WC] are grouped as 'good' units. The financial health of the sample firms lying between these two extremes i.e., the firms disclosing a combination of negative and positive values of Operating Cash Flow, Net Worth and Working Capital, have been considered as firms having 'semi-good/semi-sick' financial health and are grouped separately .

Data Base

Our study is based on the information obtained from published annual reports and accounts of the sample units and from personal interviews with different officials both at the head office level and at the estate level. Information have also been obtained from various sources, like Committee reports, annual reports of different Planters' Associations, periodicals, books, reports and reviews published by Tea Research Bureau and Tea Board, Stock Exchange Directory, etc.

METHODOLOGY

Financial Ratio Analysis techniques have been adopted in the present study. This study attempts to analyse and measure the relative changes in the financial ratios and thereby attempts to

assess their variability and predictability. In the study, simple quantitative analysis of financial ratios through the Multiple Discriminant Analysis has been attempted as finance functions are basically quantitative in nature and financial decisions are always much influenced by the measurable factors.

LIMITATION OF THE STUDY

The present study examines in detail the ability of the financial ratios in predicting the corporate financial health of the tea units operating in the plains area of West Bengal (i.e. in Terai and Duars). Therefore, as a matter of fact, the primary records kept with the management and the financial accounts and reports published by the tea units constitute the data base of our study. The management board of the tea units in West Bengal, traditionally, are conservative in disclosing the primary records kept with them. It is exceptionally that some such information could be gathered but the verification and authentication of such scanty information is not possible. In view of this, these data are not considered by the present study.

The possibility of having detailed data from governmental sources is practically nil. The financial data provided by the publications of the Tea Board are a few and ready-made, borrowed directly from the bulletins of Reserve Bank of India. The Reserve Bank of India is publishing the financial data for the Industry as a whole and thus are highly aggregative in nature. The financial

data published regularly in the Stock Exchange directories are inadequate for our purposes. The directory classification gives no information about certain important items, such as non-cash adjustments to reported profit, bank borrowings, un-discounted bills, etc. Moreover, the sales figure in the directory are not always consistent, being sometimes inclusive and sometimes exclusive of cess and excise duty. Besides, the data provided by these authorities constitute a secondary source of information. It is not possible to draw upon such aggregative and inconsistent information for the detailed analysis, as has been undertaken in this study.

The only alternative available to us is to consider directly the published annual accounts and reports of the tea units. However, corporate published accounts, though certified by the independent auditors, "are subject to a big question mark"⁵³. Moreover, these data are always an aggregated one and thus considerably reduced the utilities and effectiveness of the tools and techniques used by us.

PLAN OF THE STUDY

The present study is divided into five Chapters including the present one which may be deemed Chapter I.

Chapter II examines, in the light of the previous study, the areas for further research.

Chapter III examines the significance and the predictability of the financial ratios in discriminating different degrees of corporate financial health of sample tea units.

Chapter IV examines the accuracy of the set of financial ratios suggested, in the light of the accuracy of the models suggested by the previous researchers in this context.

Chapter V concludes the study.

* * *

N O T E S & R E F E R E N C E S

1. The 'sickness' which indicates a particular phase of the corporate financial health, is in fact, 'a general name given to an unit whose normal functioning is disturbed'^a and the consequential effects of which is closure or bankruptcy. It is very 'difficult job to define 'normalcy' in an industrial unit in unambiguous terms. For some, normalcy may mean that the unit is paying wages properly, for others it may be constructed as the units ability to meet contractual and/or financial obligations in time, for yet others, normalcy would be synonymous with the quantum of dividends declared and regularity in payment thereof etc.'^b
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7. Sharma, H.L., Ibid.
8. Vishwanathan, R., op. cit., p. 267.
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April 28, 1982; March 8, 1984; April 9, 1985,
p. 1.
(b) Statesman, Calcutta, 20th Sept. 1983.
(c) The Hindu, Madras, April 2, 1983.
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24. Economic Survey 1986-87, Govt. of India, Ministry of
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26. Reddy, B.R., *ibid.*

27. Definitions provided by:

a) The State Bank of India (on the basis of the report by Varshney Study Team 1975):

"The unit is one which fails to generate internal surplus on continuing basis and depends for its survival on frequent infusion of external funds".

b) The Reserve Bank of India (vide, its Circular DBOD No. CAS B.C. 133/C 446 (SIU)76, dated 26.11.1976):

"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 1:1 and worsening debt-equity ratio".

c) Office of the Development Commissioner, Small Scale Industries (on the basis of their survey to identify a 'sick' unit):

"(a) Utilisation of capacity less than 50% of the highest capacity achieved by the unit during the last five years making allowance for any additional capacity installed during the last year,

(b) 50% erosion of net worth of the unit, and

(c) Unit being closed for a total period of six months and more during the last year".

Source : 'Silponnati', Vol. 5, No. 8 & 9, Nov. & Dec. 1983
p. 3.

d) The Indian Parliament (through enactment of 'The Sick Industrial Companies (Special Provisions) Act, 1985 (Act 1 of 1986)', on 8/1/1986; Clause (0) of sub-section (1)):

" 'Sick industrial Company' means an industrial company (being a company registered for not less than seven years) which has at the end of any financial year accumulated losses equal to or exceeding its entire net worth and has also suffered cash losses in such financial year and the financial year immediately preceding such financial year".

28. (a) Bhattacharyya, S.B., "Financial Management in Tea Industry", An Unpublished Ph.D. Thesis, University of North Bengal, 1984.
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37. Ibid, p. 25.
38. Ibid, p. 25.
39. Ibid, p. 25.
40. Tea Statistics 1982-83, Tea Board of India, Calcutta, 1983, p. 23.
41. Deb, K.P., "Sickness in Tea Industry : A Case Study of Some Terai Gardens", Paper submitted on the Xth Annual Conference, Indian Accounting Association, Darjeeling, Feb. 1982.
42. Fleming, N.F.H., Proceedings of the National Seminar on Tea, New Delhi, 1984, p. 33.
43. Ramaswamy, N.K., op. cit., p. 117.
44. Ahmad, M., op. cit. p. 1 and Sing, V.P., op. cit., p. 5.
45. Sahney, M., "Sickness in Medium and Large Industrial Undertakings", State Bank of India, Monthly Review, August 1981, pp. 317-318.
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48. Bhattacharya, S.B., op. cit., p. 19.
49. (a) Of late, a Rs. 40 crore development programme has been initiated by the Govt. of India, through NABARD for the development of 'Darjeeling Tea' only ; Business Standard, Calcutta, Vol. IX, No. 335, 8th March, 1984, p. 1.
- (b) The Interest Subsidy Scheme - project of Rs. 43 crore, of the Tea Board of India was to revive sick tea estates, replace old and uneconomic tea estates, extend the area of tea cultivation in Darjeeling Valley, introduce modern irrigational system, resort to latest know-how to raise productivity of the tea estates and all these would go to the Darjeeling tea estates on a priority basis.: The Statesman, 9th Feb 1987, p. 10.

50. Bhattacharyya, S.B., op. cit., p. 20.
51. Ahmad, M., op. cit., p. 2.
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 Reference No. 28 of Chapter I.
53. Bhattacharyya, S.B., op. cit., p. 25.

* * *

C H A P T E R - IIPREDICTION MODELS USING FINANCIAL RATIOS

A ratio is defined as "indicated quotient of two mathematical expressions" and as "the relationship between two or more things"¹. This relationship can be expressed as a quotient, or as per centum, or in terms of 'times' or 'proportions'. Construction of a financial ratio is essentially an attempt to develop meaningful relationship between individual and/or group of items drawn from the financial statements and is of considerable significance in developing insights about the financial condition of the enterprises².

"It is inconceivable that accounting data can be analysed without transferring it into ratios, in one way or another..."³ This remark, made more than two decades ago, is even more important today with the rapid increase in the volume of financial statements. Time available for specific corporate investigation is under increasing pressure. The demand for quick analysis technique that can help detect the financial and economic event of corporations highlights the roles that financial ratios can play in this regard. "The detection of company operation and financial difficulties is a subject which has been particularly susceptible to financial ratio analysis"⁴.

The financial ratios have become an accepted evaluative technique to financial analyst. "It is being used to determine

the financial position of a firm since as early as 1890's. It is only recently that researchers have engaged themselves in using empirical techniques to enhance the quality of the ratio analysis"⁵. "Notwithstanding that the credibility of ratios is governed to a large extent by corporate reporting behaviour in discharging relevant and accurate information, it is suggested that when a technique is used extensively in financial statement analysis, it should be used as meaningful a way as possible"⁶. Traditionally, current ratio was popularly used to evaluate the credit worthiness of the business enterprises. At present, ratio analysis involves the use of several ratios by a variety of users including credit lending, credit rating agencies, investors and management people for assessing the financial condition of the firm⁷. "Despite the voluminous literature which has been built up on financial ratio analysis, very little progress has been made in empirical testing of financial ratios with a view to showing which of them really reflect a firm's state of health, its chances of survival or failure"⁸. Recently, researchers have applied sophisticated statistical technique to ratio analysis and proved that statistically derived ratio functions are more accurate and efficient in providing guidelines to the analysis⁹.

The studies concerned with warning of business failure were evident in 1930's¹⁰. These studies concluded that failing firms exhibit significantly different ratio measurements from continuing entities. In other words, financial ratios are a

better measure of prediction of events ¹¹. At that time, a study was concerned with ratios of large-asset-sized corporations that experienced difficulties in meeting their fixed indebted obligations. The interest of the researchers was created much by the study of W.H. Beaver in 1966, involving the analysis of financial ratios in a bankruptcy-prediction content ¹². He compared a list of ratios individually (in univariate ways) for failed firms and a matched sample of non-failed firms. Additional widespread interest was created by E.I. Altman who applied a sophisticated statistical technique called 'Multiple Discriminant Analysis' to financial ratio analysis ¹³. Since then several other researchers have conducted further research works in this area. It is observed that, these studies were mainly concerned with two types of problems - (i) whether it is possible to predict an economic or financial event/condition through ratio analysis, i.e. identification of the financial ratios which reflect better a particular financial or economic event/conditions; and (ii) improving or enhancing the quality of the predictive model based on financial ratios through the analysis and examination of their statistical sensitivity and statistical validity (of both the ratios and the models) to predict a particular financial or economic event/condition and thereby improving the overall quality of the ratio analysis technique. "Univariate and multivariate statistical techniques have been used by the writers who have attempted to identify a relationship between accounting ratios

and corporate failure"¹⁴. These studies have concluded that the ratios can be used as predictors of economic and financial events like failure, bankruptcy etc., and the ratios commonly used for measuring liquidity, profitability, financial stability, etc., are found to be better indicators of events¹⁵.

Therefore, this study reviews briefly some empirical works on 'financial ratio analysis' with a view to finding areas for further research. Our review is selective in nature, intended more to enlarge our understanding to search the areas of further research than to be a compendium of literature on the subject.

Donald E. Miller : 1966

Miller¹⁶ attempted to present a cause-and-effect ration approach. He studied the relationship of the ratios by dividing them into two categories : (i) causal ratios, and (ii) ratios that measure effect. He found that there exists a cause-and-effect relationship among the ratios. However, the cause-and-effect relationship was traced by him only among ratios inter se, not between a ratio and the ultimate survival of a firm. In his study, there was no clear indication about which ratios have closer bearing on the prospective health and survival of firms. Only tracing the cause-and-effect relationship among the ratios, does not help to build a categorical frame work of the financial health of a firm. Furthermore, "the examples which Miller uses to illustrate his point ignore some of the most important problems that arise in practical analysis in this imperfect world-distortions and incomparabilities resulting from price-level

changes and differences among firms in respect of financial practices"¹⁷.

W.H. Beaver : 1966

Beaver¹⁸ attempted to demonstrate the failure of an enterprise which could be forewarned reliably through combined utilization of quantitative techniques and financial ratio analysis.

Beaver used 'dichotomous classification test' to study the financial ratios of 79 failed and 79 non-failed firms. He defined failure as a business defaulting on interest payments of its debts, overdrawing its bank accounts or declaring bankruptcy. He selected the firms on the basis of industry and asset size and adopted a paired sample design, (i.e., for each failed firm in the sample, a non-failed firm of the same industry and of similar asset size was selected). He examined the predictive power of 30 different financial ratios which were further divided into six ratio groups, namely, Cash-flow ratios, Net income ratios, Debt to total assets ratios, Liquid assets to total assets ratios and Turnover ratios. He, "for the first time, threw interesting light on the relative efficiency of the various ratios to predict failure upto 5 years prior to failure"¹⁹. His approach involved ranking the firms by the values of particular financial ratios, and then visually inspecting the data to determine an 'optimal' cut-off point for classifying a firm as 'failed' or 'non-failed'. The cut-off was selected to minimise the percentage of total misclassification.

Beaver concluded that, the Cash-flow to total debt ratio had the ability to correctly classify both failed and non-failed firms to a much greater extent than would be possible through random sampling. This ability exists for at least five years before failure. His error rate was 13 percent for one year before failure and ranged between 21 to 24 percent for 2-5 years before failure.

The ratios tested by Beaver predicted the failed and non-failed firms with unequal degrees of success. Non-failed firms were correctly classified to a greater extent than the failed firms. Moreover, his findings were based on the univariate model which has several limitations. "A major limitation of the univariate approach is that different ratios can suggest different conclusions for the same company"²⁰. In spite of all these criticisms, Beaver's study by using quantitative techniques, added a new dimension to the ratio analysis to assess the quality of individual financial ratios in the context of forwarning failures.

On the basis of the same body of data²¹, an extension of his earlier effort was presented in another paper - "Alternative Accounting Measures as Predictors of Failure"²², where he attempted to emphasize the need for emperical verification of a priori beliefs²³. Beaver studied non-liquid-asset ratios (cash flow to total debts, net income to total assets and total debt to total assets) and the liquid-asset ratios divided into three

common denominator groups - a total asset group, a current debt group and a turnover group (within each denominator group four liquid asset measures were studied : Current asset, quick asset, net working capital and cash). He analysed the data at three levels : (i) the dichotomous classification test, (ii) the comparison of mean values of ratio components, and (iii) the likelihood ratio analysis, and observed that : (i) the results of the dichotomous classification test showed a consistently superior performance of the non-liquid asset ratios over the liquid asset ratios; and the superior predictive power existed not only in long-term but also in the years shortly before failure, (ii) the 'comparative mean-value' study which relied solely on the comparison of means could not be an alternative to the dichotomous classification test, and (iii) the outcome of the likelihood ratio analysis was similar to the classification test. His reason for emphasis on the dichotomous classification test was that, it was "a more convenient and accurate measure"²⁴. Thus, Beaver showed that a priori beliefs in the literature did not hold good when examined by empirical evidence.

Beaver's current asset measure was strongly criticized due to the inclusion of inventory which impaired the measure's usefulness²⁵. Another strong criticism was that the items of current assets when analysed in the form of current ratio, were subject to manipulation through a practice known as 'window dressing',²⁶.

E. I. Altman : 1968

Altman²⁷ evaluated the analytical quality of ratio analysis to predict corporate bankruptcy. To overcome the limitations of the univariate model, he suggested the multivariate model consisting of a few important variables. He used multiple discriminant analysis as an appropriate statistical technique and argued that ratios, if analysed within a multivariate frame-work, will take on a greater statistical significance than the standard techniques of ratio comparisons.

The model developed by Altman considered two groups of firms, viz., 'bankrupt' and 'non-bankrupt' and the initial sample was composed of sixty-six corporations with 33 firms in each group. The sample units selected for one group were bankrupt-manufacturing-firms which filed the bankruptcy petitions during 1946-65, and for the other were the paired sample of manufacturing firms which were still in existence during 1966 and were chosen on a stratified random basis. The sample firms were stratified by the industry category and the asset size. The necessary data were collected from the financial statements relating to the periods preceding the period of filing the bankruptcy petitions by the first group of sample firms.

He used 22 ratios for evaluation and these ratios were broadly classified into five categories, viz., profitability, liquidity, leverage, solvency and activity ratios. From the original list of 22 ratio-variables, five were selected as doing the best job together in the prediction of corporate bankruptcy.

To select the final profile of variables, he followed the following procedures:

- (i) Observation of the statistical significance of various alternative functions including determination of the relative contributions of each independent variable,
- (ii) Evaluation of inter-correlations between the relevant variables,
- (iii) Observation of the predictive accuracy of the various profiles,
- and (iv) Judgement of the analyst.

Thus, he selected the following ratios for his final discriminant function:

X_1 = Working Capital/Total Assets.

X_2 = Retained Earnings/Total Assets.

X_3 = Earnings before interest and Taxes/Total Assets

X_4 = Market value of Equity/Book value of Total Debts.

X_5 = Sales/Total Assets.

These five variables were introduced in the model and the discriminant scores (or Z-values) were obtained with the help of the discriminant function in the form :

$$Z = V_1 X_1 + V_2 X_2 + \dots + V_n X_n$$

where, $V_1, V_2, \dots, V_n$ were the discriminant Co-efficients and $X_1, X_2, \dots, X_n$ were independent variables. His final discriminant function²⁸ is as follows:

$$Z = .012 X_1 + .014 X_2 + .033 X_3 + .006 X_4 + .999 X_5$$

Altman performed the 'F-test' to find out the individual discriminant ability of the variables. He employed an additional technique, namely, the 'Scaled vector' to determine the relative contribution of each variable to the total discriminating power of the function and the interaction between them. Thus, he observed that the ratio Sales to Total Assets had larger contribution in the group separation whereas this ratio was insignificant in his univariate study.

Altman conducted several tests to ascertain the accuracy of his model. His model, for the initial sample, classified correctly 94 percent, 72 percent, 48 percent, 29 percent and 36 percent of the sample firms for one, two, three, four and five year prior to bankruptcy, respectively. He tried a similar model on the secondary sample for the data of one year prior to the date of bankruptcy and observed that the model correctly classified 96 percent of the firms in the secondary sample. In searching the possible causes for this difference in accuracy and the superiority of the secondary sample's result, he stated that, "two possible reasons are that the upward bias normally present in the initial sample tests is not manifest in this investigation, and/or the model, ... is something less than optimal"²⁹. He concluded that "bankruptcy can be accurately predicted up to two years prior to actual failure with the accuracy diminishing rapidly after the second year"³⁰. Furthermore, he suggested several practical and theoretical applications

of the model which included business credit evaluation, internal control procedure and investment guide lines.

Altman, in another study³¹, attempted to find out how far the discriminant model would help Loan Officers of commercial banks and other lending institutions to develop loan evaluation techniques. He found that most of the variables which were finally selected in predicting the bankruptcy, were also potentially important in predicting the loan defaults. He claimed that his model, like any other credit scoring model, would reduce the time and costs of loan officers in evaluating loan applications. He indicated that the model is to be updated in the light of experiences.

There are several criticisms against Altman's studies. Craig Johnson states that, "the Altman's model demonstrates that failed and non-failed firms have dissimilar ratios, not that ratios have predictive power. The crucial problem is to make an inference in the reverse direction, i.e., from ratios to failure"³². Moreover, Johnson stated that the model built up for predicting failure have not enabled the analyst to differentiate between 'firms which will fail' and 'firms which will almost fail'. Any exercise on the prediction of alternatives to failure would be more meaningful. Ratios have a meaning only if they are related to some standard and ratios by themselves cannot describe a dynamic system like failure³³. He argued that ratio-discriminant model is not dynamic in nature and, therefore, cannot capture

whatever time series contribution is relevant towards failure contributions³⁴, and concluded that Altman did not provide any evidence of the ability of ratios to predict failure. Altman has not established any logical link between the given values of ratios and grouping of failed and non-failed firms. Merely measuring the degree to which the state of failure is related to current status of firms does not differentiate between near failure and outright failure. Without additional evidence, the practical value of ratio analysis to the issue of failure is still an open question³⁵.

L.C. Gupta criticized that, "an implicit assumption underlying this approach is that the relationship among the various financial variables is of 'compensatory' type. This is incorrect. In our opinion, this is simply not true of the various aspects of business firms financial working. A business firm is more like a structure resting on several pillars and would collapse if even one of those pillars did not have a required minimum strength. That is why we do not think that the Altman-type approach would ever have much success in this area"³⁶. In view of the misclassification rate jumped from 6 percent to 28 percent from one year to two years before bankruptcy, Gupta further criticised that "an error of this magnitude is intolerably high, higher, in any case, than the minimum accuracy needed from this view point of the practical utility of a method..... Altman's error rate reaches the absurd level of 71 percent in the prediction made from years before bankruptcy..... And even

for the three years before bankruptcy, greater accuracy than his model can be achieved by just flipping a coin"³⁷. "An another serious shortcoming of Altman's model is that it was derived purely from a statistical search procedure for the 'best' function and have no basis at all in theory or logical reasoning. The lack of theoretical underpinning of the model means that the relationship could turn out to be wholly spurious without even our knowing"³⁸.

In reply to Craig Johnson's criticisms, Altman stated that, "the question is not whether a firm should be bankrupt if it displays certain ratio measures but whether its symptoms are similar to other firms which have continued to deteriorate towards bankruptcy. The discriminant bankruptcy model is a form of stochastic analysis specifying a general model for predictive purposes. To predict the results of individual firm, more specific model can be developed. Ratio models dealing exclusively with firms in a particular industry or product line will yield more representative parameters which can be used for further predictions of other firms in the same line of business"³⁹. He further stated that, "models utilising ratios could be predictors of failure but this should not preclude complementary opportunistic analysis. Alternative strategies like mergers, may avert formal bankruptcy situation but this does not diminish the overall usefulness of the ratio model"⁴⁰.

David Ewert : 1968

David Ewert⁴¹ studied the scope for predicting the non-repayment of receivables of a manufacturing firm. His study was based on the information supplied by the credit reports of Dun and Bradstreet Inc., Cincinnati, Ohio. He collected the relevant information from 300 trade accounts of a manufacturing concern of California. His sample consisted of small as well as large business concerns. He used 17 variables in his multiple discriminant analysis model. His 17 variables included only two financial ratios, namely, current ratio and the ratio of net sales to net working capital and 15 other non-ratios like credit repayment reports, legal form of organisations, ownership of premises, etc. Ewert found that the variables used could predict successfully the non-repayment of receivables and his model correctly classified 82 percent of the trade accounts. He observed that the ratio variables included in the list of 17 variables did predict the non-repayment of receivables and the non-ratio-variables could do equally well in the prediction of non-repayments.

Marc P. Blum : 1969

On the basis of the accounting and financial market data, Blum⁴² attempted to build a theoretical model to discriminate between the failing and non-failing firms. He indicated failure as "entrance into a bankruptcy proceeding or an explicit⁴³ agreement with creditors which reduces the debts of the company". His sample consisted of 330 firms of which 115 were failed and

115 were non-failed. He selected the firms on the basis of industry category, annual sales, number of employees and fiscal year and adopted a paired sample design. He selected 115 firms which failed during 1954-68 with liabilities greater than one million dollars and a paired sample of 115 non-failing firms being similar to the failed firms in respect of industry, annual sales, number of employees and fiscal year. He collected the relevant and necessary data upto eight years prior to failure where available, however, five years data prior to failure were found optimal. His best overall function contained twelve ratio variables of which five were the measures of ratio trend or variance. Blum made a deliberate choice of his variables in terms of financial theory of firm. He derived separate discriminant functions for each of the five years before failure. His model had an accuracy of 93 to 95 percent when failure occurred within one year of the statement date and 80 percent at prediction for two years prior to failure and 70 percent at prediction for three years prior to failure.

Blum's primary contribution was the inclusion of ratio trends and variance (i.e. stability over time) as predictors in his prediction model; but "since his discriminant function varies according to the number of years before failure, one would not really know which particular discriminant function to apply in a particular case ex ante"⁴⁴. This made the model impractical for adoption in spite of the higher accuracy claimed by the author.

Paul A. Meyer and Howard W. Pifer : 1970

Meyer and Pifer⁴⁵ attempted to present a model for predicting the bank failures. They studied the factors responsible for bank failure and divided them into four categories : (i) local economic conditions, (ii) general economic conditions, (iii) quality of management, and (iv) integrity of employees. Their sample consisted of 39 solvent and 39 failed banks. They studied 28 operating ratios and 4 balance sheet ratios. These ratios were computed from the data collected from the financial statements and from the information supplied by the reports of the 'Federal Deposit Insurance Corporation'⁴⁶. The data were gathered for a period of six years. They used multiple-regression analysis to assess the predictive ability of the ratios. Their model classified correctly 80 percent and 72 percent of the banks in the initial sample for one year and two years before failure. They observed that, when the lead time was three years or more, financial variables were unable to discriminate between the viable and failing banks. Their study emphasized that along with financial ratios, the report of the 'Federal Deposit Insurance Corporation' should be studied to make a better prediction of bank failure. In other words, Meyer and Pifer's study suggested that a study of financial ratios alone would not predict the failure of banks.

Robert Edmister : 1970

Robert Edmister⁴⁷ attempted to predict the failure of firms borrowing or receiving loan guarantees. He indicated a

business as a failure if its 'Small Business Administration (SBA)' loan was written off as a loss, otherwise, the business was considered as a success. His sample consisted of 21 borrowers who failed to repay loans and other 21 borrowers who had not failed to repay loans granted under SBA programme. The borrowers were selected on the basis of the industry and the size of assets, and data were collected for a period of three years. Edmister considered 19 ratios selected on the basis of the ratios found significant in the studies conducted by Beaver, Altman, Ewert and Blum, except the ratio of 'net operating margin'⁴⁸.

The hypotheses of Edmister's study were : (i) A ratio level is a predictor of small business failure; (ii) A three year's trend of such ratio is a predictor of small business failure; (iii) The three year's average of ratio is a predictor of small business failure; and (iv) The combination of the industry relative trend and the industry relative level for each ratio is a predictor of small business failure.

His first hypothesis represented the use of ratios in their crudest form and no adjustment was made for the variations between industries and the ratios were not compared with one another. It was based on the theory that there were standards which were applicable to all firms. The relative level of borrowers' ratio to the average ratio of other small business in the same industry was hypothesized to be predictor of small business failure. To test this hypothesis, the ratio level for certain industries (based on the Robert Morris Associates' (RMA) Annual Statement Studies (1958-66) and Small Business

Administration (SBA) Annual Statement studies (1958-65)) was considered and compared with the ratio levels of the borrowers under the study. To test the second hypothesis, Edmister assigned some weights to the upward and downward trend of each ratio (value '1' to upward trend and '0' for the downward trend). To test the third hypothesis, he worked out the averages for RMA and SBA relative ratios to provide an index of the relative firm to the industry position over the three years. Averaging was expected to smooth out the ratios and to result in more representative figures than that calculated from the 'most recent statements' only. His fourth hypothesis had not been presented in previous empirical research but was an explicit representation of the conditional nature of ratios, recognised by the ratio analysis. Edmister attempted to establish an interaction between the trend and the level of ratios and for this he formed four types of interactions, namely, 'up-high level of trend', 'up-low level of trend', 'up down-high level of trend' and 'down-low level of trend' for each RMA and SBA relatives.

Edmister, firstly, divided the borrowers' ratio by the respective industry ratio (RMA or SBA) to form an industry relative of ratios; secondly, he noted the trend of the industry relative as up-down or non-existent; thirdly, he calculated the three years' average ratios; and lastly, he considered together the trend and recent level as a joint condition.

The trend and the level were considered to be variables which might 'interact' or 'act' with regard to predict failure. In the context of failure of firms in repaying the loan, Edmister used the multiple discriminant analysis, with 7 variables only, to assess the predictability of the ratios.

The results of his study showed that the discriminant model developed for small business failure demonstrated 92 percent accuracy in the initial sample and 80 percent accuracy in the validation sample. His study also indicated that ratio analyses may be benefitted by comparing industry averages with borrowers' ratios and by using a small number of ratios representing different borrowers' characteristics rather than one or a few ratios describing very similar borrowers' conditions. The study showed that the small business function failed to discriminate when 'only one statement' (financial statement) was available. (But the Altman's and Beaver's studies showed that for large business 'only one statement' was sufficient for a highly discriminant function). According to Edmister's study, at least three consecutive financial statements are necessary for the analysis of a small business failure.

Edmister concluded that multiple discriminant analysis offers one mean of selecting an optimal set of ratios and methods of assigning weights to obtain a relatively simple function and the analysts interested in predicting small business failure might find the function not only more accurate method but also a more efficient technique than that of the subjective process of the

study. Edmister attempted to enhance the quality of the ratio analysis by considering average ratios, ratio trends, ratio levels and the interaction of the trend and the level. He concluded that a linear combination of the above variables can produce better prediction of events.

Edward B. Deakin: 1972

Deakin⁴⁹ proposed an alternative model for predicting failure. He replicated Beaver's analysis on a different sample over a different time period and searched for the linear combination of the variables used by Beaver which could best predict the potential failure in each of the five years prior to failure.

Deakin selected sample firms from a population which experienced failure during 1964-70. He indicated failed firms as those which experienced bankruptcy/insolvency or were otherwise liquidated for the benefit of creditors. Each of the failed firms were matched with a non-failed firm on the basis of industry classification, asset size and availability of financial information. He applied dichotomous classification test to ascertain percentage error of each ratio and calculated accuracy of the test on the initial sample and hold-out sample. He used the Spearsman's rank-order correlation coefficient to indicate the relative order of the predictive power of the ratios. The rank-order correlation coefficients were high in four of the five years, but the coefficient in the third year prior to failure was relatively low. He attempted to find out the cause which made

the coefficient in the third year relatively low by a comparison of mean values of the ratios. The results of his univariate test were quite similar to those reported by Beaver⁵⁰ but with some higher percentage of misclassification rates.

Deakin conducted discriminant analysis by constructing separate discriminant functions for each of the five years before failure and his 'original model' included 14 variables and 'revised model' included only 5 variables. The selection of variables was based purely on a statistical search procedure. He adopted a random sampling procedure for the non-failed firms drawn from 'Moody's Industrial Manual' for the period 1962-1966. The result of the discriminant analysis programme, consisting of a set of discriminant weights, indicated that a linear combination of variables maximises the difference between the groups as well as scaled vectors which indicate the relative contributory power of each variable. His model predicted all the firms in the initial sample with the misclassification rates of 3 percent, 4.5 percent, 4 percent, 21 percent and 17 percent for each of the five years prior to failure, respectively. He tested his the model on the 'independent sample' consisting of 11 failed and 23 non-failed firms, selected at random from the same source and observed a relatively higher rate of misclassification error in the first year which was quite unusual. The error rates of 22 percent, 6 percent, 12 percent, 23 percent and 15 percent were observed for each of the five years prior to failure, respectively.

Deakin concluded that the application of statistical techniques, particularly discriminant analysis, could be used to predict business failure from accounting data as far as three years in advance with a fairly high degree of accuracy. Since, such a long period could be discovered with his method, he expected that, it should be possible for the management of potentially-failing firms to take steps to avert such an occurrence.

Selection of variables by Deakin was criticised because the selection process was not based on the financial theory of firm⁵¹. The selection of variables was based purely on a statistical search procedure. "The lack of under-pinning of the model means that the relationship could turn out to be wholly spurious without even our knowing it. There was a serious lacuna in his model from the practical angle : since his discriminant function varies according to the number of years before failure, one would not really know which particular discriminant function to apply in a particular case before hand. This makes even this model impractical for adoption in spite of the higher accuracy calimed by Deakin"⁵².

E.I. Altman, M. Margain, M. Schedosser and P. Vernimmeni :
1974

They⁵³ attempted to develop a model for evaluating the creditworthiness of commercial loan applications of the firms under the cotton and wool industries in France. Their sample

consisted of 38 firms 'troubled with finance' and 99 'good' firms. They used 41 ratios which were divided into six ratio-categories, namely, liquidity, indebtedness, profitability, turnover, coverage and value added. They observed that financial ratio measures seemed to discriminate well between good and bad credit risks based on their mean values, but, this become less impressive as the time before non-repayment increases. Despite this seemingly different mean values of individual financial ratios, observation of frequency distribution of each measure showed that a large proportion of firms were difficult to discriminate from one another due to the overlapping range in univariate analysis. To overcome this problem they applied a multivariate technique, 'principal component analysis', and observed that certain group of ratios clustered together in the correlation with one principal component such that they reveal similar pieces of information. According to them, this technique provided a better understanding of the financial ratio groups than for actual discrimination between good and bad firms. Through the 'principal component analysis' they finally selected 10 variables (ratios) for their discriminant model and the linear combination of the selected variables produced a higher degree of accuracy in the prediction of firms. They, further, observed that the accuracy was reduced when 10 variables were introduced in the model. They concluded that, such reduction in the accuracy did not mean that a statistical technique for credit scoring was of no use, and one should continue to search for a modern technique

of this type to improve upon a traditional type of credit analysis.

Dalton L. Chesser : 1974

Chesser⁵⁴ attempted to develop a discriminant model for determining the 'acceptable risks' and 'unacceptable risks' of the commercial loan customers in the context of their non-compliance to original loan agreement. He suggested that, non-compliance did not necessarily mean that the borrower would completely default, rather, some workout agreement might have to be arranged which would result in settlement of the loan under conditions less favourable to the lender than those specified in the original loan agreement. He attempted to predict the probability that a commercial loan customer would not be able to comply with his original loan agreement and stated that the applicant's probability of non-compliance which represented the degree of risk associated with the loan request, was still a judgement factor (subjective factor) in the mind of the loan officer. He attempted to replace subjective assignment of probability with a mathematical technique which quantified to the extent possible for an applicant's a priori probability of non-compliance of the loan agreement.

The sample, in his study, consisted of 37 pairs and 21 pairs of the satisfactory and un-satisfactory loans for the first and second year before the event, respectively. He considered a loan agreement as unsatisfactory, if the borrowing firm failed to comply with the terms of its original loan agreement during

his test period (1962-71). His selection of the satisfactory loans were made on the basis of the firm borrowing the loan had complied with the terms of its agreement provided that it could be matched with an unsatisfactory loan in terms of industry and total asset size. He used 15 ratios selected on the basis of their popularity in the literature, their performances in the previous studies and availability of the relevant information from the financial statements of the firms under his study. These ratios were divided into liquidity, leverage, activity and profitability groups. He finally selected 6 ratios for his final model.

Chesser used a mathematical technique to estimate the probability that a loan customer would not be able to comply with the terms of the original loan agreement. The probability model utilized in his study, calculated 'P' (the estimated probability of a loan non-compliance) after obtaining a set of weights or co-efficients based upon the selected financial ratios. The model revised the weights according to a pre-established rule to assure that after each revision, the incremental change in 'P' was reduced to a level considered acceptable a priori. He attempted to compute probability values that could be used to classify the sample loans as either satisfactory or unsatisfactory. Since the possible probability value ranges from '0' to '1', the mid-point (0.50) of the possible values was selected as the cut-off value. In other words, if, through the application of the probability model, a test loan was assigned the 'P' value greater than 0.50,

it was considered as unsatisfactory loan and when it was less than 0.50, the loan was considered as satisfactory.

Chesser claimed that his model correctly classified 76 percent of the units in the initial sample for the first year data; when a similar test was conducted on the secondary sample, the model produced 75 percent accuracy. His model correctly classified 57.14 percent of the units in this sample for the data two years before the non compliance. He observed that this reduction in accuracy in the second year, specifically for the unsatisfactory loans, was due to the fact that non-compliance was more remote and the indications were less clear. "The serious lacuna of the model is that, the model does not specifically tell the loan officer whether to accept or reject a loan application"⁵⁵.

Inspite of the criticisms made against the model, Chesser's attempt to summarise the applicant's tendency to comply with a loan agreement, provided a better basis in the hands of the loan officer for matching the terms of the loan with the characteristics of the borrower. He suggested to modify his model for implementation by introducing non-ratio variables such as, measures of management performance, capacity utilization, diversification of products and services, fluctuation of sales, relation with employees, and general economic activity.

Jarrold W. Wilcox : 1976

Wilcox⁵⁶ suggested an alternative approach to the problems of predicting failure of firms. He called his model, the 'Gambler's

Ruin' approach and assumed that, at any moment, the firm's financial state can be defined by its 'adjusted cash position' or 'net liquidation value'. He arbitrarily defined the liquidation value of assets and debts. According to him, "the 'net liquidation value' or 'adjusted cash position' of a business firm is the difference between the liquidation value of assets and liquidation value of debts. The fluctuation in the net liquidation value from year to year is due to the inflows and outflows of liquid resources. This led to fluctuations in the financial states of the firm. That is, the financial states of the business firm can either improve or worsen from one period to another"⁵⁷. He assumed that the change in the financial state took place always by a fixed amount. He called this fixed amount as the 'Size of the bet' ('S') and stated that, a firm would surely fail unless the probability of the firm's gaining a bet ('P') exceeded that of its losing the bet ('q'); and, the length of period to the time of failure were determined by the size of the firm's net liquidation value in combination with the size and probabilities of inflows and outflows of liquid resources. He claimed great success for his prediction model on the basis of a sample study.

In criticizing the model, L.C. Gupta stated that "the idea underlying this approach is analogous to the concept of 'reserve strength' "⁵⁸, and added that "the model is, however, neither convincing nor realistic because of several arbitrary assumption on which it depends"⁵⁹.

Ahmed Belkaoui : 1978

Belkaoui⁶⁰ attempted to identify the financial characteristics of the companies that became the object of takeover. He used the term 'take-over' in its broadest sense and considered the companies that were subject to both voluntary and involuntary mergers. He used the dichotomous test on the ratios of the firms and also used discriminant analysis to search for a combination (of the same ratios) which best predict take-overs.

The author selected twenty five companies at random from a population which was the subject of take-over during the year 1960 to 1968. A 'control' group of 25 companies which were still in existence in 1973, were selected from the same industries (as the 'experimental' companies) and were within a range of 25 percent of the assets of the 'experimental' companies. For each of the fifty companies (25 'experimental' plus 25 'control') the annual reports were examined for five years prior to the take-over date. He selected 16 ratios on the basis of : (i) their popularity in literature, (ii) their possible relevance to the take-over phenomenon, (iii) their distinction between liquid and non-liquid ratios, and (iv) their appearance in the literature as indicators of the ability of a firm to avoid take-overs.

A review of the error percentage of the dichotomous classification test by the author showed a superior performance of the non-liquid asset ratios. This superiority in the predictive power of the non-liquid ratios was more striking in the short-term,

particularly in the year one, two and three than in the long-term. The second major result of the test pertained to the differences of prediction among the liquid asset ratios. The ratio "working capital over total assets predicted relatively better than the other liquid ratios specially in one, two, three and four years before takeover. The ratio had superior predictive ability to both the 'current ratio' and the 'acid test ratio' in year one, two and four.

Belkaoui used discriminant analysis with the same set of ratios which were used in his dichotomous classification test with the objective to search for a combination of ratios which best predict the takeovers. The result of his discriminant analysis for the initial sample showed the rates of misclassification at 28 percent, 20 percent, 16 percent, 22 percent and 20 percent for year one, two, three, four and five prior to the event, respectively. The result of the secondary sample (consisted of 11 pairs of another firms) showed the misclassification rates to 30 percents, 24 percent, 15 percent, 24 percent and 25 percent for each of the five years. The new sample's results are similar to those of the initial sample. According to Belkaoui "the results on both the initial and secondary sample determined the overall effectiveness of the discriminant model for a longer period of time prior to takeover"⁶¹ and his explanation was that "either the long-term financial position as conveyed by the accounting data is more indicative of a possible takeover, or the changes in the realisability of the model from year to year have little or no meaning"⁶².

He suggested that, "the inclusion of non-financial characteristics would add to the external validity of the model"⁶³.

C.L. Norton and R.E. Smith : 1979

The objective of the study⁶⁴ was to compare the prediction of bankruptcy based on ratios computed from General Price Level (GPL)- financial statements to the prediction based on ratios computed from traditional Historical Cost-financial statements. A sample of an equal number of bankrupt and non-bankrupt firms were chosen and the financial statements were adjusted for the effects of the general price level changes. Financial ratios were computed both from the traditional and GPL financial statements. Discriminant analysis was used for the bankruptcy classifications. The authors found that both GPL and traditional ratio exhibited the ability to predict bankruptcy. In spite of the sizeable differences in magnitude that existed between GPL and Historical cost financial statements, little differences were found in the bankruptcy predictions.

V.S. Kaveri : 1980

In his study, Kaveri⁶⁵ attempted to assess the financial ratios as predictors of borrowers' health-with special reference to the units under the small-scale industries in India. He divided the financial health of the sample units into three categories, namely, 'good', 'irregular' and 'sick'. These different degrees of financial health were identified on the basis of the 'extent of irregularity in their 'cash credit' account with the banks'.

His sample consisted of 200 units with the break-up of 80, 80 and 40 units in 'good', 'irregular' and 'sick' groups, respectively. The sample units were selected on the basis of the industry, size (investment made in plant and machinery), age and forms of organisation. He tested 22 ratios dividing them into five ratio groups - Working Capital, turnover, asset utilisation, profitability, and financial stability. He selected 13 ratios traditionally used by the Indian banks and another 9 (nine) ratios with the objective to make more meaningful interpretation in assessing the financial health of their (banks) borrowers. The study was made from banker's view point for better assessment of borrower's financial health.

From the original list of 22 ratios, he selected five ratios, on the basis of statistical significance tests (F-test and T-test) and the rank of the 'scaled vectors' of the ratios, for his discriminant function.

He observed that his model correctly classified 76 percent, 69.42 percent, 66.67 percent, 60.86 percent, 65 percent, 64.70 percent, and 57.74 percent of all the 200 units in the initial sample for each of the seven years before the event and 69 percent, 67.41 percent, 69.51 percent, 67.30 percent, 62.06 percent, 52.63 percent and 53.84 percent of all the firms in the hold-out sample for each of the seven years prior to the event. He further observed that, his model when tested on a random sample, correctly classified 61.87 percent, 61.26 percent, 59.34 percent, 58.32 percent, 52.02 percent, 51.26 percent, 51.56 percent and 51.35 percent of all the firms in the random sample for the two, three, four, five, six, seven, eight and nine years prior to the event.

Kaveri studied the problem in the light of the policies and practices of the banks in India. The author claimed that, "the model can be used for evaluating a large number of loan applications which are submitted along with the latest financial statements. It is possible to take quick decisions on the loan applications and thereby the bankers and the borrowers will be benefitted"⁶⁶. His model did not indicate how far the model be useful to the practical analysts and interested parties other than the banks and borrowers.

James A. Ohlson : 1980

Ohlson⁶⁷ presented some empirical results of a study predicting corporate failure as evidenced by the event of bankruptcy. He attempted to develop, logically and systematically, the probabilistic estimates of failure by applying the methodology of 'maximum likelihood estimation'.

He used 'conditional logit analysis' with nine selected predictors but no attempt was made to select predictors on the basis of rigorous theory. The predictors were partially selected simply because they appear to be the ones most frequently mentioned in the literature. He followed the legal definition of bankruptcy and his sample consisted of 105 firms failed during the period 1970-76 and 2058 non-failed firms.

He stated that, "the evaluation of the predictive classification power of a model should be more realistic and much can be gained by improving the data base"⁶⁸. He asserted that, "most of the previous studies have used Moddy's Manual to derive the

pertinent financial ratio and the Manual does not indicate what point in time the data were available"⁶⁹. Pointing to the other disadvantages associated with the Manual, he stated that, "the data are often highly condensed, and it is generally complicated, if not impossible, to reconstruct actual balance sheets and income statements"⁷⁰.

He observed that his model correctly predicted 96.12 percent, 95.55 percent and 92.84 percent of the firms under his total sample for the bankruptcy within one year, within two-years and within one or two-years, respectively.

The major findings of the study were "First, it was possible to identify from basic factors as being statistically significant in affecting the probability of failure (within one year). These are : (i) the size of the company; (ii) a measure(s) of the financial structure; (iii) a measure(s) of performance; (iv) a measure (s) of current liquidity (the evidence regarding this factor is not clear as compared to cases (i) - (iii). Second, the predictive power of any model depends upon when the information (financial report) is assumed to be available"⁷¹.

Robert W. Scapens, Robert J. Ryan and Leslie
Fletcher : 1981

Scapens, Ryan and Fletcher⁷² suggested that 'catastrophe theory' can provide a framework for an examination of sudden changes in corporate credit worthiness following publication of accounting information. They attempted to use the catastrophe theory⁷³ to model the relationship between accounting data

(interpreted by ratios.) and the behavioural responses of creditors. The model did not necessarily provide predictions of failure but it indicated why some companies suddenly become 'at risk'. The purpose of their analysis was to describe a possible relationship between credit granting policy of a company's creditors and its financial performance.

The authors hypothesized that, "a model derived from Catastrophe Theory will have predictive content provided that it is possible to uniquely identify the position of the system state and direction of movements in the control variables"⁷⁴.

In their study the 'cusp-catastrophe model'⁷⁵ was used initially but latter they extended their discussion to encompass the higher-order 'butterfly model'⁷⁶. They defined a successful company as 'a company which is earning a 'Satisfactory return' from its activities'. They suggested that the return could be measured by profits, fund flow or cash flow, expressed as a ratio of assets employed or finance raised or by a combination of ratios. A company with a relatively high return for its type of business was regarded as successful and creditors would be confident that their loans to that company would be safe (i.e. the co. bearing low probability of default). A company with a relatively low return for its type of business was regarded as having a greater potential for failure and thus, creditors would have less confidence in such companies and would might restrict or even would withdraw their credit. For their model it did not matter whether or not a measure of return, such as cash flow to total debt ratio, was in

reality a valid economic predictor of corporate failure. It was the creditors' perceptions of its predictive value which they attached much importance.

The study concluded that, a catastrophe model of corporate credit has some empirical validity. The model predicted that the size of the catastrophic change in credit policy would increase with operating risk. The authors concluded that their model or any other catastrophe model was not necessarily the only or the best possible representation of changes in credit policy or explanation of corporate failure.

L.C. Gupta : 1981

L.C. Gupta⁷⁷ reported the results of the study conducted by him to predict the corporate sickness through ratio analysis technique in the Indian situation. He opted for univariate approach built on Beaver's idea but advanced it much further.

His sample consisted of 41 textile companies having 21 non-sick and 20 sick units. The author prepared a list of the known sick textile companies first and next searched for 'matching non-sick companies' in terms of the following characteristics : (a) product or products manufactured, (b) age and (c) size (indicated by paid-up capital, assets, sales around a particular year (1962)). He collected financial data for each company for the period 1962-74; computed 56 financial ratios of two ratio - groups, namely, profitability ratios and balance sheet ratios and was primarily interested in assessing the 'relative predictive

power' of different financial ratios which were determined for each of the years separately.

The author argued that, "most American studies on bankruptcy prediction have attempted to prove the accuracy and superiority of their particular techniques or formulae by referring to the percentage error to their predictions made 1 year, 2 years, and so on, before the point of bankruptcy. However statistically neat and interesting this approach might appear, it does not seem to be appropriate or even relevant given the nature of the problem of industrial sickness in India"⁷⁸. The time period covered under his study was divided and indicated as : (i) the period 1962-63 as a period of '3-4 years prior to the near bankruptcy stage', (ii) the year 1964 as the 'near to the stage of acute sickness', and (iii) the rest period i.e. 1965 to 1974 as the period of 'sickness'. He claimed that his "approach is more flexible and is specially tailored to the nature of the Indian problem"⁷⁹.

He observed that, the two ratios (profitability), namely, EBDIT/Sales (net of excise) and OCF/Sales (net of excise) were the best and of equal merit among all the ratios under his study⁸⁰. He, further, observed that the following two ratios were the 'best' among the balance sheet ratios of about equal merit : (i) Net Worth/Total Debt (including both short-term and long-term); and (ii) All outside liabilities/Tangible Assets (which can be alternatively expressed in different form, viz. Net worth/Tangible Assets)⁸¹.

The author claimed that the percentage error steadily diminished as the sick units moved nearer to the stage of acute sickness and his model's misclassification rate was 3 to 10 percent for 1-2 years prior to the event and 11 to 16 percent for 3-4 years prior to the event⁸².

F. Jerry Ingram and Emma L. Frazier : 1982

The purpose of the study⁸³ was to compare the results of multiple discriminant analysis and maximum likelihood regression models (probit and logit) in an empirical setting characterised by a limited (non-normal distributed) dependent variable. "The specific analytical problem to be addressed, mortgage lending discrimination, was chosen because divergent statistical results could have serious analytical and legal implications"⁸⁴.

The salient features of the analysis were:

- (i) Each of the model was significant at $\alpha = .01$;
- (ii) The logit model's classification accuracy was slightly higher than that of the probit model and both outperformed MDA, but only marginally;
- (iii) The significance of the independent variables varied substantially among the models.

"The purpose of the article has been to compare MDA, probit and logit models in an empirical setting. The results indicate that while there were only small differences in the classifying accuracy of the three approaches, substantially different (even opposite) conclusions were supported regarding the significance of the individual variables"⁸⁵.

R.J. Taffler : 1983

To evaluate the financial viability of the enterprises R.J. Taffler⁸⁶ illustrated the benefits that accrued when published accounting information was used correctly in 'an holistic and relative manner' in the context of an UK-based linear discriminant model. His sample consisted of 46 UK-based firms, bankrupt between 1969 and 1976 and 46 non-bankrupt firms, randomly matched by the size and industry with the failed sample. He identified 80 potentially useful ratios on the basis of 'what literature there is' and the ratios used by related or similar studies. Using the varimax rotated principal component analysis (PCA), he selected only 4 ratios, viz., PBT/Average Current Liabilities, Current Assets/Total Liabilities, Current Liabilities/Total Assets and Credit interval*.

To overcome the difficulties faced in assessing the relative contribution of the individual ratios to the overall discriminating power of the discriminant-model he used "the approach with most intuitive appeal (which), measures the proportion of Mahalanobis D^2 -distance between the centroids of two constituent groups accounted for the each variable"⁸⁷.

He observed that his model misclassified only 2 companies out of 92 i.e., the total misclassification rate was 2.17 percent

* It is measured in days which considered the time for which the company would be able to finance its continuing operations from its immediate assets if it could no longer generate revenue.

(i.e., classification of a failed concern as solvent was 4.3 percent and classification of a solvent as failed was zero percent). A distinguishing feature of the study was placing the performances of the enterprises 'at risk' in a scale of 0-100 which helped to study the performances over a period of time. The 'Z-Score' measures a number of performance related characteristics of a business. As such, a company with a higher score may be viewed as a better performer than one with a lower value, i.e., the z-score is ordinal. It is not possible to view a z-score of 2 as twice as good as a z-score of 1, only that it is better"⁸⁸. To overcome these problems, he suggested to calculate a company's 'performance analysis score' (PAS) in a particular year "by ranking the scores of all firms for that year in ascending sequence and observing the percentage in which the z-score of the concern of interest lies-its PAS"⁸⁹. Different calculations were carried out for each year for each company to obtain the Co's PAS trajectory which helped to indicate their relative performance over time.

The major findings of the study were : (i) the risk index, appeared to provide an accurate measures of the actual degrees of risk of financial distress faced by a company, (ii) a transformation of the z-score, provided a single readily interpretable measure of relative company performance, permitting valid cross-sectional and inter-temporal performance comparison.

James A. Gentry, Paul Newbold and David T. Whitford: 1985

The objective of the study⁹⁰ was to determine whether relative fund-flow components by themselves can discriminate between

failed and non-failed companies. The authors used seven fund-flow components, namely, funds from operations, working capital, financial, fixed coverage expenses, capital expenditure, dividends, and other assets and liability-flows (each divided by total net flow) and a scale measure, viz., total net flows/total assets. The sample consisted of 33 failed and 33 non-failed units. Each of the failed companies was matched with a non-failed company in the same industry based on asset size and sales for the fiscal year, three years before bankruptcy. The study used only two sets of components - one by using the data from one year before failure, and the other by using the data from the mean value of each variable for three years before failure. Multiple Discriminant Analysis (MDA), Probit and Logit techniques were used to examine the predictive ability of the funds-flow components. The finding of the study was that the logit model provided the best results and the MDA and probit model did not alter the results.

The study, through Logit model, classified 77 percent to 83 percent of the sample units correctly. The model correctly classified 70 to 78 percent of the financially weak sample companies. The misclassified logit results were similar to the probit and MDA results. The logit model, tested on a secondary sample of 46 companies (having 23 financially weak and 23 non-weak companies, in the same industry, and of approximately the same asset size), correctly classified 70 to 74 percent of the financially weak companies.

The results of the logit model indicated that cash-flow from operations did not improve the classification results of failed and non-failed companies. The study observed that dividend fund-flow component was a significant variable in the failed/non-failed classification model.

H.Ooghe and E. Verbaere : 1985

Ooghe and Verbaere⁹¹ presented the relationships between the failure of a firm and its financial characteristics, within the Belgian context. They classified the enterprises into 'failing' or 'non-failing' groups on the basis of a set of financial ratios. The results of the classification analysis was used in a 'predictive context'. The primary object of the study was to construct a practical 'predictive' instrument available to the external analyst.

The population of the 'failing companies' consisted of all firms that became bankrupt, in the judgement of the commercial court, during the year 1978 to 1980 or obtained a 'concordat' (creditors agreement) during the same period. The population of the 'non-failed' enterprises was formed by all other business firms. The division of companies into one of these two sub-populations presented an artificial character to a certain degrees: the two sub-populations were only mutually exclusive within a well-defined time horizon. The authors preferred matched sampling procedure for both the groups. By this procedure, 753 annual accounts of non-failing and 395 annual accounts of failed were collected.

The study tested a variable-set of 144 financial ratios selected on the basis of supplemental theoretical considerations, together with the liquidity, profitability and solvency measures which were differentiated into components as far as possible. Linear discriminant analysis technique was used and four models (namely, one-year before bankruptcy, two-years before bankruptcy, three-years before bankruptcy, and the model for the 'global sample') were presented.

Analysing the relative importance of the ratios, the study finally selected 16 ratios for the 'original model' and 9 ratios in total for the four reduced models (in each reduced model, five ratios were considered) on the basis of univariate analysis, multivariate analysis and statistical significance tests.

The study, on the basis of the 'critical value' of discriminant scores observed that the average percentage of misclassification for the 'original' models were 9.98%, 20.4%, 23.6% and 21.3% for 1-year, 2-year, 3-year and 'global' models; and the same for the 'reduced' models were, 11.03%, 21.97%, 27.61% and 24.39% respectively. They also observed that the percentage of misclassification for the 'reduced' models (considering only 5-ratios in each model) were slightly higher than the 'original' models (considering 16 ratios in each model). The study concluded with the comment that, "the discriminant score is a summing variable that gives an important indication of the financial situation of a firm"⁹².

C.J. Casey, V.E. McGee and C.P. Stickney (1986);

Using the 'probit analysis' and the discriminant analysis, Casey, McGee and Stickney⁹³ attempted to assess the importance of the 'financial accounting data' and the 'security price information' for distinguishing bankrupt firms between 'that successfully reorganised' and 'those that liquidated'. In their study, a 'success' was defined as a firm that - (i) filed for bankruptcy but had a 'reorganisation plan' approved by its creditors, (ii) its plan was confirmed by the 'bankruptcy court', and (iii) continued in operation for at least three years subsequent to the confirmation date. A 'liquidation' was defined as a firm that - (i) filed for bankruptcy, and (ii) was either adjudicated bankrupt in 'bankruptcy court' or voluntarily decided to cease operations and liquidate.

The sample of the study consisted of 56 'success' and 57 'liquidators' divided into three sub-groups:

Group 1 : Combined Group (n = 113); Liquidators = 57,
Successes = 56.

Group 2 : 1970-75 Filing Date (n = 72); Liquidators = 37,
Successes = 35.

Group 3 : 1976-1981 Filing Date (n = 41); Liquidators =
20, Successes = 21.

The following analyses were conducted by the study:

- i) Using the Group - 1 data, a probit analysis was performed to see if there was an overall difference between the 'liquidators' and the 'successes'.

- ii) Using Group - 2 data, probit analysis was used to develop a best-fitting equation which was then applied to the Group - 3 data that served as the hold out sample.

The finding was that two factors — (i) the 'free asset percentage' and (ii) the 'change in profitability' in the years preceding bankruptcy - had significant discriminating power. The probit model was able to classify correctly 69% and 59% of the firms in the estimation sample and hold out sample, respectively. It was further claimed that the discriminat model disclosed a slightly higher classification accuracy than the probit model.

Houghton, K.A. and Woodliff, D.R. (Winter 1987):

The objective of the study⁹⁴ was to examine jointly the ability of the financial ratios in predicting corporate 'success' and 'failure' (environmental predictability) and the ability of 'humans' (human information processing) to predict the cases of 'success' and 'failure'. The study defined 'success' and 'failure' in terms of Earnings Per Share (EPS).

The principal research questions of the study were:

- "(1) Do ratios have in themselves sufficient information content to differentiate between companies with differing future levels of earnings per share? and
(2) Can 'humans' (i.e. human information processors) interpret those ratios sufficiently well to predict⁹⁵ the differing future levels of earnings per share?"

The data set for the study comprised a sample of forty eight (48) companies, containing 12 failure cases and 36 non-failure ('success') companies (matched for time period and industry). A financial profile of each of these 48 companies was assembled, based on five financial ratios over three years. These five financial ratios were selected on the basis of their use in literature and include measures of (1) income (EBIT/Total Assets), (2) liquidity (Quick assets/ Current liabilities), (3) dividend policy (Ordinary dividends/Ordinary earnings), (4) Cash flow (Total Debt/Gross cash flow), and (5) leaverage (Long term Debt/ Shareholder's equity).

The authors used the techniques of Discriminant Analysis and computed separate functions for the 'success' cases and for the 'failure' cases. The 'unvalidated discriminant function' of the 'success' group correctly classified 80.56 percent of the non-failure cases and the 'validated discriminant function' of the same group 'accurately classified' twenty four of the thirty six companies (66.67%). The 'unvalidated discriminant function' of the 'failure' group correctly classified ten of the twelve failures (83.33%) and the 'validated function' classified seven of the twelve failures (58.33%).

The study concluded that the financial ratios of failed firms were significantly different from those of non-failed firms and the financial ratios of firms which experienced different levels of Earnings Per Share were significantly different

in the preceding years. The Quick ratio, they observed, "to have a very low correlation with the failure function but, surprisingly, a high correlation with the relative 'success' function"⁹⁶. They also observed that "both financially trained and untrained users significantly out performed 'chance' in a failure prediction context, achieving an accuracy similar or superior to the discriminant function"⁹⁷.

Besides these pioneers, there are a host of other studies in the related areas. A number of researchers have tried to predict the corporate bond ratings (Horrigan 1969⁹⁸; Pinches and Mingo 1978⁹⁹; Pogue and Soldafsky 1969¹⁰⁰; West 1970¹⁰¹); to predict an economic or financial event like, corporate bankruptcy, take-overs, mergers, capital adequacy, etc, (Altman 1971¹⁰²; Altman, Baidya and Rebeiro Dias, 1979¹⁰³; Altman, Haldeman and Naryanan¹⁰⁴ 1977; Altman and Loris 1976¹⁰⁵; Altman and McGough 1974¹⁰⁶; Casey and Bertczak 1985¹⁰⁷; Castagna and Matolesy 1981¹⁰⁸; Dince and Fortson 1972¹⁰⁹; Elam 1975¹¹⁰; Fogelberg, Laurent and McCorkindale 1975¹¹¹; Libby 1975¹¹²; Mason and Harris 1979¹¹³; Martin 1977¹¹⁴; Moyer 1977¹¹⁵; Rege 1984¹¹⁶; Reuber and Roseman 1969¹¹⁷; Santomero and Vinso 1977¹¹⁸; Scott 1981¹¹⁹; Singh 1971¹²⁰; Stevens 1973¹²¹; Talmer 1980¹²²; Van Fredrikslust 1978¹²³; White and Turnbull 1975¹²⁴; White and Turnbull 1975b¹²⁵; Wilcox 1973¹²⁶); to identify differences among industries with respect to financial ratios, (Gupta 1969¹²⁷; Gupta and Huenfer 1972¹²⁸); to test the ratios over time, to identify the linkage between different ratios and to map a profile

of corporate financial characteristics (Courtis 1978¹²⁹; Horrigan 1965¹³⁰; Laurent 1979¹³¹; Pinches, Eubank, Mingo and Caruthers 1975¹³²; Pinches, Mingo and Caruthers 1973¹³³); to identify the basic properties, statistical validity and statistical distribution of accounting/financial data/ratios, (Barnes 1982¹³⁴; Bird and McHugh 1980¹³⁵; Bougen and Drury 1980¹³⁶; Deakin 1976¹³⁷; Donnithorne¹³⁸ 1981; Foster¹³⁹ 1978; Kennedy¹⁴⁰ 1975; Lev 1969¹⁴¹, McDonald and Morris 1984¹⁴²; O'Connor 1973¹⁴³; Tamari 1978¹⁴⁴; Whittington 1980¹⁴⁵); to test the sensitivity of discriminant model in the context of prediction with accounting ratios (Altman, and Eisenbeis 1978¹⁴⁶; Dillon 1979¹⁴⁷; Eisenbeis 1977¹⁴⁸; Gonedes and Dopuch 1979¹⁴⁹; Joy and Tollefson, 1975¹⁵⁰; Lachenbruch, Sneeringer and Revo 1973¹⁵¹; Richardson and Davidson 1983¹⁵²; Richardson and Davidson 1984¹⁵³); to test the effects of price level changes on the prediction model based on financial ratios (Bildensee 1978¹⁵⁴; Ketz 1978¹⁵⁵; Patel 1978¹⁵⁶; Solomon and Beck 1980¹⁵⁷); to analyse elaborately the financial ratios (Kline and Hessler 1952¹⁵⁸; Tucker 1964¹⁵⁹); ——— they all concluded that financial ratios, individually or in a set, contain specific information and can be used with statistical and mathematical techniques, for prediction or description of various attributes of the firm.

Table - II

Ratio Analysis in some Prediction Studies and Scope for Further Research

Sl. No.	Name of the Researcher	Year of the report of the study	Predicted Event	Analytical Tool Used	Variable for sample selection	Relevance of the study	Firms in the Sample
1.	Miller	1966	Survival of Firms	Ratios	NA	From Analysts point of view	NA
2.	Beaver	1966	Failure	Ratios	Industrial size	"	Industrial firms
3.	Altman	1968	Bakruptcy	"	"	"	"
4.	Ewert	1968	Non-repayment of Receivables	Ratios & Non-Ratios	Size	"	"
5.	Blum	1969	Failure	Ratios	Industry, Size, Sales & Employees	"	"
6.	Meyer & Piffer	1970	Bakruptcy	"	Managerial ability and Honesty of Employees	"	Banks
7.	Edmister	1970	Failure	"	Industry & Size	"	Trade Accounts
8.	Deakin	1972	Bankruptcy	"	"	"	Industrial firm
9.	Altman & others	1974	Good and Bad credit risks	"	Industry	"	"
10.	Chesser	1974	Non-compliance of loan Agreement	"	Industry & Size	"	Consumer Loans
11.	Wilcox	1976	Failure	Resource movement	NA	From Analyst's point of view	NA

Table - II (Contd..)

12. Belkaoui	1978	Takeover	Ratios	Industry & Size	From Analyst's point of view	Industrial Firms
13. Kaveri	1980	Good, Irregular and Sick accounts	Ratios	Industry, Size, age and organisation	Banker Borrower Relationship	Firms under Small Scale Industries
14. Ohlson	1980	Bankruptcy	Ratios	Time period	Analyst's point of view	Industrial firms
15. Scapens & Others	1981	Credit worth-ness and thereby failure	Ratios	NA	"	"
16. Gupta	1981	Corporate Sickness	Ratios	Product, age & size	"	Industrial firms specially cotton & textile firms
17. Ingram and Frazier	1982	Mortgage lending situation	Ratios	NA	"	Industrial firms
18. Taffler	1983	Financial viability	Ratios	Industry and Size	"	"
19. Gentry and others	1985	Failure	Ratios	Industry, asset size and sales	"	"
20. Ooghe and Verbaere	1985	Bankruptcy	Ratios	Time period	"	"

Table - II (Contd..)

21. Casey, et al	1986	Reorganisation Possibilities of Bankrupt firms	Ratios	Bankruptcy petitions, firms with reorganisation plans	Analyst's point of view	Industrial firms
22. Houghton and Woodliff	1987	Corporate (Winter) 'Success' and 'Failure'	Ratios and 'Human informa- tion process- ing'	Time period and Industry	"	Industrial firms
23. Scope for further research		Financial health	Ratios	Industry, locational area, and organisa- tional structure	"	Agricultural firms (Tea Industry of India)

From the comparative analysis of the major studies (Table - II) it could be observed that the researchers have attempted to predict corporate bankruptcy, failure, loss or bad accounts, unsatisfactory performance, takeover, corporate sickness etc which are basically qualitative in nature. But most of them have not agreed to any common definition in the matter of identification of financial health hazards experienced by their sample units. The matter has been interpreted and defined differently by the authors themselves. Most of the above studies have provided some sort of their own definition of financial sickness; but in fact, those definitions were the indication of different degrees of sickness or illness of the financial health of their respective sample units. In general, two major groups in this regard (i.e. the opinion about the financial health) could be observed. One group studied the failed or bankrupt or insolvent or closed units* and the other group covered the existing units having all or some of the financial characteristics and symptoms which had commonly been found in the units which were already bankrupt or failed or closed insolvent**. Beaver¹⁶⁰ identified failure as a business unit defaulting on interest payments of its debts, overdrawing

* The studies conducted by Beaver, Altman, Meyer and Piffer, Deakin, Belkaoui, Ohlson, Ooghe and Verbaere, Gupta, etc.

** The studies conducted by Ewert, Mare Blum, Edmister, Chesser, Scapens and others, Ingram and Frazier; Taffler (1983) etc.

its bank accounts or declaring bankruptcy. Altman¹⁶¹ took up the bankruptcy situation directly. Marc Blum¹⁶² identified failures as "entrance into a bankruptcy proceeding or an explicit agreement with creditors which reduced the debts of the company". Meyer and Piffer¹⁶³ considered failed banks as those which were insolvent. According to Edmister¹⁶⁴, a business was identified as a failure if its 'Small Business Administration's' loan was written-off as a loss : otherwise the business was considered as a success. Deakin¹⁶⁵ identified failed firms as those which experience bankruptcy, insolvency or were otherwise liquidated for the benefit of the creditors.

A simple observation of the above quoted studies indicated that the authors identified a unit as a 'sick' one when it had filed the petition of bankruptcy or when the unit had been closed down or when the unit had really become bankrupt; and likewise, 'the units at risk' had been identified as basically a running unit disclosing all or major symptoms and financial characteristics of the closed or bankrupt one, but depended "largely upon various factors which might increase or decrease their probability of failure"*¹⁶⁶.

The present study has considered the matter (i.e. corporate/ industrial sickness) in a different manner. This study attempted

* For instance, suppliers, bankers, etc. may be reluctant to advance credits to such companies and this may bring about their collapse¹⁷².

to analyse the corporate financial health and/or its different degrees of sickness following the guidelines as have been provided by the Indian Parliament¹⁶⁷, the Reserve Bank of India¹⁶⁸, the State Bank of India¹⁶⁹ and the Development Commissioner, Small Scale Industries¹⁷⁰. The present study considered the corporate financial health of the sample units as has been provided by the Indian authorities concerned¹⁷¹, as the variable to predict and is concerned with the analyses of the significance (predictability) of the financial ratios in this context to discriminate between the 'sick' one and the 'good' one.

The corporate financial sickness prevail upon by degrees through phases. It could be observed that the units suffering from the deficiency or shortage in working capital incur cash losses and the resultant effect of these two led to erosion of net worth of the units. The shortage or deficiency in working capital^{*} of an enterprise invited unfavourable operating cash flows^{**} and the effect of these two resulted in erosion of networth^{***} and turned the enterprise to be into financial sickness. In other words, when the working capital, operating

* The negative value of working capital was considered as the signals for shortage or deficiency in working capital.

** The negative value in operating cash flows was considered as the signals for unfavourable operating cash flow and which further indicate the excess in outflow over the inflow of cash which was also the symptom of poor earning capacity and cash losses.

*** This is, generally, indicated by showing the zero or negative value of net worth.

cash flows and net worth of an enterprise disclosed zero or negative value, the enterprises were considered to be in acute financial distress.

In India, the term 'industrial sickness' provides a different connotation and the essence of 'sickness' has been considered by the authorities concerned in a different way because the background of corporate culture influence the views of the authorities responsible to Government. As the present study is based on the financial data of the corporate bodies governed by the enactments drawn upon by those authorities and as the published financial statements are drawn upon according to the dictum¹⁷³ of such enactments and examined by the qualified professionals also on the basis of the guidelines and dictum¹⁷⁴ provided by the enactments, we have no alternative but to accept the definitions provided by such authorities.

The information and explanations collected so far have forced the present author into the belief that in India, the share-holders, the financial institutions, the commercial banks and the political leaders considered an enterprise to be a 'sick' one for reasons born of their self-interests, and that it is very difficult to accept the way they view an enterprise to be a 'sick' one.

As the present study is based on the Indian context, the definition for identification of the units are grounded on the definitions given by the authorities already referred to¹⁷⁵.

The present study, on the basis of such given definitions, regards the financial health of a particular unit at a particular point of time (i.e the annual financial statement date) as the 'sick' one when it discloses negative working capital, negative operating cash-flow and negative net worth; and likewise, the financial health of an unit has been considered a 'good' one when it discloses a positive value of these three particular financial variables. The financial health of the units lying between these two extremes have been considered as units having 'semi-good'/'semi-sick' - financial health.

It is to note that the earlier studies in this line have considered either the units of manufacturing industry or the trade accounts of the units of manufacturing industry or the trade accounts of banks (vide, Table - II), but none has studied the sample units of agro-industry in this context. The present study has identified the agro-industry as the area to be looked into and has particularly chosen the Tea Industry to test the predictability of the financial ratios to predict the financial health of the sample units.

* * *

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C H A P T E R - IIIASSESSMENT OF PREDICTIVE ABILITY OF FINANCIAL
RATIOS IN TEA UNITS.

A financial ratio stands as an index of the relationship between two individual or sets of financial variables. Again, every relationship of the financial variables can be transformed into an equation for analytical purposes. "A equation is a truism in the ex post sense. In order to have practical significance, the financial variables of the equation should be interpreted in the ex ante sense or in casual sense"¹. The abstract relativity depicted in any equation, so formed, is rather suggestive, if not conclusive, of the working of any concern. Hence, mathematical precision arrived at for the ratio analysis has, at times, little relationship with the reality. Inspite of the shortcomings and limitations, the ratios are the most valuable measure to study the financial performances and the various aspects of financial health of the various concerns over times.

Every act in the various areas of a corporate body has its effects on its own corporate structure and its financial health. "Every act causes changes throughout the firm and would be reflected on the balance sheet"². To evaluate these changes and also the changes in the degrees (i.e. sound/sick) of corporate financial health, a single isolated ratio assisted

by the rule of 'Trial and Error' can surely be misleading. Thus, for proper evaluation, it is necessary to start with the financial ratios in sets or the sets of various combination of financial ratios accompanied by statistical and mathematical tools.

The financial ratios so far used to analyse and predict various aspects of the financial health are voluminous; but our study is limited to 52 financial ratios [vide Annexure - III...] grouped under five heads : profitability, financial stability, liquidity, asset utilisation and turn-over.

To identify the financial ratios significant in monitoring various changes in the corporate financial health and to assess their predictive ability (i.e. effectiveness of the financial ratios in predicting the different degrees of corporate financial health) the steps followed by the present study are:

- A) Attempts have been made to select a profile of financial ratios significant in discriminating the different degrees of financial health through statistical significance tests: (i) Mean-Test and (ii) F-Test;
- B) Attempts have been made to list various combination-sets of the 'significant financial ratios' (i.e. the ratios which were able to discriminate different degrees of corporate financial health of sample units) through the assessment of the relative contribution of these financial ratios (representing the total

significant ratio set and/or the set of a particular ratio-group) to the overall discriminant function, and also on the basis of the financial theories of firms;

C) Attempts have been made to assess the effectiveness of the financial ratios through 'Sets' after finalising the list(s) of the financial ratios which would appear in the various 'Sets' of ratio-combination(s); and for this:

- (i) separate discriminant functions have been computed for each separate 'Sets', and
- (ii) observations have been made on : (a) their discriminating power, (b) their increment/reduction in discriminating power on/from that of the 'original' discriminant function, (c) relative contribution of the individual financial ratios to the 'reduced' discriminant functions, and (d) their predictive accuracy matrices for predicting various degrees of financial health;

and,

D) Attempts have also been made to interpret and analyse the results of the accuracy matrices of the 'Sets' to select the best 'Set of financial ratios' and the discriminant function represented by those ratios which were found significant in monitoring various degrees of corporate financial health of the Tea units;

A) SELECTION OF THE PROFILE OF THE SIGNIFICANT FINANCIAL RATIOS:

To assess the significance of each and every financial ratio/(s) under consideration of the present study in predicting the degrees of financial health and also to select a profile of the significant financial ratios that were required to use for testing purposes, the methodology followed is :

- (i) Testing the significance of the ratios through Mean-Test,
- (ii) Testing the significance of the ratios through F-Test, and
- (iii) Selection of a profile of the significant ratios qualified through both the tests (i) and (ii).

(i) MEAN TEST:

Whether the magnitudes of the financial ratios of the sample units belonging to the 'Good financial health' group significantly differ from that of the units belonging to the 'Sick financial health' group could be tested through 'Mean Test'. This test has been performed for all the 52 financial ratios under the present study.

It could be observed (Table III.1) that, the ratios R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R16, R17, R18, R19, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R33, R34, R35, R36, R37, R38, R39, R40, R41, R46, R47 and R49 had

Table - III.1

RESULT OF THE MEAN-TEST OF THE 52 SAMPLE FINANCIAL RATIOS

Ratio	Mean-Test Score	Ratio	Mean Test Score
R-1	4.3341081	R-28	12.5323160
R-2	8.5268622	R-29	9.5561995
R-3	9.1196673	R-30	2.9126300
R-4	3.7644189	R-31	0.9639223**
R-5	3.9288881	R-32	1.8022718**
R-6	8.7123213	R-33	14.2368110
R-7	8.8235176	R-34	7.7054828
R-8	3.5386127	R-35	14.5679980
R-9	5.2191605	R-36	14.3174810
R-10	13.0710920	R-37	5.9075115
R-11	14.0940820	R-38	2.3691542*
R-12	7.1327968	R-39	9.7169996
R-13	14.3798550	R-40	11.5760430
R-14	1.3593443**	R-41	11.5126890
R-15	1.7159471**	R-42	1.9229207**
R-16	12.5784800	R-43	1.1166815**
R-17	3.0756500	R-44	0.9789261**
R-18	7.2698673	R-45	1.1745655**
R-19	13.8208440	R-46	2.9796270
R-20	0.2858455*	R-47	8.5690327
R-21	3.9273903	R-48	0.3183312**
R-22	5.1094664	R-49	4.1152276
R-23	12.9572200	R-50	1.5867733**
R-24	7.1664026	R-51	1.3642532**
R-25	2.6022563	R-52	1.6032887**
R-26	5.1524143		
R-27	15.1202040		

NOTE: * Significant at 5 percent level of confidence but insignificant at 1 percent level of confidence.

** Insignificant at both 5 percent and 1 percent level of confidence.

significant differences in the mean values between the units of the two groups ('Good' and 'Sick') at one percent level of confidence. The ratio R-38 had significant difference at only five percent level of confidence. Thus, it was found that the majority of the financial ratios under the study were not coming from the same financial health group, i.e. the magnitudes of the above stated financial ratios of the sample units belonging to the 'Good financial health' group differ considerably from that of the sample units belonging to the 'Sick financial health' group.

Table - III. 2

FINANCIAL RATIOS TURNED INSIGNIFICANT BY THE MEAN-TEST

Ratio	Description of the ratio
R-14	PBT/Net Worth
R-15	PAT/Net Worth
R-20	Depreciation Charges/Sales (net of excise)
R-31	Short-term Bank Borrowing/(Working Capital Gap + Short-term Borrowings from Non-bank sources)
R-32	Short-term Borrowings/Working Capital Gap
R-38	Working Capital/Sales (net of excise)*
R-42	Current Liabilities/Sales (net of excise)
R-43	Trade Creditors/Sales (net of excise)
R-44	(Trade Debtors - Trade Creditors)/Sales (net of excise)
R-45	Current Assets/Sales (net of excise)
R-48	Net Fixed Assets/Gross Fixed Assets
R-50	Stock/Sales (net of excise)
R-51	Trade Debtors/Sales (net of excise)
R-52	Stock/Cost of Goods sold

NOTE: * Significant at 5 percent level but insignificant 1 percent level.

In analysing the financial ratios (Table-III.2) which failed to discriminate between the different degrees of financial health of the sample units, i.e. the financial ratios which had no significant differences between the mean values of the ratios for the two types of sample units - the 'good' and the 'Sick', it was observed that, all the firms under the 'Sick financial health' group incurred losses and disclosed a negative balance in NW, PBT and obviously in PAT. Again, all the firms of the 'Good financial health' group earned profits and disclosed a positive balance in NW, PBT and PAT. When computed, both the ratios (PBT/NW and PAT/NW) disclosed positive balances for the firms under both the groups because of the mathematical impact of signs³. Owing to the technical defect (i.e. mathematical impact of signs) inherent in computation process, these ratios were unable to discriminate between the negative (bad) and positive (good) financial characters and thereby failed to convey any significant and meaningful information or signals to discriminate between the different degrees of financial health, and thus the ratios, when tested for significant mean differences, failed to discriminate between units under the 'Good financial health' group and the 'Sick financial health' group and thereby turned out to be insignificant ones.

Again, a close relationship could be observed between the sales revenues and the amount of depreciation provided by the sample units, irrespective of their group belongings. For the ratio, R-20 (Depreciation charges/Sales (net of excise) the

difference between the mean value of the units under the groups (the 'good' and the 'Sick') was 0.0021 which was negligible; and that was the cause of the ratio R-20, to become insignificant.

A close scrutiny of the same units revealed that the 'short-term bank borrowings' constituted a lion's share in the working capital and the sample units depended much on the banks for their working capital needs. A shortage in the working capital was recurring every year and was common to all the sample units. The units, irrespective to their financial conditions, were either unable to repay or were in the practice to delay in repaying such bank loans which led the units to bear the burdens of huge debts. The volume of trade debtors, trade creditors, creditors for expenses, were very small and were generally condensed in the published statements; these led it difficult to work out the exact amount of 'working capital gap' which might led to overlook some valuable information which could help to discriminate between the different degrees of financial health. For all these reasons, the ratio R-31, R-32, R-42, R-43, R-44, R-45 and R-51 failed to show any significant differences in the mean values of the ratios between the 'good' and 'sick' groups and became insignificant.

It could be observed that, the ratio R-48 (Net Fixed Assets/Gross Fixed Assets) became insignificant basically owing to the fact that all the sample units, irrespective to their financial conditions, were in operation with a similar

age-old fixed assets and no remarkable volume of replacement had ever been taken place; and the units were following almost similar depreciation policies.

The ratio Stock/Sales (net of excise) (R-50) and Stock/Cost of Goods Sold (R-52) could also be observed as insignificant ones for the sample units under our study. The causes of the failure of these ratio to provide signals to help to discriminate between the degrees of financial health was due to the fact that, the published accounts of the sample units presented the data regarding both the stock and the cost of goods sold in a condensed form with the other presentable items and thus it became impossible to work out the exact amount of the above items which might led to overlook some valuable information which could help to signal and to reflect the different degrees of financial health.

Thus, through the 'mean-test', it could be observed that 38 out of 52 financial ratios under this study (Table - III.1) were showing significant differences in the mean values for the different degrees of financial health of the sample units. In other words, for the majority of the financial ratios under the study, the variations in the financial health of the sample units were reflected by the variations in the magnitudes of the financial ratios.

(ii) F - Test

Whether the financial ratios are able to discriminate between the different degrees of financial health by the

variations in their magnitudes i.e. whether the magnitudes of the financial ratios for the sample units belonging to the 'Good financial health' group and 'Sick Financial health' group differ considerably or not, (so that, one can use the ratios as reflector of financial health), have been studied through the F-test. This test has been performed for all the 52 financial ratios.

Table - III.3

RESULT OF THE F-TEST OF THE 52 SAMPLE FINANCIAL RATIOS

Ratio	F-Test Score	Ratio	F-Test Score
R-1	18.276724	R-23	163.348430
R-2	70.741555	R-24	49.969087
R-3	80.918827	R-25	6.5886912*
R-4	13.782569	R-26	25.799514
R-5	15.018868	R-27	222.439850
R-6	73.851660	R-28	152.812710
R-7	75.749018	R-29	88.987509
R-8	12.178686	R-30	8.2374825
R-9	26.503250	R-31	0.9022086**
R-10	166.228170	R-32	3.1540183**
R-11	193.261900	R-33	196.975680
R-12	49.501440	R-34	57.769495
R-13	201.185030	R-35	206.488930
R-14	1.7978616**	R-36	199.448250
R-15	2.864880**	R-37	33.954962
R-16	153.936480	R-38	5.461164*
R-17	0.00 **	R-39	91.867744
R-18	51.422277	R-40	130.382250
R-19	185.841630	R-41	128.958480
R-20	0.0794376**	R-42	3.5976744**
R-21	15.006362	R-43	1.2132648**
R-22	25.392045	R-44	0.9323856**

Table - III.3 (Contd..)

Ratio	F-Test Score	Ratio	F-Test Score
R-45	1.3423104**	R-49	16.477214
R-46	8.6381856	R-50	2.4497856**
R-47	71.415342	R-51	1.8056025**
R-48	0.0985536**	R-52	2.4763752**

NOTE : * Significant at 5 percent level but insignificant at 1 percent level of confidence.

** Insignificant at both 5 and 1 percent level of confidence.

It could be observed that (Table - III.3) the magnitudes of the majority of the financial ratios (under the study) of the sample units belonging to the 'Good financial health' group differ considerably from that of the sample units under the 'Sick financial health' group. The financial ratios which satisfied the F-test at one percent level of significance were, R-1, R-2, R-3, R-4, R-5, R-6, R-7, R-8, R-9, R-10, R-11, R-12, R-13, R-16, R-18, R-19, R-21, R-22, R-23, R-24, R-26, R-27, R-28, R-29, R-30, R-33, R-34, R-35, R-36, R-37, R-39, R-40, R-41, R-46, R-47 and R-49. The financial ratios R-25 and R-38 only had significance at 5 percent level of confidence.

It could also be observed that the financial ratios which were found insignificant by the 'Mean-test' in discriminating the financial health of the sample units, were also found insignificant by this F-test and in addition to these ratios,

Table - III.4

THE FINANCIAL RATIOS TURNED INSIGNIFICANT BY THE F-TEST.

Ratio	Description of the Ratio
R-14	PBT/Net Worth
R-15	PAT/Net Worth
R-17	Total Dividends/Profit after Tax
R-20	Depreciation Charges/Sales (net of excise)
R-25	Net Worth/Sales (net of excise)*
R-31	Short term Bank Borrowings/W.C. Gap + Short-term Non-Bank Borrowings
R-32	Short-term Borrowings/Working Capital Gap
R-38	Working Capital/Sales (net of excise)*
R-42	Current Liabilities/Sales (net of excise)
R-43	Trade Creditors/Sales (net of excise)
R-44	(Trade Debtors - Trade Creditors)/Sales (net of excise)
R-45	Current Assets/Sales (net of excise)
R-48	Net Fixed Assets/Gross Fixed Assets
R-50	Stock/Sales (net of excise)
R-51	Trade Debtors/Sales (net of excise)
R-52	Stock/Cost of Goods sold.

Note: * Ratios are significant at only 5 percent level of confidence but insignificant at 1 percent level.

Total Dividends/PAT (R-17) and Net Worth/Sales (net of excise) (R-25) were also found insignificant by the F-test (Table - III.4). In analysing the ratio R-17, it was observed that almost all the sample units irrespective of their group belongings (i.e. 'Good' and 'Sick') declared no dividend for a number of years, and as such, this ratio was unable to discriminate between the sample units according to their financial health and thereby turned insignificant. The ratio R-25 was significant at 5 percent level only.

Thus, through the F-test it could be observed that 36 out of the 52 financial ratios selected for the study (Table - III.5) were showing significant differences in their magnitudes for the sample units having dissimilar financial healths.

From the results of the above statistical significance tests (Mean Test and F-test), it could be observed that only 36 financial ratios out of the 52, satisfied both the tests (Table-III.5). (If we consider only 1 per cent level of confidence, then it could also be observed that 36 financial ratios satisfied both the tests and the first hypothesis).

It is to be noted that none of the turn-over ratios [except R-29 (Interest/Sales (net of excise)), and R-30 (Short-term Bank Borrowings/Sales (net of excise))] which have been included in the financial stability group] were found significant under both the tests i.e. Mean-test and F-test.

Table - III.5

FINANCIAL RATIOS QUALIFIED THROUGH BOTH THE MEAN TEST
AND F-TEST

Ratio No.	Description of the Ratio	Ratio No.	Description of the Ratio
<u>PROFITABILITY RATIOS</u>		<u>Financial Stability Ratios</u>	
R-1	EBDIT/Sales (net of excise)	R-24	Net Worth/Debt
R-2	EBDIT/Total Assets	R-26	Net Worth/Long-term Debt
R-3	EBDIT/(Total Assets + Accumulated Dep.)	R-27	Debt/Tangible Assets
R-4	EBDIT/Interest	R-28	All outside liabilities/Tangible Assets
R-5	EBIT/Sales (net of excise)	R-29	Interest/Sales (net of excise)
R-6	EBIT/Total Assets	R-30	Short-term Bank Borrowings/Sales (net of excise)
R-7	EBIT/(Total Assets + Accumulated Dep.)	R-33	All Bank Borrowings/Total Assets
R-8	EBIT/Interest	R-34	Book Value of Equity/Book Value of Debts
R-9	OCF/Sales (net of excise)	R-35	Net Worth/Total outside liabilities
R-10	OCF/Total Assets	<u>Liquidity Ratios</u>	
R-11	OCF/(Total Assets + Accumulated Dep.)	R-36	Current Assets/Current Liabilities
R-12	OCF/Debt	R-37	Quick Assets/Current Liabilities
R-13	OCF/Current Liabilities	R-39	Working Capital/Debt
R-16	Retained Profit/Total Tangible Assets	R-40	Working Capital/Tangible Assets
R-18	(Retained Profit + Dep. charges)/Debt	<u>Asset Utilization Ratios</u>	
R-19	(Ret. Profit + Dep. Charges)/Tangible Assets + Accumulated Dep.)	R-46	Sales/Total Assets
R-21	Depreciation charges/Net Fixed Assets	R-47	Retained Earnings/Total Assets
R-22	Dep. charges/Gross Fixed Assets	R-49	Quick Assets/Current Assets
R-23	Net Profit (before Tax)/Total Capital employed		

B) LISTING VARIOUS COMBINATION 'SETS' OF THE FINANCIAL RATIOS,
ABLE TO DISCRIMINATE BETWEEN THE DEGREES OF FINANCIAL HEALTH
OF THE SAMPLE UNITS

Having the profile of the 36 financial ratios (vide Table - III.5) qualified by the statistical significance tests, their discriminatory ability are needed to be tested, and for this purpose, the present study attempted to assess the overall relative importance of each individual ratio in discriminating different degrees of financial health of the sample units, in a multivariate setting. For this purpose, our study used the 'Multiple Discriminant Analysis' technique (linear form only).

The Discriminant Analysis is well described in the text books of Statistics. It is "designed to establish a procedure for assigning items to predetermined populations. It is to help us distinguish items in one population from those in another"⁴.

In the present study, two group situation was considered when 'Good financial health' and 'Sick financial health' bearing units with the variables consisted of financial ratios derived from the conventional published annual accounts and reports consisting the data sample from which the linear discriminant function was derived.

The relative contribution of the individual ratios to the overall discriminating power, were assessed by the 'scaled vector' which have been found out on the basis of some weights (as per the popularity in use in the literature in this matter) and the coefficients of the individual financial ratios derived

by the linear discriminant function.

The present study considered the linear discriminant function of the form:

$$Z = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \dots + \alpha_k X_k$$

where, $\alpha_1, \alpha_2, \dots, \alpha_k$ were the discriminant coefficients and, $X_1, X_2, \dots, X_k$ were the constituent financial ratios⁵.

Several computer runs were performed on Multiple (linear) Discriminant Analysis Programme with 36 financial ratios which were significant at one percent level in both the Mean Test and the F-Test. The coefficients of the linear discriminant function so obtained (henceforth referred to as coefficients of 'original' discriminant function) were shown in the Table - III.6.

(i) Test for the discriminating ability of the 'original' discriminant function:

To test the discriminating ability of the discriminant function means testing the hypothesis that, "the population discriminant function does not discriminate. This is equivalent to test that the α_i are all equal to zero"⁶.

To judge the situation, the analysis of variance of 'original' function has been done.

It could be observed from the result so obtained (Table - III.7) that the calculated value of F (43.436258) was greater than the Table Value of F at .01 level and thus rejected the hypothesis that 'population discriminant function does not discriminate'. In other words, the discriminant function so obtained (i.e. the original discriminant function) has the discriminating

Table - III.6

Discriminant Co-efficients ('Original' function)
of the 'Monitoring' Ratios.

Ratio No.	Discriminant Co-efficients	Ratio No.	Discriminant Co-efficients
PROFITABILITY RATIOS			
1	0.4376749	11	409.151
2	-0.0597458	12	-35.37922
3	-21.24796	13	13.48846
4	-0.4681357	16	14.43773
5	-11.16273	18	41.07085
6	7.309851	19	-421.0584
7	33.84721	21	4.214661
8	0.4147102	22	2.593819
9	10.26926	23	-24.63512
10	-13.05653		
FINANCIAL STABILITY RATIOS			
24	-76.90964	30	-0.3032012
26	-0.0036038	33	-0.3569336
27	-1.706424	34	76.17654
28	-0.5975249	35	1.063056
29	1.285912		
LIQUIDITY RATIOS			
36	0.3390524	40	0.3905871
37	4.716256	41	0.2986426
39	0.8559987		
ASSET UTILISATION RATIOS			
46	-2.26021	49	-3.618119
47	-1.616489		

Table - III.7

ANALYSIS OF VARIANCE OF THE 'ORIGINAL' FUNCTION

Source	Sum of Squares (SS)	Degrees of freedom (m)	Mean of Squares (MS)	F-ratio
Discriminant (between the sample)	$KD^2 = 212.96181$	$P = 36$	$KD^2/P = 5.9156058$	$\frac{KD^2/P}{D/n-p-1} =$
Residual Error (Within the sample)	$D=3.6771436$	$n-p-1 = 27$	$D/n-p-1 = 0.1361905$	43.436258

NOTE : Table value of $F(.99, 30, 27)=2.47$ and Table Value of $F(.99, 40, 27) = 2.38$

Here, $K = \frac{n_1 n_2}{n_1 + n_2} = 15.75;$

$$D = \sum_{p=1}^{36} \alpha_p \Delta \bar{X}_{jp},$$

$$= 3.6771436$$

where, X_p = Financial Ratios
 α_p = Discriminant coefficients
 p = No. of financial ratios (1,2,..... 36)
 n = Total number of units in 'good' and 'sick' group = 64
 n_1 = No. of units in 'good' group = 28
 n_2 = No. of units in 'sick' group = 36
 j = Group (i.e., Good and Sick, 1 and 2).

ability to discriminate between the two degrees (i.e. the 'good' and the 'sick') of financial health of the sample units.

(ii) Assessment of the Relative Contribution of each Individual Ratio through their Scaled Vector's rank.

The literature in the context of assessing the relative contribution of an individual ratio to the overall discriminating power of the discriminant model is voluminous. According to E.I. Altman, "the relevant statistic is observed as a scaled vector which is computed by multiplying corresponding elements by the square roots of the diagonal elements of the variance - co-variance matrix. Since the actual variable measurement units are not all comparable to each other, simple observation of the discriminant co-efficients is misleading"⁷. According to Taffler "the approach with most intuitive appeal measures the proportion of the Mahalanobis D^2 -distance between centroids of the two constituent groups accounted for by each variable according to the following formula:

$$p_j = \frac{C_j (\bar{r}_{jf} - \bar{r}_{js})}{\sum_{i=1}^K C_i (\bar{r}_{if} - \bar{r}_{is})}$$

where, p_j represents the proportion of the D^2 -distance accounted for by ratio 'j' and $\bar{r}_{if}$ and $\bar{r}_{is}$ are the means of the 'sick'

and 'good' groups for ratio 'i' respectively"⁸. W. Klecka⁹ is in the opinion to obtain scaled vectors for each of the variables through multiplying the discriminant co-efficients by the standard deviations of the respective variables.

In the present study, the scaled vectors were computed following (i) the suggestions made by Altman¹⁰; (ii) the suggestions made by R.J. Taffler¹¹; and (iii) by multiplying the co-efficients of the individual ratios of the discriminant function by the standard deviations of the respective ratios (i.e. the suggestions made by Klecka¹²). The magnitudes of the scaled vectors so obtained were shown in Table - III.8.

Table - III.8

DISCRIMINANT COEFFICIENTS AND SCALED VECTOR

Ratio No.	Discriminant Coefficient 'original function'	SCALED VECTOR on the suggestions of		
		Altman	Taffler	Klecka
<u>PROFITABILITY RATIOS</u>				
R-1	0.4376749	0.5546099	0.0305579	0.0948729
R-2	-0.0597458	-0.0418708	-0.00349527	-0.0089919
R-3	-21.24796	-13.518887	-0.9985298	-2.4874179
R-4	-0.4681357	-24.895524	-0.8331436	-3.464617
R-5	-11.16273	-12.366268	-0.8181261	-2.150808
R-6	7.309851	5.9500169	1.5394728	1.0660204
R-7	33.84721	20.970546	1.4884031	3.7780526
R-8	0.4147102	21.055441	0.6384069	2.8790468
R-9	10.26926	10.277481	0.8300008	2.1632319
R-10	-13.05653	-7.9034962	-0.8121997	-1.7833287

Contd..

Table - III.8 (Contd..)

R-11	409.151	181.20508	20.247974	43.393163
R-12	-35.37922	-83.549471	-4.9317583	-13.796455
R-13	13.48846	8.710026	1.0198828	2.1589413
R-16	14.43773	8.4422648	0.8389762	1.8616095
R-18	41.07085	92.434515	5.4311386	15.233708
R-19	-421.0584	-185.90806	-20.435764	-43.99416
R-21	4.214661	1.2486396	0.039764	0.1721726
R-22	2.593819	0.3434395	0.0139237	0.0499024
R-23	-24.63512	17.837107	-1.8849542	-4.1040952

FINANCIAL STABILITY RATIOS

R-24	-76.90964	-530.85198	-35.195272	-92.424414
R-26	- 0.0036038	- 0.2484104	- 0.0102691	- 0.0362843
R-27	- 1.706424	- 2.6551095	0.3074448	- 0.6526809
R-28	- 0.5975249	- 1.1009291	0.1051217	- 0.236354
R-29	1.285912	0.6245742	-0.0431189	0.11094
R-30	- 0.3032012	- 0.8604695	0.0866171	- 0.1914113
R-33	- 0.3569336	- 0.5096736	0.0588648	- 0.1250489
R-34	76.17654	525.68452	34.888359	91.57015
R-35	1.063056	1.7946708	0.1992211	0.4277206

LIQUIDITY

R-36	0.3390524	0.5168374	0.0571065	0.1227631
R-37	4.716256	3.9388576	0.1818185	0.5940336
R-39	0.8559987	2.1674086	0.1990307	0.4016902
R-40	0.3905871	0.7979187	0.0691717	0.1610708
R-41	0.2986426	0.6060945	-0.0527946	0.1226924

ASSET UTILIZATION

R-46	- 2.260210	-5.5467644	-0.1160824	-0.7250891
R-47	- 1.616489	-0.9650993	-0.0611059	-0.1644079
R-49	- 3.618119	-2.7300679	0.0799531	-0.371237

It could be observed from the magnitude of scaled vectors so obtained (Table - III.8) that, the profitability ratios were the majority in showing the highest relative individual discriminating power to overall discriminating power of the 'original' function, i.e. the profitability ratios were the major contributor in the 'original' discriminant function in discriminating the two different degrees of financial health — the 'good' and the 'sick' (in the first ten ranks in the 'scaled vector', eight were profitability ratios). This result is in consonant with the results obtained by Altman¹³, Gupta¹⁴, etc.

(iii) Selection of the Financial Ratios to Form 'Sets' which were used to assess the effectiveness of financial ratios in predicting Corporate Financial Health of the Sample Units:

In this section attempts have been made to select and form smaller sets of significant financial ratios (whose magnitudes varies significantly according to the variations in the financial health of the sample units) through which the effectiveness of the financial ratios in predicting corporate financial health could be assessed. For application in a practical situation, the greater number of variables (financial ratios) in the "best" linear discriminant function can cause difficulties. For this reason, reduced discriminant functions should be developed. Besides, "the reduced model (discriminant function) seems quite appropriate for classification purposes ("prediction") in a practical situation, the full original model can be used in an analytical context (description of the failure process)"¹⁵.

The smaller sets considered by us contain only four financial ratios for each of the sets (save one). The financial ratios for the sets were selected on the basis of : (i) their individual rank-position in the contributors to the discriminating power of the 'original' function of 36 ratios, and (ii) financial standard norms set forth by the financial experts to classify the financial ratios in the groups like, profitability, financial stability, liquidity, asset utilisation, turnover, etc. Thus, attempts have been made by the present study to assess the effectiveness (i.e. predictability) of the financial ratios through the following models:

1. Descriptive model
2. Ratio - representative model
3. Profitability model
4. Financial Stability model
5. Liquidity model
6. Asset Utilisation model.

1. DESCRIPTIVE MODEL

For this model, the financial ratios bearing the highest ranks in the 'scaled vector' irrespective of their ratio-categories, were selected.

It is to be observed that the rank-order of the financial ratios in the 'scaled vectors' so far derived individually on the basis of the methods suggested by Altman¹⁶, Taffler¹⁷ and Klecka¹⁸ disclosed the same rank arrangement of the ratios upto the first six places only (Table - III.9).

Table - III.9

Ranks of the Financial Ratios (first six) as per the 'Scaled Vector'.

Ratio No.	Ratio Description	Ratio Category	<u>Rank-in-Scaled Vector</u>		
			Altman	Taffler	Klecka
R-24	Net worth/Debts	Financial Stability	1	1	1
R-34	Book value of Equity/Book value of Total Debts	"	2	2	2
R-19	(Retained Profit + Depreciation)/Total Assets + Accumulated Depr.	Profitability	3	3	3
R-11	OCF/Total Assets + Accumulated Depreciation	"	4	4	4
R-18	(Retained Profit + Depreciation)/Total Debts	"	5	5	5
R-12	OCF/Total Debts	"	6	6	6

It would be observed that the magnitudes of the ratio R-34, of the sample firms, tends to equate with the magnitudes computed for the ratio, R-24 as almost all the sample units under the study had no preferred stock. An analysis of the mean, standard deviation, co-efficient of the 'original' discriminant function and the 'scaled vector' of the two ratios (Table- III.10)

revealed that there existed a little difference between the ratio R-34 and ratio R-24. To avoid the effects of the inter-correlation between the two financial ratios, our study considered only the ratio R-24 for this model. It could be observed further that, the ratio R-11 and the ratio R-19 differ only when an unit declared dividend; when an unit declared no dividend, the magnitudes of the two ratios (R-11 and R-19) would be the same. An analysis of the mean, standard deviation, co-efficient of the 'original' discriminant function and the 'scaled vector' of the two ratio (Table - III.10) revealed that there existed negligible difference between the ratios R-11 and R-19, because most of the sample units whether belonging to the 'Good-financial health' group or 'sick financial health' group, either failed to declare or did not declared dividends. The present study considered only ratio R-19 to avoid inter-correlation between the financial ratios themselves and thus finally selected the following ratios for this model and be termed as 1st set of ratios:

- i) Net Worth/Debts (R-24)
- ii) $(\text{Retained Profit} + \text{Depreciation}) / (\text{Total Assets} + \text{Accumulated Depreciation})$ (R-19)
- iii) $(\text{Retained Profit} + \text{Depreciation}) / \text{Total Debts}$ (R-18)
- iv) $\text{OCF} / \text{Total Debts}$ (R-12)

2. RATIO-REPRESENTATIVE MODEL

For this model, attempts were made to select the financial ratios which hold the first rank position amongst the 'scaled vector' of a particular ratio-category. The financial ratios

Table - III.10

Comparative position of the ratios R-19 and R-11, and R-24 and R-34.

Ratio No.	<u>Arithmetic Mean</u>		<u>Standard Deviation</u>		Co-eiffi- eients of the Original Discriminant function	<u>Scaled Vector</u>		
	Good	Sick	Good	Sick		Taffler	Altman	Klecka
R-19	0.0546	-0.1241	0.0293	0.0688	-421.05	-20.43	-185.90	-43.99
R-11	0.0581	-0.1241	0.03	0.0688	409.15	20.24	181.20	43.39
R-24	1.3564	1.2766	-0.3311	0.2350	- 76.9096	-35.1952	-530.85	-92.4244
R-34	1.3564	1.2766	-0.3297	0.2361	76.1765	34.888	525.68	91.5702

which were occupying the highest position in the 'scaled vector' in the ratio categories (vide Table - III.8) were as follows (Table - III.11).

Table - III.11

Rank of the financial ratios in the ratio-categories
(as per the magnitude of the Scaled Vector)

Ratio Category	Ratio Description	Ratio No.	Rank of the ratios in the ratio-category		
			Altman	Taffler	Klecka
Profitability	(Retained Profit+Depreciation)/Tangible Assets+Accumulated Depreciation)	R-19	1	1	1
Financial Stability	Net Worth/ Total Debts	R-24	1	1	1
Liquidity	Quick Assets/ Current Liabilities	R-37	1	2	1
	Working Capital/Debts	R-39	2	1	2
Assets Utilization	Sales (Net of excise)/Total Assets	R-46	1	1	1

It could be observed (Table - III.11) that, in the liquidity ratio-category, the 'scaled vector' computed on the basis of the method suggested by Taffler indicated ratio R-39 as the first rank holding ratio but the other two methods (i.e.

suggested by Altman and Klecka) indicated R-37 as the first one. Our study selected the ratio R-37 from the two ratios (i.e. R-37 and R-39) as the representative one of the liquidity-ratio-category because the ratio R-39 could be manipulated by several ways. To some extent, it could be attributed to 'window dressing' by management or to non-disclosure of some important liability items in the balance sheet¹⁹. This ratio cannot provide better guidelines unless it is studied along with current ratio and turnover ratio²⁰. On the other hand, the ratio of Quick Assets to Current Liabilities (R-37) was widely used as a refined measure of firm's liquidity and thus was considered as a more rigorous and penetrating test of the liquidity itself²¹. A careful study of the financial statements of the sample units indicated that the Commercial Banks were granting short-term loans (to be repaid within one year) to these units against hypothecation of the current crop. These loans constituted the lion's share of the total current liabilities of these units. The Commercial Banks, in general, were interested to see that their lendings were repaid by the units within the stipulated period and for this reason, they attached much importance to the 'Quick ratio' than other liquidity ratios in assessing and granting such short-term finances to these units to meet requirements of their working capital needs.

Thus, our study selected the following financial ratios for this model and be termed as 2nd set of ratios:

i) $(\text{Retained Profit} + \text{Depreciation}) / (\text{Tangible Assets} + \text{Accumulated Depreciation})$

(R-19) (Profitability-ratio)

ii) $\text{Net Worth} / \text{Total Debts}$ (R-24)..... (Financial-stability-ratio)

iii) $\text{Quick Assets} / \text{Current Liabilities}$ (R-37).....
(Liquidity-ratio)

iv) $\text{Sales (net of excise)} / \text{Total Assets}$ (R-46)
(Assets-Utilization-ratio)

3. PROFITABILITY MODEL

For this model, attempts were made to select the financial ratios according to their relative-higher-occupancy in the rank position of the 'scaled vector' of the ratios belonging to the profitability-category only. The financial ratios occupying the first four ranks in the scaled vector of this ratio category were selected. Analysing the scaled vectors (Table - III.8) the following were observed (Table - III.12):

Table - III.12

First Five Ranks of the Ratios in the Profitability-category

Ratio No.	Ratio Description	Ranks based on the Scaled Vector		
		Altman	Taffler	Klecka
R-19	(Retained Profit + Dep.)/ (Tangible Assets + Accumulated Dep.)	1	1	1
R-11	OCF/(Total Assets + Accumulated Depreciation)	2	2	2
R-18	(Retained Profit + Depreciation)/Total Debts	3	3	3
R-12	OCF/Total Debts	4	4	4
R-23	Net Profit (before tax)/ Total Capital Employed	8	5	5
R-4	EBDIT/Interest	5	11	7

All the three methods of computing the scaled vectors agreed to indicate R-19, R-11, R-18 and R-12 as the ratios holding the first four places in the scaled vectors of the ratio-category. For the 5th place, Altman's²² method indicated the ratio R-4 but the other two methods (Taffler²³ and Klecka²⁴) indicated the ratio R-23. To avoid intercorrelation amongst the financial ratios (vide Chapter III, page 123) our study selected R-19 from the pair of the ratios R-11 and R-19. As the the ranks of the scaled vector of the ratio R-23 and the ratio R-4 differ, the present study attempted to test effectiveness

of the profitability ratios in monitoring the financial health of the sample units through two different models - Model 1 (the ratios selected on the basis of the ranks in the scaled vector computed as per the suggestions made by Taffler²⁵ and Klecka²⁶), and Model - 2 (the ratios selected on the basis of the ranks in the scaled vector computed by the suggestion made by Altman²⁷), and the financial ratios selected for these models stand as follows:

PROFITABILITY MODEL - 1

- i) $(\text{Retained Profit} + \text{Depreciation}) / (\text{Tangible Assets} + \text{Accumulated Depreciation}) - (\text{R-19})$
- ii) $(\text{Retained Profit} + \text{Depreciation}) / \text{Total Debts} (\text{R-18})$
- iii) $\text{OCF} / \text{Total Debts} (\text{R-12})$
- iv) $\text{Net Profit (before tax)} / \text{Total Capital employed} (\text{R-23})$

PROFITABILITY MODEL - 2

- i) $(\text{Retained Profit} + \text{Depreciation}) / (\text{Tangible Assets} + \text{Accumulated Depreciation}) ((\text{R-19})$
- ii) $(\text{Retained Profit} + \text{Depreciation}) / \text{Total Debts} (\text{R-18})$
- iii) $\text{OCF} / \text{Total Debts} (\text{R-12})$
- iv) $\text{EBDIT} / \text{Interest} (\text{R-4}).$

The ratios included in 'Profitability Model - 1' be termed as 3rd set of ratios, and likewise the ratios in 'Profitability Model - 2' be termed as 4th set of ratios.

4. FINANCIAL STABILITY MODEL

For this model, attempts were made to select the financial ratios according to their relative-higher-occupancy in the rank position of the 'scaled vector' of the ratios belonging to the financial stability category only. The financial ratios occupying the first four ranks in the scaled vector (Table - III.8) of this ratio category were selected for this model. The ratios so obtained were depicted in Table - III.13 below:

Table - III.13

First Five Ranks of the Ratios in the Financial Stability Category

Ratio No.	Ratio Description	<u>Scaled Vector</u>		
		Altman	Taffler	Klecka
R-24	Net Worth/Total Debts	1	1	1
R-34	Book Value of Equity/ Book Value of Total Debts	2	2	2
R-27	Debts/Tangible Assets	3	3	3
R-35	Net Worth/Total outside liabilities	4	4	4
R-28	All outside liabilities/ Tangible Assets	5	5	5

To avoid intercorrelation amongst the financial ratios (vide Chapter III page 123), our study selected, R-24 from the pair of the ratios R-34 and R-24. Thus the ratios selected for this model were:

- i) Net worth/Total Debts (R-24)
- ii) Debts/Tangible Assets (R-27)
- iii) Net worth/Total outside liabilities (R-35)
- iv) All outside liabilities/Tangible Assets (R-28)

The above four ratios be termed as the 5th set of ratios.

5. LIQUIDITY MODEL

For this model, attempts were made to select the financial ratios according to their relative-higher-occupancy in the rank position of the 'scaled vector' of the ratios belonging to the liquidity-category only. The financial ratios occupying the first four ranks in the scaled vector of this ratio-category were selected. Analysing the scaled vectors (vide Table III.8) the following were observed (Table - III.14).

Table - III.14

First Five Ranks of the Financial Ratios of
the Liquidity Category

Ratio No.	Ratio Description	Rank based on the Scaled Vector		
		Altman	Taffler	Klecka
R-37	Quick Assets/Current liabilities	1	1	1
R-39	Working Capital/Debts	2	1	2
R-40	Working Capital/ Tangible Assets	3	3	3
R-36	Current Assets/Current liabilities	5	4	4
R-41	Current liabilities/ Tangible Assets	4	5	5

All the three methods used in computing 'scaled vectors' agreed to indicate R-37, R-39 and R-40 as the ratios holding the first three places in the 'scaled vectors'. For the 4th place, only Altman's²⁸ method indicated the ratio R-41 but other two methods (Taffler²⁹ and Klecka³⁰) indicated the ratio R-36. As the ranks of the scaled vector of the ratio R-36 and the ratio R-41 differ, present study attempted to test the effectiveness of the liquidity ratios in monitoring the financial health of the sample units through two different models - Model 1 (the ratios selected on the basis of the ranks in the 'scaled vector' computed as per suggestions made by Taffler³¹ and Klecka³²),

and Model - 2 (the ratios selected on the basis of the ranks in the scaled vector computed as per suggestions made by Altman³³):

LIQUIDITY MODEL - 1

- i) Quick Assets/Current liabilities (R-37)
- ii) Working Capital/Debt (R-39)
- iii) Working Capital/Tangible Assets (R-40)
- iv) Current Assets/Current liabilities (R-36)

LIQUIDITY MODEL - 2

- i) Quick Assets/Current liabilities (R-37)
- ii) Working Capital/Debt (R-39)
- iii) Working Capital/Tangible Assets (R-40)
- iv) Current liabilities/Tangible Assets (R-41).

The ratios included in 'Liquidity Model - 1' be termed as 6th set of ratios and the ratios in the 'Liquidity Model-2' be termed as the 7th set of ratios.

6. ASSET-UTILISATION MODEL

In the asset utilisation ratio-category, only three financial ratios were found qualified by the significance tests (viz. Mean Test and F-test, Table - III .5). Thus, there was no scope to select but only to accept these three ratios for further studies.

The three financial ratios accepted by the present study to test the significance and effectiveness of the asset utilisation ratios in monitoring the financial health of the sample units were:

- i) Sales/Total Assets (R-46) - (Rank 1).
- ii) Quick Assets/Current Assets (R-49) - (Rank 2).
- iii) Retained Earnings/Total Assets (R-47) - (Rank 3).

The above three ratios be termed as 8th 'Set' of ratios.

C) TESTING THE EFFECTIVENESS OF RATIOS THROUGH 'SETS'

The significance and the predictive power of the financial ratios monitoring corporate financial health have been tested by different researchers through model, considering either univariate or multivariate nature of the ratios. Considering the multivariate nature of the financial ratios, the present study attempted to test the effectiveness (i.e. predictive ability) of the financial ratios in 'Sets'. For this purpose, the following were computed and critically observed for each of the eight 'sets' separately:

- i) linear discriminant functions,
- ii) trace of their discriminating power,
- iii) changes, if any, in their (sets) discriminating power from that of the 'original' discriminant function,
- iv) relative contribution of the individual financial ratios to the discriminating power of the 'reduced' functions, and
- v) their (sets') predictive-accuracy-matrices for predicting different degrees of financial health.

To assess the effectiveness of the financial ratios through 'sets', the present study tested their predictive ability on the basis of those sample ratios which have greater contributions either to the 'original' discriminant function or to the group to which they belong. The highest relative contributions of the individual financial ratios to the group which they belong were identified by the 'ranks' of the 'scaled vectors'. These 'scaled vectors' of the ratio groups were computed on the basis of the co-efficients of the 'original' discriminant function.

DESCRIPTIVE - MODEL (1st Set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

$$X_1 = R-12, \text{ OCF/Total Debts.}$$

$$X_2 = R-18, \frac{(\text{Retained Profit} + \text{Depreciation Charge})}{\text{Total Debts.}}$$

$$X_3 = R-19, \frac{(\text{Retained Profit} + \text{Depreciation Charge})}{(\text{Tangible Assets} + \text{Accumulated Depreciation})}$$

$$X_4 = R-24, \text{ Net Worth/Total Debts.}$$

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = 0.138338 X_1 - 0.337754 X_2 + 1.12135 X_3 + 0.0734094 X_4$$

A good trace of the discriminating power of the above function was observed [Appendix I and I.(i)]. The discriminating power of this function was lower than that of the 'original' function (Appendix - II).

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this 'Set', the ratio (Retained Profit + Depreciation Charge)/Total Debts, (R-18) was found to contribute more than the other ratios [Appendix - III.(i)].

Analysing the 'Z-scores' of the sample units [Appendix - IV(a)(i) and IV(b)(i)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e. (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.15 (Please see next page).

RATIO-REPRESENTATIVE - MODEL (2nd Set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

$$X_1 = \text{R-19, (Retained Profit + Depreciation Charge)/} \\ \text{(Tangible Assets + Accumulated Depreciation).}$$

$$X_2 = \text{R-24, Net Worth/Total Debts}$$

$$X_3 = \text{R-37, Quick Assets/Current Liabilities}$$

$$X_4 = \text{R-46, Sales/Total Assets.}$$

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = 0.8271851 X_1 + 0.0209116 X_2 + 0.1211398 X_3 - 0.0162732 X_4$$

TABLE - III.15

PREDICTIVE ACCURACY MATRIX OF THE 1ST SET OF RATIOS

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health			Predicting Three Degrees of Financial Health					
		On the basis of the Initial Cut-off ¹			On the basis of the Optimum Cut-off ²					
		No. of Units actually classified		Percentage of Mis-classification	No. of Units actually classified		Percentage of Mis-classification	No. of Units actually classified		Percentage of Mis-classification
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick
Good	37	37	0	NIL	37	0	0	NIL	35	2
Semi*	79	-	-		34	30	15	62.02	19	56
Sick	38	0	38	NIL	0	0	38	NIL	0	3
Total	154			NIL				31.82		

* Semi-good/Semi-sick units

1. Between (+) 0.039254 and (-) 0.025669

2. Between (+) 0.059 and (-) 0.059

Source : Computed from Appendix IV.a(i) and Appendix IV.b(i)

A good trace of the discriminating power of the above function was observed [Appendix I and I(ii)]. The discriminating power of this function was lower than that of the 'original' function [Appendix II].

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this 'Set', the ratio (Retained Profit + Depreciation charge)/(Tangible Assets + Accumulated Depreciation) (R-19) was found to contribute more than the other ratios [Appendix - III.(ii)].

Analysing the 'Z-scores' of the sample units [Appendix - IV(a)(ii) and IV(b)(ii)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e. (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.16 (Please see next page).

PROFITABILITY - MODEL (3rd Set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

$$X_1 = R-12, \text{ OCF/Total Debts}$$

$$X_2 = R-18, \frac{\text{(Retained Profit + Depreciation charge)}}{\text{Total Debts.}}$$

$$X_3 = R-19, \frac{\text{(Retained Profit + Depreciation charge)}}{\text{(Tangible Assets + Accumulated Depreciation)}}.$$

$$X_4 = R-23, \text{ Net Profit (before Tax)/Total Capital Employed.}$$

TABLE - III 16

PREDICTIVE ACCURACY MATRIX OF THE '2ND SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Mis-classification	Predicting Three Degrees of Financial Health							Percentage of Mis-classification
		On the basis of ¹ the Initial Cut-off			On the basis of ² the Optimum Cut-off							
		No. of Units actually classified			No. of Units actually classified			Percentage of Mis-classification	No. of Units actually classified		Percentage of Mis-classification	
Good	Sick	Good	Semi*	Sick	Good	Semi*	Sick					
Good	37	37	0	NIL	37	0	0	NIL	33	4	0	10.81
Semi*	79				28	29	22	63.29	16	45	18	43.03
Sick	38	0	38	NIL	0	0	38	NIL	0	1	37	2.63
Total	154			NIL				32.46				25.32

*Semi-good/Semi-sick units

1. Between (+) 0.029780 and (-) 0.03047

2. Between (+) 0.043 and (-) 0.043

Source : Computed from Appendix IV. a(ii) and IV.b (ii)

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = 0.5603016 X_1 - 0.570857 X_2 + 0.8507127 X_3 + 0.0320233 X_4$$

A good trace of the discriminating power of the above function was observed [Appendix I and I(iii)]. The discriminating power of this function was lower than that of the 'original' function [Appendix - II].

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this 'set', the ratio OCF/Total Debts (R-12), was found to contribute more than the other ratios [Appendix III(iii)].

Analysing the 'Z-scores' of the sample units [Appendix IV(a)(iii) and IV(b)(iii)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e. (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.17 (Please see next page).

PROFITABILITY - MODEL -2 (4th Set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

TABLE - III 17

PREDICTIVE ACCURACY MATRIX OF THE '3RD SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Mis-classification	Predicting Three Degrees of Financial Health							Percentage of Mis-classification
		No. of Units actually classified			On the basis of the Initial Cut-off ¹			On the basis of the optimum Cut-off ²				
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
Good	37	37	0	NIL	37	0	0	NIL	34	3	0	8.1
Semi*	79				35	18	26	77.21	24	48	07	39.24
Sick	38	0	38	NIL	0	0	38	NIL	0	11	27	28.94
Total	154			NIL				39.61				29.22

* Semi-good/Semi-sick units

1. Between (+) 0.012846 and (-) 0.027478

2. Between (+) 0.02559 and (-) 0.0688

Source : Computed from Appendix IV.a(iii) and IV.b (iii)

$$X_1 = R-4, \text{ EBDIT/Interest}$$

$$X_2 = R-12, \text{ OCF/Total Debts.}$$

$$X_3 = R-18, \frac{(\text{Retained Profit} + \text{Depreciation charge})}{\text{Total Debts.}}$$

$$X_4 = R-19, \frac{(\text{Retained Profit} + \text{Depreciation charge})}{(\text{Tangible Assets} + \text{Accumulated Depreciation})}.$$

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = 0.000503 X_1 + 0.5844233 X_2 - 0.6019802 X_2 + 0.900522 X_4$$

A good trace of the discriminating power of the above function was observed [Appendix - I and I(iv)]. The discriminating power of this function was lower than that of the 'original' function [Appendix - II].

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this 'Set', the ratio OCF/Total Debts (R-12) was found to contribute more than the other ratios [Appendix - III. (iv)].

Analysing the 'Z-scores' of the sample units [Appendix - IV(a)(iv) and IV(b)(iv)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e., (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on

the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.18 (Please see next page).

FINANCIAL STABILITY MODEL (5th Set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

X_1 = R-24, Net Worth/Total Debts

X_2 = R-27, Total Debts/Tangible Assets

X_3 = R-28, All outside Liabilities/Tangible Assets

X_4 = R-35, Net worth/Total outside liabilities.

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = (-) 0.0166212X_1 - 0.1581827X_2 - 0.0614432X_3 + 0.1524073X_4$$

A good trace of the discriminating power of the above function was observed [Appendix I and I.(v)]. The discriminating power of this function was lower than that of the 'original' function [Appendix - II].

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this 'Set', the ratio Net Worth/Total Outside liabilities, (R-35) was found to contribute more than the other ratios [Appendix - III.(v)].

TABLE - III 18

PREDICTIVE ACCURACY MATRIX OF THE '4TH SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Mis-classification	Predicting Three Degrees of Financial Health						Percentage of Mis-classification	
		No. of Units actually classified			On the basis of ₁ the Initial Cut-off ₁			On the basis of ₂ the optimum Cut-off ₂				
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
Good	37	37	0	NIL	37	0	0	NIL	21	16	0	43.24
Semi*	79				34	19	26	75.94	10	67	2	15.19
Sick	38	0	38	NIL	0	0	38	NIL	0	16	22	42.11
Total	154			NIL				38.96				28.57

*Semi-good/Semi-sick units

1. Between (+) 0.014015 and (-) 0.0259

2. Between (+) 0.0549 and (-) 0.106

Source : Computed from Appendix IV.a(iv) and Appendix IB.b(iv)

Analysing 'z-scores' of the sample units [Appendix - IV(a)(v) and IV(b)(v)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e., (i) two degrees (the 'good' and the 'sick'), and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.19 (Please see next page).

LIQUIDITY - MODEL (6th set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

X_1 = R-36, Current Assets/Current Liabilities.

X_2 = R-37, Quick Assets/Current Liabilities.

X_3 = R-39, Working Capital/Total Debts.

X_4 = R-40, Working Capital/Tangible Assets.

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = 0.1940037X_1 + 0.1552836X_2 + 0.0409238X_3 + 0.021835X_4 .$$

A good trace of the discriminating power of the above function was observed [Appendix - I and I.(vi)]. The discriminating power of this function was lower than that of the 'original' function [Appendix - II].

TABLE - III 19

PREDICTIVE ACCURACY MATRIX OF THE '5TH SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Misclassification	Predicting Three Degrees of Financial Health						Percentage of Misclassification	
		No. of Units actually classified			On the basis of the Initial Cut-off ¹			On the basis of the optimum Cut-off ²				
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
Good	37	36	1	2.7	36	0	1	2.7	33	4	0	10.81
Semi*	79				56	1	22	98.73	33	33	13	58.23
Sick	38	0	38	NIL	0	0	38	NIL	0	3	35	7.89
Total	154			1.33				51.29				34.42

*Semi-good/Semi-sick units

1. Between (-) 0.157764 and (-) 0.161482

2. Between (-) 0.0972082 and (-) 0.2012191

Source: Computed from Appendix IV.a(v) and IV.b(v)

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this 'set', the ratio, Current Assets/Current Liabilities, (R-36), was found to contribute more than the other ratios [Appendix - III. (vi)].

Analysing the 'z-scores' of the sample units [Appendix - IV(a)(vi) and IV(b)(vi)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health like, (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.20 (Please see next page).

LIQUIDITY - MODEL (7th set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

X_1 = R-37, Quick Assets/Current Liabilities.

X_2 = R-39, Working Capital/Total Debts.

X_3 = R-40, Working Capital/Tangible Assets.

X_4 = R-41, Current Liabilities/Tangible Assets.

After several computer runs and calculations the derived linear discriminant function of the financial ratios reads as

$$Z = 0.1866785X_1 + 0.1087585X_2 - 0.141728X_3 - 0.2126614X_4$$

Good trace of the discriminating power of the above function was observed [Appendix I and I(vii)]. The discriminating power of this function was lower than that of the 'original' function [Appendix - II].

TABLE - III 20

PREDICTIVE ACCURACY MATRIX OF THE '6TH SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Mis-classification	Predicting Three Degrees of Financial Health						Percentage of Mis-classification	
		No. of Units actually classified			On the basis of ¹ the Initial Cut-off			On the basis of ² the optimum Cut-off				
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
Good	37	37	0	NIL	37	0	0	NIL	33	4	0	10.81
Semi*	79				21	2	56	97.5	12	56	11	29.11
Sick	38	0	38	NIL	0	0	38	NIL	0	12	26	31.58
Total	154			NIL				50.0				25.32

*Semi-good/Semi-sick units

1. Between (+) 0.169569 and (+) 0.172505

2. Between (+) 0.20 and (+) 0.089

Source : Computed from Appendix IV.a(vi) and IVb (vi)

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of the 'set', the ratio, Current liabilities/Tangible Assets, (R-41) was found to contribute more than the other ratios [Appendix - III (vii)].

Analysing the 'z-scores' of the sample units [Appendix - IV(a)(vii) and IV(b)(vii)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e., (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the 'good', the 'semi-good/semi-sick' and the 'sick' financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III.21 (Please see next page).

ASSET-UTILISATION - MODEL (8th set of Ratios)

For computational purposes, the financial ratios already selected for this model were coded as below:

X_1 = R-46, Sales/Total Assets.

X_2 = R-47, Retained Earnings/Total Assets.

X_3 = R-49, Quick Assets/Current Assets.

After several computer runs and calculations the derived linear discriminant function of the financial ratios read as:

$$Z = 0.2596268X_1 + 1.2316048X_2 - 0.9683406X_3.$$

A good trace of the discriminating power of the above function was observed [Appendix I and I(viii)]. The discriminating power of this function was lower than that of the 'original' function (Appendix-II).

TABLE - III 21

PREDICTIVE ACCURACY MATRIX OF THE '7TH SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Misclassification	Predicting Three Degrees of Financial Health						Percentage of Misclassification	
		No. of Units actually classified			On the basis of ¹ the Initial Cut-off			On the basis of ² the optimum Cut-off				
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
Good	37	37	0	NIL	37	0	0	NIL	36	1	0	2.7
Semi*	79				17	4	58	94.94	13	59	7	25.31
Sick	38	0	38	NIL	0	0	38	NIL	0	16	22	42.105
Total	154			NIL				48.7				24.025

* Semi-good/Semi-sick units

1. Between (-) 0.12978 and (-) 0.14276

2. Between (-) 0.1265 and (-) 0.215

Source : Computed from Appendix IV.a(vii) and IV.b(vii)

In assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of the 'set', the ratio, Retained Earnings/Total Assets, (R-47) was found to contribute more than the other ratios [Appendix- III.(viii)].

Analysing the 'z-scores' of the sample units [Appendix - IV(a)(viii) and IV(b)(viii)] computed on the basis of the above function, the accuracy of the model for predicting the various degrees of corporate financial health i.e., (i) two degrees (the 'good' and the 'sick') and (ii) three degrees (the good, the semi-good/semi-sick and the sick financial health) on the basis of (a) the initial cut-offs, and (b) the optimal cut-offs, was depicted in Table - III. 22 (Please see next page).

D) ANALYSIS OF THE PREDICTIVE-ACCURACY-MATRICES OF THE 'SETS' OF RATIOS (THAT IS, OF THE DERIVED 'REDUCED' FUNCTIONS) AND SELECTION OF THE BEST 'SET' TO MONITOR CORPORATE FINANCIAL HEALTH:

In this section attempts have been made to analyse and compare the classification performances of the 'sets' of financial ratios and to select a 'set' which would discriminate the different degrees of corporate financial health, in a better way than the other 'sets' under this study. The best 'set of ratio' was selected on the basis of the classification accuracy in classifying the sample units in both the 'initial' and 'secondary' samples. The discriminant function (of the 'set of ratios') with the highest classification accuracy was chosen

TABLE - III 22

PREDICTIVE ACCURACY MATRIX OF THE '8TH SET OF RATIOS'

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health		Percentage of Mis-classification	Predicting Three Degrees of Financial Health							Percentage of Mis-classification
		No. of Units actually classified			On the basis of ¹ the Initial Cut-off ¹			On the basis of ² the optimum Cut-off ²				
		Good	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
											No. of Units actually classified	
		Good	Sick		Good	Semi*	Sick	Percentage of Mis-classification	Good	Semi*	Sick	Percentage of Mis-classification
Good	36	29	7	19.44	29	0	7	19.44	20	13	3	44.44
Semi*	79				39	2	38	97.46	22	35	22	55.70
Sick	38	4	34	10.52	4	0	34	10.52	1	15	22	42.11
Total	153			14.86				57.52				49.67

* Semi-good/Semi-sick units

1. Between (+) 0.227417 and (+) 0.215778

2. Between (+) 0.30 and (+) 0.151

Source: Computed from Appendix IV.a(viii) and IV.b(viii)

as the best 'set'.

The performances of the 'sets' of financial ratios to discriminate between two extreme degrees (the 'good' and the 'sick') of corporate financial health were shown in Table - III.23.

Table - III.23

Misclassification of the 'Sets' of ratios in classifying two degrees of financial health.

Sets of Ratios	Percentages of Misclassification		
	Good	Sick	Overall
1st	NIL	NIL	NIL
2nd	NIL	NIL	NIL
3rd	NIL	NIL	NIL
4th	NIL	NIL	NIL
5th	2.7	NIL	1.33
6th	NIL	NIL	NIL
7th	NIL	NIL	NIL
8th	19.44	10.52	14.86

NOTE : No. of units in 'Good' group = 37
'Sick' group = 38

All the 'reduced' functions (except Asset-Utilisation function) computed and used to discriminate between the two extreme degrees of financial health (i.e. the 'good' and the 'sick') of the sample units, were found able to predict the actual group membership of the sample units with a high degree of accuracy. The '8th set of ratios' i.e. the discriminant function, computed from the Asset-Utilisation ratios, was able to classify the units of the 'good' group at 80.56% only and the units in the 'sick' group at 89.48% level of accuracy; the overall rate of correct classification was 85.14%. The performance of this 'Set' compared to that of others was found low and the causes for this low performance were : (i) unlike the other 'sets' of ratios, the 8th 'Set' was constructed by only three ratios instead of four and thus, the function computed for this 'Set' was a further reduced one and it was well established in the literature that the performance of the reduced functions were always lower than that of the function consisting more ratios than the reduced one³⁴, (ii) the ratios of the 8th 'Set' occupied relatively lower rank positions amongst the 'scaled vectors' of the total set of ratios (vide Table - III.24) considered under the eight different 'Sets' (i.e. 17 ratios in total, vide Table - III.8) and also amongst the total set of significant ratios (i.e. 36 ratios in total, vide Table - III.8), in other words, the ratios of the 8th 'Set' had relatively lower contributory shares in the overall discriminating power than that of the ratios used in

other 'sets', (here, the position of the ratio R-46 was found better than the other two ratios in this set), and (iii) the variability of the ratios (except ratio R-46) of this set were found low in comparison to other ratios (vide Table - III.24).

Table - III. 24

Amongst the Total Ratios considered in 8 different 'Sets' of ratios, the Relative Position of the Ratios of the 8th 'Set' in Scaled Vector, Difference of Mean Values, and Standard Deviation.

Ratio No.	Ratio Description	Ranks in Scaled Vector under the methods suggested by			Ranks in	
		Altman	Taffler	Klecka	Diff- erence of Mean	Standard Devia- tion
R-46	Sales/Total Assets	7 (18)	11 (22)	7 (18)	13 (26)	12 (17)
R-47	Retained Earnings/ Total Assets	9 (20)	12 (24)	11 (23)	16 (32)	16 (33)
R-49	Quick Assets/ Current Assets	14 (26)	14 (27)	12 (27)	17 (34)	17 (32)

NOTE: The rank positions occupied by the ratios amongst the significant ratios (36 in number) were shown in brackets.

Source: Compiled from Table III.8 and Annexure - V.

Again, in the two-degree situation, all the 'sets' of ratios (save the '8th Set' of ratios) with their respective discriminant functions were tested on the 'secondary data' sample containing thirty-six (36) financially 'good' and twenty (20) financial 'sick' units (vide Annexure - II.2.). The '8th' set of ratios was not tested on the secondary data sample because of its relatively lower rate of accuracy in classifying the units in the 'initial' sample. The results of the tests were shown in Table - III.24(a).

Table - III.24(a)

ACCURACY RATES(%) OF PREDICTION OF THE DISCRIMINANT
FUNCTIONS OF THE SECONDARY DATA SAMPLE

SET OF RATIOS	ACCURACY RATE (%)		
	ONLY SICK UNITS	ONLY GOOD UNITS	OVERALL RATE
1ST SET	100	94.44	96.43
2ND SET	80	97.22	91.07
3RD SET	15	94.44	66.08
4TH SET	95	94.45	94.63
5TH SET	80	100	92.86
6TH SET	75	100	91.07
7TH SET	70	94.45	85.71

Note : The accuracy rates were computed on the basis of the 'initial' cut-off points in the 'z-scores' of the initial sample units.

It was observed [Table - III.24(a)] that in classifying only the 'sick' units, the discriminant function of the '1st set' of ratios was the best one having the highest classification accuracy (100 percent). In classifying only the 'good' units, the discriminant functions of the '5th set' and the '6th set' of ratios were the best 'sets' having the highest classification accuracy (100 percent). But, in classifying all the units in the 'secondary' sample, the discriminant function, of the '1st set' of ratios was the best one amongst the functions of the 'sets', having the highest classification accuracy (96.43 percent).

The present study also attempted to extend the levels of the degrees of financial health for prediction i.e. attempted to assess the performances in predicting three degrees of financial health — the 'good', the 'sick' and the 'semi-good/semi-sick'.

Table - III.25

Percentage of Misclassification of the 'Sets' of ratios in classifying Three degrees of financial health

Sets of Ratios	Percentage of Misclassification							
	On the basis of Initial cut-offs				On the basis of Optimum cut-offs			
	Good	Semi*	Sick	Overall	Good	Semi*	Sick	Overall
1st	NIL	62.02	NIL	31.82	5.4	29.11	7.89	18.18
2nd	NIL	63.29	NIL	32.4	10.81	43.03	2.63	25.32
3rd	NIL	77.21	NIL	39.61	8.10	39.24	28.94	29.22
4th	NIL	75.94	NIL	38.96	43.24	15.19	42.11	28.57
5th	2.7	98.73	NIL	51.29	10.81	58.23	7.89	34.42
6th	NIL	97.47	NIL	50.0	10.81	29.11	31.58	25.32
7th	NIL	94.94	NIL	48.7	2.7	25.31	42.11	24.03
8th	19.44	97.47	10.52	57.52	44.44	55.69	42.11	49.67

NOTE : No. of units in the Good group = 37
 Semi group = 79
 Sick group = 38
 (Save 8th Set)

*Semi-good/Semi-sick.

It could be observed (Table- III.25) that, all the reduced functions disclosed a poor performance when used to re-classify the sample units in the 'semi-good/semi-sick' group (on the basis of the 'initial' cut-off points). Amongst the 'sets' of ratios, the 1st 'Set' of ratios had the minimum rate of misclassification not only for the units in the 'semi-good/semi-sick' group, but also the units in all the three groups. However, all the 'Sets' were unable to predict the 'semi-good/semi-sick' units with a high degree of accuracy owing to the fact that the financial characteristics and the variabilities in the ratio magnitudes of the 'semi-good/semi-sick' units were not considered at the time of framing and computing the discriminant functions.

It could also be observed (Table - III.25) that, on the basis of the 'optimum' cut-off points, three different 'sets' were found to classify, in a better way than the other 'Sets', the units in three different health-groups. To predict the units in the 'good' group, the 7th 'Set' of ratios was the best (2.7%) amongst the 'Sets'. To predict the units in the 'sick' group, the 2nd 'Set' of ratios was the best (2.63%) amongst the 'Sets'. To predict the units in the 'semi-good/semi-sick' group, the 4th 'Set' of ratios was the best (15.19%) amongst the 'Sets'. The second best 'Sets' to classify the sample units were — 1st 'Set' for the 'good' group, and 7th 'Set' for the 'semi-good/semi-sick' group, and 1st and 5th

'Sets' for the 'sick' group. Amongst the 'sets', the performance of the 1st 'Set' of ratios to classify all the sample units (in a three-degree situation) was found the best (18.18 %).

In the three-degree situation, we have attempted to test the predictive ability of the '1st' set of ratios in re-classifying the units in the 'secondary sample', as this particular set disclosed the minimum rate of mis-classification in classifying the units in the 'initial sample'.

The secondary sample was consisted of 36 'good', 91 'Semi-good/semi-sick' and 20 'sick' units (Annexure - II.2). Using the descriptive function

$$Z = 0.138338X_1 - 0.337754X_2 + 1.12135X_3 + 0.0734094X_4$$

the 'Z-scores' of the units of the secondary sample were computed.

Analysing the 'Z-scores' [Appendix - Va] & Vb] of the secondary sample units, the accuracy of the 'set' in predicting the two degrees and three degrees of financial health on the basis of (i) the derived 'initial' cut-off points [between (+) 0.039254 and (-) 0.025669], and (ii) the derived 'optimum' cut-off points [between (+) 0.059 and (-) 0.059] was depicted in the Table - III.26 (Please see next page).

It could be observed that the '1st set' of financial ratios with its discriminant function was also effective in classifying the secondary sample units. Like the classification

TABLE - III 26

PREDICTIVE ACCURACY MATRIX OF THE SELECTED^{1st} SET OF RATIOS¹
(DESCRIPTIVE MODEL) TESTED ON THE SECONDARY SAMPLE

Degree of Financial Health	No. of units	Predicting Two Degrees of Financial Health			Percentage of Mis-classification	Predicting Three Degrees of Financial Health						Percentage of Mis-classification	
		No. of Units actually classified				On the basis of ₁ the Initial Cut-off ¹			On the basis of ₂ the optimum Cut-off ²				
		Good	Semi*	Sick		Good	Semi*	Sick	Good	Semi*	Sick		
Good	36	34	02	0	5.55	34	2	0	5.55	30	6	0	16.66
Semi*	91					51	26	14	71.43	40	44	7	51.64
Sick	20	0	0	20	NIL	0	0	20	NIL	0	1	19	5.0
Total	147				3.57				45.58				36.73

* Semi-good/Semi-sick units

1. Between (+) 0.039254 and (-) 0.025669

2. Between (+) 0.059 and (-) 0.059

Source: Computed from Appendix V.a) and V.b

error of the 'initial' sample, the 'set' had also lower accuracy rate (63.27%) in re-classifying the total units of the secondary sample into three different financial health groups - the 'good', the 'semi-good/semi-sick' and the 'sick'.

Thus, in the light of the above observations, the '1st set of ratios' with its discriminant function was found as the best 'set' amongst the others having the highest classification accuracy in classifying the sample tea units.

It could further be observed that (Table - III.27), in the overall discriminating power of the 'original' and 'reduced' discriminant functions the relative share of contributions of the ratios R-24, R-18, R-19, R-12, R-35, R-36, R-41 and R-47 were more than the other financial ratios; the second best financial ratios were, R-27, R-37, R-40, R-49.

Table - III.27

Rank of the Financial Ratios in Discriminating Power of the Discriminant Functions

Ratio No.	Original Discriminant function	Discriminant Functions of the Models						Total number of Appearances
		Descriptive Model	Ratio-representative Model	Profitability Model	Financial Stability Model	Liquidity Model	Asset-Utilisation Model	
R-12				1st				1
R-18		1st		2nd				2
R-19	2nd	2nd	1st					3
R-24	1st		2nd					2
R-27					2nd			1
R-35					1st			1
R-36						1st		1
R-37						2nd		
R-40						2nd		1
R-41						1st		1
R-47							1st	1
R-49							2nd	1

Compiled from Appendix III(i) to Appendix III.(viii) and Table - III.3.

* Model - 1 (6th set of ratios)

** Model - 2 (7th set of ratios)

Therefore, in the overall discriminating power of the discriminant functions, the relative individual contribution of the ratios $R-19 \left[\frac{\text{Retained Profit} + \text{Depreciation charge}}{\text{Total Tangible Assets} + \text{Accumulated Depreciation}} \right]$, $R-24 \left(\frac{\text{Net Worth}}{\text{Total Debt}} \right)$, and $R-18 \left[\frac{\text{Retained Profit} + \text{Depreciation}}{\text{Total Debt}} \right]$ were found more than that of the other sample ratios in discriminating between different degrees of corporate financial health of the Tea units.

Thus, it could be observed that, out of the 52 financial ratios, 36 ratios were found to discriminate between various degrees of corporate financial health, and out of these 36 financial ratios 17 ratios, in eight different sets, were tested further and found that the set of financial ratios comprising $R-12$, $R-18$, $R-19$ and $R-24$ (i.e. $\text{OCF} / \text{Total Debts}$, $\left(\frac{\text{Retained Profit} + \text{Depreciation charge}}{\text{Total Debts}} \right)$, $\left(\frac{\text{Retained Profit} + \text{Depreciation charge}}{\text{Tangible Assets} + \text{Accumulated Depreciation}} \right)$, and $\text{Net Worth} / \text{Total Debts}$) has higher predictive ability than other sets in discriminating different (two/three) degrees of financial health of the sample tea units (both in the 'initial' and 'secondary' samples).

* * *

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APPENDIX - IANALYSIS OF VARIANCE TEST TO ASSESS THE DISCRIMINATING ABILITY

To assess the discriminating ability of the derived functions, the present study tested the hypothesis that, 'the derived discriminant function does not discriminate'. The hypothesis was tested by using the analysis-of-variance test, and the general form of the analysis-of-variance table used for all the 'sets' of ratios was Table - I.A. In that table

$$K = \frac{n_1 n_2}{n_1 + n_2}, \quad D = \bar{Y}_1 - \bar{Y}_2, \quad \bar{Y}_j = \alpha_1 \bar{X}_{1j} + \alpha_2 \bar{X}_{2j} + \dots + \alpha_p \bar{X}_{pj},$$

'p' was the number of financial ratios (X) in the discriminant function, 'j' was the number of financial health groups (here, 1 = 'good' and 2 = 'sick'), $n = n_1 + n_2$, ' n_1 ' was the number of units in the 'good' group, ' n_2 ' was the number of units in the 'sick' group, ' α ' was the discriminant coefficients.

TABLE - I.A

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE 'SETS' OF FINANCIAL RATIOS

Source of Variation	Sum of Squares (SS)	Degrees of Freedom (m)	Mean of Squares (MS)	F
Discriminant	KD^2	p	KD^2/p	$\frac{KD^2/p}{D/n-p-1}$
Residual Error	D	n-p-1	$D/n-p-1$	

For our 'Sets' of ratios, $n_1 = 28$, $n_2 = 36$, $n = 64$,

$$K = \frac{28(36)}{28+36} = 15.75$$

$p = 4$ (except the '8th set of ratios' where $p = 3$), the value of D for the respective 'sets' was computed on the basis of α_p (Table - III.8) and $\bar{X}_{pj}$ (Annexure - V)

APPENDIX - I(i)ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '1ST SET OF RATIOS'TABLEANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '1ST SET OF RATIOS'

Source	SS	m	MS	F
Discriminant	0.8390371	4	0.2097592	
				53.619564
Residual Error	0.2308078	59	0.00391199	

Table Value of F at (.99, 4, 55) = 3.68 and at (.99, 4, 60) = 3.65

The calculated value of F (53.62) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide Appendix - I) was rejected, i.e., the derived discriminant function of the '1st set of ratios' would discriminate.

APPENDIX - I.(ii)

ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '2ND SET OF RATIOS'

TABLE

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '2ND SET OF RATIOS'

Source	SS	m	MS	F
Discriminant	0.6132593	4	0.1533148	45.842243
Residual Error	0.1973249	59	0.0033444	

Table Value of F at (.99, 4, 55) = 3.68 and at (.99, 4, 60) = 3.65.

The calculated value of F (45.842) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide Appendix - I) was rejected, i.e., the derived discriminant function of the '2nd set of ratios' would discriminate.

APPENDIX - I. (iii)

ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '3RD SET OF RATIOS'

TABLE

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '3RD SET OF RATIOS'.

Source	SS	m	MS	F
Discriminant	0.4595078	4	0.1148769	39.680591
Residual Error	0.1708074	59	0.00289504	

Table Value of F at (.99, 4, 55)=3.68 and at (.99, 4, 60)= 3.65

The calculated value of F (39.681) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide, Appendix - I) was rejected, i.e., the derived discriminant function of the '3rd set of ratios' would discriminate.

APPENDIX - I. (iv)

ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '4TH SET OF RATIOS'.

TABLE

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '4TH SET OF RATIOS'.

Source	SS	m	MS	F
Discriminant	0.4616797	4	0.1154199	
				39.775277
Residual Error	0.1712104	59	0.00290187	

Table Value of F at (.99, 4, 55) = 3.68 and at (.99, 4, 60) = 3.65.

The calculated value of F (39.775) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide, Appendix-I) was rejected, i.e., the derived discriminant function of the '4th set of ratios' would discriminate.

APPENDIX - I (v)

ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '5TH SET OF RATIOS'.

TABLE

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '5TH SET OF RATIOS'

Source	SS	m	MS	F
Discriminant	0.7766829	4	0.1941707	51.588731
Residual Error	0.2220658	59	0.00376382	

Table Value of F at (.99, 4, 55) = 3.68 and at (.99, 4, 60) = 3.65

The calculated value of F (51.589) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide, Appendix - I) was rejected, i.e., the derived discriminant function of the '5th set of ratios' would discriminate.

APPENDIX - I (vi)ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '6TH SET OF RATIOS'TABLEANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '6TH SET OF RATIOS'

Source	SS	m	MS	F
Discriminant	0.5792535	4	0.1448133	44.55
Residual Error	0.191776	59	0.00325044	

Table Value of F at (.99, 4, 55) = 3.68 and at (.99, 4, 60)=3.65

The calculated value of F (44.55) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide, Appendix - I) was rejected, i.e., the derived discriminant function of the '6th set of ratios' would discriminate.

APPENDIX - I(vii)

ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '7TH SET OF RATIOS'.

TABLE

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '7TH SET OF RATIOS'.

Source	SS	m	MS	F
Discriminant	0.4326603	4	0.108165	38.503844
Residual Error	0.1657425	59	0.00280919	

Table Value of F at (.99, 4, 55)=3.68 and at (.99, 4, 60)= 3.65

The calculated value of F (38.504) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide, Appendix - I) was rejected, i.e., the derived discriminant function of the '7th set of ratios' would discriminate.

APPENDIX - I (viii)

ANALYSIS OF VARIANCE TEST TO ASSESS DISCRIMINATING
ABILITY OF THE '8TH SET OF RATIOS'.

TABLE

ANALYSIS OF VARIANCE FOR THE DISCRIMINANT FUNCTION
OF THE '8TH SET OF RATIOS'.

Source	SS	m	MS	F
Discriminant	0.31686	3	0.10562	44.679077
Residual Error	0.1418384	60	0.00236397	

Table Value of F at (.99, 3, 55) = 4.16 and at (.99, 3, 60) = 4.13

The calculated value of F (44.679) was greater than the Table Value of F at one percent level of significance, and thus, the hypothesis 'the population discriminant function does not discriminate' (vide, Appendix - I) was rejected, i.e., the derived discriminant function of the '8th set of ratios' would discriminate.

APPENDIX - II

COMPARISON OF DISCRIMINATING POWERS OF THE 'ORIGINAL DISCRIMINANT' AND 'REDUCED DISCRIMINANTS'.

To compare the discriminating power of the 'original' discriminant function to that of the 'reduced' functions (i.e. the functions of the eight different 'sets' of ratios) or to assess whether the 'original' discriminant function was discriminating the different degrees of financial health significantly better than that of the functions of the different 'sets of ratios', a further test has been attempted. For the assessment, a 'F' - ratio of the definition has been formed¹:

$$F = \frac{\text{The decrease in the discriminant 'sum of squares' from 'original' discriminant to 'reduced' discriminant}}{\text{Residual error 'mean of square' of the 'original' discriminant}}$$

It was found that (Table - II.A) the calculated values of F were greater than the 'table value' of F at one percent level of significance. The results so obtained indicated to be significant ones and thus it could be stated that the discriminating power of the 'reduced' functions were lower than that of the 'original' function².

NOTE : 1. Peters, W.S. and Summers, G.W., Statistical Analysis for Business Decisions, Prentice-Hall Inc., Englewood Cliffs, New Jersey, 1968, pp. 414-415.

2. The result was in consonant with the study made by Hubert Ooghe and Eric Verbaere. Ooghe, H. and Verbaere, E., "Predicting Business Failure on the Basis of Accounting Data : The Belgian Experience", International Journal of Accounting Education and Research, Vol. 20, No. 2, Spring 1985, pp. 19-44.

TABLE - II.A (Appendix - II)

'F-ratio' FOR COMPARING THE DISCRIMINATING POWERS

'Sets' of Ratios	Decrease in Discriminant. 'Sum of Squares'	Residual Error 'Mean squares' of 'original' function	F-ratio
1st Set	212.12277		1557.5445
2nd Set	212.34855		1559.2023
3rd Set	212.5023	0.1361905	1560.3313
4th Set	212.50013		1560.3153
5th Set	212.18512		1558.0023
6th Set	212.38255		1559.452
7th Set	212.52914		1560.5283
8th Set	212.64495		1561.3787

NOTE : Table Value of F at (.99, 1, 27) is 7.68

Compiled from Appendix I.1 to I.8, and Table - III.7.

APPENDIX - III(i)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '1ST SET OF RATIOS'

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-12	0.0539461	0.3078661	0.3266908	4	4	4
X ₂	R-18	0.1252773	0.7130582	0.7601529	1	2	1
X ₃	R-19	0.1171639	0.8688744	0.4951108	2	1	3
X ₄	R-24	0.088218	0.536318	0.5066923	3	3	2

APPENDIX - III (ii)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '2ND SET OF RATIOS'.

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-19	0.0864281	0.7496991	0.3652279	1	1	1
X ₂	R-24	0.02513	0.1787007	0.1443377	2	2	2
X ₃	R-37	0.0152581	0.0872089	0.1011718	3	3	3
X ₄	R-46	0.00522054	0.0156072	0.0399359	4	4	4

APPENDIX - III (iii)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '3RD SET OF RATIOS'

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-12	0.2184948	1.684948	1.323175	1	1	1
X ₂	R-18	0.2117382	1.6285295	1.2847771	2	2	2
X ₃	R-19	0.0888864	0.8907225	0.3756161	3	3	3
X ₄	R-23	0.00533493	0.0528594	0.0231865	4	4	4

APPENDIX - III (iv)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '4TH SET OF
RATIOS'.

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-4	0.00372264	0.0192665	0.0267496	4	4	4
X ₂	R-12	0.2279013	1.7533502	1.3801394	1	1	1
X ₃	R-18	0.2232822	1.713275	1.3548233	2	2	2
X ₄	R-19	0.0940907	0.9406548	0.3976084	3	3	3

APPENDIX - III(v)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN
THE DISCRIMINATING POWER OF THE FUNCTION OF '5TH
SET OF RATIOS'

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-24	-0.0199741	0.1262121	0.1147242	4	4	3
X ₂	R-27	-0.0605024	0.4729062	0.2461242	2	2	2
X ₃	R-28	-0.0243041	0.1793684	0.113208	3	3	4
X ₄	R-35	0.061321	0.4739374	0.2572968	1	1	1

APPENDIX - III (vi)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '6TH SET
OF RATIOS'.

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Clecka	Taffler	Altman
X ₁	R-36	0.0702443	0.6278449	0.2957311	1	1	1
X ₂	R-37	0.0195586	0.1150242	0.1296876	2	3	2
X ₃	R-39	0.0192041	0.1828294	0.10362	3	2	3
X ₄	R-40	0.00900435	0.0743012	0.044607	4	4	4

APPENDIX - III (vii)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '7TH SET
OF RATIOS'.

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-37	0.0235129	0.1599993	0.1559075	4	4	4
X ₂	R-39	0.0510365	0.562204	0.275379	3	2	3
X ₃	R-40	0.058446	0.5580204	0.2895319	2	3	2
X ₄	R-41	0.0873684	0.835817	0.4315957	1	1	1

APPENDIX - III (viii)

RELATIVE CONTRIBUTION OF INDIVIDUAL RATIOS IN THE
DISCRIMINATING POWER OF THE FUNCTION OF '8TH SET
OF RATIOS'.

Ratio Code	Ratio No.	SCALED VECTOR			R A N K S		
		Klecka	Taffler	Altman	Klecka	Taffler	Altman
X ₁	R-46	0.0832898	0.3464104	0.6371481	3	3	3
X ₂	R-47	0.1252625	1.2094996	0.7353103	1	1	1
X ₃	R-49	0.0993565	0.5559101	0.7306657	2	2	2

APPENDIX - IV.a(i)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF THE
FUNCTION OF '1ST SET OF RATIOS' (INITIAL SAMPLE)

GOOD UNITS				SICK UNITS			
CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
3 ₉	0.1464008	5 ₃	0.0879867	6 ₉	-0.3330781	15 ₁	-0.072228
7 ₉	0.2966953	7 ₃	0.1367814	19 ₉	-0.0256696	16 ₁	-0.1055917
9 ₉	0.0909529	8 ₃	0.0895698	21 ₉	-0.0482001	19 ₁	-0.195897
11 ₉	0.0857144	11 ₃	0.0984812	2 ₀	-0.1369805	20 ₁	-0.1444497
25 ₉	0.1628408	14 ₃	0.0996009	5 ₀	-0.0595341	21 ₁	-0.1496847
7 ₀	0.1857307	17 ₃	0.0880447	6 ₀	-0.4030667	23 ₁	-0.0936717
11 ₀	0.0671425	18 ₃	0.1452121	12 ₀	-0.1109679	26 ₁	-0.1952746
22 ₀	0.0669828	24 ₃	0.1079668	15 ₀	-0.195304	2 ₂	-0.1397211
25 ₀	0.0902228	25 ₃	0.1011614	16 ₀	-0.1577116	6 ₂	-0.1682912
7 ₁	0.1494881	3 ₄	0.4959139	19 ₀	-0.1441123	12 ₂	-0.0870316
11 ₁	0.0641325	7 ₄	0.1696402	20 ₀	-0.1613774	15 ₂	-0.0707329
22 ₁	0.0590868	8 ₄	0.0712974	21 ₀	-0.1642963	16 ₂	-0.0959307
25 ₁	0.0873976	11 ₄	0.1116803	2 ₁	-0.1671193	19 ₂	-0.0785377
7 ₂	0.232606	16 ₄	0.0678087	4 ₁	-0.063416	21 ₂	-0.191907
11 ₂	0.0646374	18 ₄	0.122877	5 ₁	-0.0451212	23 ₂	-0.0600832
18 ₂	0.0392545	22 ₄	0.0794633	6 ₁	-0.1901704	26 ₂	-0.2712668
22 ₂	0.0629737	23 ₄	0.0544452	8 ₁	-0.1325141	6 ₃	-0.1006401
1 ₃	0.254142	25 ₄	0.1370256	10 ₁	-0.1082793	20 ₄	-0.139858
3 ₃	0.2600432			12 ₁	-0.1331438	21 ₄	-0.1065403

NOTE: Subscripts in the Company Code indicate the years,
subscript 9 = 1979, 0=1980, 1 = 1981 and so on.

APPENDIX - IV.a(ii)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF THE
FUNCTION OF '2ND SET OF RATIOS' (INITIAL SAMPLE)

GOOD UNITS				SICK UNITS			
CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
3 ₉	0.092042	7 ₃	0.22057	6 ₉	-0.280081	15 ₁	-0.083555
7 ₉	0.1042094	8 ₃	0.1533665	19 ₉	-0.030477	19 ₁	-0.170575
9 ₉	0.0495359	11 ₃	0.1004543	21 ₉	-0.043648	20 ₁	-0.132928
11 ₉	0.0498567	14 ₃	0.0808071	2 ₀	-0.133456	21 ₁	-0.124051
25 ₉	0.0792719	17 ₃	0.0511692	5 ₀	-0.065595	23 ₁	-0.090687
7 ₀	0.0715301	18 ₃	0.1450381	6 ₀	-0.322898	26 ₁	-0.205581
11 ₀	0.0431162	24 ₃	0.0489086	12 ₀	-0.112708	2 ₂	-0.113436
22 ₀	0.0297805	25 ₃	0.0709658	15 ₀	-0.191926	6 ₂	-0.106714
25 ₀	0.0510187	3 ₄	0.2451424	16 ₀	-0.135839	12 ₂	-0.068834
7 ₁	0.0735729	7 ₄	0.2183673	19 ₀	-0.134087	15 ₂	-0.058309
11 ₁	0.0479335	8 ₄	0.1420915	20 ₀	-0.139319	16 ₂	-0.079558
22 ₁	0.0340515	11 ₄	0.1216316	21 ₀	-0.143921	19 ₂	-0.058523
25 ₁	0.0657772	16 ₄	0.0572409	2 ₁	-0.147958	21 ₂	-0.153456
7 ₂	0.1227106	18 ₄	0.0911513	4 ₁	-0.085012	23 ₂	-0.053593
11 ₂	0.047557	22 ₄	0.0664249	5 ₁	-0.051689	26 ₂	-0.245749
18 ₂	0.033945	23 ₄	0.0577997	6 ₁	-0.132288	6 ₃	-0.050481
22 ₂	0.0339214	25 ₄	0.1043973	8 ₁	-0.125144	20 ₄	-0.113275
1 ₃	0.1652849			10 ₁	-0.117644	21 ₄	-0.072821
3 ₃	0.259229			12 ₁	-0.119590		
5 ₃	0.0935505			15 ₁	-0.062053		

NOTE : Subscripts in the Company Code indicate the years,
subscript 9 = 1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV.a.(iii)

SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '3RD SET OF RATIOS' (INITIAL SAMPLE)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₉	0.0607902	6 ₉	-.2786293
7 ₉	0.0519873	19 ₉	-.0274783
9 ₉	0.0308678	21 ₉	-.0412952
11 ₉	0.0455154	2 ₀	-.1400115
25 ₉	0.0354057	5 ₀	-.0643219
7 ₀	0.0282739	6 ₀	-.3207612
11 ₀	0.0332958	12 ₀	-.10804
22 ₀	0.02617	15 ₀	-.1909926
25 ₀	0.0128461	16 ₀	-.142911
7 ₁	0.0271349	19 ₀	-.1299465
11 ₁	0.0393773	20 ₀	-.1879425
22 ₁	0.025592	21 ₀	-.1396381
25 ₁	0.0195819	2 ₁	-.1439637
7 ₂	0.0538473	4 ₁	-.0774652
11 ₂	0.0424029	5 ₁	-.04035
18 ₂	0.0135247	6 ₁	-.1139112
22 ₂	0.0276829	8 ₁	-.1275886
1 ₃	0.1283425	10 ₁	-.1145362
3 ₃	0.2235141	12 ₁	-.1129545
5 ₃	0.096813	15 ₁	-.0506276
7 ₃	0.1123006	16 ₁	-.0836705
8 ₃	0.0967126	19 ₁	-.1617991
11 ₃	0.0980347	20 ₁	-.1241129
14 ₃	0.0999731	21 ₁	-.1161358
17 ₃	0.070297	23 ₁	-.0855725
18 ₃	0.091651	26 ₁	-.1984094
24 ₃	0.0894566	2 ₂	-.1079506
25 ₃	0.0596047	6 ₂	-.0881822
3 ₄	0.1950873	12 ₂	-.0597559
7 ₄	0.1257814	15 ₂	-.0425232

Contd..

APPENDIX - IV.a.(iii) (Contd..)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
8 ₄	0.0870297	16 ₂	-.0688127
11 ₄	0.1084226	19 ₂	-.0484754
16 ₄	0.0693408	21 ₂	-.1474727
18 ₄	0.0563166	23 ₂	-.0447683
22 ₄	0.0594532	26 ₂	-.2303619
23 ₄	0.0537346	6 ₃	-.0308537
25 ₄	0.0671555	20 ₄	-.1073071
		21 ₄	-.0666365

NOTE : Subscripts in the Company Code indicate the years,
 subscript 9 = 1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV. a. (iv)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS
OF THE FUNCTION OF '4TH SET OF RATIOS' (INITIAL SAMPLE)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₉	0.0626874	6 ₉	-.27983
7 ₉	0.0549089	19 ₉	-.02598
9 ₉	0.0322648	21 ₉	-.040536
11 ₉	0.0472919	2 ₀	-.139536
25 ₉	0.0369709	5 ₀	-.063694
7 ₀	0.0300612	6 ₀	-.321878
11 ₀	0.0349237	12 ₀	-.106929
22 ₀	0.0278405	15 ₀	-.190729
25 ₀	0.0140158	16 ₀	-.143833
7 ₁	0.0280966	19 ₀	-.129211
11 ₁	0.0407959	20 ₀	-.190053
22 ₁	0.0271461	21 ₀	-.140103
25 ₁	0.0206805	2 ₁	-.142972
7 ₂	0.0532269	4 ₁	-.075909
11 ₂	0.0434940	5 ₁	-.039449
18 ₂	0.0145317	6 ₁	-.134758
22 ₂	0.0290241	8 ₁	-.126126
1 ₃	0.1220796	10 ₁	-.113445
3 ₃	0.2474946	12 ₁	-.112105
5 ₃	0.0949588	15 ₁	-.049623
7 ₃	0.1136695	16 ₁	-.08373
8 ₃	0.0950308	19 ₁	-.161255
11 ₃	0.0974201	20 ₁	-.123758
14 ₃	0.0961764	21 ₁	-.116167
17 ₃	0.0676489	23 ₁	-.084693
18 ₃	0.0876142	26 ₁	-.196922
24 ₃	0.0862651	2 ₂	-.107116
25 ₃	0.0599517	6 ₂	-.088067

Contd..

APPENDIX - IV.a(iv) (Contd..)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₄	0.2094333	12 ₂	-.058857
7 ₄	0.1308568	15 ₂	-.041355
8 ₄	0.0863562	16 ₂	-.068726
11 ₄	0.1104497	19 ₂	-.047411
16 ₄	0.0681545	21 ₂	-.147946
18 ₄	0.0563484	23 ₂	-.043406
22 ₄	0.0610564	26 ₂	-.22813
23 ₄	0.0537845	6 ₃	-.031085
25 ₄	0.0676912	20 ₄	-.106494
		21 ₄	-.066194

NOTE : Subscripts in the Company Code indicate the years,
 subscript 9 = 1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV.a (v)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '5TH SET OF RATIOS' (INITIAL SAMPLE)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₉	-.0298533	6 ₉	-.3423123
7 ₉	-.0100187	19 ₉	-.1786406
9 ₉	-.0349776	21 ₉	-.22015
11 ₉	-.04193	2 ₀	-.2087046
25 ₉	-.0226825	5 ₀	-.179553
7 ₀	-.0008251	6 ₀	-.4307351
11 ₀	-.066028	12 ₀	-.2176802
22 ₀	-.0521534	15 ₀	-.2247463
25 ₀	-.0341775	16 ₀	-.2330249
7 ₁	-.0064857	19 ₀	-.2546885
11 ₁	-.0775572	20 ₀	-.2068048
22 ₁	-.0703575	21 ₀	-.2857252
25 ₁	-.0101042	2 ₁	-.3090656
7 ₂	-.0016814	4 ₁	-.1614821
11 ₂	-.0766778	5 ₁	-.2113839
18 ₂	-.0911126	6 ₁	-.4013031
22 ₂	-.0639256	8 ₁	-.2275491
1 ₃	0.1251315	10 ₁	-.2012191
3 ₃	-.0036246	12 ₁	-.2692174
5 ₃	-.0927527	15 ₁	-.245296
7 ₃	-.0301136	16 ₁	-.2641709
8 ₃	-.1577641	19 ₁	-.3265912
11 ₃	-.0442616	20 ₁	-.2657384
14 ₃	-.0324518	21 ₁	-.3319886
17 ₃	-.0483339	23 ₁	-.2299501
18 ₃	0.0038188	26 ₁	-.216921

Contd..

APPENDIX - IV.a(v) (Contd..)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
24 ₃	-.0035768	2 ₂	-.3547604
25 ₃	-.026894	6 ₂	-.3058014
3 ₄	-.0972082	12 ₂	-.2928058
7 ₄	-.0336272	15 ₂	-.2700011
8 ₄	-.1294939	16 ₂	-.2946984
11 ₄	-.0339139	19 ₂	-.3206419
16 ₄	-.1725759	21 ₂	-.3850713
18 ₄	-.0042556	23 ₂	-.255703
22 ₄	-.053273	26 ₂	-.3232426
23 ₄	-.1540241	6 ₃	-.298023
25 ₄	-.0081718	20 ₄	-.3175239
		21 ₄	-.3630924

NOTE : Subscripts in the Company Code indicate the years,
 subscript 9 = 1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV.a (vi)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '6TH SET OF RATIOS' (INITIAL SAMPLE)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₉	0.3735928	6 ₉	-.0302974
7 ₉	0.3498658	19 ₉	0.0852013
9 ₉	0.2278596	21 ₉	0.1441115
11 ₉	0.1725058	2 ₀	0.1396303
25 ₉	0.3277369	5 ₀	0.0776054
7 ₀	0.3029155	6 ₀	-.0272573
11 ₀	0.1812113	12 ₀	0.101207
22 ₀	0.2025601	15 ₀	0.0811479
25 ₀	0.2721166	16 ₀	0.1385752
7 ₁	0.3274915	19 ₀	0.0690471
11 ₁	0.1785094	20 ₀	0.1055208
22 ₁	0.2137106	21 ₀	0.0945479
25 ₁	0.3265746	2 ₁	0.097116
7 ₂	0.4009879	4 ₁	0.1112151
11 ₂	0.1991985	5 ₁	0.0636519
18 ₂	0.2618664	6 ₁	-.0291465
22 ₂	0.2193422	8 ₁	0.0942927
1 ₃	0.348813	10 ₁	0.0725119
3 ₃	0.4628902	12 ₁	0.0829168
5 ₃	0.2987981	15 ₁	0.0853141
7 ₃	0.2723146	16 ₁	0.1151649
8 ₃	0.428387	19 ₁	0.0355033
11 ₃	0.2197869	20 ₁	0.0693875
14 ₃	0.2293821	21 ₁	0.0637654
17 ₃	0.3264606	23 ₁	0.0985099

Contd..

APPENDIX - IV.a (vi) (Contd..)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
18 ₃	0.5177134	26 ₁	0.0505365
24 ₃	0.2284033	2 ₂	0.0740777
25 ₃	0.2381619	6 ₂	-.0098939
3 ₄	0.3196788	12 ₂	0.0807244
7 ₄	0.265539	15 ₂	0.0677214
8 ₄	0.4274721	16 ₂	0.1695699
11 ₄	0.2327531	19 ₂	0.0597994
16 ₄	0.433504	21 ₂	0.0524286
18 ₄	0.2988579	23 ₂	0.0888948
22 ₄	0.2196924	26 ₂	-.0101803
23 ₄	0.3289806	6 ₃	0.0211837
25 ₄	0.2601303	20 ₄	0.0524229
		21 ₄	0.0761012

NOTE : Subscripts in the Company Code indicate the years,
subscript 9 = 1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV.a(vii)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '7TH SET OF RATIOS' (INITIAL SAMPLE)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₉	0.0578284	6 ₉	-.319891
7 ₉	0.0675535	19 ₉	-.199137
9 ₉	-.099382	21 ₉	-.1595
11 ₉	-.120423	2 ₀	-.184537
25 ₉	0.0098434	5 ₀	-.192606
7 ₀	-.023894	6 ₀	-.347732
11 ₀	-.116567	12 ₀	-.203959
22 ₀	-.104527	15 ₀	-.218563
25 ₀	-.065694	16 ₀	-.15126
7 ₁	-.008212	19 ₀	-.222343
11 ₁	-.129789	20 ₀	-.205121
22 ₁	-.112745	21 ₀	-.192821
25 ₁	-.017372	2 ₁	-.226835
7 ₂	0.1195697	4 ₁	-.215053
11 ₂	-.121169	5 ₁	-.203257
18 ₂	-.025371	6 ₁	-.375111
22 ₂	-.110673	8 ₁	-.215591
1 ₃	0.0426349	10 ₁	-.200469
3 ₃	0.2361804	12 ₁	-.234305
5 ₃	-.049225	15 ₁	-.217798
7 ₃	-.029134	16 ₁	-.175023
8 ₃	0.0249339	19 ₁	-.263523
11 ₃	-.096467	20 ₁	-.254501
14 ₃	-.086232	21 ₁	-.209853
17 ₃	-.087212	23 ₁	-.19474
18 ₃	0.159937	26 ₁	-.268657
24 ₃	-.071591	2 ₂	-.240462
25 ₃	-.073364	6 ₂	-.394953

Contd..

APPENDIX - IV.a(vii) (Contd..)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
3 ₄	0.0730742	12 ₂	-.243288
7 ₄	-.03575	15 ₂	-.23397
8 ₄	0.0552565	16 ₂	-.142761
11 ₄	-0.082055	19 ₂	-.249529
16 ₄	-.04693	21 ₂	-.229388
18 ₄	-.023904	23 ₂	-.199173
22 ₄	-.110087	26 ₂	-.316952
23 ₄	-.050342	6 ₃	-.360039
25 ₄	-.040776	20 ₄	-.243648
		21 ₄	-.204304

NOTE : Subscripts in the Company Code indicate the years,
 subscript 9 = 1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV.a (viii)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF THE
FUNCTION OF '8TH SET OF RATIOS' (INITIAL SAMPLE)

GOOD CO GROUP		SICK CO GROUP	
CO CODE	Z-Scores	CO. CODE	Z-Scores
3 ₉	0.1358465	6 ₉	0.1600888
7 ₉	0.4744262	19 ₉	0.0923746
9 ₉	0.2813687	21 ₉	0.0895081
11 ₉	0.3162094	2 ₀	0.1478576
25 ₉	0.3196517	5 ₀	0.10126
7 ₀	0.489842	6 ₀	0.1443415
11 ₀	0.2441955	12 ₀	0.1572362
22 ₀	0.3079102	15 ₀	0.2547738
25 ₀	0.2607493	16 ₀	0.0472238
7 ₁	0.4445116	19 ₀	0.1375783
11 ₁	0.1870368	20 ₀	0.1330706
22 ₁	0.2612557	21 ₀	0.1411685
25 ₁	0.3569382	2 ₁	0.2424224
7 ₂	0.5562887	4 ₁	0.2012175
11 ₂	0.2274173	5 ₁	0.2086787
18 ₂	0.0232758	6 ₁	0.1706669
22 ₂	0.3118202	8 ₁	0.1822225
1 ₃	0.4616203	10 ₁	0.2157789
3 ₃	0.3718358	12 ₁	0.1466388
5 ₃	0.2502074	15 ₁	0.2674765
3 ₃	0.2790628	16 ₁	0.0513844
8 ₃	—	19 ₁	0.1899417
11 ₃	0.2630466	20 ₁	0.1831311
14 ₃	0.5353721	21 ₁	0.1440969
17 ₃	0.3688182	23 ₁	0.1457117

Contd..

APPENDIX - IV.a (viii) (Contd..)

GOOD CO GROUP		SICK CO GROUP	
CO. CODE	Z-Scores	CO. CODE	Z-Scores
18 ₃	0.3716702	26 ₁	0.1610451
24 ₃	0.8611013	2 ₂	0.106381
25 ₃	0.4451225	6 ₂	0.0744464
3 ₄	0.4430934	12 ₂	0.1205916
7 ₄	0.3084956	15 ₂	0.3011898
8 ₄	0.1708488	16 ₂	0.1719828
11 ₄	0.145357	19 ₂	0.1053587
16 ₄	0.2792822	21 ₂	0.1114666
18 ₄	0.3915047	23 ₂	0.1500122
22 ₄	0.1676885	26 ₂	0.1936458
23 ₄	0.161335	6 ₃	0.078632
25 ₄	0.4036089	20 ₄	0.1064899
		21 ₄	0.0003372

NOTE : Subscripts in the Company Code indicate the years,
subscript 9=1979, 0 = 1980, 1 = 1981 and so on.

APPENDIX - IV. b (i)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF THE FUNCTION
OF '1ST SET OF RATIOS' (INITIAL SAMPLE).

CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
1979							
1	0.0420792	4	-0.0281623	3	0.1563256	19	0.042686
2	-0.0171283	8	-0.0531083	4	-0.0068227	20	0.0437665
4	0.0427158	9	0.0394029	5	0.0245745	21	-0.003262
5	-0.0253931	10	-0.0564597	8	-0.0400837	22	0.0960683
8	0.0032843	13	-0.0068723	9	0.0706512	23	0.0519002
10	0.0698253	14	0.0016719	10	0.0179486	26	-0.048023
12	-0.0569909	17	0.0318163	13	0.0178735	1984	
13	0.0719547	18	0.003757	14	0.0190739	2	0.0323068
14	0.1413559	23	-0.0562788	17	-0.0088909	4	0.0655404
15	-0.0328255	24	-0.0133804	20	-0.0079904	5	0.04885
16	-0.0146797	16	-0.0789982	24	0.0083827	6	-0.0643422
17	0.133921	1981		25	0.0462368	9	0.0778785
18	0.0500528	1	0.018255	1983		10	0.0505212
20	-0.0532022	3	0.1291095	2	-0.00072446	12	0.034404
22	0.1048498	9	0.0442069	4	0.0492385	13	-0.1026428
23	0.0048793	13	-0.0703597	9	0.1148487	14	0.0889017
24	0.0149998	14	-0.0155269	10	0.0493501	15	0.0634564
26	0.0750078	17	-0.0125274	12	0.0370689	17	0.0726827
1980		18	0.0197501	13	0.0821709	19	0.0322741
1	0.035943	24	-0.0283528	15	0.0521809	26	-0.0348589
3	0.1497849	1982		16	0.0729522		
		1	0.0458592				

APPENDIX - IV. b (ii)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '2ND SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
1979							
1	-0.006084	4	-0.073022	3	0.1692871	19	0.040999
2	-0.036281	8	-0.053653	4	-0.007738	20	0.0455594
4	-0.01587	9	-0.003228	5	0.0184115	21	0.0090822
5	-0.053101	10	-0.079383	8	-0.04739	22	0.0736012
8	-0.006544	13	-0.044416	9	0.0222403	23	0.0691308
10	0.0206822	14	-0.06457	10	0.0098929	26	-0.024711
12	-0.08038	17	-0.026727	13	-0.005671	1984 2	0.0586012
13	0.0312323	18	-0.036027	14	-0.001798	4	0.0392012
14	0.0411648	23	-0.064468	17	-0.036207	5	0.0509128
15	-0.061253	24	-0.065846	20	-0.000687	6	-0.025162
16	-0.02166	26	-0.123582	24	-0.011143	9	0.0540159
17	0.0347408	1981 1	-0.022639	25	0.0238086	10	0.0425319
18	0.0227286	3	0.0487667	1983 2	0.0076392	12	0.0349456
20	-0.082119	9	-0.003936	4	0.050645	13	-0.132573
22	0.050775	13	-0.098631	9	0.0607026	14	0.0417199
23	-0.029211	14	-0.056412	10	0.0402908	15	0.0491713
24	-0.03862	17	-0.062985	12	0.041605	17	0.0276718
26	0.0316414	18	0.005094	13	0.051836	19	0.0353694
1980							
1	-0.003785	24	-0.076483	15	0.0510902	26	-0.018679
3	0.047986	1982 1	0.0158382	16	0.0553954		

APPENDIX - IV. b (iii)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '3RD SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Scores	CO. CODE	Z-Score	CO. CODE	Z-Scores
1979					
1	-.024353	23	-.0673195	13	0.0650784
2	-.0449286	24	-.0685724	15	0.0736954
4	-.0294035	26	-.1208202	16	0.0867627
5	-.0519441	1981		19	0.0668643
8	-.0261983	1	-.031034	20	0.0692908
10	0.0101766	3	0.0180359	21	0.0242672
12	-.0791949	9	-.0125137	22	0.0666493
13	0.0140247	13	-.094165	23	0.0640756
14	0.0193152	14	-.0492595	26	0.0107598
15	-.0584764	17	-.0648187	1984	
16	-.0213679	18	-.0131718	2	0.0559858
17	0.0155442	24	-.0667821	4	0.0560915
18	-.0045205	1982		5	0.0487319
20	-.0873241	1	0.0124395	6	0.00297728
22	0.0363213	3	0.0461171	9	0.0639401
23	-.0337856	4	0.00361148	10	0.0433406
24	-.0466144	5	0.0239039	12	0.0458111
26	0.0178502	8	-.053905	13	-.1227099
1980					
1	-.0159604	9	0.0290951	14	0.0479916
3	-.0122183	10	0.0244752	15	0.0688675
4	-.07251	13	-.0049794	17	0.0355309
8	-.0663625	14	0.00694599	19	0.0467656
9	-.0166638	17	-0.0342372	26	0.0132111
10	-.0895321	20	0.0154866		
13	-.0502682	24	-.0077042		
14	-.0650882	25	-.0141782		
17	-.0384904	1983			
18	-.0563271	2	0.0216521		
		4	0.0660217		
		9	0.0914038		
		10	0.051831		
		12	0.0543016		

APPENDIX - IV. b (iv)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '4TH SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Score	CO. CODE	Z-Score
1979			
1	-.022882	24	-.066456
2	-.043694	26	-.119372
4	-.027604	1981	
5	-.05111	1	-.029422
8	-.024825	3	0.0203784
10	0.0115789	9	-.011022
12	-.0773	13	-.093264
13	0.0152186	14	-.047426
14	0.0233582	17	-.063506
15	-.057518	18	-.012009
16	-.020502	24	-.064192
17	0.0185744	1982	
18	-.003345	1	0.0137964
20	-.086431	3	0.0487901
22	0.0378685	4	0.0047848
23	-.032328	5	0.0255359
24	-.044626	8	-.052515
26	0.0188613	9	0.0299563
1980		10	0.0258121
1	-.014628	13	-.003962
3	-.010589	14	0.0081288
4	-.071037	17	-.033088
8	-.065317	20	0.0166237
9	-.015364	24	-.006431
10	-.088268	25	-.013067
13	-.049588	1983	
14	-.067771	2	0.0225192
17	-.037615	4	0.0634568
18	-.055144	9	0.0903298
23	-.066363	10	0.0507836

APPENDIX - IV. b (v)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '5TH SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Score	CO. CODE	Z-Scores	CO. CODE	Z-Scores
1979					
1	-.0538107	23	-.1994218	9	-.0279995
2	-.1229258	24	-.0986674	10	-.1431442
4	-.0590961	26	-.1375265	12	-.2466179
5	-.1220196	1981		13	-.0888261
8	-.1098649	1	-.0830772	15	-.2383527
10	-.0495161	3	-.021865	16	-.240053
12	-.1512495	9	-.0592857	19	-.2395012
13	-.0411881	13	-.1479524	20	-.2520622
14	-.0276765	14	-.1204928	21	-.3289509
15	-.1291993	17	-.0967049	22	-.0297457
16	-.1640482	18	-.0950906	23	-.1947168
17	-.022743	24	-.1285978	26	-.3444611
18	-.0642751	1982		1984	
20	-.1312127	1	-.0821972	2	-.2755407
22	-.0210843	3	.0745421	4	-.0730149
23	-.975315	4	-.1387645	5	-.083224
24	-.0705818	5	-.1586304	6	-.2926111
26	-.0341945	8	-.221729	9	-.0589439
1980		9	-.0463718	10	-.1273052
1	-.725952	10	-.1948472	12	-.173601
3	-.0281639	13	-.1471447	13	-.1711626
4	-.113273	14	-.118219	14	-.0330058
8	-.1620895	17	-.1198049	15	-.1638644
9	-.0640709	20	-.2659775	17	-.0508328
10	-.131965	24	-.1344192	19	-.1757284
13	-.1090139	25	-.0420507	26	-.281124
14	-.0854097	1983			
17	-.0587997	2	-.3107278		
18	-.0872575	4	-.1093012		

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS
OF THE FUNCTION OF '6TH SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Scores	CO. CODE	Z-Scores	CO. CODE	Z-Scores
1979					
1	0.1414933	24	0.1618206	12	0.1147163
2	0.1929959	26	0.1083601	13	0.1156452
4	0.1902448	1981		15	0.3786335
5	0.0779299	1	0.1331262	16	0.3132357
8	0.1728337	3	0.3379602	19	0.0936585
10	0.1659825	9	0.1705765	20	0.0907762
12	0.1209318	13	0.0615747	21	0.0900147
13	0.1557182	14	0.091409	22	0.1995217
14	0.1881632	17	0.1172957	23	0.4402742
15	0.1432712	18	0.2119744	26	-0.0245051
16	0.1641909	24	0.1223764	1984	
17	0.1650224	1982		2	0.4729334
18	0.258363	1	0.104331	4	0.1299928
20	0.1484726	3	0.6976305	5	0.1898342
22	0.1985937	4	0.1306025	6	0.0203727
23	0.1327252	5	0.0819336	9	0.1665616
24	0.2312397	8	0.0904747	10	0.1455374
26	0.1949308	9	0.1709229	12	0.1439453
1980					
		10	0.0619643	13	0.0353178
1	0.1327114	13	0.0783628	14	0.1624278
3	0.3401426	14	0.1212551	15	0.1239329
4	0.1510786	17	0.1037537	17	0.076313
8	0.1442717	20	0.0744503	19	0.1176006
9	0.1859942	24	0.1614246	26	-0.0157675
10	0.1265942	25	0.2623462		
13	0.1198401	1983			
14	0.1325654	2	0.0880173		
17	0.1498793	4	0.1096433		
18	0.220418	9	0.1546654		
23	0.1239848	10	0.0892694		

APPENDIX - IV. b (vii)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '7TH SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
1979					
1	-.143396	18	-.140296	4	-.213865
2	-.144293	23	-.177644	9	-.153364
4	-.136736	24	-.145343	10	-.174061
5	-.192318	26	-.207921	12	-.209775
8	-.155398	1981		13	-.161324
10	-.148523	1	-.153411	15	-.062359
12	-.181928	3	0.0155405	16	-.082045
13	-.145267	9	-.126501	19	-.235141
14	-.129001	13	-.198911	20	-.227425
15	-.187352	14	-.209053	21	-.207502
16	-.150369	17	-.187287	22	-.093817
17	-.143349	18	-.143824	23	-.014478
18	-.106921	24	-.156677	26	-.321191
20	-.178574	1982		1984	
22	-.110844	1	-.159192	2	-.024095
23	-.165989	3	0.2464122	4	-.171372
24	-.098902	4	-.178832	5	-.1293
26	-.110003	5	-.208834	6	-.360827
1980		8	-.214755	9	-.160895
1	-.170384	9	-.12746	10	-.145337
3	0.023094	10	-.196735	12	-.202532
4	-.184224	13	-.191815	13	-.190827
8	-.180942	14	-.180111	14	-.135436
9	-.133635	17	-.201054	15	-.173016
10	-.15703	20	-.243641	17	-.162053
13	-.175611	24	-.149993	19	-.210558
14	-.18834	25	-.062946	26	-.294619
17	-.158467	1983			
		2	-.236037		

APPENDIX - IV.b(viii)

Z-SCORE OF 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS OF
THE FUNCTION OF '8TH SET OF RATIOS' (INITIAL SAMPLE)

CO. CODE	Z-Scores	CO. CODE	Z-Scores	CO. CODE	Z-Scores
1979					
1	0.2292657	23	0.0664903	10	0.2548881
2	0.1645544	24	0.3063314	12	0.1270538
4	0.3441233	26	0.194913	13	0.3216059
5	0.1535993	1981		15	0.2812256
8	-.0189849	1	0.114618	16	0.3864659
10	0.3731257	3	0.2740424	19	0.4710923
12	0.1627557	9	0.393262	20	0.2186384
13	0.1429993	13	0.2474987	21	0.11712
14	0.4062133	14	0.293563	22	0.4916008
15	0.3082775	17	0.1737284	23	0.2097331
16	0.123995	18	0.0551105	26	0.2856261
17	0.2745099	24	0.3405521	1984	
18	0.1168825	1982		2	0.4489553
20	0.1397117	1	0.1753034	4	0.5342849
22	0.2906049	3	0.3087839	5	0.080944
23	0.1101691	4	0.1826385	6	0.2105501
24	0.3976757	5	0.0979665	9	0.3336792
26	0.0958498	8	0.0279397	10	0.1696512
1980		9	0.475439	12	0.1604483
1	0.0660731	10	0.271424	13	0.3619799
3	0.2548882	13	0.2174979	14	0.5565814
4	0.1061107	14	0.2771577	15	0.2836315
8	0.068159	17	0.1596065	17	0.3385998
9	0.2990601	20	0.1725675	19	0.4218367
10	0.1097125	24	0.1985635	26	0.2615358
13	0.1221996	25	0.2531538		
14	0.2400271	1983			
17	0.1540012	2	0.1297394		
18	0.0340538	4	0.202843		
		9	0.5779407		

APPENDIX - V a)

Z-SCORE OF 'GOOD' AND 'SICK' UNITS ON THE BASIS OF THE
FUNCTION OF '1ST SET OF RATIOS' (SECONDARY SAMPLE).

CO. CODE	GOOD UNITS		SICK UNITS		
	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
2 ₄	0.089489	14 ₇	0.1145134	9 ₅	-0.112493
3 ₄	0.1646839	15 ₇	0.083126	9 ₆	-0.066221
6 ₄	0.0931652	2 ₈	0.0355276	5 ₈	-0.401052
12 ₄	0.1113075	7 ₈	0.0472515	9 ₈	-0.177997
14 ₄	0.1229695	14 ₈	0.0955522	6 ₉	-0.114259
15 ₄	0.1468156	15 ₈	0.0728897	9 ₉	-0.146481
18 ₄	0.0680731	18 ₈	0.0508603	1 ₀	-0.073113
2 ₅	0.0998131	2 ₉	0.0661309	4 ₀	-0.06668
12 ₅	0.1029641	14 ₉	0.0714081	6 ₀	-0.156191
14 ₅	0.1020219	18 ₉	0.0388943	11 ₀	-0.06353
15 ₅	0.105664	2 ₀	0.0605568	12 ₀	-0.140504
16 ₅	0.1172138	16 ₀	0.0537776	17 ₀	-0.104396
18 ₅	0.1023678	2 ₁	0.0698799	19 ₀	-0.047215
12 ₆	0.1490186	15 ₁	0.0903348	4 ₁	-0.261906
14 ₆	0.0992391	16 ₁	0.0529176	6 ₁	-0.065749
15 ₆	0.1399673	18 ₁	0.0249926	7 ₁	-0.102113
18 ₆	0.0782076			11 ₁	-0.061521
2 ₇	0.1122426			12 ₁	-0.128006
7 ₇	0.1611154			17 ₁	-0.128006
12 ₇	0.1433071			19 ₁	-0.411557

APPENDIX - V.a(ii)

Z-Score of the Units in 'Good' and 'Sick' Groups
(Secondary Sample) on the Basis of the Discriminant
Function of the '2nd Set of Ratios'

GOOD UNITS				SICK UNITS	
CO CODE	Z-Score	CO CODE	Z-Score	CO CODE	Z-Score
1974		14	0.1234345	1975	
2	0.2158506	15	0.0531638	9	-0.0872282
3	0.3554956	1978		1976	
6	0.1583582	2	0.1704078	9	-0.0546935
12	0.150762	7	0.0469522	1978	
14	0.1339927	14	0.0692233	5	-0.3397111
15	0.111773	15	0.0569997	9	-0.1466879
18	0.2379367	18	0.1492605	1979	
1975		1979		6	-0.0690585
2	0.1983936	2	0.1542035	9	-0.1013153
12	0.1324878	14	0.0278671	1980	
14	0.0920194	18	0.1029865	1	-0.068394
15	0.0881027	1980		4	-0.0302565
16	0.0990258	2	0.1554832	6	-0.2340318
18	0.1369967	16	0.0694293	11	-0.1203342
1976		1981		12	-0.0237778
12	0.1995193	2	0.1565028	17	-0.113245
14	0.0702508	15	0.0718936	19	-0.0919979
15	0.0944676	16	0.0679536	1981	
18	0.110884	18	0.1041206	4	-0.029177
1977				6	-0.197063
2	0.1853557			7	-0.0614998
7	0.1771942			11	-0.0723316
12	0.2055044			12	-0.0299483
				17	-0.1023163
				19	-0.3419038

APPENDIX - V.a(iii)

Z-Score of the Units in 'Good' and 'Sick' Groups
(Secondary Sample) on the Basis of the Discriminant
Function of the '3rd Set of Ratios'.

GOOD UNITS				SICK UNITS	
CO CODE	Z-Score	CO CODE	Z-Score	CO CODE	Z-Score
1974				1975	
2	0.1235056	14	0.394912	9	-0.0127216
3	0.1309992	15	0.3608609	1976	
6	0.2030317	1978		9	-0.0103836
12	0.2217472	2	0.1710674	1978	
14	0.1721063	7	0.2946672	5	-0.3401404
15	0.3496012	14	0.1558205	9	-0.0266164
18	0.0156775	15	0.0884447	1979	
1975		18	0.0241337	6	22.846006
2	0.3093745	1979		9	0.0009974
12	0.1717287	2	0.087835	1980	
14	0.1634449	14	0.0124026	1	0.5256924
15	0.246346	18	0.0061367	4	11.466134
16	0.1322675	1980		6	0.0406526
18	0.1290676	2	0.0311252	11	0.2908774
1976		16	0.0361316	12	0.6084422
12	0.2499302	1981		17	0.3029612
14	0.1505747	2	0.0389898	19	0.6092378
15	0.3581644	15	0.108803	1981	
18	0.1291857	16	0.0381604	4	0.268685
1977		18	0.0141681	6	-0.0627718
2	0.2745286			7	0.6063513
7	0.3274509			11	0.0726266
12	0.2451203			12	0.61835
				17	0.0815844
				19	-0.0610089

APPENDIX - V. a (iv)

Z-Score of the Units in 'Good' and 'Sick' Groups (Secondary Sample) on the Basis of the Discriminant Function of the '4th Set of Ratios'.

GOOD UNITS				SICK UNITS	
CO CODE	Z-Score	CO CODE	Z-Score	CO CODE	Z-Score
1974				1975	
2	0.0999376	14	0.1251723	9	-0.0754791
3	0.0776641	15	0.0874563	1976	
6	0.0866708	1978		9	-0.0254631
12	0.093269	2	0.0929122	1978	
14	0.0745845	7	0.0223215	5	-0.3649545
15	0.199487	14	0.0438448	9	-0.1354261
18	0.00253953	15	0.0632009	1979	
1975		18	0.0285088	6	-0.1210672
2	0.2338016	1979		9	-0.1144626
12	0.0720345	2	0.0393667	1980	
14	0.0699806	14	0.0172781	1	-0.0692573
15	0.0917899	18	0.0198321	4	-0.0653562
16	0.0747322	1980		6	-0.264154
18	0.0558707	2	0.0175925	11	-0.1393266
1976		16	0.0296271	12	-0.0607757
12	0.1549959	1981		17	-0.1264516
14	0.0645937	2	0.0255147	19	-0.095354
15	0.1731614	15	0.0569337	1981	
18	0.0491417	16	0.030818	4	-0.0404228
1977		18	0.00496803	6	-0.2090492
2	0.1785576			7	-0.0624074
7	0.1510976			11	-0.0811436
12	0.1330247			12	-0.0590691
				17	-0.1052714
				19	-0.3495009

Z-Score of the Units in 'Good' and 'Sick' Groups (Secondary Sample) on the Basis of the Discriminant Function of the '5th Set of Ratios'.

GOOD		UNITS		SICK UNITS	
CO CODE	Z-Score	CO CODE	Z-Score	CO CODE	Z-Score
1974				1975	
2	-0.056643	14	-0.0212281	9	-0.431665
3	0.1631897	15	-0.1039072	1976	
6	-0.079543	1978		9	-0.4789268
12	-0.017728	2	-0.0358193	1978	
14	0.107657	7	-0.0725305	5	-0.3391609
15	0.0691345	14	-0.0038543	9	-0.4442314
18	0.0099582	15	-0.0880297	1979	
1975		18	-0.10727	6	-0.220733
2	-0.0348836	1979		9	-0.359689
12	0.0202167	2	-0.048798	1980	
14	0.028978	14	-0.003979	1	-0.2477322
15	0.0372371	18	-0.129288	4	-0.132842
16	0.0736887	1980		6	-0.380859
18	0.0232299	2	-0.0415424	11	-0.268782
1976		16	-0.1193678	12	-0.159324
2	0.0298535	1981		17	-0.262016
14	0.0351165	2	-0.026625	19	-0.1590036
15	-0.0248776	15	-0.016059	1981	
18	-0.0513564	16	-0.1330406	4	-0.246793
1977		18	-0.131704	6	-0.480585
2	-0.0196159			7	-0.235725
7	0.0378211			11	-0.304864
12	0.0822328			12	-0.1547753
				17	-0.308349
				19	-0.378208

APPENDIX - V.a(vi)

Z-Score of the Units in 'Good' and 'Sick' Groups (Secondary Sample) on the Basis of the Discriminant Function of the '6th Set of Ratios'.

GOOD UNITS				SICK UNITS	
CO CODE	Z-Scores	CO CODE	Z-Scores	CO CODE	Z-Scores
1974				1975	
2	0.5803862	14	0.3049247	9	0.00165019
3	0.8270644	15	0.256479	1976	
6	0.3253319	1978		9	0.0011781
12	0.3910213	2	0.4027914	1978	
14	0.5113471	7	0.2581351	5	0.0237132
15	0.4169969	14	0.2811628	9	0.0051423
18	0.8208279	15	0.2512868	1979	
1975		18	0.4670317	6	0.184493
2	0.4560952	1979		9	0.0544478
12	0.4103319	2	0.4064433	1980	
14	0.3681546	14	0.2668371	1	0.0833719
15	0.3821906	18	0.4305782	4	0.133428
16	0.2861751	1980		6	0.0801153
18	0.3767403	2	0.4261736	11	0.1011866
1976		16	0.2571364	12	0.1572724
12	0.4236566	1981		17	0.2017244
14	0.347854	2	0.4489738	19	0.1806615
15	0.2968145	15	0.2487788	1981	
18	0.2981006	16	0.2573758	4	0.2060715
1977		18	0.4262025	6	0.0439864
2	0.3827795			7	0.11551
7	0.3050864			11	0.0878424
12	0.4978807			12	0.1800463
				17	0.0687931
				19	0.0796006

APPENDIX - V.a(vii)

Z-Scores of the Units in 'Good' and 'Sick' Groups
(Secondary Sample) on the Basis of the Discriminant
Function of the '7th Set of Ratios'

GOOD UNITS				SICK UNITS	
CO CODE	Z-Scores	CO CODE	Z-Scores	CO CODE	Z-Scores
1974				1975	
2	0.2093255	14	-0.0160975	9	-0.2552149
3	0.3945787	15	-0.1503995	1976	
6	0.0332651	1978		9	-0.1337727
12	0.0475507	2	0.0906737	1978	
14	0.1135535	7	-0.0783274	5	-0.1904831
15	0.0245008	14	-0.0509753	9	-0.2396052
18	0.3380746	15	-0.1327724	1979	
1975		18	0.1166873	6	-0.1005545
2	0.1587525	1979		9	-0.169331
12	0.0643254	2	0.0934038	1980	
14	0.0010072	14	-0.0591395	1	-0.1778366
15	0.0069404	18	0.0503673	4	-0.0663528
16	0.0254444	1980		6	-0.2062165
18	0.0502311	2	0.1139231	11	-0.1782156
1976		16	-0.055401	12	-0.0708182
12	0.0777013	1981		17	-0.1745431
14	0.0010903	2	0.1302	19	-0.1234143
15	-0.1238641	15	-0.067996	1981	
18	-0.0080699	16	-0.0791547	4	-0.181047
1977		18	0.1009325	6	-0.2417229
2	0.0882787			7	-0.1942352
7	-0.0138705			11	-0.1961419
12	0.1605362			12	-0.0848944
				17	-0.180391
				19	-0.2126492

APPENDIX - V.b

Z- SCORE OF THE 'SEMI-GOOD/SEMI-SICK' UNITS ON THE BASIS
OF THE FUNCTION OF '1ST SET OF RATIOS' (SECONDARY
SAMPLE)

CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
1974		1976		1979	
1	0.0755411	10	0.0690057	1	0.0476189
4	0.1179166	11	0.2423574	3	0.0055096
5	0.1383033	13	0.0705824	4	-0.043159
7	0.0592437	16	0.13793	7	-0.042372
8	0.0000108	17	0.1069214	8	0.0494355
9	0.0232459	19	0.0121109	10	-0.323968
10	0.1206533	1977			
11	0.1079031	1	0.0612242	11	-0.016853
13	0.0558635	3	0.1481208	12	0.0092875
16	0.1613107	4	0.0890306	13	0.038839
17	0.0650286	5	0.0450448	15	0.0775924
19	0.1283225	6	0.0631787	16	0.0685849
1975		8	0.1103477	17	-0.03241
1	0.0303321	9	0.0900343	19	0.0350133
3	0.0745435	10	0.081631	1980	
4	0.0444558	11	0.2570928	3	-0.008567
5	0.0254242	13	0.0954713	7	-0.118416
6	0.0026583	16	0.1053928	8	-0.026375
7	0.0459347	17	0.0686259	10	-0.688062
8	0.0809457	18	0.0943889	13	-0.024705
10	0.0357202	19	0.0452059	14	-0.025117
11	0.0618474			15	0.0564859
13	0.0042912			18	-0.011811
17	0.0339964			1981	
19	0.0508584			1	-0.003668
				3	-0.017611
				8	-0.0836691
				10	-0.720129
				13	0.0160579
				14	0.0553312

APPENDIX - V.b (Contd..)

CO. CODE	Z-Score	CO. CODE	Z-Score	CO. CODE	Z-Score
1976		1978			
1	0.0713201	1	-0.020276		
2	0.1073141	3	0.0843076		
3	0.17344	4	-0.034514		
4	0.1096649	6	-0.036612		
5	0.0264085	8	0.0545401		
6	0.0761623	10	-0.219307		
7	0.0728962	11	0.0261877		
8	0.0999314	12	-0.144989		
		13	0.0178693		
		16	0.0872224		
		17	-0.033496		
		19	-0.023299		

* * *

C H A P T E R - IVRELEVANCE OF THE FINDINGS OF PRESENT STUDY

Over the past years, a number of empirical studies have been undertaken to examine the relationship between the financial ratios and a firms' state of health, its chance of survival and/or failure. Several attempts have been made to search the financial ratios with a view to show which one or which set of them really reflects better the financial health of a firm. Researchers have applied sophisticated statistical and mathematical techniques to ratio analysis and tried to predict certain economic and financial events. But the results of those studies could not be compared with each other because "the time periods, predictors and the data sets are different"¹.

Again, "there is no way one can completely order the predictive power of a set of models used for predictive (decision) purpose. As a minimum, this requires a complete specification of the decision problem, including a preference structure defined over the appropriate state-space. Previous work in the area of bankruptcy prediction has generally been based on two highly specific and restrictive assumptions when predictive performance is evaluated. First, a (mis)classification matrix is assumed to be an adequate partition of the pay off structure. Second, the

two types of classification error have an additive property and the "best" model is one which minimise the sums of percentage errors. Both of these assumptions are arbitrary, although it must be admitted that the first assumption is of some value if one is to describe at least one implication of using a model"².

In this section, our study would attempt to focus on above (mis)classification description and also on the assumption (i.e. the additive property of the two types of classification errors) as it would help to ascertain as to what extent the results of the models of other researchers conform to our study.

Univariate models and our study

In an univariate setting, Beaver³, Belkaoui⁴, Gupta⁵ studied and tested the power of individual financial ratios and attempted to search out the ratio/ratios which would discriminate better between the different degrees of financial health of firms. Beaver, in predicting the two events like, failure and non-failure, showed that the failure of an enterprise could be forewarned reliably through combined utilisation of quantitative technique and financial ratio analysis; and observed that the ratio 'Cash Flow to Total Debts' misclassified only 13, 21, 23, 24 and 22 percent of the sample units for the one, two, three, four and five years before bankruptcy, respectively. Belkaoui, in predicting two events like, take-over and non take-over, observed that the performance of the non-liquid-asset ratios were better than the 'liquid-asset' ratios; the predictive power of the 'non-liquid-asset' ratios

was more striking in the short-term period and amongst the 'liquid-asset' ratios, the performance of the 'Working Capital to Total Assets' ratio was better. Belkaoui, did not clearly stated the classification rate of his univariate analysis. Gupta in predicting two events like, the 'sick' and the 'non-sick' in Indian context, reported that the two ratios, namely, EBDIT/Sales (net of excise) and OCF/Sales (net of excise) were the best and were of about equal merits amongst the ratios (56 in number) under his study. Gupta's mis-classification rate was '3 to 10' percent for '1 to 2 ' years, and '11 to 16' percent for '3 to 4' years prior to bankruptcy. The performance of our model, though tested in multivariate-setting in predicting the two events like, the 'good' and the 'sick', was better than the performances reported by these researchers (vide, Table - IV.1). Moreover, the performance of our model, in predicting three events like, the 'good', the 'semi-good/semi-sick', and the 'sick' financial health, was slightly lower than the performances of the models suggested by Beaver and Gupta (Table - IV.1).

Table - IV.1

Accuracy rates (%) of our model and Univariate models

Models suggested by	Accuracy of the models(%)				
	Years prior to the event				
	1	2	3	4	5
W.H. Beaver	87	79	77	76	78
L.C. Gupta	(97 to 90)		(89 to 84)		-
A. Belkaoui	Not available.				
Our study					
(i) Two degree Situation	100				
(ii) Three-degree Situation	81.82				

It is to be noted that the ratio 'Cash flow to Debts' suggested by Beaver⁶ as the 'best' was ranked 6th in our study; and the ratio 'EBDIT/Total Assets + Accumulated Depreciation' and 'OCF/Total Assets + Accumulated Dep.' suggested by Gupta⁷ as the 'best amongst the return on investment measures' was ranked 4th and second best amongst the 'set of ratios' selected as 'best', in our study.

Multivariate Models and our study

i) In multivariate setting, Meyer & Piffer⁸ attempted to present a model for predicting bank failures using the Multiple Regression Analysis technique, and Chessser⁹, in predicting two events like, acceptable and un-acceptable risk of commercial loan customers to comply with their loan agreement, used a mathematical technique based on the theories of probability. Meyer & Piffer reported that their model correctly classified 80 percent and 72 percent of the sample units for one year and two year prior to failure, respectively. Chessser reported that his model correctly classified 76 percent and 57.14 percent of the units in the initial sample for one and two year prior to the event, respectively; and 75 percent of the units in the secondary sample for one year prior to the event.

Model used in our study is neither the Multiple Regression Analysis nor the mathematical technique of probability, however, it outperformed the performance of both the models of Meyer & Piffer and Chessser; even the performance of our model in classifying the units of the secondary sample into two groups, was better than the performance of Chessser's model in classifying the secondary sample units (Table - IV.2)

Table - IV.2

Accuracy Rates of the Models (%) (Multiple Regression Analysis and Probability Analysis)

Model suggested by	Accuracy of the Model (%) prior to the event		
	Initial sample		Secondary Sample
	1-year	2-year	
Meyer and Piffer	80	72	-
Chesser	76	57.14	75
Our Study			
i) Two Degree Situation	100		96.43
ii) Three Degree Situation	81.82		63.27

ii) Again, in the multivariate setting of the financial ratios, the techniques of Maximum Likelihood Estimation were used by James Ohlson¹⁰, Ingram & Frazier¹¹, Gentry et al¹² and Casey et al¹³. Ohlson used conditional logit method in predicting two events like bankruptcy and non-bankruptcy, and reported that his probabilistic model correctly classified 96.12 percent, 95.55 percent and 92.84 percent of the sample firms for the bankruptcy within one-year, two-year and 'one or two year', respectively. Besides, Ingram, & Frazier, Gentry et al and Casey et al used both the probit and the logit methods

of analysis (Casey et al used only probit method) and also studied the performance of the Multiple discriminant Analysis in that context. Ingram & Frazier reported that the performance of all the models employed by them were significant at .01 level of accuracy and the "logit model's classification accuracy was slightly higher than that of the probit model and both outperformed the MDA but only marginally"¹⁴. Gentry et al reported that their logit model classified 77 to 83 percent of the companies correctly and "the mis-classified logit results were similar to the probit and MDA results"¹⁵. Gentry et al, stated further that their model when applied to classify only the companies rated as financially weak, correctly classified 70 to 78 percent of the units in the initial sample; and 74 to 70 percent of the units in the secondary sample. Casey et al, reported that their 'probit' model was able to classify correctly 69% and 59% of the firms in the 'estimation' sample and 'validation' sample, respectively; and their model using discriminant analysis had "slightly higher classification accuracy"¹⁶.

Our study, unlike the above studies, used only the discriminant analysis (linear form). The performance of our model was similar to the results stated by Ingram and Frazier; and slightly higher than that of Ohlson's model. However, the results of our model outperformed the results of the models suggested by Gentry et al and Casey et al, in all the sample cases (Table - IV.3).

Table - IV.3

Accuracy rates (%) of the Models (Maximum Likelihood Estimation).

Models suggested by	Accuracy of the Models (%) for the	
	Initial Sample	Secondary Sample
Ohlson	96.12 for 1-year data 95.55 for 2-year data 92.84 for '1 or 2'-year data	-
Ingram and Frazier	99.0	-
Gentry et al (i) 'Failure'	77 to 83	-
(ii) Financially Weak companies	70 to 78	74 to 70
Casey et al	69.4	58.5
Our Study		
(i) Two-degree Situation	100	96.43
(ii) Three-year Situation	81.82	63.27
(iii) Only 'Sick' units	100	100

iii) In the multivariate setting of the financial ratios, the Multiple Discriminant Analysis technique was also used by a number of researchers like, Altman¹⁷, Ewert¹⁸, Blum¹⁹,

Edmister²⁰, Deakin²¹, Belkaoui²², Kaveri²³, Taffler²⁴, Ooghe & Verbaere²⁵, Casey et al²⁶ and Houghton and Woodliff²⁷. Most of these researchers have chosen two events (like, bankrupt - non-bakrupt, failure - non-failure, repayment - non-repayment of loans, take overs - non-take overs, good-bad credit risks, 'success' - 'failure' of bankrupt firms that had reorganisation plans, etc.) for prediction except Kaveri who attempted to predict three events - good, irregular and sick accounts of Banks. Ewert, Edmister and Taffler reported that their models correctly classified 82 percent, 92 percent, and 97.8 percent of the units in the initial sample, respectively. Amongst these researchers, only Edmister tested his model on the secondary data sample and observed that his model correctly classified the 80 percent of the units in the secondary sample. The performances so reported were slightly lower than the performance of our model in classifying both the initial and secondary sample units. The performance of the Deakin's model was slightly lower than the performance of our model for both the initial and secondary sample units. The results of our model, both for the initial and secondary sample, (in two-degree-situation) totally outperformed the results of the models of Casey et al and Houghton and Woodliff (for both the 'success' and 'failure' cases); but the results of our model in a 'three-degree' situation were similar to that of the results reported by Casey et al and Houghton and Woodliff. The performances of the models of Altman,

Blum, and Ooghee & Verbaere, prior to the events, for (i) the one year, ranged between 95 to 89 percent, (ii) the two year, ranged between 80 to 72 percent, (iii) the three year, ranged between 72.4 to 48 percent, (iv) the four year, ranged between 75.6 to 29 percent; and for the Altman's model only 36 percent for the five-year prior to the events. Amongst these researchers, Altman only tested his model on the secondary data sample and observed that his model correctly classified²⁹ 83.5 percent of the units for one year prior to the bankruptcy. The performances of the models suggested by Kaveri and Belkaoui were slightly lower than the models stated above (i.e., studies based on the Multiple Discriminant Analysis) including the performance of the model of the present study. The model developed in this study maintained 100 percent accuracy for the initial sample and 96.43 percent accuracy for the secondary (i.e. validation) sample when examined in a 'two-degree situation (i.e. the 'good' and the 'sick' groups only). This model maintained 81.82 percent accuracy for the initial sample and 63.27 percent accuracy for the secondary sample when examined in a 'three-degree' situation (i.e. the 'good', the 'semi-good/semi-sick', and the 'sick' groups). The decrease in accuracy rate in the case of secondary sample was also witnessed by almost all the previous researchers. The table (Table - IV.4) below depicts the position.

Table - IV.4

Accuracy rates (%) of the Models (Discriminant Analysis)

Models suggested by	Accuracy of the Models (%), years prior to the event				
	1-year	2-year	3-year	4-year	5-year
Altman	95 (79)	72	48	29	36
Ewert	82				
Blum	93	80	70		
Edmister	92 (80)				
Deakin	97 (78)	95.5 (94)	96 (88)	79 (77)	83 (85)
Belkaoui	72 (70)	80 (76)	84 (85)	78 (76)	80 (75)
Kaveri	76.0 (69)	69.4 (67.4)	66.7 (69.5)	60.86 (67.3)	65.0 (62.0)
Taffler	97.8				
Ooghe and Varbaere	89.0	78.0	72.4	75.6	
Casey et al	72.6 to 80.5 (61)				
Houghton and Woodliff	80.56 (66.67) - for 'Success' cases 83.33 (58.33) - for 'Failure' cases				
Our study					
i) Two-degree- situation	100(96.43)				
ii) Three-degree situation	81.82 (63.27)				

NOTE : The results of the secondary sample are shown in the 'brackets'.

A close examination of the classification accuracy of (our) discriminant function (Descriptive function) derived on the basis of the '1st Set of ratios' revealed that the rate of accuracy considerably decreased when the model was examined in a 'three-degree' situation to classify the sample units i.e. the performance of the model by extending the predictable degrees of financial health from 'two-degree' situation to a 'three-degree' situation (Vide Table - III-15. and Table - III-23&25). On the basis of both the 'initial' and 'optimum' cut-off points, the function was unable to classify the units under the 'semi-good/semi-sick' group with high degree of accuracy. It could also be observed that the 'Z-Scores' of the misclassified 'semi-good/semi-sick' units were more close to the 'Z-Scores' of the units in the 'good' group than the 'sick' group. In the 'initial' sample, amongst the misclassified 'semi-good/semi-sick' units, the units (mis) identified as 'good' (82.61 percent) were more than those as 'sick' (17.39 percent) ones (Vide Table - III-15). Similar results were observed when the function was tested on the 'secondary' data sample; amongst the misclassified units of the 'semi-good/semi-sick' group, the units identified/classified as 'good' were 87.23 percent and as 'sick' were 12.77 percent (Vide Table - III-15). The reasons for such performance were:

- (i) the financial characteristics (reflected by the financial ratios) of the 'semi-good/semi-sick' units were not taken at the time of : (a) selecting the 'monitoring' ratios, (b) selecting the ratios to form small 'sets' and (c) computing the discriminant functions;

- (ii) the relatively lower effectiveness of the 'reduced' functions;
- (iii) the overlaps between the financial characteristics of the 'good', the 'sick' and the 'semi-good/semi-sick' units were not sufficiently covered and reflected by the definitional parameters (the positive and negative values of OCF, NW and WC); and
- (iv) the difference between the average magnitudes of the financial ratios of the 'good'/the 'sick' units and the 'semi-good/semi-sick' units were lower than that between the 'good' units and the 'sick' units (Vide Annexure-vi).

Thus, it could be stressed that, in the light of the results reported by the researchers (as far as available and discussed above) the classification accuracy of the discriminant function based on the '1st set of ratios' containing R-12 ($OCF/Total\ Debts$); R-18 $\left[(Retained\ Profit + Depreciation\ Charge)/Total\ Debts \right]$, R-19 $\left[(Retained\ Profit + Depreciation\ Charge)/(Tangible\ Assets + Accumulated\ Depreciation) \right]$, and R-24 ($Net\ Worth/Total\ Debts$) was highly satisfactory in classifying the different degrees of corporate financial health of the Tea units, considering at least 'two-degrees' of financial health. Furthermore, in a 'three-degrees of financial health' situation, this '1st set of ratios' could also be used satisfactorily for the same purpose, at least in Tea units.

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CHAPTER - VS U M M A R Y A N D C O N C L U S I O N

Prediction of different degrees of corporate financial health, in an objective manner, is very important as well as necessary as this can be used as a vital device for total monitoring system with a view to saving an unit from being sick. Corporate sickness and its mounting ill-effects warrant prompt detection, and that too at an early stage, of the signals of mal-functioning of an unit. "The early detection of rapidly deteriorating conditions may enable managers of a firm to take action early enough to reverse the trend"¹. As an instrument of forewarning, the 'Ratio Analysis Technique' associated with sophisticated statistical or mathematical tools is helpful in predicting corporate financial health. The context necessitates an inquiry as to whether financial ratios can reflect different degrees of corporate financial health; and if they do, an assessment of the predictive ability of the financial ratios in identifying different degrees of firm's financial health becomes inevitable.

To assess predictive ability (i.e. effectiveness) of financial ratios, researchers have been attempting to:

(i) identify the particular financial ratios (an individual ratio or a set of ratios) which reflect the particular financial/economic event better, and (ii) improve or enhance the quality of the prediction models through statistical sensitivity and statistical validity tests of both the ratios and the models. As a whole, they have been attempting to improve the overall quality of the 'Ratio Analysis Technique' itself.

Generally, researchers have attempted to identify and predict various aspects of the financial health of their respective sample units 'in an objective manner' and amongst them three major study groups could be identified:

- (i) the group that studied and compared the financial characteristics of the units which failed or closed or were bankrupt with those of the non-failing or the running or the non-bankrupt ones;
- (ii) the group that studied some particular financial aspects of the corporate units which were irregular in those financial matters i.e. non-compliance of loan agreement, bad credit risks, etc. and,
- (iii) the group that studied the 'units at risk' and the 'potential bankrupt units' and their chances of revival.

Thus, our study centered around the examination of :

- (i) whether financial ratios are able to discriminate between the different degrees of corporate financial health,
- (ii) whether financial ratios can serve as indicators/predictors of different degrees/statuses of corporate financial health,
- (iii) which 'set' of financial ratios indicate/predict the corporate financial health, in a better way,

and in relation to the above, hypotheses developed were:

- (i) the magnitudes of financial ratios of the sample tea units having dissimilar financial health differ from one financial status to the other,
- (ii) the financial ratios are the predictors of the degrees of corporate financial health of the tea units, and
- (iii) the classification accuracy of the financial ratios (in 'sets') differ from one another.

The financial health of "corporate enterprises represent a continuum on the scale calibrated according to some measure of health or survival strength"². The 'good' and the 'sick' categories of financial health were not of the nature of "abrupt or qualitative classes like 'male' or 'female' "³. Our study was limited primarily to the two-fold classification (i.e. the 'good' and the 'sick') although the results derived were tested against a three-fold classification (i.e., the 'good', the 'semi-good/semi-sick', and the 'sick').

The definitions and measurements of the relationships of the financial characteristics (variables) differ widely owing to the implicit emphasis placed by different users of financial information on different aspects of a particular firm's functioning⁴. A number of permutations and combinations of these definitions and measurements resulted in quite a large number of financial ratios. A variety of financial ratios were used by previous researchers in their prediction studies, and a variety of financial ratios (either a ratio or a 'set of ratios') were recommended by them as the best ones for the particular financial/economic events under their study. Our study tested fifty two (52) financial ratios to assess its effectiveness in identifying the degrees of financial health of tea units.

Testing the First Hypothesis

The test of the first hypothesis was determined by the observation of the results of the statistical significance tests (Mean Test and F-Test) of the financial ratios. A financial ratio was considered significant one only when the particular ratio was found significant at .01 level in both the 'Mean' and 'F' - Tests.

Out of the sample financial ratios, the present study found that only thirtysix (36) ratios were significant (and considered those as 'monitoring' ratios); that is, the magnitudes of these 36 ratios varied according to the variations in the corporate financial health of the sample tea units. Thus, the first hypothesis of our study held good for these 36 financial ratios.

Testing the Second Hypothesis

For testing the second hypothesis, the financial characteristics (grounded on those 36 significant financial ratios) of the 'good' units were compared with that of the 'sick' units (i.e. between the two extreme degrees of financial health) in terms of all the 'monitoring' financial ratios and in terms of suitable small 'sets' of such financial ratios.

The financial ratios (36) tested through small 'sets' were selected on the basis of relative individual discriminating power of the ratios. Actually seventeen (17) ratios were selected to study in eight (8) such 'sets'. The number of ratios considered for each of the small 'sets' (save the 8th set) to form discriminant function (termed as 'reduced' functions) were four because of the reasons:

- (i) The financial ratios of only four 'groups' (out of the five 'groups' under this study) were found significant (Vide Table III.5) in discriminating between the degrees of corporate financial health and the small 'set of ratios' containing only one representative ratio from each of the four 'groups' made the 'set' (the Ratio-representative Set or the '2nd set' of ratios) to contain only four ratios;
- (ii) For application in a practical situation, researchers suggested that "the greater number of variables in the 'best' linear discriminant model can cause difficulties. The reduced model seems quite appropriate for classification purposes ('prediction') in practical situation, the full original model can be used in an analytical context"⁵.

For this, a discriminant function (termed as 'original' function) was computed taking all the 36 'monitoring' ratios, and for selection of ratios for these small 'sets' (8) the relative share of contributions of the individual ratios in the overall discriminating power of the 'original' function were observed considering : (i) the whole set of 'monitoring' ratios (36) and, (ii) the ratio 'sets' representing the ratio 'groups' like profitability, financial stability, liquidity, and asset-utilisation.

The relationship between the degrees of financial health and the classifying ability i.e. the effectiveness of :

- (i) the whole set of 'monitoring' ratios (represented by a small 'set'),
- (ii) the set of ratios containing only one representative ratio from each ratio 'groups' (save the 'turn-over' group)⁶,
- (iii) the profitability ratios,
- (iv) the financial-stability ratios,
- (v) the liquidity ratios, and
- (vi) the asset-utilisation ratios,

were examined and analysed. For each of the set of ratios, linear discriminant function was derived and based on such

functions 'Z-scores' of the sample units were computed. And, the classification accuracy (i.e. the predictive ability) of each of the derived functions based on the 'initial' and 'optimum' cut-off points of the 'Z-scores' were assessed (Table - V.1).

The assessment revealed that the 'reduced' discriminant functions of the 'sets' of ratios were able to predict/classify the different degrees of financial health of the corporate tea units. Besides, F-statistic of all the discriminant functions (computed to test discriminating ability of the functions) were significant at .01 level [vide Appendix I and Appendix-I(i) to I(viii)] .

Thus, the second hypothesis of the study held good.

Testing the Third Hypothesis

For testing the third hypothesis of this study, the predictive (classification) accuracy of the 'sets' of ratios were assessed and based on the classification accuracy of both the 'initial' and 'secondary' sample tea units, the best 'set' of ratios was selected. The discriminant function of the 'set of ratios' with highest classification accuracy was chosen as the best one.

Table - V.1

CLASSIFICATION ACCURACY (%) OF 'SETS' OF RATIOS (INITIAL SAMPLE)

'Sets' of Ratios	Two-degree Situation			Three - degree Situation				On the basis of 'Optimum'			
	Good	Sick	Overall	On the basis of 'Initial' cut-off points				cut-off points			
				Good	Semi-good/ semi-sick	Sick	Overall	Good	Semi- good/ semi- sick	Sick	Overall
1st	100	100	100	100	37.97	100	68.18	94.59	70.89	92.11	81.82
2nd	100	100	100	100	36.71	100	67.53	89.19	56.96	97.37	74.68
3rd	100	100	100	100	22.78	100	60.39	91.89	60.76	71.05	70.78
4th	100	100	100	100	24.05	100	61.04	56.76	84.81	57.89	71.43
5th	97.30	100	98.67	97.30	1.27	100	48.71	89.19	41.77	92.11	65.58
6th	100	100	100	100	2.53	100	50.00	89.19	70.89	68.42	74.68
7th	100	100	100	100	5.06	100	51.30	97.3	74.69	57.90	75.97
8th	80.56	89.48	85.14	80.56	2.53	89.48	42.48	55.56	44.31	57.89	50.33

In the "two-degree situation", it was observed that all the 'sets of ratios' save the '8th set of ratios' (i.e. the set representing the asset-utilisation ratio group) perfectly reclassified the sample units (initial sample) and each of the 'sets' was of about equal merits (in terms of rate of classification accuracy) in identifying the 'good' and the 'sick' financial firms. In reclassifying only the 'sick' sample units, the classification error of the derived functions of the 'sets' were 'zero' and that of only the 'good' units ranged between 'zero' and 2.7 percent. However, the '8th set of ratios' correctly classified 89.48 percent of the 'sick' units and 80.56 percent of the 'good' units. In the context of this low rate, it could be emphasised that:

- (i) the function representing the asset-utilisation ratios was comparatively a reduced one (i.e. it contained only three financial ratios instead of four);
- (ii) the ratios of this 'set' had lower contributing shares in the overall discriminating power than that of the ratios used in the other 'sets';
- (iii) the variability of the ratios (save the R-46) of this 'set' was found low in comparison to other ratios; and,

(iv) the constituent ratios of the function failed to reflect the degrees of financial health as could be expected by the definitional parameters.

Again, in the two-degree situation, the discriminant functions of the 'sets of ratios' except the '8th Set'⁷ tested on the secondary sample consisting of 36 'good' and 20 'sick' units, revealed that amongst the discriminant functions of the 'sets of ratios', the function of the '1st set of ratios' was the best one in identifying/predicting only the 'sick' sample units; the discriminant function of the '5th set' and '6th set of ratios' were the best 'sets' in identifying/predicting only the 'good' sample units (vide Table III.24(a). The discriminant function of the '1st set of ratios' was the best one amongst the functions of the 'sets' in identifying/predicting all the units in the secondary sample. [The accuracy rate of classification of the '1st set' was 96.43 percent which was the highest one in classifying the secondary sample units (vide, Appendix-Va(i))].

Further attempts had been made to study the possibilities of identification and classification of the corporate financial health by dividing the same into three statuses - the 'good', the 'semi-good/semi-sick' and the 'sick'. For such study, tests were made on the basis of the discriminant functions obtained

in two-degree situation. It was observed that classification/prediction was possible but the overall classification accuracy was lower (ranged between 68.18 percent to 42.48 percent on the basis of 'initial' cut-off points and ranged between 81.82 percent to 50.33 percent on the basis of the 'optimum' cut-off points) than that under the two-degree situation (Vide Table-V. 1). The poor classification accuracy of the 'sets' in classifying the 'semi-good/semi-sick' sample units that ranged between 37.97 percent and 1.27 percent could be held responsible for this. Such low classification accuracy was due to the fact that:

- (i) the financial characteristics (reflected by the financial ratios) of the 'semi-good/semi-sick' units were not taken into consideration at the time of :
 - (a) selecting the 'monitoring' ratios,
 - (b) selecting the ratios to form small 'sets', and
 - (c) computing the discriminant functions,
- (ii) the difference between the average values of financial ratios of the 'good' units/'sick' units and the 'semi-good/semi-sick' units were lower than that of the difference between the 'good' units and 'sick' units (Vide, Annexure — VI).

An analysis of the combinations and positions of the definitional parameters (i.e. the positive and negative values of OCF, NW and WC) of the (mis)classified 'semi-good/semi-sick' units could not

focus any meaningful light on the misclassification aspects of the three-degree situation. A close scrutiny of the financial characteristics from the published annual accounts and reports of the misclassified 'semi-good/semi-sick' units, also could not provide any clue to analyse such low rate. Perhaps, a bit further disclosure in financial reporting could have helped in this matter⁸.

It would be noted that, in the three-degree situation, on the basis of the 'initial' cut-off points, the '1st set' and the '2nd set' of ratios were of about equal merits (in terms of percentage of classification accuracy) to identify/classify all the sample units in the 'initial' sample. However, on the basis of the 'optimum' cut-off points, the '1st set' of ratios was the best one amongst all the 'sets' as its overall classification accuracy was highest (81.82 percent). This '1st set' of ratios when tested on the 'secondary' sample (consisting of 36 'good', 91 'semi-good/semi-sick' and 20 'sick' units) disclosed an overall classification accuracy of 63.27 percent (vide, Table III. 26).

Thus, it could be observed that the classification accuracy of the 'sets' under the study differ from one another and the '1st set of ratios' was the best set having the highest classification accuracy in classifying/predicting the different degrees of financial health of the tea units. Hence, the third hypothesis of the study held good.

Thus, it could be emphasised that the variations in the degrees of corporate financial health of tea units could be identified/predicted through 'z-scores' and the magnitudes/characteristics of the financial variables (in terms of the ratios studied) were the determinants of the said 'z-scores'. In other words, the financial ratios were useful and effective in identifying/classifying the different degrees of financial health of the tea units.

The '1st set of ratios' consisting of R-12 (OCF/Total Debts), R-18 $\left[\frac{\text{Retained Profit} + \text{Depreciation Charge}}{\text{Total Debt}} \right]$, R-19 $\left[\frac{\text{Retained Profit} + \text{Depreciation Charge}}{\text{Tangible Assets} + \text{Accumulated Depreciation}} \right]$, and R-24 (Net Worth/Total Debt) was the best indicator of the corporate financial health of tea units.

Amongst the ratios tested, the profitability ratios were the best indicators of the corporate financial health. The '1st set of ratios' which was the best indicator of corporate financial health, consisting of four ratios of which three were from profitability 'group'; again, in assessing the relative contribution of the individual financial ratios in the overall discriminating power of the function of this '1st set' of ratios, it was the profitability ratio R-18 which was found to contribute more than the other ratios in the 'set' $\left[\text{vide Appendix III.(i)} \right]$. In analysing the importance and position of the financial ratios in contributing towards the overall discriminating power of the

discriminant functions of all the 'sets' under study, the ratio R-19 which was also a profitability ratio, was identified as the important indicator having the highest number of appearances in the 'sets' (Vide Table - III.27).

Since thirties, researchers have been attempting to search the best ratio predictors⁸. They have also been attempting to enhance the quality of the Ratio Analysis Technique by applying quantitative techniques. This study attempted to widen the usefulness of the financial ratios of the published annual accounts. To obtain better results, possibilities remained for further probing into:

- (i) by using the alternative definitional parameters to identify the different degrees/statuses of corporate financial health;
- (ii) by using the alternative independent variables in the discriminant analysis (e.g. using the tertiary financial ratios, non-financial ratios, non-ratios etc);
- (iii) by increasing the sample size by the expansion in the numbers of the sample units; and
- (iv) by using cross-sectional data to provide evidence to the extent of generalisations of the results provided.

An alternative classification technique other than the Multiple Discriminant Analysis may provide a more powerful device in assessing the predictability of the financial ratios in monitoring corporate financial health in Tea units.

NOTES & REFERENCES

1. Baldwin, Jane Nora : Bankruptcy Prediction Using Quarterly Financial Statement Data, A Bell & Howell Information Co., Michigan, 1987, p. 118.
2. Gupta, L.C. : Financial Ratios for Monitoring Corporate Sickness, Oxford University Press, New Delhi, 1984, p. 111.
3. Ibid, p. 111.
4. Ibid, p. 114.
5. Ooghe, H and Verbaere, E : "Predicting Business Failure on the Basis of Accounting Data : The Belgian Experience", The International Journal of Accounting Education and Research, Vol. 20, No. 2, Spring 1985, p. 33 and 37.
6. The financial ratios in this group was found insignificant in discriminating between the degrees of corporate financial health of the tea units (Vide, Table - III. 5, Chapter - III, Page 112).
7. The '8th set of ratios' was not tested on secondary sample because of its lower rate of accuracy in classifying the units in the 'initial' sample.
8. Similar views were also expressed by the researchers like, L.C.Gupta; Gupta, L.C. : Controlling Corporate Sickness : Lessons from Experiences for Managers and Bankers; Oxford University Press, 1988, pp. 17 & 18.
9. Lev, B. : Financial Statement Analysis : A New Approach, Prentice-Hall Inc., 1974.

* * *

ANNEXURE - I.1CAUSES OF SICKNESS

A. Internal Causes

(1) Planning

(a) Technical feasibility

Inadequate technical know-how, locational disadvantage, Outdated production process.

(b) Economic viability

High cost of inputs, Break-even point too high, Uneconomic size of project, Under-estimation of financial requirements, Unduly large investment in fixed assets, Over-estimation of demand.

(2) Implementation

Cost overruns resulting from delays in getting licences, sanctions, etc. Inadequate mobilisation of finance.

(3) Production

(a) Production management

Inappropriate product mix, Poor quality control, Poor capacity utilisation, High cost of production, Poor inventory management, Inadequate maintenance and replacement, lack of timely and adequate modernisation etc., High wastage.

Contd..

(b) Labour management

Excessively high wage structure, Inefficient handling of labour problems, Excessive manpower, Poor labour productivity, Poor labour relations, Lack of trained skilled labour or technically competent personnel.

(c) Marketing management

Dependence on a single customer or a limited number of customers/single or a limited number of products, Poor sales realisation, Defective pricing policy, Booking of large orders at fixed prices in an inflationary market, Weak market organisation, Lack of market feedback and market research, Lack of knowledge of marketing techniques, Unscrupulous sales/purchase practices.

(d) Financial management

Poor resources management and financial planning, Faulty costing, Liberal dividend policy, General financial indiscipline and application of funds for unauthorised purposes, Deficiency of funds, Over-trading, Unfavourable gearing or keeping adverse debt-equity ratio, Inadequate working capital, Absence of cost consciousness, lack of effective collection machinery.

(e) Administrative management

Over centralisation, Lack of professionalism, Lack of feed-back to management (Management information System), Lack of controls, Lack of timely diversification, Excessive expenditure on R & D, Divided loyalties (where the same management has interest in more than one unit, cases are known where promoters of limited companies who also own private ownership firms tend to look after the interests of the latter, often at the cost of the former), Dissension within the management, Incompetent management, Dishonest management.

B. External Causes

(a) Infrastructural bottlenecks, Non-availability of/irregular supply/of critical raw materials or other inputs, Chronic power shortage, Transport bottlenecks

(b) Financial bottlenecks

Non-availability of adequate finance at the right time.

(c) Government controls and policies, etc.

Government price controls, Fiscal duties, Abrupt changes in Government Policies affecting costs/prices/imports/exports/licensing, Procedural delays on the part of the financial/licensing/other controlling or regulating

authorities (Banks, RBI, financial institutions, Government departments, licensing authorities, Monopolies and Restrictive Trade Practices Board, etc.).

(d) Market constraints

Market saturation, Revolutionary technological advances, Rendering one's products obsolete, Recession-fall in domestic/export demand.

(e) Extraneous factors

Natural calamities, Political situation (domestic as well as international) War, Sympathetic strikes, Multiplicity of labour unions.

(Source : Report of the Tiwari Committee).

Collected from : Srivatsan and Goyal, S. : Commentary on the Sick Industrial Companies (Special Provision) Act, 1985 (Act 1 of 1986); Book Corporation, Delhi.

SYMPTOMS OF SICKNESS

- (a) Continuous irregularity in cash credit.
- (b) Low capacity utilisation
- (c) Profit fluctuations, downward trends in sales and stagnation or fall in profits followed by contraction in the share of the market;
- (d) Higher rate of rejection of goods manufactured;
- (e) Reduction in credit summations - whenever the companies are in financial difficulty, they open a separate account with another bank and deposit all collections therein;
- (f) Failure to pay statutory liabilities;
- (g) Larger and longer outstandings in the bill accounts;
- (h) Longer period of credit allowed on sale documents negotiated through the bank and frequent returns by customers of the same;
- (i) Constant utilisation of cash credit facilities to the hilt and failure to pay timely instalment of principal and interest on term loans and instalment credits;
- (j) Non-submission of periodical financial data/stock statement, etc. in time;
- (k) Financing capital expenditure out of funds provided for working capital purposes;
- (l) Decrease in working capital on account of -
 - i) increase in debtors and particularly dues from selling agents
 - ii) increase in creditors
 - iii) increase in inventories which may include large number of slow or non-moving items;

Contd..

- (m) A general decline in that particular industry combined with many failure;
- (n) Rapid turnover of key personnel;
- (o) Existence of a large number of law suits against the company;
- (p) Rapid expansion and too much diversification within a short time;
- (q) Sudden/frequent changes in management-whether professional or otherwise and/or dominated by one man/few individuals;
- (r) Diversion of funds for purposes other than running the unit;
- (s) Any major change in the shareholdings.

Source : Report of the Tiwari Committee,

Collected from : Srivatsan and Goyal, S. : Commentary on The Sick Companies (Special Provisions) Act, 1985 (Act 1 of 1986); Book Corporation, New Delhi.

ANNEXURE - I. (3)Causes of sickness in tea industry

1. Locational Disadvantages
2. Outdated productive process
3. High cost of inputs
4. Inadequate mobilisation of finance
5. Poor quality control
6. Poor capacity utilisation
7. High cost of production
8. Inadequate maintenance and replacement
9. Lack of timely and adequate modernisation
10. Excessively high wage-structure
11. Inefficient handling of labour problems
12. Excessive manpower
13. Poor labour productivity
14. Lack of trained, skilled labour or technically competent personnel
15. Dependence on a single customer or limited number of customers/single or limited number of products.
16. Weak market organisation
17. General financial indiscipline and application of funds for unauthorised purposes.
18. Deficiency of funds
19. Unfavourable gearing or keeping adverse debt-equity ratio
20. Inadequate working capital
21. Absence of cost consciousness
22. Lack of professionalism
23. Lack of feedback to management (Management Information System)
24. Lack of control
25. Lack of timely diversification
26. Dividend loyalties
27. Dissension with management
28. Incompetent Management
29. Dishonest management
30. Non-availability of/irregular supply of critical raw materials or other inputs.

Contd..

31. Chronic power shortage
32. Transport bottlenecks
33. Non-availability of adequate finance at right time
34. Fiscal duties
35. Intense competition in the market
36. Natural calamities
37. Political situation (The units in West Bengal are suffering seriously by the strained Centre-State relationship. As the political party in power at Centre and the State is not the same, each of them try to establish their supremacy through petty trade union politics and vitiates the working-atmosphere in the gardens)
38. Recession-fall in domestic/export demand
39. Sympathetic strikes
40. Multiplicity of labour unions.

ANNEXURE - I.4

STATEMENT OF THE TYPES OF ORGANISATION, NUMBER OF UNITS, NUMBER OF ESTATES OWNED,
TEA GRANT AREA, AREA UNDER TEA AND PRODUCTION OF THE TEA UNITS IN HILL-TRACTS OF
DARJEELING (WEST BENGAL)

Type of Organisation	No. of Cos./Units	No. of Estates	Grant Area (In Hectare)	Area under Tea (In Hectare)	Production (1980) (In '000 kgs)
FERA Co. (Public Limited Co.)	3	9	6404.39	2352.12	2175
Group Co. (Public Limited Co.)	3	7	3006.76	1577.63	1162
Private Limited Co.	15	17	8486.20	3599.38	2609
Proprietorship Firms	16	19	3470.40	1877.94	1097
Partnership Firms	3	3	1551.43	614.24	437
Others (Govt. Co., Research Centre)	-	5	1798.98	822.70	377
Total	40	60	24718.16	10844.01	7857
Public Limited Co. (Other than FERA and Group Companies)	30	34	16405.53	6548.52	5978
Grand Total	70	94	41123.69	17392.53	13835
Public Limited Companies (as percentage of Grand Total	42.85	36.17	39.89	37.65	43.21

NOTE: FERA Cos. = The Companies under the Foreign Exchange Regulation Act.

Compiled from : Tea Directory, Tea Board of India, Calcutta, 1982, pp. 254-285.

ANNEXURE - I.5

STATEMENT OF THE TYPES OF ORGANISATION, NUMBER OF UNITS, NUMBER OF ESTATES OWNED,
TEA GRANT AREA, AREA UNDER TEA AND PRODUCTION OF THE UNITS IN WEST BENGAL

Types of Organisation	No. of Cos./ Units	No. of Estates	Grant Area (In Hectare)	Area Under Tea (In Hectare)	Production (1980) (In '000 kgs)
Public Limited Co. (Other than FERA and Group Co.)	111 (56.3)	146 (50.0)	85428.58 (49.2)	44961.3 (50.3)	66130 (50.0)
FERA Co.	5 (2.5)	29 (9.9)	25709.25 (14.8)	13790.4 (15.4)	23570 (17.8)
Group Co.	7 (3.6)	32 (11.0)	28000.71 (16.1)	13921.95 (15.6)	24508 (18.5)
Total Public limited Co.	123 (62.4)	207 (70.9)	139138.54 (80.1)	72673.65 (81.3)	114208 (86.3)
Private Limited Co.	35 (17.8)	39 (13.4)	20651.33 (11.9)	9683.65 (10.8)	11625 (8.8)
Partnership Firms	12 (6.1)	12 (4.1)	5248.1 (3.0)	2418.1 (2.7)	2965 (2.2)
Proprietorship Firms	25 (12.7)	28 (9.6)	5810.27 (3.4)	3469.07 (3.9)	2712 (2.1)
Others (Govt. Limited, Research Centres, etc.)	2 (1.02)	6 (2.0)	2718.62 (1.6)	1195.95 (1.3)	868 (0.6)
TOTAL	197 (100.0)	292 (100.0)	173566.86 (100.0)	89440.32 (100.0)	132378 (100.0)

NOTE : Figures in the bracket are the percentage of the 'TOTAL' (Column wise)

Compiled from: Tea Directory, Tea Board of India, Calcutta, 1982, pp. 254 to 348.

ANNEXURE - I.6

STATEMENT OF THE TYPES OF ORGANISATION, NUMBER OF UNITS, NUMBER OF ESTATES OWNED, TEA GRANT AREA, AREA UNDER TEA AND PRODUCTION OF THE TEA UNITS IN TERAIS* AND DUARS (WEST BENGAL)**

Types of Organisation	No. of Cos./Units	No. of Estates	Grant Area (In Hectare)	Area Under Tea (In Hectare)	Production (1980) (In '000 kgs)
Public limited Co. (Other than FERA and Group Co.)	80	112	69023.05	38412.78	60152
Group Co. (Public limited).	5	25	24993.95	12344.32	23346
FERA Co. (Public Limited)	3	20	19304.86	11438.28	21395
Total Public Limited Co.	88	157	113321.86	62195.38	104893
Private Limited Co.	20	22	12165.13	6084.17	9016
Partnership Firms	9	9	3696.67	1803.86	2528
Proprietorship Firms	9	9	2339.87	1591.13	1615
Government Limited Co.	1	1	919.64	373.25	491
TOTAL	127	198	133732.41	72780.49	119645
Our Sample Units	26	30	15985.53	9095.67	13431
Our Sample units as percentage of TOTAL	20.47	15.15	11.95	12.5	11.23

Contd..

ANNEXURE - I.6 (Contd..)

Our Sample Units as percentage of Public Limited Co. (other than Group and FERA Co.)	32.5	26.79	23.16	23.68	22.33
FERA and Group Co. as percentage of TOTAL	6.3	22.7	33.12	32.68	37.39
FERA and Group Co. as percentage of Total Public limited Co.	9.09	28.67	39.09	38.24	42.65

Compiled from: Tea Directory, Tea Board of India, Calcutta, 1982, pp. 254 and 286 to 348.

* Includes the estate in West Dinajpur

** Includes the estate in Cooch Behar.

ANNEXURE - I.7

LOCATION, TEA GRANT AREA, AREA UNDER TEA, PRODUCTION, TOTAL TANGIBLE ASSETS AVAILABLE
PER HECTARE OF TEA GRANT AREA OF THE SAMPLE UNITS (INITIAL SAMPLE).

Co. CODE	Name of the Unit	Location	Tea Grant Area (In Hectare)	Area under Tea (In Hectare)	Production (1980 (In .000 kgs)	Tangible Assets* per Hectare of Grant Area (In '000 Rs)
1	Alipurduar Tea Co. Ltd.	Duars	453.32	233.56	300	20.24
2	Amritapur Tea Co.Ltd.	"	333.71	229.41	315	15.25
3	Ashapur " " "	Terai	174.00	112.14	139	14.72
4	Atiabari " " "	Duars	757.64	518.77	923	21.82
5	Bhojnarayan " " "	Terai	352.70	200.38	285	13.21
6	Chandmani " " "	Terai	293.89	182.47	230	10.84
7	Khayerbari " " "	Duars	503.38	344.23	625	34.65
8	Debpara " " "	"	621.38	496.52	652	24.27
9	Diabari " " "	"	447.97	271.19	632	29.48
10	The Eastern " " "	"	1348.79	724.00	508	6.43
11	Chuniajhora " " "	Duars	498.10	232.70	309	13.15
12	Goodwill " " "	"	392.36	381.24	315	15.14
13	Jalpaiguri Duars Tea Co. Lrd.	Terai	456.81	289.44	387	18.63
14	Katalguri Tea Co. Ltd.	Duars	777.06	478.19	924	20.79
15	The Kohinoor " " "	"	753.25	315.99	512	11.87
16	Merry View " " "	Terai	477.93	274.60	280	10.88

Contd..

ANNEXURE - I.7 (Contd..)

17	Northern Bengal Tea Corporation Ltd.	Duars	355.93	247.42	405	21.70
18	Palashbari Tea Corporation Ltd.	Duars	426.01	315.71	617	35.03
19	Saraswatipur Tea & Industries Ltd.	"	364.22	233.17	292	13.34
20	Sareda Tea Co. Ltd.	"	998.97	567.15	832	13.41
21	Sayedabad " "	Terai	1360.97	264.22	336	4.59
22	Sukna Tea & Industries Lrd.	"	333.20	248.96	294	19.33
23	Sunny Valley Tea & Industries	Duars	342.56	243.94	415	22.91
24	The Bijohnagar Tea Co. Ltd	Terai/ Duars	1541.28	942.20	1650	11.28
25	The Friends Tea Co.Ltd.	Duars	369.17	253.31	559	35.01
26	Gopalpur " "	"	1250.83	494.76	695	22.87
TOTAL			15985.53	9095.67	13431	480.84
AVERAGE			614.83	349.83	516.58	18.49

* Tangible Assets of 1980.

Source : Tea Directory, Tea Board of India, Calcutta, 1982, pp. 254 and 286 to 348 and the Annual Accounts of the Sample Units.

ANNEXURE - II.1

POSITION OF THE NET WORTH (NW), OPERATING CASH FLOW (OCF), AND WORKING CAPITAL (WC)
BALANCES OF THE SAMPLE UNITS (INITIAL SAMPLE).

Co. CODE	1979			1980			1981			1982			1983			1984		
	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC
1	+	-	-	+	-	-	+	-	-	+	+	-	+	+	+	NA		
2	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	+
3	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+
4	+	-	-	+	-	-	-	-	-	-	+	-	+	+	-	+	+	-
5	+	-	-	-	-	-	-	-	-	+	+	-	+	+	+	+	+	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
7	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8	+	-	-	+	-	-	-	-	-	+	-	-	+	+	+	+	+	+
9	+	+	+	+	-	-	+	-	-	+	+	-	+	+	-	+	+	-
10	+	+	-	+	-	-	-	-	-	-	+	-	+	+	-	+	+	-
11	+	+	-*	+	+	-*	+	+	-*	+	+	-*	+	+	-*	+	+	-*
12	+	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-
13	+	+	-	+	-	-	+	-	-	+	-	-	+	+	-	+	-	-
14	+	-	-	+	-	-	+	-	-	+	+	-	+	+	+	+	+	-
15	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	-
16	+	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+

Contd..

ANNEXURE - II.1 (Contd..)

17	+	-	-	+	-	-	+	-	-	+	-	-	+	+	+	+	+	-
18	+	-	+	+	-	+	+	-	-	+	+	+	+	+	+	+	+	+
19	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-
20	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
22	+	+	-	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+
23	+	-	-	+	-	-	-	-	-	-	-	-	-	+	+	+	+	+
24	+	-	+	+	-	-	+	-	-	+	-	-	+	+	+		NA	
25	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
26	+	+	-	+	-	-	-	-	-	-	-	-	-	+	-	-	+	-

* WC was negative due to excessive balance of provisions

NOTE : All positive (+) are 'Good' units (save Co. No. 11);
 All negative (-) are 'Sick' units; and
 others are 'semi-good/semi-sick' units.

Source : Annual Accounts of the Sample units.

ANNEXURE - II.2

POSITION OF THE NET WORTH (NW), OPERATING CASH FLOW (OCF), AND WORKING CAPITAL (WC)
BALANCES OF THE SAMPLE UNITS (SECONDARY SAMPLE)

Co. CODE	1974			1975			1976			1977			1978			1979			1980			1981		
	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC	NW	OCF	WC
1	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	+	-	-	-	-	-	+	-
2	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	+	+	+	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	-	+	-	-
4	+	=	-	=	=	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	-	-	-	-
5	+	+	-	+	+	-	+	+	-	+	+	-	-	-	-	NA			NA			NA		
6	+	+	+	+	-	-	+	+	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-
7	+	-	-	+	-	-	+	+	-	+	+	+	+	+	+	+	-	-	+	-	-	-	-	-
8	+	-	-	+	+	-	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	-
9	-	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	NA			NA		
10	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	-	+	-	-	+	-	-
11	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	-	-	-	-
12	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	+	-	-	-	-	-	-	-
13	+	+	-	+	-	-	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	+	-
14	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	+	+	-
15	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	+	+	-	+	+	+
16	+	+	-	+	+	+	+	+	-	+	+	-	+	+	-	+	+	-	+	+	+	+	+	+
17	+	+	-	+	+	-	+	+	-	+	+	-	+	-	-	+	-	-	-	-	-	-	-	-
18	+	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	-	+	+	+	+
19	+	+	-	+	+	-	+	-	-	+	+	-	+	-	-	+	+	-	-	-	-	-	-	-

NOTE : All positive (+) are 'Good' units, all negative (-) are 'Sick' units and others are 'seimi-good/semi-sick' units.

Source: Annual Accounts of Secondary Sample units.

ANNEXURE - IIILIST OF THE FINANCIAL RATIOS TESTED:

The following variables (ratios) were used to describe the financial characteristics of each firm:

<u>Profitability Ratios</u>	<u>Ratio No.</u>
	1. EBDIT/Sales (net of excise)
	2. EBDIT/Total Assets
	3. EBDIT/(Total Assets + Accumulated Depreciation)
	4. EBDIT/Interest
	5. EBIT/Sales (net of excise)
	6. EBIT/Total Assets
	7. EBIT/(Total Assets + Accumulated Depreciation)
	8. EBIT/Interest
	9. OCF/Sales (net of excise)
	10. OCF/Total Assets
	11. OCF/(Total Assets + Accumulated Depreciation)
	12. OCF/Total Debts
	13. OCF/Current Liabilities
	14. PBT/Net Worth
	15. PAT/Net Worth
	16. Retained Profit/Total Tangible Assets
	17. Total Dividends/Net Profit after Tax (i.e. PAT)
	18. (Retained Profit + Depreciation charge)/Total Debts
	19. (Retained Profit + Depreciation charge)/(Tangible Assets + Accumulated Depreciation)
	20. Depreciation charge/Sales (net of excise)
	21. Depreciation charge/Net Fixed Assets
	22. Depreciation charge/Gross fixed Assets
	23. Net Profit before Tax (i.e. PBT)/Total Capital employed.

Contd..

ANNEXURE - III (Contd..)Financial-
Stability-ratios

24. Net worth/Total Debt
25. Net worth/Sales (net excise)
26. Net worth/Long-term Debt
27. Total Debt/Tangible Assets
28. All outside liabilities/Tangible Assets
29. Interest/Sales (net of excise)
30. Short-term Bank borrowings/Sales (net of excise)
31. Short-term Bank borrowings/(Working Capital Gap + Short-term borrowing from non-banks).
32. Short-term Bank Borrowings/Working Capital Gap
33. All Bank borrowings/Total Assets
34. Book Value of Equity/Book Value of Total Debts

Liquidity-ratios

35. Net Worth/Total outside liabilities
36. Current Assets/Current liabilities
37. Quick Assets/Current Liabilities
38. Net working capital/Sales (net of excise)
39. Net working capital/Total Debt
40. Net working capital/Tangible Assets
41. Current liabilities/Tangible Assets
42. Current liabilities/Sales (net of excise)
43. Trade Creditors/Sales(net of excise)
44. (Trade Debtors-Trade Creditors)/Sales (net of excise)

Asset-
Utilization
ratios

45. Current Assets/Sales (net of excise)
46. Sales/Total Assets
47. Retained Earnings/Total Assets
48. Net Fixed Assets/Gross Fixed Assets
49. Quick Assets/Current Assets

Turn-Over-Ratios

50. Stock/Sales (net of excise)
51. Sundry Debtors/Sales (net of excise)
52. Stock/Cost of Goods sold.

ANNEXURE - III(1)

R-1, EBD IT/SALES (NET OF EXCISE)

Co. CODE	1979	1980	1981	1982	1983	1984
1.	0.1281875	0.2560606	0.1172192	0.2188154	0.4941721	NA
2.	0.0002842	-0.1958971	-0.0350527	0.0283225	0.3609650	0.2106330
3.	0.1677665	0.0535047	0.0762520	0.0840982	0.2789432	0.1745764
4.	0.0107532	-0.1250268	-0.0627045	0.1329185	0.3478648	0.1697442
5.	0.0247458	0.0013028	0.0947933	0.2592461	0.2811556	0.1479234
6.	-0.9080629	-0.5878062	-0.3933929	-3.1361391	-0.0386132	0.1101720
7.	0.0842326	0.1086513	0.1313713	0.1950676	0.2742165	0.3523007
8.	0.0805098	-0.0326755	-0.0391401	0.1103748	0.3274212	0.1881463
9.	0.2492128	0.0548211	0.0570741	0.1693977	0.1760184	0.2271178
10.	0.0967507	-0.0780484	-0.1208077	0.1881640	0.2707948	0.2086558
11.	0.1923132	0.1936048	0.3101739	0.2550334	0.2510534	0.2747178
12.	-0.0719655	-0.1105541	-0.0273210	0.1042730	0.3583893	0.3330779
13.	0.1321200	-0.0297383	-0.0175608	0.1906397	0.3253069	-0.0454382
14.	0.0042678	-0.1081636	0.0072841	0.1425084	0.2355632	0.1325854
15.	-0.0244742	-0.4114672	0.0286122	0.0952460	0.3907113	0.2768471
16.	0.1337528	-0.0909306	0.0275397	0.0730338	0.3227331	0.2721524
17.	0.0071258	-0.0190198	-0.0382176	0.0476246	0.2379788	0.1412025
18.	0.1172258	-0.0617911	0.0819547	0.1542830	0.2792051	0.1274859
19.	0.1440468	-0.1572772	-0.1090994	0.2032203	0.3688602	0.2743715
20.	-0.0709985	-0.1605926	-0.6802345	0.1328986	0.2815423	0.0718202

Contd..

ANNEXURE - III(1) (Contd..)

21.	0.1204017	-0.0961515	-0.0073114	0.0403921	0.2830807	0.1637191
22.	0.2306713	0.1473819	0.1989058	0.1807315	0.1873424	0.2362758
23.	0.0210053	-0.0377937	0.0380292	0.1306121	0.2950048	0.3060293
24.	-0.0178934	-0.0452196	-0.0057468	0.1087874	0.1878862	NA
25.	0.1709501	0.1497723	0.1272525	0.0822327	0.2526423	0.1622423
26.	0.1325699	-0.1614213	-0.3333196	-0.2087338	0.0715692	0.0831429

Source : Annual Reports

ANNEXURE - III(2)

R-2 EBDIT/TOTAL ASSETS

Co. CODE	1979	1980	1981	1982	1983	1984
1.	0.0192469	0.0372955	0.0349744	1.1160736	0.3982393	NA
2.	0.0001693	0.1193237	-0.0317462	0.023128	0.2902672	0.3334413
3.	0.1077897	0.0335845	0.0603433	0.1152301	0.3707046	0.1810738
4.	0.0063796	-0.0591152	-0.0507772	0.0969614	0.3170788	0.2674783
5.	0.0158659	0.0008039	0.0825474	0.153863	0.3654166	0.1861922
6.	-0.3336559	-0.3185472	-0.1570432	-0.1185946	-0.0162361	0.0605653
7.	0.0391462	0.0487956	0.0765018	0.1360232	0.2642531	0.2582046
8.	0.0257457	-0.0139763	-0.034025	0.1015057	0.4149829	0.4124996
9.	0.0830019	0.027356	0.0554524	0.1549531	0.2598948	0.1782316
10.	0.0635801	-0.0544717	-0.0869243	0.1917374	0.3139011	0.2152665
11.	0.1266364	0.1105626	0.140798	0.1576982	0.2695703	0.2579534
12.	-0.0438252	-0.054701	-0.0150668	0.0829449	0.3172304	0.2476824
13.	0.0652027	-0.0133847	-0.013919	0.1259321	0.35648	-0.0540514
14.	0.0028319	-0.0632031	0.0071602	0.1215083	0.3418218	0.1735471
15.	-0.0182594	-0.1951314	0.0227262	0.0760284	0.4148258	0.3378736

Contd..

ANNEXURE - III(2) (Contd..)

16.	0.0766867	-0.054737	0.0174014	0.0484277	0.4791325	0.3155595
17.	0.0041851	-0.0102312	-0.0246379	0.032338	0.3219481	0.1941416
18.	0.0350553	-0.0270577	0.0560583	0.1181976	0.3194548	0.1802256
19.	0.0421927	-0.074861	-0.0718736	0.1263905	0.3163257	0.208917
20.	-0.0545042	-0.1091771	-0.0497745	0.0770582	0.2610664	0.0405488
21.	0.0432367	-0.0522935	-0.0047117	0.0269786	0.2628565	0.1882723
22.	0.0900196	0.0809951	0.1031098	0.1211504	0.2760385	0.1551845
23.	0.0097671	-0.0168696	0.025854	0.1012768	0.3564054	0.2841986
24.	-0.0178845	-0.0432954	-0.0073136	0.0904363	0.3717879	NA
25.	0.0742058	0.0445141	0.0871081	0.0422738	0.2058506	0.1765798
26.	0.0777	0.1093693	-0.1920039	-0.2232996	0.0825323	0.099635

Source : Annual Accounts and Reports

ANNEXURE - III(3)

R-3. EBDIT/(TOTAL ASSETS + ACCUMULATED DEPRECIATION)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.0153995	0.0297733	0.0258054	0.081323	0.2949617	NA
2.	0.000138	-0.0939709	-0.0237551	0.0173353	0.2258408	0.2456725
3.	0.0970624	0.0295103	0.0505836	0.0872577	0.2985861	0.1484204
4.	0.0048062	-0.0451598	-0.03685	0.0725411	0.2204616	0.1854283
5.	0.0138947	0.0006954	0.0696882	0.1320739	0.2984766	0.1533115
6.	-0.2559499	-0.2466258	-0.1258952	-0.1005892	-0.0141504	0.0528794
7.	0.0322442	0.0399411	0.0622933	0.1072654	0.2082351	0.200405
8.	0.0210013	-0.0111279	-0.0252937	0.0729994	0.2960921	0.2643114
9.	0.0692761	0.02236	0.0423523	0.114563	0.1922105	0.1437027
10.	0.0512171	-0.0423038	-0.065027	0.1399475	0.2275242	0.1640758
11.	0.1013292	0.0895906	0.1183903	0.1297799	0.2196602	0.2110969
12.	-0.0328279	-0.0411821	-0.0114692	0.0632091	0.2498104	0.2007922
13.	0.0545605	-0.0111869	-0.0112166	0.1018677	0.2836448	-0.040773
14.	0.0020958	-0.0465708	0.0050083	0.0839205	0.237564	0.1232526
15.	-0.014765	-0.1535214	0.0179412	0.0584708	0.3169291	0.2606084
16.	0.0751539	-0.0525859	0.0164141	0.0449763	0.4361375	0.2855398
17.	0.0033912	-0.00914	-0.0192875	0.0252411	0.2355442	0.1414724
18.	0.0293894	-0.0222147	0.0443022	0.0868411	0.2339819	0.1338124

Contd..

ANNEXURE - III(3) (Contd..)

19.	0.0316624	-0.0580359	-0.0548417	0.1002602	0.2533647	0.1732115
20.	-0.041441	-0.0828828	-0.0379844	0.0619927	0.2102618	0.030915
21.	0.037623	-0.0452623	-0.0040092	0.0229546	0.2261296	0.157265
22.	0.0621005	0.0632227	0.0803708	0.0933549	0.2017296	0.1223934
23.	0.0082951	-0.0143318	0.0213447	0.0818917	0.2799139	0.2273972
24.	-0.0124327	-0.0293884	-0.0046088	0.0610631	0.2302781	NA
25.	0.0642892	0.0384057	0.0710204	0.0342064	0.1660884	0.1397621
26.	0.0605566	-0.0808323	-0.1394647	-0.1479881	0.0516591	0.0660511

Source : Annual Accounts and Reports

ANNEXURE - III(4)

R-4, EBD IT/INTEREST

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.360591	0.6265569	0.424742	1.2345615	6.077531	NA
2.	0.002722	-1.4494162	-0.1716464	0.1250249	1.1869419	2.2440552
3.	2.0054654	0.6777161	1.0421022	1.4020597	69.37693	36.619387
4.	0.1265488	-1.1882247	-0.7199529	1.073897	3.2305828	2.7596301
5.	0.1896814	0.0094446	0.6056983	1.2993003	4.0164939	2.1809557
6.	-4.2932679	-2.1259051	-41.586905	NA	-0.6765006	1.0742089
7.	3.6244025	3.3721981	3.1631014	4.7553912	23.158443	30.055969
8.	0.4183731	-0.1737397	-0.2123508	0.5478977	3.4178935	2.9888492
9.	2.6061796	0.547676	0.758421	1.5707712	3.6574192	6.6770019
10.	1.3443781	-0.7120164	-1.0075103	1.3241563	2.0317605	2.3817886
11.	2.79023	2.1207074	2.0594592	2.1435263	5.9306096	12.074422
12.	-0.5753111	-0.5077293	-0.0986434	0.4845308	2.0716331	2.1739361
13.	1.4703219	-0.2414229	-0.1166234	0.9523954	2.5134276	-0.4139905
14.	0.0816245	-1.3905492	0.0821553	1.1191359	4.2942511	2.8765798
15.	-0.2843023	-2.4127597	0.2398544	0.5517078	2.3511568	2.9100085
16.	0.7590444	-0.476073	0.1473134	0.365763	2.1300749	2.5699296

Contd..

ANNEXURE - III(4)

17.	0.1525046	-0.2600467	-0.3488534	0.3931345	3.1337301	1.9163784
18.	0.8669189	-0.5151117	0.7508933	1.2512876	6.0614257	3.4128734
19.	0.5114723	-0.6528272	-0.4289026	0.6493883	2.9000235	2.4581046
20.	-0.7070289	-1.0827772	-0.3689112	1.661487	6.5892862	0.2034229
21.	0.4475975	-0.3994449	-0.0314822	0.1208775	1.2846536	0.6764923
22.	3.1899397	1.9726149	1.7035047	1.683245	3.2565563	6.0635414
23.	0.1791638	-0.2312796	0.1808993	0.622018	2.1000374	1.9522788
24.	-0.3079878	-0.6055331	-0.0653309	0.8839337	3.4536269	NA
25.	4.7178471	1.7171124	1.6730696	0.6780095	2.8948978	5.4265781
26.	1.5646379	-1.3941683	-1.6026976	-1.318309	1.6521393	0.1712888

Source : Annual Accounts and Reports

ANNEXURE - III(5)
R-5, EBIT/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0689301	0.0897332	0.0241817	0.1612659	0.4554668	NA
2.	-0.0535859	-0.2462340	-0.0683311	-0.0024279	0.3344638	0.1966684
3.	0.1379123	0.0139583	0.0424910	0.0557981	0.2583408	0.1383388
4.	-0.0470589	-0.1878006	-0.0986155	0.1030354	0.3216180	0.1484763
5.	-0.0058309	-0.0373621	0.0698259	0.2061988	0.2415813	0.1205417
6.	-0.9853690	-0.6293721	-0.4280147	-3.4036270	-0.0560217	0.0981454
7.	0.0346001	0.0554497	0.0929558	0.1435177	0.1881411	0.2589179
8.	-0.0141930	-0.0961015	-0.0728132	0.0809214	0.274041	0.1504994
9.	0.1763032	0.0031625	0.0275181	0.1405476	0.1543333	0.1955571
10.	0.0512393	-0.1238311	-0.1647688	0.1548724	0.2424693	0.184432
11.	0.1237015	0.1233042	0.2233487	0.1956822	0.2142615	0.2292777
12.	-0.1181457	-0.1659870	-0.0670019	0.0807792	0.3317521	0.3050524
13.	0.0912100	-0.0668363	-0.0428871	0.1654704	0.3111998	-0.0672835
14.	-0.0416871	-0.1532132	-0.0198165	0.1139364	0.2158181	0.1079072
15.	-0.0541860	-0.4805253	-0.0039176	0.0631943	0.3657039	0.2567608
16.	0.0981804	-0.1280161	-0.0057685	0.0461261	0.3124968	0.2541816

Contd..

ANNEXURE- III(5) (Contd..)

17.	-0.0280260	-0.0578171	-0.0685276	0.0211909	0.2210519	0.1213329
18.	0.0462735	-0.1024757	0.0553358	0.1263936	0.2631728	0.1018104
19.	0.0311966	-0.2191323	-0.1469773	0.1607327	0.3320165	0.2377959
20.	-0.0877787	-0.1779069	-0.0811812	0.1033514	0.2623475	0.0336348
21.	0.0579618	-0.1303620	-0.0426605	0.0138950	0.2657556	0.1504166
22.	0.1368353	0.0893696	0.1320576	0.1274007	0.1581126	0.1815065
23.	-0.0533764	-0.1097899	-0.0059095	0.0854603	0.2669892	0.2638255
24.	-0.0468808	-0.0785859	-0.0337933	0.0821163	0.1693676	NA
25.	0.1408264	0.0878104	0.0948769	0.0450170	0.2013147	0.1231934
26.	0.1072381	-0.1855716	-0.3584724	-0.2243672	0.0616098	0.0739074

Source : Annual Accounts and Reports.

ANNEXURE - III (6)
R-6, EBIT/TOTAL ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0103496	0.0130696	0.0072149	0.082254	0.3670477	NA
2.	-0.0319164	-0.1499846	-0.0618855	-0.0019825	0.2689563	0.3113348
3.	0.0886083	0.0087614	0.033626	0.0764516	0.3433247	0.1434874
4.	-0.0279189	-0.0887959	-0.0798575	0.0751622	0.2931548	0.2339648
5.	-0.0037385	-0.0230544	0.0608055	0.1223793	0.313982	0.0955293
6.	-0.362061	-0.3410728	-0.1708643	-0.1287098	-0.0235561	0.0539539
7.	0.01608	0.0249026	0.0541312	0.1000768	0.1813051	0.1897635
8.	-0.0045387	-0.0411055	-0.0632975	0.0744191	0.3473274	0.3299609
9.	0.0587189	0.0015781	0.0267363	0.128563	0.2278763	0.1534641
10.	0.0336721	-0.0864244	-0.1185555	0.1578136	0.2810666	0.1902752
11.	0.0814562	0.0704158	0.1013852	0.1209988	0.2300648	0.2152862
12.	-0.0719478	-0.0821286	-0.0369497	0.0642565	0.2936523	0.2268421
13.	0.0450132	-0.0300819	-0.033993	0.1093059	0.341021	-0.0800376
14.	-0.0276619	-0.0895268	-0.0194794	0.0971467	0.3131701	0.1412447
15.	-0.0404264	-0.2278811	-0.0031117	0.0504437	0.3882749	0.3133597
16.	0.0562914	-0.0770633	-0.0036449	0.0305856	0.4639357	0.2947226

Contd.. 273

ANNEXURE - III(6) (Contd..)

17.	-0.0164603	-0.0311012	-0.044178	0.014389	0.2990487	0.1668226
18.	0.0138376	-0.0448731	0.0378505	0.0968313	0.3011113	0.1439283
19.	0.0091378	-0.1344368	-0.0968272	0.0999657	0.293523	0.1810669
20.	-0.0673861	-0.120948	-0.0594008	0.0599259	0.2432675	0.0189897
21.	0.0208142	-0.0710718	-0.0274918	0.0092807	0.2467691	0.1729641
22.	0.0534	0.0491139	0.0684566	0.085401	0.23297	0.1192124
23.	-0.0248193	-0.0488315	-0.0040176	0.066266	0.3225589	0.2450053
24.	-0.0468577	-0.0752419	-0.043007	0.0682644	0.3351435	NA
25.	0.0611298	0.0260983	0.064946	0.0231422	0.1640293	0.1340801
26.	0.0628529	-0.1257321	-0.2064927	-0.2400239	0.0710473	0.0885677

Source : Annual Accounts and Reports

ANNEXURE -III(7)

R-7, EBIT/(TOTAL ASSETS + ACCUMULATED DEPRECIATION)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0082808	0.0104336	0.0053234	0.0599346	0.2718592	Nil
2.	-0.0260248	-0.1181173	-0.0463078	-0.001486	0.2092601	0.2293849
3.	0.07979	0.0076985	0.0281874	0.0578929	0.2765328	0.1176121
4.	-0.0210332	-0.0678338	-0.0579542	0.0562322	0.2038275	0.1621952
5.	-0.003274	-0.0199442	0.0513332	0.1050487	0.2564643	0.1249325
6.	-0.2777397	-0.2640656	-0.136975	-0.1091686	-0.0205301	0.047107
7.	0.0132449	0.0203838	0.0440776	0.0789187	0.142871	0.1472846
8.	-0.0037023	-0.0327281	-0.0470544	0.0535196	0.2478194	0.2114243
9.	0.0490087	0.0012899	0.0204201	0.0950518	0.1685305	0.1237335
10.	0.0271246	-0.0671189	-0.0886899	0.1151868	0.2037249	0.1450275
11.	0.0551779	0.057059	0.08525	0.0995776	0.187469	0.17618
12.	-0.0538935	-0.0618312	-0.0281271	0.0489675	0.2312433	0.1838973
13.	0.0376662	-0.0251423	-0.0273933	0.0884185	0.2713443	-0.0603754
14.	-0.0204714	-0.0659673	-0.0136253	0.067095	0.2176513	0.1003116
15.	-0.0326897	-0.1792875	-0.0024565	0.0387945	0.2966441	0.2417003
16.	0.0551663	-0.0740327	-0.0034381	0.0284058	0.4223043	0.2666851

Contd..

ANNEXURE - III(7) (Contd..)

17.	-0.013338	-0.0277842	-0.0345842	0.0112312	0.2187904	0.1215648
18.	0.0116011	-0.0368414	0.0299128	0.0711431	0.2205463	0.1068628
19.	0.0068571	-0.0808606	-0.0738822	0.0792987	0.2351006	0.1501212
20.	-0.0512355	-0.0918188	-0.0453305	0.0482099	0.1959267	0.014478.
21.	0.0181118	-0.0613666	-0.0233933	0.0078965	0.21229	0.144487
22.	0.0368383	0.038337	0.0533598	0.0658075	0.170255	0.0940223
23.	-0.0210787	-0.0416335	-0.0033168	0.0535822	0.2533314	0.1960374
24.	-0.0325737	-0.0510733	-0.0271018	0.0460925	0.2075813	NA
25.	0.0529606	0.022517	0.0529513	0.0187258	0.1323453	0.0161238
26.	0.0489853	-0.0929256	-0.149989	-0.1590719	0.0444702	0.0587141

Source : Annual Accounts and Reports

ANNEXURE - III(8)

R-8, EBIT/INTEREST

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.1939002	0.2195689	0.0876221	0.9098657	5.6015171	NA
2.	-0.5131361	-1.8528134	-0.3346046	-0.0107175	1.0997992	2.095279
3.	1.6485904	0.1768023	0.5807061	0.9302490	64.252832	29.018141
4.	-0.5538083	-1.7848125	-1.1322721	0.8324604	2.9868314	2.4138644
5.	-0.0446949	-0.2708452	0.4461649	1.0334357	3.4511490	1.7772452
6.	-4.6587665	-2.2762353	-45.246894	NA	-0.9814976	0.9569462
7.	1.4887919	1.7209870	2.2381506	3.4986984	15.889106	22.089169
8.	-0.0737550	-0.5109836	-0.3950409	0.4016917	2.8606667	2.3907983
9.	1.8437165	0.0315945	0.3656710	1.3032536	3.2068327	5.7491519
10.	0.7119844	-1.1296804	-1.3741361	1.0898754	1.8192358	2.1052764
11.	1.7947584	1.3506493	1.4829667	1.6446864	5.0614789	10.077232
12.	-0.9444877	-0.7623096	-0.2419120	0.3753610	1.9176596	1.9910188
13.	1.0150482	-0.5425927	-0.2848177	0.8266550	2.4044311	-0.6130237
14.	-0.7972921	-1.9697050	-0.2235043	0.8947567	3.9343047	2.3411608
15.	-0.6294455	-2.8177026	-0.0328411	0.3660502	2.2006715	2.698877
16.	0.5571719	-0.6702359	-0.0308568	0.2310060	2.0625147	2.4002326

Contd..

ANNEXURE -III(8) (Contd..)

17.	-0.5998062	-0.7904973	-0.6255259	0.1749279	2.9108349	1.6467114
18.	0.3422062	-0.8542719	0.5070029	1.0250952	5.7133714	2.725525
19.	0.1107712	-0.9095755	-0.5778121	0.5136196	2.6909723	2.1304226
20.	-0.8741324	-1.1995170	-0.4402578	1.2920908	6.140047	0.133382
21.	0.2154751	-0.5415669	-0.1836918	0.0415817	1.2060303	0.621526
22.	1.8922872	1.1961561	1.1309912	1.1865483	2.7484569	4.6579977
23.	-0.4552709	-0.6718617	-0.0281109	0.4069904	1.900604	1.6830442
24.	-0.8069300	-1.0523401	-0.3841693	0.6672227	3.113229	NA
25.	3.8864997	1.0067304	1.2474067	0.3711662	2.3067615	4.1204952
26.	1.2656632	-1.6027506	-1.7236395	-1.4170457	1.4222305	1.5135198

Source : Annual Accounts and Reports

ANNEXURE - III(9)

R-9, OCF/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.2273053	-0.1526183	-0.1587583	0.0415740	0.1771428	NA
2.	-0.1041440	-0.3310529	-0.2392673	-0.1982128	0.0397415	0.0520027
3.	0.0527780	-0.0254438	0.0471429	0.0241163	0.1147008	0.0856592
4.	-0.0742201	-0.2302483	-0.1497997	0.0091463	0.1054043	0.0534456
5.	-0.1057142	-0.1366434	-0.0617092	0.0559576	0.1030592	0.0468868
6.	-1.1195715	-0.8643031	-0.4028524	-3.1361391	-0.0956910	0.0076109
7.	0.0544319	0.0626968	0.0582932	0.0910114	0.1513065	0.1848454
8.	-0.1119256	-0.2207471	-0.2234583	-0.0910767	0.1193307	0.0700404
9.	0.1027610	-0.0452766	-0.0181797	0.0414410	0.0609816	0.0913313
10.	0.0247838	-0.1876644	-0.2407149	0.0388630	0.0687252	0.0600498
11.	0.0917552	0.0834258	0.1148299	0.0888821	0.1004058	0.1218546
12.	-0.1970553	-0.3282965	-0.3042891	-0.1109310	0.0853760	0.0842056
13.	0.0414812	-0.1529178	-0.1681385	-0.0095289	0.0813629	-0.1551950
14.	-0.0480181	-0.1859485	-0.0813787	0.0151705	0.0793012	0.0475500
15.	-0.1105596	-0.5820051	-0.0906777	-0.0773924	0.0988318	0.0798873
16.	-0.0424593	-0.2819322	-0.1594068	-0.1266414	0.0698004	0.0728353

Contd..

ANNEXURE - III(9) (Contd..)

17.	-0.0395994	-0.0921600	-0.1477697	-0.0735161	0.0706179	0.0375005
18.	-0.0179953	-0.1817479	0.0271882	0.0292392	0.0963630	0.0495242
19.	-0.1375848	-0.3981944	-0.3634681	-0.1097208	0.1061687	0.0832609
20.	-0.1714167	-0.3089081	-0.2524199	0.0385422	0.1004542	-0.2812382
21.	-0.1485938	-0.3368643	-0.2395508	-0.2937705	0.0341230	-0.0782926
22.	0.1210968	0.0640027	0.0735204	0.0617989	0.0664461	0.107509
23.	-0.0962356	-0.2012052	-0.1721937	-0.0793691	0.0748255	0.08182
24.	-0.0759911	-0.1198969	-0.0937114	-0.0142845	0.0610555	NA
25.	0.0688225	0.0622018	0.0405847	-0.0390527	0.0935235	0.0735683
26.	0.0336602	-0.2772045	-0.5412950	-0.3670683	0.0167269	0.0185136

Source : Annual Accounts and Reports

ANNEXURE - III (10)

R-10, OCF/TOTAL ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0341291	-0.022229	-0.0473683	0.2120492	0.1427542	NA
2.	-0.0620295	-0.2016491	-0.2166976	-0.16186	0.0319577	0.0823225
3.	0.0339098	-0.0159708	0.0006781	0.0330437	0.1524328	0.0888472
4.	-0.0440329	-0.1088661	-0.1213058	0.0066721	0.096076	0.084218
5.	-0.0677793	-0.0843163	-0.0537373	0.0332109	0.1339456	0.0590167
6.	-0.411372	-0.4683879	-0.1608195	-0.1185946	-0.0402364	0.004184
7.	0.0252966	0.0281573	0.033946	0.0634634	0.1458088	0.0135475
8.	-0.035792	-0.0944203	-0.1942553	-0.0837582	0.1512432	0.1535594
9.	0.0342252	-0.0225932	-0.0176632	0.0379073	0.0900406	0.0716726
10.	0.0162868	-0.1309751	-0.1732007	0.039601	0.0796651	0.0619524
11.	0.0604199	0.0476422	0.052125	0.0549596	0.1078115	0.1144185
12.	-0.1200017	-0.1624377	-0.1678071	-0.0882411	0.0755711	0.0626167
13.	0.0204714	-0.0688258	-0.1332692	-0.0062945	0.0891596	-0.1846135
14.	-0.0318629	-0.108655	-0.079943	0.0129349	0.1150726	0.0622404
15.	-0.0824848	-0.2760062	-0.0720024	-0.0617771	0.1049316	0.0974972
16.	-0.0243439	-0.169718	-0.100724	-0.0839742	0.1036264	0.0844522

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ANNEXURE - III (10) (Contd..)

17.	-0.0232576	-0.0495751	-0.0952633	-0.0499188	0.095535	0.0515601
18.	-0.0053813	-0.0795857	-0.0185971	0.0224004	0.1102545	0.0700118
19.	-0.0403	-0.189533	-0.2394493	-0.0682395	0.0910476	0.0633979
20.	-0.1315934	-0.2100077	-0.1846973	0.0223478	0.0931484	-0.1587844
21.	-0.0533607	-0.1836544	-0.1543752	-0.1962139	0.0316851	-0.0900342
22.	0.0472581	0.0351733	0.0381119	0.0414259	0.0979047	0.0706113
23.	-0.0447482	-0.0894905	-0.1170656	-0.0615428	0.0903992	0.0759832
24.	-0.0759537	-0.1147951	-0.119262	-0.0118748	0.1208163	NA
25.	0.0298744	0.0184871	0.0277814	-0.020076	0.0762021	0.0800694
26.	0.0197284	-0.1878171	-0.3118051	-0.3926829	0.0192891	0.0221858

Source : Annual Accounts and Reports

ANNEXURE - III (11)

R-11, OCF/TOTAL ASSETS + ACCUMULATED DEPRECIATION)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0273069	-0.0177455	-0.0349503	0.015451	0.0971452	NA
2.	-0.0505791	-0.1588046	-0.1621508	-0.121321	0.0248645	0.0606534
3.	0.030535	-0.0140334	0.0005684	0.0250223	0.1227779	0.0728252
4.	-0.0331731	-0.083166	-0.0880341	0.0049917	0.0668007	0.0583838
5.	-0.0593583	-0.0729415	-0.0453661	0.0285077	0.1094083	0.0437842
6.	-0.3155665	-0.3626356	-0.1289224	-0.1005892	-0.0350676	0.003653
7.	0.0208365	0.0230479	0.0276413	0.0500461	0.1148994	0.1051487
8.	-0.0291962	-0.0751771	-0.1444066	-0.0602511	0.1079125	0.098394
9.	0.0285655	-0.0184671	-0.0134904	0.0280264	0.0665914	0.0577874
10.	0.0131198	-0.1017179	-0.1295693	0.0289044	0.0577435	0.04722
11.	0.0483455	0.0386052	0.0438294	0.0452298	0.0878505	0.0936347
12.	-0.089889	-0.1222926	-0.1277394	-0.0672452	0.0595102	0.0507624
13.	0.0171301	-0.0575243	-0.107395	-0.0050917	0.0709427	-0.1392609
14.	-0.0235803	-0.0800618	-0.0559539	0.0089336	0.0799747	0.044203
15.	-0.0666992	-0.2171503	-0.0568594	-0.0475106	0.0801683	0.0752015
16.	-0.0238573	-0.1630436	-0.0950091	-0.0779894	0.0943274	0.0764182

Contd..

ANNEXURE - III (11) (Contd..)

17.	-0.0188458	-0.0442878	-0.0745758	-0.0389637	0.0698954	0.0375722
18.	-0.0045115	-0.0653408	-0.0146971	0.0164578	0.080755	0.0519818
19.	-0.030242	-0.1469352	-0.1827073	-0.0541314	0.0729256	0.0525628
20.	-0.100054	-0.1594294	-0.1409482	0.0179786	0.0750213	-0.1210593
21.	-0.0464325	-0.1585755	-0.1313604	-0.1669498	0.0272581	-0.0752062
22.	0.0326012	0.0274554	0.029707	0.0319216	0.071549	0.0556908
23.	-0.0380041	-0.0762993	-0.0966477	-0.049763	0.0709978	0.0607968
24.	-0.0528002	-0.0779215	-0.0751554	-0.0080179	0.0748312	NA
25.	0.0258821	0.0159502	0.0226505	-0.0162448	0.0614829	0.0633747
26.	0.0153756	-0.1388113	-0.226484	-0.2602443	0.0120735	0.0147077

Source : Annual Accounts and Reports.

ANNEXURE -III (12)

R-12, OCF/DEBT

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0869666	-0.0590646	-0.1046316	0.0420690	1.0065286	NA
2.	-0.1054827	-0.2391975	-0.178536	-0.1180553	0.0267038	0.0781060
3.	0.2041480	-0.0972351	0.0034906	0.1211929	1.8758055	1.593229
4.	-0.1255815	-0.2536149	-0.2124331	0.0142674	0.2202979	0.2212924
5.	-0.1279908	-0.1131492	-0.0625740	0.0449655	0.3224164	0.2036656
6.	-0.3704390	-0.3276095	-0.1285803	-0.1432398	-0.0475212	0.0049864
7.	0.2502413	0.1817070	0.1847210	0.5753873	1.7190952	1.730965
8.	-0.0715389	-0.1405872	-0.2290761	-0.0835474	0.2201983	0.2673637
9.	0.1201257	-0.0563960	-0.0424267	0.0907372	0.4339787	0.255311
10.	0.0519415	-0.2101334	-0.2130982	0.0502890	0.1274435	0.0979033
11.	0.1618641	0.1190104	0.1227579	0.1300796	0.4628287	0.5746928
12.	-0.1911992	-0.1966684	-0.1695270	-0.0828608	0.0780912	0.0936774
13.	0.0539368	-0.1330059	-0.1996836	-0.0081594	0.1565176	-0.2373312
14.	-0.1186262	-0.2862321	-0.1663425	0.0272854	0.5855187	0.1917783
15.	-0.1531558	-0.3436384	-0.0831084	-0.0655740	0.1220686	0.1349009
16.	-0.0341497	-0.1839815	-0.0998901	-0.0752415	0.1076451	0.1113147

Contd..

ANNEXURE -III (12) (Contd..)

CO. CODE	1979	1980	1981	1982	1983	1984
17.	-0.08696211	-0.1365710	-0.2179067	-0.1025981	0.2563352	0.1225046
18.	-0.0160357	-0.2253039	-0.0482951	0.0522999	0.6146410	0.28606
19.	-0.0567083	-0.1956695	-0.1988826	-0.0574291	0.1024007	0.0972759
20.	-0.2292330	-0.2703419	-0.1910264	0.0229073	0.0996804	-0.1378151
21.	-0.0599033	-0.1650731	-0.1219470	-0.1329884	0.0257197	-0.067764
22.	-0.2001580	0.0868590	0.0821450	0.1037714	0.3432003	0.2638814
23.	-0.1028285	-0.1402488	-0.1281116	-0.0623010	0.1153590	0.1108555
24.	-0.1575903	-0.2288416	-0.2004353	-0.0196087	0.3642165	NA
25.	0.1992314	0.0690039	0.0701578	-0.0431444	0.2198325	0.4086668
26.	0.0531031	-0.3606495	-0.4464333	-0.3923700	0.0176799	0.0249285

Source : Annual Accounts and Reports.

ANNEXURE - III (13)

R-13, OCF/CURRENT LIABILITIES

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0553284	-0.0319297	-0.0719462	0.0313500	0.4318331	NA
2.	-0.0830858	-0.2105714	-0.1778338	-0.1163040	0.0246446	0.2403607
3.	0.0653259	-0.0313903	0.0014562	0.1763021	0.3449251	0.1600846
4.	-0.0660208	-0.1309115	-0.1250574	0.0085082	0.1302301	0.1146430
5.	-0.0830606	-0.0902368	-0.0532132	0.0330853	0.3096454	0.0897066
6.	-0.2281463	-0.2164926	-0.0737719	-0.0616127	-0.0223835	0.0023865
7.	0.0436440	0.0473117	0.0596609	0.1372126	0.2461210	0.2294178
8.	-0.0441792	-0.1008558	-0.1696889	-0.0698527	0.3044749	0.3299617
9.	0.0571954	-0.0345712	-0.0286490	0.0646627	0.1471710	0.0998293
10.	0.0250616	-0.1659346	-0.1758239	0.0409731	0.0959127	0.0789672
11.	0.1061443	0.0826429	0.0802235	0.0860400	0.1704542	0.1833266
12.	-0.1429454	-0.1654553	-0.1406645	-0.0671243	0.0673557	0.0638998
13.	0.0310438	-0.0893958	-0.1488697	-0.0067837	0.1238429	-0.2035779
14.	-0.0513968	-0.1385082	-0.0915231	0.0167885	0.2033803	0.0996568
15.	-0.0962086	-0.2618539	-0.0654674	-0.0517159	0.3263548	0.1154264
16.	-0.0325594	-0.2043713	-0.1049431	-0.1183372	0.2612714	0.2712049

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ANNEXURE - III (13) (Contd..)

17.	-0.0382353	-0.0724423	-0.1215437	-0.0581606	0.1483873	0.080286
18.	-0.0075422	-0.1008719	-0.0234981	0.0307471	0.2693529	0.126424
19.	-0.0437424	-0.1683763	-0.1657106	-0.0494903	0.0793790	0.0631936
20.	-0.1512339	-0.1912207	-0.1418463	0.0181806	0.0803420	-0.1174602
21.	-0.0675664	-0.1826976	-0.1319672	-0.1443512	0.0267226	-0.069625
22.	0.0863244	0.0670882	0.0643663	0.0704488	0.1747565	0.1080132
23.	-0.0626127	-0.1059498	-0.1188272	-0.0589889	0.3056757	0.1886075
24.	-0.1357273	-0.1646600	-0.1660630	-0.0162932	0.2430731	NA
25.	0.0529530	0.0322072	0.0622331	-0.0369385	0.1521723	0.1573252
26.	0.0335508	-0.2085287	-0.2544350	-0.2305514	0.0108588	0.0147705

Source : Annual Accounts and Reports.

ANNEXURE - III (14)

R-14, PBT/NET WORTH

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.215337	-0.2056408	-0.3330177	-0.0321406	0.4902868	NA
2.	-0.6332363	3.0627885	0.714496	0.367776	-0.064304	-0.5630593
3.	0.1107351	-0.1247664	-0.0765892	-0.0106212	0.7088432	0.3559383
4.	-0.2988748	-1.6316697	2.737811	0.2479972	1.7935913	0.6052754
5.	-0.7742648	34.950006	0.9589522	0.024998	1.3313919	0.1073916
6.	0.5475952	0.4081591	0.1438742	0.1357603	0.0582418	0.0146876
7.	0.0125582	0.0257689	0.077898	1.1673115	0.4365698	0.4573334
8.	-0.4456018	-4.209417	1.1896804	-0.792738	1.8896806	1.7180414
9.	0.0849182	-0.1813896	-0.16075	0.0914752	0.4875332	0.5433139
10.	-0.0487073	-1.2224041	3.3747458	-0.273554	1.4843449	0.6310082
11.	0.1112988	0.0703021	0.1426735	0.2030945	0.6806917	0.6440548
12.	-3.0512739	1.292711	0.5933333	0.2618483	-0.756526	-3.231145
13.	0.0020325	-0.3900029	-1.6459124	-0.0993397	0.758741	-0.3211934
14.	-0.186749	-0.7594631	-1.158903	-0.1220508	0.7636673	0.2424094
15.	-1.2484302	1.3881042	0.3310289	0.222946	-1.352742	3.3223185
16.	-0.8754638	1.320703	0.4672485	0.2852015	-1.604925	3.8552942

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ANNEXURE - III (14) (Contd..)

17.	-0.1262556	-0.2626304	-0.697344	-0.7140029	0.6433844	0.2076328
18.	-0.1120802	-0.6306295	-0.2637762	0.01301	0.6039762	0.2321956
19.	2.4711219	0.9035702	0.5254924	0.1996725	-0.8157141	-1.4887855
20.	1.3911361	1.7874393	0.6024185	-0.043225	-0.78112	0.3637313
21.	0.7730531	0.6882125	0.3847301	0.3409304	-0.0875305	0.1629208
22.	0.0748062	0.0271847	0.0295899	0.0515456	0.4592451	0.3858006
23.	-0.495858	-10.658706	1.0886144	0.4295192	-3.0408114	1.2712312
24.	-0.3735636	-0.7571408	-1.1983784	-0.3065449	0.5555233	NA
25.	0.1325458	0.0005552	0.0314034	-0.1104575	0.2603868	0.2677012
26.	0.038247	-6.0738514	1.1306326	0.5205772	-0.0244534	-0.0534418

Source : Annual Accounts and Reports.

ANNEXURE - III (15)

R-15, PAT/NET WORTH

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.215337	-0.20564086	-0.3330177	-0.0321406	0.1814059	NA
2.	-0.6332363	3.0627885	0.714496	0.367776	-0.0280524	-0.2083318
3.	0.0467854	-0.1247664	-0.0765892	-0.0106212	0.2622718	0.1316975
4.	-0.2988748	-1.6316697	2.737811	0.2479972	0.6636285	0.223952
5.	-0.7742648	34.950006	0.9589522	0.010905	0.4926145	0.1853446
6.	0.5475952	0.4081591	0.1438742	0.1357603	0.0582418	0.0031488
7.	0.0053057	0.010533	0.0301116	0.0644149	0.1615308	0.1692133
8.	-0.4456018	-4.209417	1.1896804	-0.792738	0.6991816	0.6356752
9.	0.0314198	-0.1813896	-0.16075	0.0352178	0.1803873	0.2010261
10.	-0.0487073	-1.2224041	3.3747458	-0.119336	0.5492073	0.233473
11.	0.0470236	0.0288248	0.0549295	0.0781912	0.251856	0.2383001
12.	-3.0512739	1.292711	0.5933333	0.2618483	-0.279914	-1.195523
13.	0.0008587	-0.3900029	-1.6459124	-0.0993397	0.2807344	-0.3211934
14.	-0.186749	-0.7594631	-1.158903	-0.1220508	0.2825568	0.0896915
15.	-1.2484302	1.3881042	0.3310289	0.222946	-0.500514	1.229258
16.	-0.8754638	1.320703	0.4672485	0.2852015	-0.593822	1.4264579
17.	-0.1262556	-0.2626304	-0.697344	-0.7140029	0.2380522	0.0768245

Contd..

ANNEXURE -III (15) (Contd..)

18.	-0.1120802	-0.6306295	-0.2637762	0.0056755	0.2234711	0.0859123
19.	2.4711219	0.9035702	0.5254924	0.1996725	-0.3018143	-0.55085
20.	-1.3911361	1.7874393	0.6024185	-0.016641	-0.289014	0.3637313
21.	0.7730531	0.6882125	0.3847301	0.3409304	-0.0323862	0.1629208
22.	0.0316053	0.0111116	0.0129083	0.0217924	0.1699206	0.1427462
23.	-0.495858	-10.658706	1.0886144	0.4295192	-1.1250996	0.4703552
24.	-0.3735636	-0.7571408	-1.1983784	-0.3065449	0.2055434	NA
25.	0.0490418	0.0002269	0.0136996	-0.1104575	0.0963432	0.0990493
26.	0.0141514	-6.0738514	1.1306326	0.5205772	-0.0090475	-0.0197735

Source : Annual Accounts and Reports.

ANNEXURE - III (16)

R-16, RETAINED PROFIT/TOTAL TANGIBLE ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0637257	-0.0464548	-0.0751277	-0.0814833	0.099968	NA
2.	-0.0941153	-0.23231	-0.2468369	-0.1869708	0.010647	0.0602159
3.	0.0013041	-0.040794	-0.0260391	-0.0057345	0.1048558	0.0360069
4.	-0.0783315	-0.1385468	-0.1503865	-0.015127	0.0648009	0.0459025
5.	-0.0873837	-0.1081747	-0.0754793	0.0017271	0.0825109	0.018709
6.	-0.4397771	-0.4909135	-0.1746406	-0.1287098	-0.0475564	-0.0024274
7.	-0.0051959	0.0008331	0.009665	0.0242762	0.0583627	0.0596774
8.	-0.0660765	-0.1215496	-0.2235278	-0.1108451	0.0835875	0.0710207
9.	0.0045507	-0.048711	-0.0463794	0.0043947	0.0418541	0.0369503
10.	-0.0136212	-0.1629278	-0.2048318	0.0056772	0.0468307	0.0330018
11.	0.0094176	0.0059687	0.0090091	0.0124544	0.0556326	0.0585677
12.	-0.1481243	-0.1898656	-0.18969	-0.1069294	0.051993	0.0417764
13.	0.0002819	-0.085523	-0.1533433	-0.0229208	0.0737006	-0.2105996
14.	-0.0623568	-0.1349787	-0.106634	-0.0114266	0.0731772	0.0214334
15.	-0.1046518	-0.3087559	-0.097862	-0.0873617	0.0783808	0.0729833
16.	-0.0044739	-0.1920427	-0.1217704	-0.1018164	0.0684296	0.0636153

Contd..

ANNEXURE - III (16) (Contd..)

17.	-0.0439032	-0.0704451	-0.1148034	-0.0678678	0.0646565	0.0204892
18.	-0.026599	-0.0974011	-0.0368049	0.0010341	0.0835163	0.0265436
19.	-0.0733549	-0.2189749	-0.2644029	-0.0946642	0.0682449	0.035548
20.	-0.1444752	-0.2217787	-0.1943236	0.0052155	0.0753496	-0.1803434
21.	-0.0757831	-0.2023056	-0.1771555	-0.2139118	0.0155977	-0.1053318
22.	0.005235	-0.0013645	0.0018137	0.0041368	0.0514591	0.0265265
23.	-0.0793347	0.1215124	-0.1469372	-0.0965536	0.0565525	0.03679
24.	-0.1049268	-0.1467416	-0.1549554	-0.0340468	-0.0654482	NA
25.	0.0122261	0.0000712	0.0047623	-0.0400276	0.027462	0.0311849
26.	-0.000737	-0.2041798	-0.3262932	-0.4094074	0.0078041	0.0111183

Source : Annual Accounts and Reports.

ANNEXURE - III (17)

R-17, TOTAL DIVIDENDS/NET PROFIT AFTER TAX

CO. CODE	1979	1980	1981	1982	1983	1984
1.	*	*	*	*	0.1039299	NA
2.	*	*	*	*	*	*
3.	0.9114520	-0.1264401**	-0.3179906**	-3.1631553**	0.1615083	0.2975757
4.	*	*	*	*	0.1018845	0.0947073
5.	*	*	*	*	*	0.2379572
6.	*	*	*	*	*	*
7.	3.3295315	0.8046170	0.1650388	0.1177721	0.0715585	0.1097421
8.	*	*	*	*	*	*
9.	0.5422768	*	*	0.6184215	0.2786531	0.2122327
10.	*	*	*	*	*	0.1071220
11.	0.3820342	0.2036784	0.2913017	0.3179488	0.1855376	0.1837397
12.	*	*	*	*	*	*
13.	*	*	*	*	*	*
14.	*	*	*	*	0.1532470	0.2840724
15.	*	*	*	*	*	*
16.	*	*	*	*	*	*

Contd..

ANNEXURE - III (17) (Contd..)

17.	*	*	*	*	0.1098505	0.1547727
18.	*	*	*	*	0.091336	0.2126980
19.	*	*	*	*	*	*
20.	*	*	*	*	*	*
21.	*	*	*	*	*	*
22.	0.5079150	1.4144938	0.4756242	0.2712293	0.0615848	0.2342036
23.	*	*	*	*	*	*
24.	*	*	*	*	0.2224463	NA
25.	0.2721829	*	0.1525064	-0.0209111	0.2012412	0.1699495
26.	1.1510022	*	*	*	*	*

NOTE : * No Dividend, ** Dividend declared out of past profits.

Source : Annual Accounts and Reports.

ANNEXURE - III (18)

R-18, RETAINED PROFIT + DEPRECIATION CHARGE/DEBT

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0869666	-0.0590646	-0.1046316	0.042069	0.9247769	NA
2.	-0.1054827	-0.2391975	-0.178536	-0.1180553	0.0267038	0.078106
3.	0.1233292	-0.0972351	-0.0391255	0.0546636	1.6272643	1.3196904
4.	-0.1255815	-0.2536149	-0.2124331	0.0142674	0.203442	0.2086743
5.	-0.1279908	-0.1131492	-0.062574	0.0449655	0.3224164	0.1835044
6.	-0.370439	-0.3276095	-0.1285803	-0.1432398	-0.0475212	0.0049864
7.	0.1767767	0.1595647	0.1743253	0.5452023	1.6660608	1.6369717
8.	-0.0715389	-0.1405872	-0.2290761	-0.0853474	0.2201983	0.2673637
9.	0.1012025	-0.056396	-0.0424267	0.0736882	0.3560518	0.2198501
10.	0.0519415	-0.2101334	-0.2130982	0.050289	0.1274435	0.0916463
11.	0.1462667	0.1151967	0.1140368	0.1163383	0.4084228	0.5084753
12.	-0.1911992	-0.1966684	-0.169527	-0.0828608	0.0780912	0.0936774
13.	0.0539368	-0.1330059	-0.1996836	-0.0081594	0.1565176	-0.2373312
14.	-0.1186262	-0.2862321	-0.1663425	0.0272854	0.5181311	0.1655736
15.	-0.1531558	-0.3436384	-0.0831084	-0.065574	0.1220686	0.1349009
16.	-0.0341497	-0.1839815	0.0998901	-0.0752415	0.1076451	0.1113147

Contd..

ANNEXURE - III (18) (Contd.)

17.	-0.0869621	-0.136571	-0.2179067	-0.1025981	0.2349262	0.1135903
18.	-0.0160357	-0.2253039	-0.0482951	0.0522999	0.5678422	0.25676
19.	-0.0567083	-0.1956695	-0.1988826	-0.0574291	0.1024007	0.0972759
20.	-0.229233	-0.186143	-0.1910264	0.0229073	0.0996804	-0.1378151
21.	-0.0599033	-0.1650731	-0.121947	-0.1329884	0.0257197	-0.067764
22.	0.177272	0.0753596	0.0785992	0.0999147	0.3313621	0.2335637
23.	-0.1028285	-0.1402488	-0.1281116	-0.062301	0.115359	0.1108555
24.	-0.1575903	-0.2288416	-0.2004353	-0.0196087	0.3077713	NA
25.	0.1687393	0.0690039	0.0679936	-0.0449064	0.1998725	0.3760785
26.	0.0379799	-0.3606495	-0.4464333	-0.39237	0.0176799	0.0249285

Source : Annual Accounts and Reports

ANNEXURE - III (19)

R-19, (RETAINED PROFIT + DEPRECIATION CHARGE)/(TANGIBLE ASSETS +
ACCUMULATED DEPRECIATION)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0273069	-0.0177455	-0.0349503	0.0154512	0.0971452	NA
2.	-0.0505791	-0.1588046	-0.1621508	-0.121321	0.0248645	0.0606534
3.	0.0184467	-0.0140334	-0.0063723	0.0112862	0.1065099	0.0603219
4.	-0.0331731	-0.083166	-0.0880341	0.0049917	0.0616895	0.0550548
5.	-0.0593583	-0.0729415	-0.0453661	0.0285077	0.1094083	0.0437842
6.	-0.3155665	-0.3626356	-0.1289224	-0.1005892	-0.0350676	0.003653
7.	0.0147194	0.0202393	0.0260857	0.0474905	0.1113547	0.099439
8.	-0.0291962	-0.0751771	-0.1444066	-0.0602511	0.1079125	0.098394
9.	0.0240656	-0.0184671	-0.0134904	0.0227604	0.054634	0.0497611
10.	0.0131198	-0.1017179	-0.1295693	0.0289044	0.0577435	0.0442022
11.	0.0436869	0.0373681	0.0407157	0.0404518	0.0775236	0.0828459
12.	-0.089889	-0.1222926	-0.1277394	-0.0672452	0.0595102	0.0507624
13.	0.0171301	-0.0575243	-0.107395	-0.0050917	0.0709427	-0.1392609
14.	0.0235803	-0.0800618	-0.0559539	0.0089336	0.0707704	0.038163
15.	-0.0666992	-0.2171503	-0.0568594	-0.0475106	0.0801683	0.0752015
16.	-0.0238573	-0.1630436	-0.0950091	-0.0779894	0.0943274	0.0764182

Contd..

ANNEXURE - III (19) (Contd..)

17.	0.0188458	-0.0442878	-0.0745758	-0.0389637	0.0640578	0.0348382
18.	-0.0045115	-0.0653408	-0.0146971	0.0164578	0.0746063	0.0466575
19.	-0.030242	-0.1469352	-0.1827073	-0.0541314	0.0729256	0.0525628
20.	-0.100054	-0.1594294	-0.1409482	0.0179786	0.0750213	-0.1210593
21.	-0.0464325	-0.1585755	-0.1313604	-0.1669498	0.0272581	-0.0752062
22.	0.0288736	0.0238205	0.0284247	0.0307352	0.069081	0.0492924
23.	-0.0380041	-0.0762993	-0.0966477	-0.049763	0.0709978	0.0607968
24.	-0.0528002	-0.0779215	-0.0751554	-0.0080179	0.0632341	NA
25.	0.0219209	0.0159502	0.0219518	-0.0169082	0.0559005	0.0583209
26.	0.0109968	-0.1388113	-0.226484	-0.2602443	0.0120735	0.0147077

Source : Annual Accounts and Reports.

ANNEXURE - III (20)

R-20, DEPRECIATION CHARGE/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.1971177	0.1663274	0.0930375	0.0575495	0.0387053	NA
2.	0.0538701	0.0503368	0.0332784	0.0307504	0.0265012	0.0139645
3.	0.0298542	0.0395464	0.0337609	0.0283016	0.0206024	0.0362376
4.	0.0578122	0.0627738	0.0359115	0.0298831	0.0262468	0.0212679
5.	0.0305767	0.0386649	0.0249673	0.0530472	0.0395742	0.0273816
6.	0.0773060	0.0415658	0.0346218	0.2674878	0.0174085	0.0120265
7.	0.0496325	0.0532015	0.0384154	0.0515499	0.0860754	0.0933827
8.	0.0947029	0.0634259	0.0336731	0.0294534	0.0533802	0.0376469
9.	0.0729096	0.0516586	0.0295559	0.0288500	0.0216875	0.0315607
10.	0.0455114	0.0457826	0.043961	0.0332915	0.0283254	0.0242237
11.	0.0686116	0.0703005	0.0868252	0.0593511	0.0367918	0.0454401
12.	0.0461802	0.0554329	0.0396808	0.0120821	0.0266371	0.0280255
13.	0.0409099	0.0370979	0.0253263	0.0251692	0.0141071	0.0218452
14.	0.0459549	0.0450495	0.0271006	0.0285719	0.0197450	0.0246781
15.	0.0297117	0.0690581	0.0325298	0.0320516	0.0250074	0.0200862
16.	0.0355723	0.0370854	0.0333083	0.0269076	0.0102362	0.0179707

Contd..

ANNEXURE - III (20) (Contd..)

17.	0.0351518	0.0387972	0.0303100	0.0264337	0.0169269	0.0198695
18.	0.0709523	0.0406845	0.0266189	0.0278893	0.0160322	0.0256755
19.	0.1128501	0.0618550	0.0378779	0.0424876	0.0265896	0.0365755
20.	0.0167802	0.0173143	0.0131559	0.0295471	0.0191947	0.0381853
21.	0.0624398	0.0342105	0.0353490	0.026497	0.0173250	0.0133025
22.	0.0938360	0.0580123	0.0668482	0.0533307	0.0292298	0.0547693
23.	0.0743818	0.0719961	0.0439387	0.0451517	0.0280156	0.0422038
24.	0.0289874	0.0333663	0.0280464	0.026671	0.0185185	NA
25.	0.0301236	0.0619619	0.0323756	0.0372156	0.0513275	0.0390489
26.	0.0253317	0.0241503	0.0251515	0.0156334	0.0099594	0.0092354

Source : Annual Accounts and Reports

ANNEXURE - III (21)

R-21, DEPRECIATION CHARGE/NET FIXED ASSETS

CO. CODE.	1979	1980	1981	1982	1983	1984
1.	0.0581063	0.0524043	0.0564472	0.0529297	0.0617353	NA
2.	0.1088376	0.1056521	0.0967893	0.0860479	0.0807164	0.0747210
3.	0.0646686	0.0768739	0.0716611	0.0711231	0.0734678	0.1039437
4.	0.1035449	0.1037477	0.0969196	0.0881017	0.0779175	0.0786485
5.	0.0378485	0.0498706	0.0453265	0.0753741	0.1262822	0.0877879
6.	0.0503422	0.0497706	0.0355079	0.0374761	0.0342321	0.0320228
7.	0.0981433	0.0989919	0.0927157	0.118511	0.2143222	0.1759296
8.	0.1045177	0.0986591	0.0935273	0.0866197	0.3387692	0.2972553
9.	0.0837546	0.0827354	0.0774171	0.0705994	0.0819459	0.0846492
10.	0.0866504	0.0837201	0.0792231	0.0750079	0.0722026	0.0673239
11.	0.0935932	0.0863199	0.0954552	0.0961023	0.1022429	0.1100836
12.	0.0740178	0.0790777	0.0739845	0.0702699	0.0906324	0.0957585
13.	0.0446561	0.0374071	0.0366306	0.0336725	0.0308443	0.0402730
14.	0.075785	0.069732	0.0606445	0.0570244	0.0723854	0.0691086
15.	0.0836782	0.0957434	0.0830846	0.0815287	0.0746040	0.0765672
16.	0.0601376	0.0578378	0.0568708	0.050491	0.0403458	0.0598608

Contd..

ANNEXURE - III (21) (Contd..)

17.	0.0453598	0.0483076	0.045057	0.0416244	0.0431870	0.0416751
18.	0.1317694	0.1031058	0.0954416	0.0925239	0.0887500	0.1118732
19.	0.0753616	0.0751900	0.0660987	0.0811265	0.0848111	0.0940954
20.	0.0813576	0.0724967	0.0609101	0.0811911	0.0832929	0.0786414
21.	0.0634509	0.0500314	0.0550295	0.0459493	0.0486453	0.0397889
22.	0.0905833	0.0750983	0.1000345	0.1060027	0.1073919	0.1161798
23.	0.0771463	0.0805118	0.0760047	0.0867745	0.0806452	0.0974558
24.	0.0781902	0.0804461	0.0741049	0.0587930	0.0832776	NA
25.	0.0488327	0.0576635	0.0551171	0.0486117	0.0917074	0.0936748
26.	0.0333857	0.0437329	0.0386813	0.0349459	0.0218688	0.0192209

Source : Annual Accounts and Reports

ANNEXURE - III (22)

R-22, DEPRECIATION CHARGE/GROSS FIXED ASSETS

CO. CODE.	1979	1980	1981	1982	1983	1984
1.	0.0389845	0.0338854	0.0156476	0.0316660	0.0364649	NA
2.	0.0615624	0.0547517	0.0465266	0.0401150	0.0387967	0.0338478
3.	0.0471137	0.0538501	0.0472229	0.0447891	0.0445772	0.0646247
4.	0.0520771	0.0498746	0.0428924	0.0373227	0.0321001	0.0385830
5.	0.029711	0.0376107	0.032734	0.0540329	0.0814391	0.0567735
6.	0.0327308	0.0302678	0.021709	0.0225327	0.0202641	0.0187927
7.	0.0513638	0.0515992	0.0476607	0.0629075	0.1264378	0.1010291
8.	0.0587289	0.0510956	0.0444743	0.0385187	0.1125261	0.0984565
9.	0.049754	0.0481828	0.0422147	0.036332	0.0431014	0.0464794
10.	0.0509903	0.047741	0.0429766	0.041253	0.0393513	0.0365795
11.	0.061681	0.0574197	0.0654521	0.0614731	0.0643828	0.0699972
12.	0.0393354	0.0406266	0.0359063	0.0323227	0.0444839	0.0461926
13.	0.0311969	0.0259746	0.0254443	0.0227758	0.0203950	0.0267646
14.	0.0404631	0.0358323	0.0306582	0.0278383	0.0343264	0.0368969
15.	0.0441946	0.053417	0.0447266	0.0416626	0.0399392	0.0397538
16.	0.0567262	0.052292	0.0489197	0.0414826	0.0319767	0.0459750

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ANNEXURE - III (22) (Contd..)

17.	0.0299538	0.0378487	0.0274795	0.0251960	0.0255270	0.0265796
18.	0.0599697	0.0455875	0.0399174	0.0360914	0.0320699	0.0540699
19.	0.0428617	0.0432031	0.0362654	0.0450668	0.0440747	0.0554655
20.	0.0272022	0.0245415	0.02055	0.0377336	0.0390911	0.0368047
21.	0.0446137	0.0351286	0.0386651	0.0315780	0.0326234	0.0263009
22.	0.052807	0.045181	0.0550629	0.0562992	0.0559767	0.0622850
23.	0.055975	0.056118	0.0494331	0.0547730	0.0488431	0.0601166
24.	0.0358109	0.0367062	0.0334042	0.0258370	0.0344905	NA
25.	0.0309843	0.0384935	0.0352555	0.0303964	0.0601370	0.0592640
26.	0.0203995	0.0225014	0.0192848	0.0169364	0.0102288	0.0102074

Source : Annual Accounts and Reports

ANNEXURE - III (23)

R-23, NET PROFIT (BEFORE TAXES)/TOTAL CAPITAL EMPLOYED

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.0637257	-0.0464549	-0.0751277	-0.0081483	0.3015213	NA
2.	-0.0941153	-0.23231	-0.2468369	-0.1869708	0.0244059	0.1627461
3.	0.0348604	-0.040794	-0.0260391	-0.0057346	0.3379814	0.1385428
4.	-0.0783315	-0.1385468	-0.1503865	-0.015127	0.1950057	0.1370394
5.	-0.0873837	-0.1081747	-0.0754793	0.0039594	0.2230031	0.0663548
6.	-0.4397771	-0.4909135	-0.1746406	-0.1287098	-0.0475564	-0.0024274
7.	0.0052793	0.0104326	0.0299455	0.0714728	0.1698945	0.1811727
8.	-0.0660765	-0.1215496	-0.2235278	-0.1108452	0.2259126	0.1919481
9.	0.0268707	-0.0483711	-0.0463794	0.0299153	0.1568167	0.1267708
10.	-0.0136212	-0.1629278	-0.2048318	0.0130139	0.1265695	0.0998951
11.	0.0360706	0.018281	0.0330187	0.0474292	0.1846107	0.1939225
12.	-0.1481243	-0.1898653	-0.18969	-0.1069294	0.1405217	0.1129094
13.	0.0006673	-0.085523	-0.1533433	-0.0229208	0.1991907	-0.2105996
14.	-0.0623568	-0.1349787	-0.106634	-0.0114266	0.2335702	0.0809136
15.	-0.1046518	-0.3087559	-0.097862	-0.0873617	0.2118401	0.1972522
16.	-0.0447392	-0.1920427	-0.1217704	-0.1018164	0.2389987	0.1719334

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ANNEXURE - III (23) (Contd.)

17.	-0.0439032	-0.0704451	-0.1148034	-0.0678678	0.1963123	0.065516
18.	-0.026599	-0.0974011	-0.0368049	0.0023705	0.2484084	0.0911208
19.	-0.073355	-0.2189749	-0.264403	-0.0946643	0.1844461	0.0960759
20.	-0.1444752	-0.2217787	-0.1943236	0.0135468	0.2036478	-0.1803436
21.	-0.0757832	-0.2023057	-0.1771555	-0.2139119	0.0421564	-0.1053318
22.	0.0251802	0.0080541	0.0079286	0.0134266	0.1482061	0.0936193
23.	-0.0793347	-0.1215124	-0.1469372	-0.0965537	0.152845	0.0994326
24.	-0.1049268	-0.1467416	-0.1549555	-0.0340468	0.2274921	NA
25.	0.045401	0.0001744	0.0128811	-0.0392077	0.0929213	0.1015404
26.	0.0131928	-0.2041799	-0.3262934	-0.4094074	0.0210924	0.03005

Source : Annual Accounts and Reports.

ANNEXURE -III (24)

R-24, NET WORTH/TOTAL DEBTS

CO. CODE.	1979	1980	1981	1982	1983	1984
1.	0.75409	0.6002445	0.4983191	0.5029653	4.3361508	NA
2.	0.252742	-0.0899728	-0.2846307	-0.3707969	-0.3171407	-0.2742343
3.	1.8952503	1.9906311	1.7498155	1.9802263	5.8674818	8.903473
4.	0.7474726	0.1978092	-0.0961935	-0.1304337	0.2492981	0.5949132
5.	0.2131194	-0.0041535	-0.0916534	0.021445	0.4031749	0.4571263
6.	-0.7231943	-0.8412525	-0.9705055	-1.145084	-0.9643681	-0.9187414
7.	4.1585821	2.6126376	2.0918592	3.8673381	4.5881923	5.0616119
8.	0.296385	0.0429943	-0.2215685	0.1424783	0.1740563	0.1945252
9.	1.1106292	0.6656472	0.693015	0.7828016	1.5503072	0.8311601
10.	0.8918674	0.2138389	-0.0746769	-0.0604131	0.1364092	0.2501776
11.	0.8682274	0.6495674	0.5450297	0.5527307	1.1642913	1.5123243
12.	0.077347	-0.1778245	-0.3229789	-0.3834649	-0.1919403	-0.0522779
13.	0.8650362	0.4237745	0.1395952	0.2990907	0.4608618	0.0843188
14.	1.2431422	0.4681955	0.191334	0.1974885	1.5562593	1.0284874
15.	0.1556474	-0.2769338	-0.3411267	-0.4159337	-0.1821757	0.0821491
16.	0.0716882	-0.15763	-0.2584543	-0.3198726	-0.1546909	0.0587819

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ANNEXURE - III (24) (Contd..)

17.	1.3001978	0.7389252	0.3765756	0.1953615	0.8186962	0.7497054
18.	0.707186	0.4372434	0.3623488	0.4254109	2.2928277	1.6034261
19.	-0.0417712	-0.2501897	-0.4179102	-0.3989915	-0.2543111	-0.0990173
20.	0.1809118	-0.1099764	-0.333626	-0.3212504	-0.2789946	-0.4303371
21.	-0.1100506	-0.2642167	-0.3637407	-0.425258	-0.3909437	-0.4866013
22.	1.4256669	0.731635	0.5775312	0.6525025	1.1312678	0.9068534
23.	0.3676576	0.0178664	-0.1477124	-0.2275638	-0.0641428	0.1141151
24.	0.5827772	0.3863566	0.2173125	0.1834012	1.2345192	NA
25.	2.2843255	1.1728419	1.0358591	0.7628204	1.029487	1.93593
26.	0.9284695	0.0645504	-0.4131995	-0.7858218	-0.7905801	-0.631803

Source : Annual Accounts and Reports

ANNEXURE - III (25)

R-25, NET WORTH/SALES (NET OF EXCISE)

CO. CODE.	1979	1980	1981	1982	1983	1984
1.	1.9709714	1.5509845	0.7561032	0.4970472	0.7631357	NA
2.	0.2495343	-0.124523	-0.381451	-0.6225616	-0.47198	-0.1825842
3.	0.489976	0.5208951	0.4296149	0.3940471	0.3587818	0.4786911
4.	0.4417647	0.1795842	-0.067832	-0.083616	0.1192798	0.1436808
5.	0.1760262	-0.005015	-0.090386	0.2668737	0.1288734	0.1052373
6.	-2.1856978	-2.219401	-3.040671	-25.07084	-1.941896	-1.402302
7.	0.9045655	0.9014739	0.6601376	0.6126141	0.4038306	0.5405169
8.	0.4637068	0.0675089	-0.216134	0.1520427	0.0943253	0.0509591
9.	0.9500835	0.5344034	0.2969548	0.3575176	0.2178455	0.2973274
10.	0.4255534	0.1909738	-0.084354	-0.046686	0.07356	0.1534487
11.	0.4921683	0.4553441	0.5098304	0.3776752	0.2525809	0.3206647
12.	0.079716	-0.29684	-0.579724	-0.513368	-0.209845	-0.046992
13.	0.6652742	0.4872164	0.1175426	0.3492884	0.2395707	0.5511952
14.	0.5032053	0.3041596	0.0936052	0.1098022	0.2107759	0.2550061
15.	0.1123582	-0.46903	-0.372195	-0.490897	-0.147497	0.0486481
16.	0.0891318	-0.241551	-0.412446	-0.538388	-0.100306	0.0384621

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ANNEXURE - III (25) (Contd..)

17.	0.592063	0.4986372	0.2553683	0.1399852	0.225543	0.2294963
18.	0.7936075	0.352715	0.2039878	0.2378334	0.3594681	0.2775935
19.	-0.1013446	-0.5091313	-0.7637508	-0.7622896	-0.2636688	-0.0847514
20.	0.1352829	-0.182508	-0.440849	-0.540511	-0.28116	-0.8781856
21.	-0.2729871	-0.539186	-0.7145254	-0.9393925	-0.5186753	-0.5622063
22.	0.8625369	0.5391107	0.5168952	0.3885845	0.219022	0.3694651
23.	0.3440853	0.0256317	-0.198539	-0.2899074	-0.041605	0.0842073
24.	0.2810193	0.2024237	0.1016022	0.1336035	0.2069491	NA
25.	0.7890979	1.0572273	0.5992212	0.6904769	0.4379757	0.3485066
26.	0.5885246	0.0496151	-0.5009992	-0.7351486	-0.7479647	-0.4692183

ANNEXURE - III (26)

R-26, NET WORTH/LONG TERM DEBT

CO. CODE	1979	1980	1981	1982	1983	1984
1.	3.3929916	2.899539	1.944509	3.6172035	11.252243	NA
2.	1.4181536	-0.6415859	-2.721732	-4.3569112	-4.5841114	-0.3053627
3.	1.8952502	1.990631	1.7498155	1.9802262	5.8674819	6.9798027
4.	3.6936484	1.0170423	-0.6467743	-0.4287357	0.7081329	5.808257
5.	1.704859	-0.0492302	-1.2595339	3.5035346	0.4204462	0.6402733
6.	NA	-30 .665296	.35.818672	-40.820744	-43.351224	-43.482528
7.	NA	NA	8.2498455	3.8730343	21.133074	29.711196
8.	3.5680773	0.8265873	-4.3577889	1.2760300	0.2208798	0.2641942
9.	3.7149578	3.3416015	3.0387992	3.7704059	4.8342315	4.7892021
10.	3.9681343	1.7220874	-0.8026885	-0.5868780	1.0135519	2.7697413
11.	3.0377456	1.5905917	1.9476600	1.8287839	2.8164747	4.0217109
12.	0.4335884	-0.8895374	-2.5224507	-4.3548298	-2.9124441	-0.6350654
13.	26.818791	20.280728	8.0133295	22.808928	14.975333	2.3793385
14.	7.2346264	4.7012223	2.0257549	0.6888428	2.3830299	8.011667
15.	1.7930613	-1.4416543	-1.6348766	-2.1822791	-0.1875288	0.6187268
16.	0.2539664	-0.4602567	-0.8663494	-0.5514507	-0.1979493	0.0692488

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ANNEXURE - III (26) (Contd..)

R-26, NET WORTH/LONG TERM DEBT.

17.	7.9046873	5.6549847	3.1909504	2.0373288	5.9765081	7.4672174
18.	31.086141	2.7301576	2.0211418	2.041351	2.2928277	7.2965866
19.	-0.3110233	-2.3094386	-10.537357	-5.5509612	-3.2426017	-1.1874118
20.	3.9921835	-5.4209394	-18.234434	-3.8143872	-2.6429315	-3.4431502
21.	-0.3179942	-1.0181413	-1.5841753	-2.3398428	-1.6275749	-1.8294856
22.	3.4607971	1.8605345	2.1130658	1.8871668	3.2747560	2.7191386
23.	1.2766636	0.0791963	-0.9010321	-1.2385491	-0.0666171	0.1507322
24.	1.7608539	1.7776626	0.8477754	0.2233335	2.1911002	NA
25.	3.6712676	2.8112021	2.860308	3.4956487	2.5063977	3.3941727
26.	5.1449299	0.1145453	-4.5726656	-9.4508145	-10.008902	-9.3319941

Source : Annual Accounts and Reports

ANNEXURE - III (27)
R-27, DEBT/TANGIBLE ASSETS

CO. CODE.	1979	1980	1981	1982	1983	1984
1.	0.3924394	0.3763518	0.4527156	0.5040509	0.1418284	NA
2.	0.5880536	0.8430232	1.2137475	1.3710525	1.1967529	1.0539853
3.	0.166104	0.1642509	0.1942967	0.2726544	0.081252	0.0557654
4.	0.3506322	0.4292575	0.5710307	0.4676453	0.4361188	0.3805737
5.	0.5295636	0.7451787	0.8587801	0.7385876	0.4154429	0.2897731
6.	1.1104984	1.4297139	1.250732	0.8279449	0.8467029	0.8390763
7.	0.101089	0.1549601	0.1837694	0.1102969	0.0848172	0.0782656
8.	0.5003155	0.671614	0.8479947	0.9813813	0.6868502	0.5743465
9.	0.2849118	0.4006174	0.4163223	0.4177709	0.2074771	0.2807266
10.	0.3135602	0.6232951	0.8127742	0.7874687	0.6251017	0.6327914
11.	0.3732757	0.4003203	0.4246164	0.4225076	0.2329404	0.1990951
12.	0.6276268	0.825947	0.9898548	1.0649319	0.9677281	0.6684291
13.	0.3795453	0.5174642	0.6674022	0.7714441	0.5696457	0.7778728
14.	0.2685992	0.3796045	0.4809015	0.4740616	0.1965311	0.3245438
15.	0.538568	0.8031879	0.8666279	0.9420974	0.9462482	0.7227324
16.	0.7128567	0.9224732	1.0083473	1.116063	0.9626664	0.7586801

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ANNEXURE -III (27) (Contd..)

17.	0.2674461	0.3629988	0.4371746	0.4865472	0.3726955	0.4208828
18.	0.3355851	0.353237	0.3850737	0.4283065	0.1793804	0.2447454
19.	0.7106544	0.9686386	1.203973	1.188239	0.8891317	0.6517348
20.	0.5740595	0.7768226	0.966868	0.9755725	0.9344705	1.1521556
21.	0.8907801	1.1125646	1.2659203	1.4754225	1.2319402	1.3286461
22.	0.2361039	0.4049469	0.4639589	0.3992035	0.2852699	0.2675873
23.	0.4351735	0.6380837	0.9137782	0.9878315	0.7836347	0.6854265
24.	0.4819693	0.5016356	0.5950153	0.6055928	0.3317158	NA
25.	0.1499484	0.2679137	0.395985	0.4653229	0.3466373	0.1959288
26.	0.3715124	0.5207746	0.6984362	1.007978	1.0910248	0.8899808

Source : Annual Accounts and Reports

ANNEXURE - III (28)

R-28, ALL OUTSIDE LIABILITIES/TANGIBLE ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.7040652	0.7740966	0.7744029	0.7464796	0.3851776	NA
2.	0.8513741	1.0758491	1.3454698	1.508382	1.379539	1.2890388
3.	0.6851911	0.7020396	0.6600181	0.4600816	0.523125	0.6107672
4.	0.7379119	0.9150888	1.0549294	0.9264657	0.8912763	0.7735916
5.	0.8822214	0.9972604	1.0721162	1.0490073	0.8309547	0.8647718
6.	1.8031062	2.2027504	2.2138423	1.9480665	1.816427	1.7708942
7.	0.5796128	0.5951452	0.6155802	0.5470755	0.6108422	0.6038498
8.	0.8517139	0.9711243	1.1878889	1.3086499	1.0379824	0.888275
9.	0.6835685	0.7333301	0.7114823	0.6729681	0.6783466	0.7666711
10.	0.7203457	0.8667151	1.0606955	1.0475734	0.9147302	0.8416897
11.	0.6759117	0.7399664	0.7685713	0.766467	0.7287895	0.6989036
12.	0.9514547	1.1468736	1.3197023	1.4083641	1.1857461	1.034944
13.	0.6716794	1.0241158	0.9068338	0.9380017	0.7374719	0.9344106
14.	0.6660928	0.8222708	0.9194556	0.9063782	0.6941466	0.6662106
15.	0.9041045	1.2083345	1.280978	1.3741068	1.1566005	0.9406281
16.	0.9488965	1.1454095	1.2606117	1.356998	1.1489158	0.9554032

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ANNEXURE - III (28) (Contd..)

17.	0.6522671	0.731771	0.8353706	0.9049473	0.6948755	0.6844617
18.	0.7626788	0.8455494	0.8604689	0.8177936	0.5887116	0.6075687
19.	1.0167464	1.230588	1.4927347	1.4642542	1.2167326	1.0575836
20.	0.8961457	1.121136	1.319785	1.3113746	1.2580433	1.4958154
21.	1.0980308	1.293958	1.4604668	1.6274353	1.4816194	1.6465214
22.	0.6447102	0.6835256	0.7189161	0.7260564	0.6587816	0.7429706
23.	0.840005	1.6266834	1.1349764	1.2247947	1.0502643	0.9217822
24.	0.7191192	0.8061897	0.8706955	0.8889334	0.5904902	NA
25.	0.657469	0.6857794	0.5898151	0.6450421	0.6431413	0.6206951
26.	0.6550619	0.9663836	1.2885934	1.7864488	1.8625424	1.5622924

Source : Annual Accounts and Reports.

ANNEXURE - III (29)

R-29, INTEREST/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	Q3554929	0.408679	0.2759775	0.1772414	0.0813113	NA
2.	0.1044282	0.1351558	0.2042146	0.2265354	0.3041134	0.0938626
3.	00836546	0.0789486	0.0731713	0.0599819	0.0040206	0.0047673
4.	0.0849734	0.1052215	0.0870952	0.1237721	0.1076786	0.0615097
5.	0.1304600	0.1379463	0.1565025	0.1995274	0.0700002	0.067825
6.	0.2115085	0.2764969	0.0094595	NA	0.0570778	0.1025610
7.	0.0232404	0.0322197	0.0415324	0.0410203	0.0118408	0.0117214
8.	0.1924355	0.1880716	0.1843182	0.2014516	0.0957962	0.0629494
9.	00956238	0.1000977	0.0752538	0.1078436	0.0481264	0.0340149
10.	00719669	0.109616	0.1199072	0.1421010	0.1332809	0.0876046
11.	00689237	0.0912925	0.1506094	0.1189784	0.0423318	0.0227520
12.	0.1250898	0.2177423	0.276968	0.1106733	0.1729984	0.1532142
13.	0.0898578	0.1231795	0.1505776	0.2001686	0.1294276	0.1097568
14.	0.0522859	0.0777848	0.0886629	0.1273379	0.0548554	0.0460913
15.	0.0860853	0.1705379	0.1192900	0.1726384	0.1661783	0.0951361
16.	0.1762122	0.1910015	0.1869466	0.1996753	0.1515125	0.1058987

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ANNEXURE - III (29) (Contd..)

17,	0.0467252	0.0731402	0.1095521	0.1211407	0.0759410	0.0736819
18.	0.1352212	0.1199568	0.1091429	0.1232994	0.0460626	0.0373544
19	0.2816316	0.2409171	0.2543687	0.3129411	0.1271921	0.1116191
20	0.1004181	0.1483154	0.1843946	0.0799877	0.0427272	0.3530584
21.	0.2689955	0.2407128	0.2322394	0.3341626	0.2203557	0.2420118
22.	0.0723121	0.0747139	0.1167627	0.1073708	0.0575277	0.0389666
23.	0.1172410	0.1634115	0.2102229	0.2099812	0.1404759	0.1567549
24.	0.0580977	0.0746773	0.0879646	0.1230719	0.0544025	NA
25.	0.0362347	0.0872233	0.0760593	0.1212854	0.0872715	0.0298977
26.	0.0847288	0.1157832	0.2079741	0.1583345	0.0433191	0.0488315

Source : Annual Accounts and Reports

ANNEXURE -III(30)

R-30, SHORT-TERM BANK BORROWINGS/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	1.2033585	1.4495384	0.7151982	0.4744585	0.1081730	NA
2.	0.8113470	1.1899233	1.2000093	1.5360885	1.3852728	0.0678691
3.	NA	NA	NA	NA	NA	NA
4.	0.4714100	0.7312907	0.6002846	0.4460357	0.3100199	0.2167783
5.	0.7227016	1.1057511	0.9146745	1.1682839	0.0131305	0.0658518
6.	2.6708091	2.3348925	2.7659584	20.011222	1.8790985	1.3886970
7.	0.2175177	0.3450436	0.2355564	NA	0.0689062	0.0885951
8.	1.4345822	1.4885074	0.9258790	0.9479754	0.1148803	0.0690816
9.	0.5997007	0.6429084	0.3307758	0.3618933	0.0954545	0.2956429
10.	0.3699060	0.7821762	1.0245061	0.6932415	0.4666836	0.5579571
11.	0.4026400	0.4103297	0.6708299	0.4767725	0.1272598	0.1323945
12.	0.8467764	1.3355871	1.5651041	1.2208786	1.0212341	0.8248934
13.	0.7442646	1.1021027	0.8123041	1.1360579	0.4936965	0.6198450
14.	0.3352298	0.5849444	0.4430165	0.3965920	0.0469888	0.2161135
15.	0.6592136	1.3683135	0.8634181	0.9552830	NA	0.5002501
16.	0.8923669	1.0075753	1.1197468	0.7068202	0.1417034	0.0988994

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ANNEXURE - III (30) (Contd..)

17.	0.3804635	0.5866376	0.5981039	0.6478342	0.2377522	0.2753814
18.	0.9577190	0.6774866	0.4620329	0.4425596	NA	0.1350809
19.	1.6121685	1.5876992	1.592063	1.6358691	0.9114330	0.6679390
20.	0.7138329	1.1089199	1.2971495	1.5407638	0.9013480	1.7955749
21.	1.6220914	1.5111183	1.5133434	1.8075165	1.0080458	0.8480696
22.	0.3557752	0.3980216	0.6503896	0.3896206	0.1267256	0.2715386
23.	0.6663659	1.1109817	1.1237455	1.0398909	0.0240918	0.1792995
24.	0.3226144	0.4100590	0.3476937	0.5358785	0.0731855	NA
25.	0.1305014	0.5253469	0.3689821	0.7076384	0.2506879	0.0773423
26.	0.5194760	0.6716478	1.1029238	0.8577289	0.8713684	0.6923851

Source : Annual Accounts and Reports

ANNEXURE - III (31)

R-31, SHORT-TERM BANK BORROWING/(WORKING CAPITAL GAP + SHORT-TERM
BORROWINGS FROM NON-BANKING SOURCES)

CO. CODE.	1979	1980	1981	1982	1983	1984
1.	0.6009736	0.9399628	0.6951796	0.6178972	0.3507855	NA
2.	2.1773147	1.5195895	1.5782689	2.1973644	2.0136759	0.2290362
3.	NA	NA	NA	NA	NA	NA
4.	2.1370980	1.7037311	2.5901073	2.3998725	-0.7268675	2.2222372
5.	4.229349	2.7312846	2.7835931	2.6934106	0.1036351	3.8425858
6.	-7.684627	-12.59413	-4.6068292	-2.2123742	-5.4146253	-9.5016496
7.	0.3561952	0.4903855	0.4219531	NA	0.7751344	0.7698919
8.	1.3774557	1.5941937	2.5563295	2.6737236	0.3465718	0.4051512
9.	0.8444482	1.1416449	1.3385610	1.2167180	2.9015728	1.6141677
10.	1.3991897	1.8430366	2.7372868	3.4582788	3.0477877	1.5958557
11.	1.2950354	1.2409096	1.2837251	1.1026413	1.2246313	1.1568677
12.	1.8750662	2.1195072	2.4049971	2.5871520	1.7760171	1.5145699
13.	1.4409599	1.6522721	2.8794175	2.1456783	1.5852891	3.5075219
14.	1.1593196	1.9865331	3.8403759	2.5652549	0.6912444	1.5362736
15.	1.5276967	3.2352875	3.2036675	4.0215509	NA	1.5580904
16.	1.2809012	1.6485990	1.9899878	1.2204066	0.5086944	0.2635770

Contd..

ANNEXURE - III (31) (Contd..)

17.	1.3963436	1.5841247	2.2933707	2.9250681	0.5210109	4.680286
18.	0.7362518	0.9535117	1.0304764	0.9837304	NA	0.6722682
19.	1.2428341	1.7235062	2.4591141	2.1471568	1.8096171	1.3385387
20.	1.5059519	2.2016255	2.7431241	2.5591549	2.2782199	3.7743068
21.	1.4211167	1.9697039	2.6724473	2.7504375	2.3419978	3.5421886
22.	1.0012248	0.7817551	0.9328673	0.8708888	1.0246726	0.9651228
23.	2.1677741	1.9884127	1.9980044	2.2628784	0.0937907	0.4640271
24.	0.8577568	1.3814622	1.8971651	1.3412786	0.7086755	NA
25.	0.2520970	0.5942104	0.6250738	0.8525035	0.8253956	1.0893428
26.	1.1276146	2.5555379	19.220569	-3.4349282	-3.3499974	-3.3072941

Source : Annual Accounts and Reports

ANNEXURE - III (32)

R-32, SHORT-TERM BANK BORROWING/WORKING CAPITAL GAP

	1979	1980	1981	1982	1983	1984
1.	1.0259743	1.5377303	1.1619273	1.2119083	0.3507855	NA
2.	2.1773384	1.5195976	1.5782755	2.1973747	2.0136836	0.2290374
3.	NA	NA	NA	NA	NA	NA
4.	2.1370980	1.7037311	2.5901073	2.3998725	-0.7268675	2.2222372
5.	4.229349	2.7312846	2.7835931	2.6934106	0.1036351	3.8425858
6.	-3.8207598	-5.608155	-3.1337514	-1.9401874	-4.302017	-5.5208666
7.	0.3561952	0.4903855	0.4219531	NA	0.7751344	0.7698919
8.	1.3774557	1.5941937	2.5563295	2.6737236	0.3465718	0.4051512
9.	0.8444482	1.1416449	1.338561	1.2167180	2.9015728	1.6141677
10.	1.3991897	1.8430366	2.7372868	3.4582788	3.0477877	1.5958557
11.	1.3042983	1.2576166	1.2906954	1.1026413	1.2246313	1.1568677
12.	1.8750662	2.1195072	2.4049971	2.5871520	1.7760171	1.5145699
13.	1.4409599	1.7128236	3.0417129	2.2145354	1.6386317	3.7380676
14.	1.1593196	1.9865331	3.8403759	2.5652549	0.6912444	1.5362736
15.	1.5276967	3.2352875	3.2036675	4.0215509	NA	1.6255100
16.	1.2809012	1.6485990	1.9899878	1.2204066	0.5086944	0.263577

Contd.

ANNEXURE - III (32) (Contd..)

17.	1.3963436	1.5841247	2.2933707	2.9250681	0.5210109	4.680286
18.	0.7362518	0.9535117	1.0304764	0.9837304	NA	0.6722682
19.	1.9927936	2.2866638	3.2866294	2.6193562	1.9830517	1.7467278
20.	1.5061544	2.2019304	2.7434805	2.5593947	2.278407	3.774818
21.	1.4211167	1.9697039	2.6724473	2.7504375	2.3419978	3.5421886
22.	1.0012248	0.8651442	0.9328673	0.8708888	1.0246726	0.9651228
23.	2.1677741	1.9884127	1.9980044	2.2628784	0.0937907	0.4640271
24.	0.8577568	1.3814622	1.8971651	1.3412786	0.7086755	NA
25.	0.2520970	0.5942104	0.6250738	0.8525035	0.8253956	1.0893428
26.	1.1276146	2.5555379	19.220569	-3.4349282	-3.3499974	-3.3072941

Source : Annual Accounts and Reports

ANNEXURE - III (33)

R-33, ALL BANK BORROWINGS/TOTAL ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.1806802	0.2111273	0.2133921	0.2419987	0.0871734	NA
2.	0.5349715	0.779434	1.1488332	1.3010929	1.1508692	1.0067328
3.	NA	NA	NA	NA	NA	NA
4.	0.2979857	0.3536505	0.4861024	0.4007058	0.3614863	0.3415933
5.	0.4931339	0.7100253	0.8252213	0.7143099	0.3906027	0.2672658
6.	0.9813541	1.2653378	1.1041763	0.7567345	0.7901278	0.7634149
7.	0.101089	0.1549601	0.1817343	0.0815876	0.0664025	0.0649322
8.	0.4810086	0.6535861	0.8257443	0.9579568	0.675897	0.5664519
9.	0.2434348	0.3585559	0.3562529	0.3556211	0.1523059	0.2472014
10.	0.2430863	0.545899	0.7371602	0.706408	0.5409733	0.5756352
11.	0.3100766	0.2765821	0.3124432	0.2998158	0.1390493	0.1243152
12.	0.5302348	0.6739183	0.8631121	0.9711592	0.9039513	0.6134047
13.	0.3673031	0.4960384	0.6438451	0.7504534	0.5410057	0.7373415
14.	0.2376938	0.3497232	0.43548	0.4292862	0.1389768	0.2828809
15.	0.4918173	0.6488999	0.6858008	0.7625374	0.7260877	0.6105223
16.	0.6260127	0.8298939	0.9207946	1.0277716	0.8852721	0.6904772

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ANNEXURE - III (33) (Contd..)

17.	0.2234554	0.3155665	0.385582	0.4398916	0.3216415	0.3786264
18.	0.3279508	0.345107	0.3703658	0.4098627	0.0932755	0.2308017
19.	0.5415169	0.8106484	1.0488359	1.0174102	0.7816231	0.5085946
20.	0.564487	0.7677701	0.9599703	0.9707073	0.9301318	1.1477059
21.	0.5825008	0.8238441	0.9752535	1.2072695	0.9360278	0.9752563
22.	0.1494258	0.2504462	0.3614223	0.275625	0.1867231	0.1783449
23.	0.3788564	0.5514589	0.82412	0.8634756	0.6503841	0.5530667
24.	0.3756825	0.444138	0.5280885	0.5537637	0.2724125	NA
25.	0.0951692	0.192111	0.3063236	0.3855329	0.2503177	0.1323982
26.	0.3194933	0.4550682	0.6353234	0.9175829	1.0048473	0.8297263

Source : Annual Accounts and Reports

ANNEXURE - III (34)

R-34. BOOK VALUE OF EQUITY/BOOK VALUE OF TOTAL DEBT

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.75409	0.6002445	0.4983191	0.5029653	4.3361507	NA
2.	0.252742	-0.0899728	-0.2846307	-0.3707969	-0.3171407	-0.2742343
3.	1.8952502	1.990631	1.7498155	1.9802262	5.8674819	6.9798027
4.	0.7474726	0.1978092	-0.0961935	-0.1304337	0.2492981	0.5949132
5.	0.2131194	-0.0041535	-0.0916534	0.21445	0.4031749	0.4571263
6.	-0.7231943	-0.8412525	-0.9705055	-1.145084	-0.9643681	-0.9187418
7.	4.1585821	2.6126376	2.0918592	3.8730343	4.5881923	5.0616119
8.	0.296385	0.0429943	-0.2215685	0.1424783	0.1740563	0.1945252
9.	1.1106292	0.6656472	0.693015	0.7828016	1.5503072	0.8311601
10.	0.8918674	0.2138389	-0.0746769	-0.0604131	0.1364092	0.2501776
11.	0.8682274	0.6495674	0.5450297	0.5527307	1.1642913	1.5123243
12.	0.077347	-0.1778248	-0.3229789	-0.3834649	-0.1919403	-0.0522779
13.	0.8650362	0.4237745	0.1395952	0.2990907	0.4608618	0.0843188
14.	1.2431422	0.4681955	0.191334	0.1974885	1.5562593	1.0284874
15.	0.1556474	-0.2769338	-0.3411267	-0.4159337	-0.1821757	0.0821491
16.	0.0716882	-0.15763	-0.2584543	-0.3198726	-0.1546909	0.0587819

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ANNEXURE - III (34) (Contd..)

17.	1.3001978	0.7389252	0.3765756	0.1953615	0.8186962	0.7497054
18.	0.707186	0.4372434	0.3623488	0.4254109	2.2928277	1.6034261
19.	-0.0417712	-0.2501901	-0.4179103	-0.3989915	-0.2543111	-0.0990173
20.	0.1809118	-0.1597226	-0.333626	-0.3212504	-0.2789946	-0.4303372
21.	-0.1100507	-0.2642167	-0.3637408	-0.4252581	-0.3909439	-0.4866017
22.	1.4256669	0.731635	-0.5775312	0.6525025	1.1312678	0.9068534
23.	0.3676576	0.0178664	-0.1477124	-0.2275638	-0.0641428	0.1141152
24.	0.5827793	0.3863566	0.2173125	0.1834012	1.2345192	NA
25.	2.2843255	1.1728419	1.0358591	-0.7628204	-1.029487	1.93593
26.	0.9284695	0.0645504	-0.4131996	-0.7858218	-0.7905801	-0.631803

Source : Annual Accounts and reports

ANNEXURE -III (35)

R-35, NET WORTH/TOTAL OUTSIDE LIABILITIES

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.4203228	0.2918281	0.2913171	0.339621	1.5964111	NA
2.	0.1745717	-0.0705016	-0.2567651	-0.337038	-0.2751202	-0.2242282
3.	0.4594467	0.4858025	0.5151126	1.1735255	0.9113405	0.6372844
4.	0.3551752	0.09279	-0.0520693	-0.0658381	0.1219864	0.2926716
5.	0.1279274	-0.0031036	-0.0734157	0.1509904	0.2015708	0.1531767
6.	-0.4454015	-0.5460221	-0.5482966	-0.4866705	-0.4495271	-0.4353137
7.	0.7252896	0.6802799	0.6244836	0.7457612	0.6370839	0.6560408
8.	0.174103	0.0297342	-0.1581704	0.1068472	0.1151760	0.1257773
9.	0.4629109	0.3636423	0.4055162	0.4859543	0.4741725	0.3043402
10.	0.3882221	0.1537815	-0.0572223	-0.0454129	0.0932183	0.1880862
11.	0.479483	0.3514147	0.3011153	0.3046876	0.3721382	0.4308124
12.	0.0510219	-0.1280643	-0.2422533	-0.2899563	-0.1566491	-0.0337642
13.	0.4888053	0.2808822	0.1027378	0.2459823	0.3559837	0.0701932
14.	0.5012921	0.2161443	0.1000731	0.1032921	0.4406178	0.5010267
15.	0.0927179	-0.1840797	-0.2307846	-0.2851671	-0.1353972	0.0631193
16.	0.0538556	-0.1269498	-0.2067343	-0.2630792	-0.1296142	0.0466784

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ANNEXURE - III (35) (Contd..)

17.	0.5331142	0.3665476	0.1970733	0.1050366	0.4391065	0.4610019
18.	0.3111678	0.1826629	0.1621569	0.2228023	0.6986245	0.6459042
19.	-0.0291959	-0.1969333	-0.3370677	-0.3237807	-0.1858387	-0.0610193
20.	0.1158898	-0.11067	-0.2444128	-0.2389882	-0.2072363	-0.3314683
21.	-0.0892789	-0.2271775	-0.3152874	-0.3855363	-0.3250629	-0.3926590
22.	0.5221037	0.4334487	0.3727149	0.3587618	0.4898690	0.3266111
23.	0.1904689	0.0115317	-0.1189244	-0.1835366	-0.0478589	0.0848547
24.	0.39059	0.2404027	0.1485069	0.1249435	0.6935076	NA
25.	0.5209842	0.4581947	0.6954462	0.5502862	0.5548681	0.6110966
26.	0.5265731	0.0347855	-0.2239601	-0.4402302	-0.4630995	-0.3599150

Source : Annual Accounts and Reports

ANNEXURE - III (36)

R-36, CURRENT ASSETS/CURRENT LIABILITIES

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.7906866	0.7685336	0.7675455	0.6536336	1.4880428	NA
2.	0.9445789	0.7412001	0.5651098	0.5088582	0.5675592	2.0559267
3.	1.3550540	1.3308026	1.3466657	2.4263854	1.4195054	1.1502622
4.	0.9585354	0.8282576	0.6923448	0.7579753	0.8998626	0.7442492
5.	0.5664270	0.5371353	0.4946103	0.5657061	1.3412229	0.9067966
6.	0.2416717	0.253018	0.2801713	0.3792987	0.4372848	0.4526325
7.	1.3152333	1.2705834	1.3302674	1.5022758	1.0325158	1.0328647
8.	0.8448318	0.7465197	0.5719486	0.5448646	1.5526488	1.4778225
9.	1.0614849	0.9390939	0.8681576	0.8994206	0.8490271	0.8770455
10.	0.8932827	0.6836470	0.5250577	0.4804600	0.5623943	0.7260424
11.	0.8887767	0.9123831	0.8924746	0.9570378	0.9603717	0.9729912
12.	0.7133347	0.6444678	0.5773290	0.5467933	0.6479630	0.7873272
13.	0.8295494	0.7180814	0.5039094	0.5447154	0.6916997	0.3901328
14.	0.9506893	0.7836218	0.6314962	0.7322002	1.0538278	0.8418912
15.	0.8018513	0.5746578	0.5712102	0.5203832	1.8150007	0.7026221
16.	0.8499328	0.7123150	0.6332701	0.8807180	1.5122815	2.0288897

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ANNEXURE - III (36) (Contd..)

17.	0.8957275	0.8299659	0.7225578	0.6626964	1.4592882	0.5363970
18.	1.1437948	1.0183323	0.9881899	1.0076968	1.8560772	1.1681056
19.	0.5894433	0.5263061	0.4206850	0.4818776	0.6292525	0.6947703
20.	0.7882996	0.6252586	0.5367323	0.5571538	0.5954864	0.4517807
21.	0.7814359	0.5965269	0.4782659	0.4347515	0.5476478	0.4587322
22.	0.9996897	1.0135928	1.0409767	1.0658469	0.9919747	1.0098587
23.	0.7664475	0.7091963	0.6126507	0.5686724	1.9509336	1.4773951
24.	1.0955553	0.8444969	0.7086301	0.8444754	1.1197750	NA
25.	1.2978877	1.1857621	1.3393741	1.1158044	1.0862861	1.0734118
26.	0.9414008	0.6924571	0.5085446	0.3044313	0.2654651	0.2805747

Source : Annual Accounts and Reports

ANNEXURE - III (37)

R-37, QUICK ASSETS/CURRENT LIABILITIES

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.0282093	0.0074830	0.0089895	0.0106925	0.0647331	NA
2.	0.0871118	0.0855023	0.0618479	0.0688033	0.0600764	0.3357568
3.	0.3946044	0.2341049	0.2522588	1.1652157	0.5801624	0.2157498
4.	0.0522720	0.0459041	0.0309172	0.0277271	0.0819322	0.0638241
5.	0.0200136	0.0424680	0.0203513	0.0377264	0.1341611	0.1507893
6.	0.0197210	0.0335094	0.0135649	0.0107053	0.0471798	0.0020416
7.	0.1078583	0.0668015	0.1511073	0.1184922	0.4011229	0.3515389
8.	0.1414236	0.1229086	0.1138592	0.1252073	0.6750042	0.7694183
9.	0.1020052	0.0562955	0.0767439	0.0225096	0.0646648	0.0721759
10.	0.0209176	0.1018220	0.0284729	0.0374356	0.0766037	0.1498893
11.	0.0541166	0.0674513	0.0877430	0.1081067	0.2474322	0.3079676
12.	0.0224654	0.0070445	0.0178328	0.0679299	0.0923231	0.0548069
13.	0.0602532	0.0159278	0.0047854	0.0278241	0.0144576	0.0051690
14.	0.0582873	0.0163913	0.0214967	0.0098044	0.1154593	0.0882616
15.	0.0278677	0.0147780	0.0455532	0.0268045	0.0535781	0.0472003
16.	0.0527554	0.1041981	0.0919553	0.0235657	0.0436207	0.1005520

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ANNEXURE - III (37) (Contd..)

17.	0.0150583	0.0291208	0.0143013	0.0276057	0.0285127	0.0495866
18.	0.1398165	0.1343762	0.1381956	0.2022258	0.4509928	0.3518864
19.	0.0057183	0.0071618	0.0039971	0.0419708	0.0028286	0.0561999
20.	0.0817451	0.0523782	0.0255185	0.0069626	0.0388253	0.0468852
21.	0.0271058	0.0167072	0.0259954	0.0397532	0.0856344	0.1542151
22.	0.0301600	0.0324804	0.0585220	0.0499043	0.1414203	0.1458614
23.	0.0217214	0.0483939	0.0326896	0.0453284	0.2637692	0.1718035
24.	0.0836543	0.0592241	0.0248620	0.0497676	0.0329611	NA
25.	0.1700502	0.1510709	0.3076043	0.2509378	0.1376437	0.2786180
26.	0.1084707	0.0118253	0.0020388	0.0326601	0.0091857	0.0198599

Source : Annual Accounts and Reports

ANNEXURE - III (38)

R-38, WORKING CAPITAL/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.8599198	-1.1063656	-0.5129394	-0.4593244	0.2002007	NA
2.	-0.0694675	-0.4068759	-0.4396831	-0.8370355	-0.6973457	0.2284526
3.	0.2868551	0.2681363	0.2040132	0.1951148	0.1395016	0.0804033
4.	-0.0466141	-0.3020618	-0.3685241	-0.2601776	-0.7365350	-0.1192287
5.	-0.5518238	-0.7009045	-0.5860796	-0.7345276	0.1135692	-0.0487144
6.	-3.7213082	-2.9821748	-3.9308242	-31.59422	-2.4056468	-1.7456158
7.	0.3931552	0.3585733	0.3226961	0.3331532	0.0199896	0.0264796
8.	-0.3931097	-0.5548019	-0.5636882	-0.5934229	0.2165959	0.1014266
9.	0.1104679	-0.0797662	-0.0836628	-0.0644593	-0.0625570	-0.1124879
10.	-0.1055344	-0.3577808	-0.6502281	-0.4927829	-0.3135615	-0.2083283
11.	-0.0961456	-0.0884468	-0.1539089	-0.0443812	-0.0233429	-0.0179523
12.	-0.3951782	-0.7054467	-0.9143324	-0.7489780	-0.4462204	-0.2802547
13.	-0.2277585	-0.4822411	-0.5603015	-0.6395201	-0.2025485	-0.4649245
14.	-0.0460690	-0.2904895	-0.3276589	-0.2419906	0.0209883	-0.0754396
15.	-0.2277054	-0.9453793	-0.5939088	-0.7177420	0.2468111	-0.2058170
16.	-0.2397523	-0.3964046	-0.5570565	-0.1276524	0.1368595	0.2763207

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ANNEXURE - III (38) (Contd..)

17.	-0.1079922	-0.2163147	-0.3373070	-0.4263575	0.2185764	-0.2165428
18.	0.3430844	0.0330307	-0.0136646	0.0073193	0.3062680	0.0658521
19.	-1.2913411	-1.1202423	-1.2706642	-1.1486840	-0.4958711	-0.4021562
20.	-0.2399526	-0.6053771	-0.8243993	-0.9388170	-0.505776	-1.3126162
21.	-0.4806711	-0.7439379	-0.9470671	-1.1503423	-0.5776245	-0.6086499
22.	-0.0004352	0.0129677	0.0468044	0.0577621	-0.0030513	0.0098127
23.	-0.3589695	-0.5522538	-0.5613116	-0.5803475	0.2327764	0.2070992
24.	0.0534996	-0.1132293	-0.1644236	-0.1363504	0.0300853	NA
25.	0.3871618	0.3587623	0.2213195	0.1224324	0.0530305	0.0343287
26.	-0.0587902	-0.4088273	-1.0455413	-1.1074369	-1.1314786	-0.9017360

Source : Annual Accounts and Reports.

ANNEXURE - III(39)

R-39, WORKING CAPITAL/DEBT

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.3290037	-0.4281731	-0.338059	-0.4647934	1.1375439	NA
2.	-0.0703605	-0.2939823	-0.3280818	-0.4985374	-0.4685721	0.3431268
3.	1.1095689	1.0246985	0.8309429	0.9805208	2.2813956	1.4954723
4.	-0.0788718	-0.3327163	-0.522609	-0.4058511	-1.539378	-0.4936687
5.	-0.6681069	-0.5803923	-0.5942931	-0.5902395	0.3552963	-0.2116042
6.	-1.2312906	-1.1303776	-1.2546197	-1.4430325	-1.1946718	-1.143669
7.	1.8074488	1.0392116	1.0225669	2.1031446	0.2271156	0.2479655
8.	-0.2512618	-0.3533366	-0.5778594	-0.5560932	0.3996794	0.3871735
9.	0.1291348	-0.0993559	-0.1952472	-0.1411367	-0.4451897	-0.3144528
10.	-0.2211772	-0.4006177	-0.5756287	-0.6376652	-0.5814662	-0.3396515
11.	-0.1696092	-0.1261731	-0.164535	-0.0649523	-0.1076012	-0.0846669
12.	-0.3834343	-0.422603	-0.5093972	-0.559455	-0.4081463	-0.311779
13.	-0.2961476	-0.4194471	-0.6654217	-0.547612	-0.3896422	-0.7109832
14.	-0.113811	-0.4471529	-0.6697522	-0.4352403	0.1549667	-0.3042623
15.	-0.3154355	-0.5581887	-0.5443321	-0.6081373	0.30484	-0.3475506
16.	-0.1573969	-0.2586832	-0.3490719	-0.0758421	0.2110626	0.4223027

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ANNEXURE - III (39) (Contd..)

17.	-0.237156	-0.3205545	-0.4974055	-0.595019	0.7934081	-0.7073898
18.	0.3057235	0.0409465	-0.0242729	0.8514577	1.953497	0.3803728
19.	-0.5322521	-0.550478	-0.6952826	-0.601235	-0.4782724	-0.4698495
20.	-0.3208851	-0.3647904	-0.623889	-0.5579815	-0.5018801	-0.6432211
21.	-0.1937754	-0.3645508	-0.4821193	-0.5207541	-0.4353759	-0.5267997
22.	-0.0007193	0.0175986	0.052295	0.0969928	-0.0157605	0.0240853
23.	-0.3835615	-0.384945	-0.417614	-0.4555456	0.3588729	0.2805928
24.	0.1109474	-0.2161154	-0.3516785	-0.1871719	0.1794688	NA
25.	1.1207781	0.3979953	0.3825897	0.1352601	0.1246513	0.190694
26.	-0.0927488	-0.5318939	-0.8623108	-1.1837715	-1.1959415	-1.2141882

Source : Annual Accounts and Reports

ANNEXURE - III (40)

R-40, WORKING CAPITAL/TANGIBLE ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.129114	-0.1611438	-0.1530445	-0.2342794	0.161336	NA
2.	-0.0413757	-0.2478339	-0.3982085	-0.683521	-0.5607651	0.3616505
3.	0.1843038	0.1683076	0.1614494	0.2673433	0.1853921	0.0833958
4.	-0.027655	-0.142821	-0.2984258	-0.1897943	-0.6713518	-0.1878773
5.	-0.3538051	-0.432496	-0.5103671	-0.4359435	0.1476053	-0.0386062
6.	-1.3673463	-1.6161166	-1.5691932	-1.1947515	-1.0115321	-0.9596256
7.	0.1827133	0.1610364	0.1879165	0.2323121	0.0192633	0.0194071
8.	-0.1257102	-0.2373058	-0.4900217	-0.5457396	0.2745199	0.2223716
9.	0.036792	-0.0398037	-0.0812857	-0.0589628	-0.0923667	-0.0882753
10.	-0.0693523	-0.249703	-0.4678562	-0.5021413	-0.3634755	-0.2149286
11.	-0.063311	-0.0505096	-0.0698642	-0.0274428	-0.0250646	-0.0168567
12.	-0.2406536	-0.3490477	-0.5042293	-0.5957815	-0.3949746	-0.2084021
13.	-0.1124014	-0.2170488	-0.4441039	-0.422452	-0.221958	-0.5530546
14.	-0.0305695	-0.1697413	-0.3220848	-0.2063307	0.0304557	-0.0987464
15.	-0.1698834	-0.4483304	-0.4717334	-0.5729246	0.2620442	-0.2511861
16.	-0.1122015	-0.2386283	-0.3519857	-0.0846446	0.2031828	0.3203927

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ANNEXURE -III (40) (Contd..)

17.	-0.0634264	-0.1163609	-0.2174531	-0.2895048	0.2956996	-0.2977282
18.	0.1025963	0.0144638	-0.0093468	0.0056074	0.3504191	0.0930945
19.	-0.3782473	-0.5332142	-0.8371014	-0.7144109	-0.4252471	-0.3062172
20.	-0.1842071	-0.4115589	-0.6032183	-0.5443514	-0.4689922	-0.7410909
21.	-0.1726113	-0.4055863	-0.6103245	-0.7683322	-0.5363571	-0.6999303
22.	-0.0001698	0.0071265	0.0242627	0.0387199	-0.004496	0.0064449
23.	-0.1669158	-0.2456272	-0.3816066	-0.4500023	0.2812253	0.1923255
24.	0.0534732	-0.1084112	-0.2092541	-0.1133499	-0.0595325	NA
25.	0.1680588	0.1066284	0.1514998	0.0629396	0.0432088	0.0373623
26.	-0.0344573	-0.2769967	-0.602269	-1.184716	-1.3048019	-1.0806043

Source : Annual Accounts and Reports

ANNEXURE - III (41)

R-41, CURRENT LIABILITIES/TANGIBLE ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.5168458	0.6961866	0.6583855	0.6763923	0.3305776	NA
2.	0.7465717	0.9576277	1.2185396	1.3916979	1.2967444	0.3424959
3.	0.5190869	0.5087858	0.4657212	0.187427	0.441873	0.5550017
4.	0.6669555	0.8316006	0.9700011	0.7841945	0.7377407	0.7346112
5.	0.8160222	0.93439	1.0098487	1.0037987	0.4325771	0.6578868
6.	1.8031062	2.1635285	2.1799538	1.9248414	1.7975917	1.7531654
7.	0.5796128	0.5951452	0.5689829	0.462519	0.5924276	0.5905164
8.	0.8101548	0.9361907	1.1447732	1.1990712	0.4967346	0.4653856
9.	0.5983909	0.6535271	0.6165377	0.5862316	0.61181	0.7179513
10.	0.6498707	0.7893179	0.9850802	0.9665115	0.8306007	0.7845326
11.	0.5692246	0.5764831	0.6497474	0.6387684	0.6324952	0.6241238
12.	0.8394934	0.9817612	1.1929595	1.3145914	1.1219694	0.9799197
13.	0.6594373	0.7698993	0.8952074	0.9278858	0.7199412	0.9068444
14.	0.6199388	0.7844659	0.8740341	0.7704666	0.5658001	0.6245477
15.	0.8573539	1.0540465	1.1001509	1.1945467	0.3215263	0.8446699
16.	0.7476753	0.8294782	0.9597957	0.7096182	0.3966235	0.3113965

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ANNEXURE - III (41) (Contd..)

17.	0.6082764	0.6843387	0.7837781	0.8582918	0.6438216	0.6422053
18.	0.7134909	0.7889774	0.7914332	0.7285359	0.4093311	0.5537858
19.	0.9213038	1.1256517	1.4449853	1.378846	1.1469996	1.003236
20.	0.8701313	1.0982477	1.3020947	1.2292112	1.1593982	1.3518147
21.	0.7897515	1.0052376	1.1698001	1.3592825	1.185707	1.2931316
22.	0.5474477	0.5242846	0.5921095	0.5880286	0.5602348	0.6537282
23.	0.7146824	0.8446498	0.9851744	1.0432962	0.2957359	0.4028647
24.	0.5596052	0.6971643	0.7181736	0.7288237	0.4970372	NA
25.	0.5641685	0.574005	0.4464093	0.5434994	0.5007622	0.5089433
26.	0.5880176	0.9006773	1.2254807	1.7032338	1.776365	1.5020382

Source : Annual Accounts and Reports

ANNEXURE - III (42)

R-42, CURRENT LIABILITIES/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	4.1082895	4.7798118	2.2066237	1.3261229	0.4102113	NA
2.	1.2499371	1.5721643	1.3454541	1.7042647	1.6125509	0.2163527
3.	0.8079195	0.8105628	0.5885014	0.1367896	0.3325383	0.5350869
4.	1.1241927	1.7588084	1.197848	1.0750049	0.8093698	0.4661912
5.	1.2727358	1.5142756	1.1596588	1.6913146	0.3328298	0.5226687
6.	4.9072527	3.9922987	5.4607777	50.900848	4.2750701	3.1891117
7.	1.2471783	1.3251858	0.9770752	0.6632873	0.6147646	0.8057151
8.	2.5334438	2.1887382	1.3168706	1.3038385	0.3919232	0.2122683
9.	1.7966654	1.3096609	0.6345672	0.6408799	0.4143594	0.9148747
10.	0.9889168	1.1309545	1.3690679	0.9484987	0.7165390	0.7604402
11.	0.8644385	1.0094721	1.4313746	1.0330318	0.5890488	0.6646858
12.	1.3785354	1.9841995	2.1632253	0.8498954	1.2675387	1.3177748
13.	1.3362146	1.7105694	1.1294341	1.4046603	0.6569847	0.7623374
14.	0.9342614	1.3425084	0.98891604	0.9036252	0.3899157	0.4771377
15.	1.1491651	2.2226325	1.3850817	1.4964908	0.3028355	0.6921062
16.	1.3040546	1.3779126	1.5189831	1.0701738	0.2671568	0.2685620

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ANNEXURE -III (42) (Contd..)

17.	1.0356743	1.2721845	1.2157742	1.2640176	0.4759025	0.4670869
18.	2.3859305	1.8017686	1.1570388	0.950956	0.3577575	0.3917307
19.	3.145342	2.3649079	2.1933911	2.217013	1.3374901	1.3175532
20.	1.1334538	1.6154529	1.7795314	2.1199621	1.2503316	2.394327
21.	2.1992232	1.8438355	1.8152297	2.0351092	1.2769355	1.1244896
22.	1.4028106	0.9540091	1.1422193	0.8772177	0.3802214	0.9953322
23.	1.5369973	1.8990611	1.4491097	1.3454913	0.2447872	0.4338110
24.	0.5598813	0.7281485	0.5643123	0.8767132	0.251182	NA
25.	1.2996905	1.931299	0.6521402	1.0572348	0.6145899	0.4676191
26.	1.0032610	1.3293346	2.1274392	1.5921317	1.5404015	1.2534116

Source : Annual Accounts and Reports

ANNEXURE - III (43)

R-43, TRADE CREDITORS/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.6353686	0.8412281	0.6102130	0.2348985	0.1213778	NA
2.	0.0512693	0.0676168	0.0159844	0.0316211	0.0479161	0.0783648
3.	0.0234824	0.0102889	0.0022177	0.0042293	0.0000213	0.0091573
4.	0.2364774	0.3721238	0.2884844	0.3433870	0.3490296	0.1716012
5.	0.1112370	0.1281000	0.0968120	0.1874690	0.1677097	0.3217883
6.	0.4608450	0.3102468	0.4214163	3.3621878	0.2328267	0.1913470
7.	0.0101895	0.0100675	0.0564299	0.0369137	0.1454771	0.1442837
8.	0.2493131	0.2403299	0.1758397	0.2298933	0.1854249	0.1233578
9.	0.0842309	0.0655813	0.0533092	0.0695714	0.1087902	0.1596442
10.	0.0336499	0.0302955	0.0414166	0.0307778	0.0966683	0.0943652
11.	0.2414606	0.3660191	0.3644420	0.2687555	0.1337826	0.2073584
12.	0.2920437	0.3952438	0.2859632	0.2022951	0.1401793	0.1631998
13.	NA	NA	NA	NA	NA	NA
14.	0.1448117	0.2424318	0.2585181	0.2938004	0.2133232	0.1492531
15.	0.1675320	0.0880116	0.0437512	0.0427247	0.0327090	0.0677143
16.	0.261771	0.1155872	0.1104612	0.1110431	0.0376278	0.0420608

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ANNEXURE - III (43) (Contd..)

17.	0.1891258	0.2510367	0.2473369	0.2786162	0.1873384	0.1762542
18.	0.4949072	0.4362925	0.2871247	0.2939329	0.2554259	0.1919184
19.	0.3859854	0.2944550	0.0497748	0.0612647	0.2616519	0.2791346
20.	0.0884170	0.1015867	0.1125867	0.1142748	0.0953613	0.1896450
21.	0.2259668	0.1377880	0.1407807	0.079421	0.2411421	0.2504131
22.	0.2679849	0.2209924	0.1430185	0.1755694	0.0547483	0.2281759
23.	0.2504697	0.2284727	0.1410512	0.1335903	0.1320725	0.1229570
24.	0.0361373	0.0325179	0.0353384	0.0300921	0.0103657	NA
25.	0.1730107	0.3322664	0.0489757	0.0444969	0.0777291	0.2326396
26.	0.1375359	0.1928629	0.2495552	0.1363819	0.1023067	0.0806821

Source : Annual Accounts and Reports

ANNEXURE - III (44)

R-44, (TRADE DEBTORS-TRADE CREDITORS)/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	-0.5591488	-0.8270087	-0.6066300	-0.2335278	-0.1207810	NA
2.	-0.0511256	-0.0303999	-0.0090430	-0.0188262	-0.0450828	-0.076394
3.	-0.0234824	-0.0102889	-0.0022177	-0.0042293	-0.0000213	0.0195975
4.	-0.1899774	-0.3271272	-0.2551115	-0.3164796	-0.2877738	-0.1562190
5.	-0.1097428	-0.1211465	-0.0947274	-0.1851186	-0.1665853	-0.3217883
6.	-0.3687047	-0.1794420	-0.3514032	-2.8467377	-0.0331902	-0.1909869
7.	-0.0101467	-0.0100267	-0.0564006	-0.0368888	-0.1454646	-0.1440212
8.	-0.2142745	-0.2253382	-0.1730854	-0.2131697	-0.1841312	-0.1218668
9.	-0.0244028	-0.0573082	-0.0461762	-0.0578820	-0.0918626	-0.1585268
10.	-0.0284998	0.0351230	-0.0181071	-0.0130059	-0.0558684	-0.0449553
11.	-0.2410562	-0.3368144	-0.3135882	-0.2316512	-0.0984943	-0.1698146
12.	-0.2850708	-0.3910963	-0.2781464	-0.2002218	-0.1319680	-0.1455673
13.	NA	NA	NA	NA	NA	NA
14.	-0.1010283	-0.2306824	-0.2438397	-0.2894749	-0.1835528	-0.1476178
15.	-0.1527796	-0.0840785	-0.0434221	-0.0410773	-0.0283946	-0.0659450
16.	-0.2377405	-0.1134598	-0.1070438	-0.1092187	-0.0355351	-0.0409040

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ANNEXURE - III (44) (Contd..)

17.	-0.1891258	-0.2510367	-0.2473369	-0.2776241	-0.1866948	-0.1728115
18.	-0.4949072	-0.4358593	-0.2869800	-0.2936401	-0.2552375	-0.1915344
19.	-0.3801545	-0.2911187	-0.0483102	-0.0595165	-0.2604241	-0.2768769
20.	-0.0802745	-0.1007142	-0.1064433	-0.1010087	-0.0734094	-0.1788136
21.	-0.1993201	-0.1247950	-0.1271164	-0.0675625	-0.2177183	-0.2431597
22.	-0.2603842	-0.2167229	-0.139021	-0.1737671	-0.0538491	-0.2268836
23.	-0.2248507	-0.1937049	-0.1137101	-0.1255147	-0.1256719	-0.1160837
24.	-0.0090726	-0.0183289	-0.0280471	-0.0266689	-0.2359021	NA
25.	-0.1730107	-0.3322664	-0.0489757	-0.0444969	-0.0777291	-0.2326396
26.	-0.1296469	-0.1871946	-0.2472136	-0.1351377	-0.1010122	-0.0773714

Source : Annual Accounts and Reports

ANNEXURE - III (45)

R-45, CURRENT ASSETS/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	3.2483696	3.6734461	1.6936842	0.8667985	0.610412	NA
2.	1.1806643	1.1652883	0.7603294	0.8672291	0.9152352	0.4448053
3.	1.0947747	1.0786992	0.7925146	0.3319015	0.4720399	0.6154903
4.	1.0775785	1.4567466	0.8293239	0.8143272	0.7283217	0.3469624
5.	0.7209119	0.813371	0.5735792	0.9567870	0.4463991	0.4739542
6.	1.1859444	1.0101238	1.5299535	19.306627	1.8694233	1.4434958
7.	1.6403305	1.6837591	1.2997714	0.9964405	0.6347542	0.8321947
8.	2.1403341	1.6339363	0.7531824	0.7104155	0.6085191	0.3136949
9.	1.9071333	1.2298947	0.5509044	0.5764206	0.3518023	0.8023867
10.	0.8833824	0.7731737	0.7188397	0.4557157	0.4029775	0.5521119
11.	0.7682928	0.9210252	1.2774656	0.9886505	0.5657058	0.6467335
12.	0.9833572	1.2787528	1.2488929	0.4647172	0.8213183	1.03752
13.	1.1084561	1.2283282	0.5691326	0.7651402	0.4544362	0.2974128
14.	0.8881924	1.0520188	0.5615015	0.6616345	0.4109040	0.4016981
15.	0.9214597	1.2772531	0.7911729	0.7787487	0.5496467	0.4862891
16.	1.1083588	0.9815079	0.9619266	0.9425213	0.4040163	0.5448827

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ANNEXURE - IIII (45) (Contd..)

17.	0.9276820	1.0558698	0.8784671	0.8376600	0.6944789	0.2505440
18.	2.7290149	1.8347993	1.1433741	0.9582753	0.6640256	0.4575828
19.	1.8540009	1.2446655	0.9227269	1.068329	0.8416190	0.9153970
20.	0.8935012	1.0100758	0.955132	1.181145	0.7445556	1.0817108
21.	1.718552	1.0998975	0.8681625	0.8847668	0.6993110	0.5158396
22.	1.4023754	0.9669768	1.1890238	0.9349799	0.3771700	1.0051449
23.	1.1780277	1.3468072	0.8877981	0.7651438	0.4775637	0.6409102
24.	0.6133809	0.6149191	0.3998887	0.7403628	0.2812673	NA
25.	1.6868524	2.2900614	0.8734598	1.1796673	0.6676205	0.5019479
26.	0.9444708	0.9205072	1.0818978	0.4846948	0.4089229	0.3516756

Source : Annual Accounts and Reports

ANNEXURE -III (46)

R-46, SALES (NET OF EXCISE)/TOTAL ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.1648886	0.1576031	0.3218969	0.5380428	0.8350967	NA
2.	0.6317779	0.6496521	0.944517	0.8395634	0.8341347	1.6290109
3.	0.6545564	0.638625	0.8057548	1.3895375	1.3429184	1.0493671
4.	0.6386509	0.5139016	0.85575	0.7680429	0.9538437	1.6291485
5.	0.6687271	0.634006	0.904093	0.6260687	1.3294066	0.8068807
6.	0.388066	0.5775816	0.4298229	0.0528488	0.431567	0.5665395
7.	0.4912856	0.4878111	0.6178263	0.7250674	0.9880829	0.7570053
8.	0.3517424	0.4458832	0.9127533	0.9646918	1.3093064	2.2474635
9.	0.3657973	0.5341421	1.0180061	0.9637428	1.5204534	0.8154421
10.	0.6977467	0.7405133	0.7591936	1.06236	1.2047988	1.0705092
11.	0.675469	0.5867683	0.477621	0.6488322	1.1056828	0.9727328
12.	0.6368856	0.5337114	0.5734659	0.8247039	0.9089316	0.7736839
13.	0.5116193	0.4685533	0.8169625	0.6811873	1.1205785	1.2147855
14.	0.7003749	0.6219223	1.0283068	0.8913595	1.4910168	1.354815
15.	0.7811605	0.5101674	0.8237481	0.833175	1.1002609	1.2578867
16.	0.6032225	0.632869	0.6575503	0.6890513	1.5166193	1.1909826

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ANNEXURE - III (46) (Contd..)

17.	0.605995	0.5575616	0.6700978	0.7009799	1.3760439	1.402935
18.	0.3235517	0.4547571	0.7159959	0.8026802	1.1832217	1.450277
19.	0.3245428	0.5026801	0.6874838	0.6444591	0.8817318	0.7894691
20.	0.8014325	0.7058812	0.7652712	0.5951571	0.9442597	0.6033286
21.	0.3823967	0.5683636	0.6719347	0.6931982	0.9625518	1.1747869
22.	0.4040518	0.5627431	0.530155	0.6877801	1.4950823	0.6748707
23.	0.4974504	0.466495	0.713646	0.8088331	1.2418651	0.9641032
24.	1.061001	1.0228302	1.3440623	0.8833959	2.0405558	NA
25.	0.4442547	0.3073538	0.6947336	0.5257356	0.8281468	1.1110192
26.	0.6151673	0.7092498	0.6048729	1.1063131	1.1846945	1.2313955

ANNEXURE - III (47)

R-47, RETAINED EARNINGS/TOTAL ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.1794437	0.0280803	0.0344155	0.0417779	0.2329739	NA
2.	0.0729383	0.0738021	0.0837766	0.0157018	0.0127274	0.149531
3.	0.2012788	0.2106417	0.1999322	0.3353722	0.3401628	0.2860309
4.	0.187657	0.0213997	0.0180934	0.0151479	0.0352117	0.1578069
5.	0.0115251	0.0107305	0.0112012	NA	0.0015589	0.0263717
6.	0.1123379	0.0995708	0.0860316	0.0714969	0.0576991	0.0550738
7.	0.3461224	0.3362313	0.3199913	0.3608461	0.3431183	0.3585036
8.	0.0420526	0.0907966	0.1120629	NA	NA	0.074299
9.	0.226901	0.1773551	0.174212	0.2025488	0.2086241	0.1637357
10.	0.1742826	0.0500806	0.0577971	0.0576942	0.0600742	0.0743985
11.	0.1622279	0.1327073	0.128479	0.1366888	0.1830678	0.1618255
12.	0.0226532	0.0237537	0.0224603	0.0217412	0.0235806	0.0219119
13.	0.0653647	0.0178868	0.0362043	0.0404671	0.0413392	0.0482453
14.	0.2303879	0.0802324	0.0483517	0.0476641	0.2065251	0.2487434
15.	0.1129593	0.1195374	0.10623	0.1094131	0.0196114	0.017945
16.	0.0223182	0.0199446	0.0172757	0.0154245	0.0167603	0.0146656

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ANNEXURE - III (47) (Contd..)

17.	0.1083597	0.0350917	0.0153613	0.0145755	0.0247487	0.0518652
18.	0.1228065	0.0355359	0.0037663	0.0074751	0.2433924	0.2490102
19.	0.0142162	0.0164387	0.0167694	0.018151	0.2001649	0.2396859
20.	0.0260257	0.0251082	0.0247524	0.0244803	0.0297324	0.0408759
21.	0.0193379	0.0168291	0.0180881	0.0162696	0.015129	0.016941
22.	0.1745012	0.1565741	0.144569	0.1450083	0.1960761	0.1074521
23.	0.0068698	0.0092993	0.0098234	0.013968	0.0148041	0.01919
24.	0.1592653	0.0882479	0.0207628	0.0213361	0.292157	NA
25.	0.2689044	0.2470943	0.3239339	0.2715423	0.2864654	0.2975824
26.	0.0387387	0.0221739	0.0064032	0.0083656	0.0093819	0.0084236

Source : Annual Accounts and Reports

ANNEXURE - III (48)

R-48, NET FIXED ASSETS/GROSS FIXED ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.6709180	0.6466145	0.2772086	0.5982644	0.5906651	NA
2.	0.5656357	0.5182258	0.4807000	0.4661943	0.4806546	0.4529897
3.	0.7285401	0.7004993	0.6589753	0.6297407	0.6067584	0.6217281
4.	0.5029420	0.4807301	0.4425569	0.4236326	0.4119760	0.4905759
5.	0.7849980	0.7541663	0.7221832	0.7168635	0.6448976	0.6467128
6.	0.6501672	0.6081462	0.6113848	0.6012563	0.5919634	0.5868555
7.	0.5233417	0.5212471	0.5140529	0.5308160	0.5899424	0.5742589
8.	0.5619038	0.5179003	0.4755348	0.4446876	0.3321615	0.3312186
9.	0.5940452	0.5823723	0.5452895	0.5146222	0.5259744	0.5490824
10.	0.5884605	0.5702455	0.5424761	0.5499816	0.5450125	0.5433359
11.	0.6590328	0.6651965	0.6856838	0.6396639	0.6297042	0.6358549
12.	0.5314322	0.5137553	0.4853223	0.4599791	0.4908176	0.4823869
13.	0.6986033	0.6943752	0.6946200	0.6763920	0.6612257	0.6645783
14.	0.5339193	0.5138576	0.5055408	0.4881824	0.4742175	0.5338987
15.	0.5281496	0.5579185	0.5383263	0.5110180	0.5353491	0.5192025
16.	0.9432737	0.9041139	0.8601891	0.8215834	0.7925671	0.7680324

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ANNEXURE - III (48) (Contd..)

17.	0.6603604	0.7834929	0.6098847	0.6053185	0.5910815	0.6377823
18.	0.4551110	0.4421430	0.4182395	0.3900762	0.3613508	0.4833139
19.	0.5687472	0.5745867	0.5486555	0.5555122	0.5196816	0.5894605
20.	0.3343537	0.3385660	0.3373824	0.4647507	0.4693217	0.4680065
21.	0.7031216	0.7021304	0.7026251	0.6872369	0.6706390	0.6610130
22.	0.5829660	0.6016249	0.5504391	0.5311108	0.5212382	0.5361092
23.	0.7255692	0.6970160	0.6503958	0.6312107	0.6056541	0.6168605
24.	0.4579977	0.4562833	0.4507693	0.4394565	0.4141636	NA
25.	0.6344988	0.6675531	0.6396472	0.6252896	0.6557484	0.6326568
26.	0.6110268	0.5145181	0.4985573	0.4846461	0.4677357	0.5310573

Source : Annual Accounts and Reports

ANNEXURE - III (49)

R-49, QUICK ASSETS/ CURRENT ASSETS

CO. CODE	1979	1980	1981	1982	1983	1984
1.	0.0356770	0.0097368	0.0117120	0.0163587	0.0435021	NA
2.	0.0922229	0.1153566	0.1094441	0.1352113	0.1058506	0.1633117
3.	0.2912093	0.1759125	0.1873210	0.4802269	0.4087074	0.1875657
4.	0.0545332	0.0554225	0.0446558	0.0365804	0.0910497	0.0857564
5.	0.0353331	0.0790638	0.0411461	0.0666891	0.1000289	0.1662879
6.	0.0816028	0.1324389	0.0484164	0.0282240	0.1078926	0.0045106
7.	0.0820070	0.0525754	0.1135917	0.0788751	0.4131358	0.3403533
8.	0.1673985	0.1646422	0.1990725	0.2297953	0.4347436	0.5206432
9.	0.0960967	0.0599467	0.0883986	0.0250268	0.0761634	0.0822944
10.	0.0234166	0.1489394	0.0542281	0.0779163	0.1362099	0.2064471
11.	0.0608888	0.0739287	0.0983143	0.1129597	0.2576421	0.3165163
12.	0.0314936	0.0109307	0.0308885	0.1242333	0.1424820	0.0696114
13.	0.0726337	0.0221810	0.0094965	0.0510800	0.0209016	0.0132495
14.	0.0613106	0.0209174	0.0340409	0.0133904	0.1095618	0.1048374
15.	0.0347542	0.0257163	0.0797486	0.0515091	0.0295196	0.0671774
16.	0.0620701	0.1462809	0.1452072	0.0267573	0.0288443	0.0495601

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ANNEXURE - III (49) (Contd..)

17.	0.0168112	0.0350867	0.0197926	0.0416567	0.0195388	0.0924439
18.	0.1222392	0.1319571	0.1398472	0.2006812	0.2429817	0.3012454
19.	0.0097012	0.0136077	0.0095015	0.0870984	0.0044952	0.0808899
20.	0.1036980	0.0837705	0.0475442	0.0124969	0.0651994	0.1037788
21.	0.0346871	0.0280075	0.0543534	0.0914389	0.1563677	0.3361767
22.	0.0301694	0.0320449	0.0562184	0.0468212	0.1425644	0.1444374
23.	0.0283404	0.0682377	0.0533577	0.0797091	0.1352015	0.1162881
24.	0.0763579	0.0701295	0.0350847	0.0589331	0.0294355	NA
25.	0.1310207	0.1274040	0.2296627	0.2248941	0.1267103	0.2595630
26.	0.1152227	0.0170773	0.0040092	0.1072823	0.0346025	0.0707829

Source : Annual Accounts and Reports

ANNEXURE - III (50)
R-50, STOCK/SALES (NET OF EXCISE)

CO. CODE	1979	1980	1981	1982	1983	1984
1.	2.2205912	2.3709449	1.0484206	0.5438075	0.3735939	NA
2.	0.6653957	0.6846850	0.4557003	0.5068599	0.6482828	0.310416
3.	0.0448329	0.0406204	0.0863148	0.0607809	0.0156610	0.1894738
4.	0.538529	0.7742555	0.3798704	0.4093207	0.4377771	0.0864148
5.	0.3987509	0.5909843	0.4878603	0.8019765	0.3099608	0.1958283
6.	0.5205883	0.4770365	0.9246612	14.311098	1.2800473	1.1542213
7.	0.6451986	0.7055499	0.4741355	0.3653527	0.0331389	0.0619927
8.	1.0776673	0.9215928	0.4187125	0.406183	0.2392952	0.0350137
9.	0.7300789	0.5855043	0.1967043	0.2994397	0.1103111	0.3385696
10.	0.2004866	0.1287964	0.0959461	0.0292759	0.1458303	0.1841618
11.	0.5560671	0.6486515	1.0066037	0.7849171	0.3051067	0.3282660
12.	0.66219	0.9442020	0.9491657	0.5237778	0.5563069	0.744313
13.	0.7417362	0.8872503	0.3663786	0.5129427	0.3233573	0.1518647
14.	0.3963916	0.5190813	0.1943747	0.3650293	0.2049441	0.1098888
15.	0.5433619	0.7572973	0.4389651	0.4144687	0.3972462	0.2497984
16.	0.7392271	0.5869699	0.6293810	0.7603303	0.3077502	0.4009391

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ANNEXURE - III (50) (Contd..)

17.	Q4209134	0.5512237	0.4269796	0.3952015	0.2392094	0.0800751
18.	1.004612	0.6890933	0.3386568	0.3923065	0.2564814	0.0951263
19.	0.1577178	1.0175516	0.7599025	0.8473263	0.7245865	0.7131487
20.	0.531607	0.6316478	0.6392139	0.8879068	0.5602641	0.6902332
21.	1.2525524	0.7752553	0.6523875	0.6151545	0.4896913	0.2414334
22.	0.7125182	0.5869501	0.7856120	0.6578235	0.199606	0.5566013
23.	0.8839676	1.0268567	0.7102072	0.5801393	0.3552885	0.5017981
24.	0.4098806	0.4128297	0.2688144	0.5679967	0.2189268	NA
25.	0.3905907	0.8508261	0.3419311	0.5180575	0.3057176	0.0609506
26.	0.3965552	0.454154	0.6061839	0.1763657	0.1364355	0.0833597

Source : Annual Accounts and Reports

ANNEXURE- III (51)

R-51, TRADE DEBTORS/SALES (NET OF EXCISE)

CODE	1979	1980	1981	1982	1983	1984
1.	0.0762198	0.0142193	0.0035829	0.0013706	0.0005968	NA
2.	NA	0.0372168	0.0069414	0.0127948	0.0028333	0.0019708
3.	NA	NA	NA	NA	NA	0.0287548
4.	0.0465000	0.0449966	0.0333729	0.0269073	0.0612557	0.0153822
5.	0.0014952	0.0069535	0.0020845	0.0023503	0.0011244	NA
6.	0.0921402	0.1308048	0.0700130	0.5154500	0.1996365	0.0003601
7.	0.0000427	0.0000408	0.0000292	0.0000248	0.0000124	0.0002624
8.	0.0350385	0.0149916	0.0027543	0.0167235	0.0012936	0.0014910
9.	0.0598280	0.0082730	0.0071329	0.0116893	0.0169275	0.0011173
10.	0.0051501	0.0654186	0.0233095	0.0177718	0.0407998	0.0494099
11.	0.0004043	0.0292047	0.0508537	0.0371043	0.0352882	0.0375437
12.	0.0069729	0.0041475	0.0078167	0.0020733	0.0082112	0.0176324
13.	NA	NA	NA	NA	NA	NA
14.	0.0437833	0.0117493	0.0146783	0.0043255	0.0297703	0.0016352
15.	0.0147523	0.0039331	0.0003291	0.0016474	0.0043144	0.0017692
16.	0.0240305	0.0021273	0.0034173	0.0018243	0.0020927	0.0011567

Contd..

ANNEXURE -III (51) (Contd..)

17.	NA	NA	NA	0.0009921	0.0006436	0.0034426
18.	NA	0.0004332	0.0001446	0.0002928	0.0001884	0.0003839
19.	0.0058308	0.0033363	0.0014645	0.0017481	0.0012277	0.0022576
20.	0.0081424	0.0008725	0.0061433	0.0132661	0.0219519	0.0108314
21.	0.0266467	0.0129930	0.0136643	0.0118584	0.0234237	0.0072533
22.	0.0076006	0.0042694	0.0039975	0.0018022	0.0008992	0.0012922
23.	0.0256190	0.0347677	0.0273410	0.0080755	0.0064006	0.0068733
24.	0.0270646	0.0141889	0.0072913	0.0034231	0.0005975	NA
25.	NA	NA	NA	NA	NA	NA
26.	0.0078890	0.0056683	0.0023415	0.0012441	0.0012944	0.0033106

Source : Annual Accounts and Reports

ANNEXURE - III (52)

R-52, STOCK/COST OF GOODS SOLD

CODE	1979	1980	1981	1982	1983	1984
1.	1.4918285	1.6500880	0.7915678	0.5020129	0.5577815	NA
2.	0.5431979	0.4833055	0.4118837	0.4789976	0.8582139	0.3469740
3.	0.0530360	0.0399467	0.1420542	0.1007722	0.0207010	0.2175870
4.	0.4689283	0.5761057	0.3132551	0.3911669	0.3633990	0.0754567
5.	0.3379670	0.4839413	0.4332470	0.7650838	0.3636323	0.2025862
6.	0.2303877	0.2417468	0.6101539	2.967006	1.2277467	1.0961845
7.	0.6438662	0.6598177	0.4678968	0.3848763	0.0389415	0.0785446
8.	0.8046815	0.6748743	0.3156892	0.3428846	0.2766080	0.0367365
9.	0.4838107	0.5049687	0.1829240	0.2917164	0.1225011	0.4070437
10.	0.1932228	0.5909855	0.3615508	0.0289122	0.1610482	0.1985430
11.	0.5627212	0.6434282	0.9386056	0.7632824	0.3513943	0.3846484
12.	0.5110727	0.6303612	0.6789067	0.5999835	0.7749963	0.8351130
13.	0.7142049	0.7197299	0.2958647	0.4812240	0.3845498	0.1262872
14.	0.3522595	0.4075352	0.1697642	0.3518563	0.2432695	0.0968273
15.	0.7038248	0.4223993	0.3755465	0.3581326	0.4725040	0.2856544
16.	0.6466736	0.4239223	0.5029978	0.6313491	0.3565333	0.4550753

Contd..

ANNEXURE - III (52) (Contd..)

17.	0.3802659	0.4717699	0.3565218	0.3591406	0.2807920	0.0686326
18.	0.8206416	0.5399907	0.3030486	0.3666567	0.3117915	0.0980243
19.	0.1594901	1.0590310	0.5218319	0.8284432	0.8868495	0.7825367
20.	0.4555486	0.4721586	0.4972329	0.5775709	0.7188910	0.2932618
21.	0.9663950	0.5435853	0.4913094	0.4427750	0.4939511	0.2417290
22.	0.8487517	0.6733995	0.7680898	0.6466901	0.2176943	0.6270336
23.	0.7041590	0.7613526	0.5548142	0.5618484	0.4060456	0.5485522
24.	0.3502404	0.3523192	0.235716	0.5363362	0.2465456	NA
25.	0.6000499	0.8226971	0.3903091	0.5679567	0.4216891	0.0653358
26.	0.3718767	0.3349284	0.3723081	0.1244466	0.1463810	0.0881742

Source : Annual Accounts and Reports

ANNEXURE - IV(1)

R-12, OCF/Total Debts (Secondary Sample)

	1974	1975	1976	1977	1978	1979	1980	1981
1.	0.1783349	0.0392019	0.1654334	0.1099592	-.0794642	0.08289	-.101823	0.0064686
2.	0.1277533	0.2427843	0.1417004	0.1723834	0.1024011	0.0595105	0.0342227	0.0527065
3.	0.339	0.0835443	0.2201257	0.2164714	0.0726055	-.0441869	-.0521114	-.0839951
4.	0.1810832	0.027171	0.1537414	0.1234454	-.0924635	-.0763834	-.0840821	-.0498442
5.	0.2174709	0.0270425	0.0299313	0.0554586	-.4045363	NA	NA	NA
6.	0.1983711	-.0810971	0.1427745	0.1032028	-.1162611	-.200311	-.2960869	-.1904761
7.	-.0400432	-.0745614	0.0665983	0.4523206	0.0527704	-.1835024	-.2272863	-.0859939
8.	-.0146557	0.0969985	0.1443298	0.1738675	0.0264296	0.0312261	-.0882131	-.1469988
9.	0.0451025	-.0677517	-.0.0054632	0.1168447	-.1246635	-.1044301	NA	NA
10.	0.1485451	0.030303	0.0772797	0.0955631	-.238137	-.2597928	-.3692927	-.2463672
11.	0.0384615	0.0499782	0.3103597	0.3906976	-.013867	-.0255385	-.1482289	-.0798135
12.	0.2063975	0.1616575	0.4160482	0.3548913	-.276499	0.0078698	-.0852659	-.0842407
13.	0.1320166	-.0226876	0.1369268	0.1973045	0.0122065	0.0640483	-.0614272	0.0185341
14.	0.286848	0.223977	0.1875862	0.3033346	0.1994949	0.0609159	-.1511533	0.1052403
15.	0.3544093	0.156569	0.3365384	0.1635207	0.0821319	0.0843424	0.0071013	0.1384711
16.	0.4025974	0.1627118	0.28492	0.1767751	0.126264	0.0836274	0.0566828	0.0582397
17.	0.074415	0.0222634	0.1488183	0.0739021	-.0756547	-.0485406	-.1419019	-.105636
18.	0.0035618	0.1633019	0.1116965	0.1631673	0.0567177	0.037037	-.055518	0.0088995
19.	0.1336238	0.035044	-.0076103	0.0385412	-.0364969	0.0336441	-.1024533	-.2684371

Source: Annual Accounts and Reports.

ANNEXURE - IV(2)

R-18, (Retained Profit + Depreciation charge)/Total Debts
(Secondary Sample)

	1974	1975	1976	1977	1978	1979	1980	1981
1.	0.1783349	0.0392019	0.1654334	0.1099592	-0.0794642	0.08289	-0.101823	0.0064686
2.	0.0881057	0.1680814	0.0944669	0.1336851	0.0776836	0.0400444	0.0266821	0.039886
3.	0.339	0.0835443	0.2201257	0.1786928	0.0726055	-0.0441869	-0.0521114	-0.0839951
4.	0.1810832	0.027171	0.1537414	0.1017964	-0.0924635	-0.0763834	-0.0840821	-0.0498442
5.	0.2174709	0.0270425	0.0299313	0.0554586	-0.4045363	NA	NA	NA
6.	0.1669575	-0.0810971	0.1254335	0.083185	-0.1162611	-0.200311	-0.2960869	-0.1904761
7.	-0.0400432	-0.0745614	0.0665983	0.4101265	0.0527704	-0.1835024	-0.2272863	-0.0859939
8.	-0.0146557	0.0969985	0.1443298	0.150871	0.0264296	0.0312261	-0.0882131	-0.1469988
9.	0.0451025	-0.0677517	-0.0054632	0.1168447	-0.1246635	-0.1044301	NA	NA
10.	0.1485451	0.030303	0.0772797	0.0955631	-0.238137	-0.2597928	-0.3692927	-0.2463672
11.	0.0384615	0.0499782	0.3103597	0.3906976	-0.013867	-0.0255385	-0.1482289	-0.0798135
12.	0.1549885	0.1001821	0.3218923	0.2375	-0.276499	0.00786981	-0.0852659	-0.0842407
13.	0.1320166	-0.0226876	0.1369268	0.181132	0.0122065	0.0495468	-0.0614272	0.0185341
14.	0.2380952	0.1880832	0.137931	0.2457763	0.1691919	0.0609159	-0.1511533	0.1052403
15.	0.1622296	0.0742001	0.1643253	0.0449322	0.0388816	0.0633099	0.0071013	0.1092314
16.	0.3506493	0.0768361	0.2585128	0.1545857	0.117596	0.0754819	0.0500661	0.0559925
17.	0.074415	0.0222634	0.1488183	0.0739021	-0.0756547	-0.0485406	-0.1419019	-0.105636
18.	0.0035618	0.1435621	0.1001053	0.1543691	0.0534767	0.037037	-0.055518	0.0088995
19.	0.1336238	0.035044	-0.0076103	0.0350042	-0.0364969	0.0336441	-0.1024533	-0.2684371

Source : Annual Accounts and Reports.

ANNEXURE - IV(3)

R-19, (Retained Profit + Dep. charge)/(Tangible Assets + Accumulated Dep.)
(Secondary Sample)

	1974	1975	1976	1977	1978	1979	1980	1981
1.	0.0817078	0.020479	0.0657563	0.0516611	-.0435918	0.0509675	-.0783799	0.0049813
2.	0.0512163	0.0753424	0.0435052	0.068716	0.0417298	0.0223325	0.0142635	0.0196629
3.	0.0904241	0.0447913	0.1064476	0.0980717	0.0445849	-.0308303	-.0381528	-.0477167
4.	0.0971379	0.0170283	0.0798022	0.0583113	-.0652368	-.0604068	-.0742209	-.0461982
5.	0.1577315	0.018555	0.0210999	0.0394834	-.4103086	NA	NA	NA
6.	0.0764517	-.0382452	0.0567171	0.0412621	-.0677891	-.1373134	-.2977049	-.2364994
7.	-.0138732	-.0262042	0.0238619	0.1418563	0.0237473	-.0977673	-.1645322	-.0710435
8.	-.0077955	0.0470943	0.0703839	0.0648494	0.0136374	0.0175419	-.0575977	-.1075005
9.	0.0533117	-.0852098	-.0291938	0.127039	-.1527205	-.1289802	NA	NA
10.	0.1227848	0.0241286	0.0588928	0.0666666	-.2421805	-.3548585	-.7141268	-.7308948
11.	0.0462916	0.057328	0.262271	0.287234	-.0115002	-.0228129	-.1573414	-.0917461
12.	0.0695013	0.0385559	0.1117192	0.0700208	-.1826372	0.00532	-.0691361	-.0672274
13.	0.0615906	-.0118613	0.0767894	0.1039925	0.0072262	0.0260731	-.0386034	0.0119079
14.	0.050909	0.0535021	0.0382775	0.0888598	0.0560982	0.0190914	-.069141	0.0352838
15.	0.0553269	0.0278986	0.0602323	0.0210314	0.017203	0.0273595	0.0030197	0.044858
16.	0.1003303	0.0251945	0.1043478	0.0797862	0.0636932	0.04036	0.0284818	0.0329041
17.	0.0522911	0.0156209	0.946676	0.045898	-.0565012	-.0414998	-.142964	-.1189427
18.	0.0012961	0.0498597	0.0455198	0.0748569	0.0295169	0.0218983	-.034915	0.0050884
19.	0.112653	0.0300492	-.0067767	0.0306525	-.0346566	0.0312273	-.1077238	-.3925736

Source : Annual Accounts and Reports

ANNEXURE - IV(4)

R-24, Net Worth/Total Debts (Secondary Sample)

	1974	1975	1976	1977	1978	1979	1980	1981
1.	0.2653736	0.2068603	0.4164904	0.3435764	0.1738095	0.0953014	-.0752927	-.1084975
2.	0.6013215	0.5246179	0.9649122	0.769569	0.5920903	0.6318131	0.6653132	0.7357549
3.	1.783	1.1683544	1.3345911	0.9338874	0.6647785	0.4259622	0.3245283	0.2608122
4.	0.6143896	0.419286	0.692517	0.5578074	0.2751741	0.1273057	-.0029952	-.0728971
5.	0.0653634	0.1363636	0.1187438	0.161144	-.2945736	NA	NA	NA
6.	0.4956369	0.4001192	0.4791907	0.4185943	0.2209347	-.0031104	-.342826	-.4725803
7.	0.9101731	0.8234649	0.8094262	1.0624472	0.4242744	0.4177326	0.2827586	-.0440456
8.	0.0794137	0.6467789	0.6782255	0.879094	0.6064392	0.4902894	0.2808971	0.1027097
9.	-.3751708	-.4148524	-.4709765	-.396681	-.4305181	-.3088847	NA	NA
10.	0.171516	0.2003367	0.2503863	0.3532423	0.0650263	0.3016659	0.5323721	0.685601
11.	0.8672456	0.1025641	0.1382748	0.3121447	0.1433974	0.0495225	-.1269095	-.2063792
12.	0.7787509	0.9699453	1.0204081	1.3065217	0.0636544	0.0666316	-.0409764	-.039986
13.	0.1787941	0.1780104	0.1604708	0.1735849	0.1661971	0.2380664	0.0862691	0.0871946
14.	1.4523809	1.0157932	1.0482758	0.7617517	0.8472222	0.8465984	0.3033921	0.5006496
15.	1.233361	1.0595643	1.1084612	0.709684	0.7542595	0.7714042	0.7426296	0.7869674
16.	1.5194805	1.258757	0.9374565	0.5950443	0.5183472	0.5074667	0.421041	0.3661048
17.	0.2892213	0.2849721	0.4146971	0.4344876	0.2012609	0.0605587	-.1156513	-.2138098
18.	0.9171861	0.9856437	0.6201264	0.5450909	0.3811137	0.2959355	0.2216216	0.2869049
19.	0.3902202	0.3289927	0.2478206	0.2360043	0.1128624	0.0913477	-.0549205	-.3388659

Source : Annual Accounts and Reports.

ANNEXURE - IV (5)
R-4, EBDIT/INTEREST (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	2.569395	1.9098712	2.403162	2.4384057	-0.0470588	2.7558685	-0.9189944	1.1057692
2	64.0	249.0	132.0	191.66666	84.0	17.0625	1.6095238	2.0190476
3	4.3482142	1.8159509	5.4202898	11.949579	2.5463917	0.3534482	0.3348623	0.2278761
4	3.074074	1.4444444	4.2214285	7.2950819	2.8571428	0.1900826	0.0100755	0.6052631
5	72.2	NA	21.333333	1.3767772	-5.099567	NA	NA	NA
6	4.7653061	-0.0542635	3.2436974	4.5128205	-1.0201342	-1.8495575	-2.5103092	1.1431334
7	0.63	0.081081	2.031746	11.718309	3.7040816	-1.6163522	-1.9609375	0.1172248
8	0.8407407	1.7422969	2.5661016	8.4285714	1.8957055	1.4712643	-0.2415254	-0.1173864
9	1.792	0.1282722	1.4524421	1.8970331	-0.1724683	-0.2916246	NA	NA
10	3.0208333	1.4390243	2.6129032	2.2173913	-2.5657894	-2.4142011	-2.7876106	-1.251509
11	1.4043478	1.5399061	3.8300395	3.4930232	0.8411552	0.7599164	-0.4765886	0.1477449
12	6.6763005	6.2531645	9.97	11.0	-2.0839936	1.0878477	-0.0283911	-0.0168243
13	3.1166666	0.6623376	4.4257425	6.1063829	1.2222222	2.2727272	0.2402234	1.1795918
14	8.8030303	8.2025316	7.01	31.46875	8.5652173	2.2971428	-1.4977578	1.7084548
15	79.916666	39.425531	42.068965	NA	7.4741379	3.1806451	1.107505	2.7188081
16	10.447368	6.372549	16.925	20.851063	5.6513761	3.1847133	1.9698113	1.7036199
17	1.8255319	1.3773584	2.24	2.3781818	0.037037	0.4485815	-0.3992673	-0.0309597
18	2.8527131	3.8869565	6.23125	9.3103448	1.934466	1.5159128	0.1996753	1.0776818
19	2.8039215	1.9547169	0.7962962	2.1657608	0.1906542	1.589041	-0.28872	-1.3774334

Source : Annual Accounts and Reports

ANNEXURE - IV (6)

R-23, NET PROFIT (Before TAX)/TOTAL CAPITAL EMPLOYED (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.657754	0.0508474	0.3515228	0.3415948	-0.589041	0.3604651	1.8464566	0.3116531
2	0.1831501	0.6407766	0.3258741	0.6114285	0.382653	0.1822183	NA	0.0484027
3	0.1800336	0.0346695	0.2525918	0.4461974	0.0499612	-0.1904103	-0.2685492	-0.526936
4	0.2789473	0.0660736	0.4194499	0.5854665	-0.4119677	-0.7734693	36.0	0.9601139
5	2.8971962	0.0084388	0.0330578	0.1515151	0.0145029	NA	NA	NA
6	0.3814553	-0.2801788	0.2521109	0.5026567	-0.6468531	71.7	0.9080532	0.425973
7	-0.0820451	-0.1304926	0.049367	0.5853852	0.2910447	-0.4688489	-0.8324496	2.079365
8	-0.553648	0.1086587	0.1759557	0.4732461	0.020206	0.00233	-0.3901393	-1.6468085
9	-0.0916818	0.1844041	0.0449492	-0.2475644	0.3184837	0.3423137	NA	NA
10	0.7946428	0.0924369	0.265432	0.2415458	-3.8108108	-0.8746268	-0.6627491	-0.367052
11	0.0290891	0.3601694	2.0564263	0.7433774	-0.3362637	-0.9506726	1.3214285	0.4678899
12	0.4229828	0.3295774	0.3295454	0.3818635	-5.3303571	0.1181102	2.080851	2.1067538
13	0.5290697	-0.3039215	1.1814671	1.295031	-0.0960451	0.2563451	-1.0418848	-0.0772946
14	0.3247462	0.3116607	0.2861842	0.9045358	0.2901142	-0.0099789	-0.7021466	0.0328719
15	0.6138279	0.5534853	0.6625405	0.8649898	0.1560961	0.1068576	-0.0707041	0.173036
16	0.2915479	0.1983842	0.4343958	0.4810441	0.1599777	0.0749063	0.0272393	0.0296675
17	0.1989389	0.0716145	0.3161175	0.2481511	-0.466265	-1.1391752	1.3511777	0.5672601
18	0.045631	0.2407828	0.2655055	0.2997065	-0.0069578	-0.0377895	-0.2505081	0.0310192
19	0.2779156	0.1024447	-0.0709101	0.1483204	-0.4451082	0.0442541	2.1852791	0.8435266

Source : Annual Accounts and Reports

ANNEXURE - IV (7)

R-27, TOTAL DEBTS/TANGIBLE ASSETS (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.7902803	0.8285962	0.7059701	0.7442821	0.8519269	0.9129906	1.0814233	1.1218868
2	0.6296809	0.4831829	0.5124481	0.5651093	0.5909849	0.6128152	0.6004876	0.5761181
3	0.3593244	0.4611792	0.4283405	0.5170931	0.6006804	0.7011842	0.7550881	0.7777985
4	0.6194291	0.655377	0.5932203	0.6419278	0.7842066	0.8872752	0.6030042	1.078629
5	0.9386467	0.8795546	0.8938596	0.8612195	1.3621431	NA	NA	NA
6	0.6686114	0.7142248	0.6757812	0.7049231	0.8190446	1.0031201	1.5221707	1.8960234
7	0.5235127	0.5484064	0.5526613	0.4846625	0.5925578	0.7051321	0.9423565	1.046075
8	0.6636507	0.607246	0.5958674	0.5321713	0.6224016	0.6710963	0.7807027	0.9068569
9	1.6004374	1.7089707	1.8894623	1.6505842	1.7565011	1.4467658	NA	NA
10	0.8535947	0.8330995	0.7987654	0.7389659	1.070555	1.421895	2.1384525	3.1806722
11	1.1525262	1.1148255	0.8459845	0.7609123	0.8748276	0.9487989	1.1453566	1.2605103
12	0.5621922	0.5076282	0.4949494	0.433349	0.9401549	0.9375307	0.7001	0.6800011
13	0.8490732	0.9339853	0.8612593	0.8516988	0.8574879	0.807317	0.9201995	0.9194422
14	0.4077669	0.4960826	0.4882154	0.5676168	0.5413533	0.5415362	0.8767546	0.666378
15	0.4477556	0.4855395	0.7985909	0.9118799	0.8671456	0.5645238	0.5738453	0.5596727
16	0.3969072	0.4427213	0.5159555	0.6269418	0.6586108	0.6633645	0.8038186	0.8321085
17	0.775662	0.7782269	0.706865	0.6969395	0.8324586	0.9428991	1.1215109	1.2717859
18	0.5217189	0.503615	0.6172357	0.647211	0.7240533	0.7716433	0.8185086	0.7770581
19	0.7193104	0.7524495	0.8013972	0.8092183	0.8985836	0.9162982	0.69002	1.5125525

Source : Annual Accounts and Reports

ANNEXURE - IV (8)

R-28, ALL OUTSIDE LIABILITIES/TANGIBLE ASSETS (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.7902803	0.8285962	0.7059701	0.7442821	0.8519269	0.9129906	1.0814233	1.1218868
2	0.6296809	0.4831829	0.5124481	0.5651093	0.5909849	0.6128152	0.6004876	0.5761181
3	0.3593244	0.4611792	0.4283405	0.5170931	0.6006804	0.7011842	0.7550881	0.7777985
4	0.6194291	0.655377	0.5932203	0.6419278	0.7842066	0.8872752	0.6030042	1.078629
5	0.9386467	0.8795546	0.8938596	0.8612195	1.3621431	NA	NA	NA
6	0.6686114	0.7142248	0.6757812	0.7049231	0.8190446	1.0031201	1.5221707	1.8960234
7	0.5235127	0.5484064	0.5526613	0.4846625	0.5925578	0.7051321	0.9423565	1.046075
8	0.6636507	0.607246	0.5958674	0.5321713	0.6224016	0.6710963	0.7807027	0.9068569
9	1.6004374	1.7089707	1.8894623	1.6505842	1.7565011	1.4467658	NA	NA
10	0.8535947	0.8330995	0.7987654	0.7389659	1.070555	1.421895	2.1384525	3.1806722
11	1.1525262	1.1148255	0.8459845	0.7609123	0.8748276	0.9487989	1.1453566	1.2605103
12	0.5621922	0.5076282	0.4949494	0.433349	0.9401549	0.9375307	0.7001	0.6800011
13	0.8490732	0.9339853	0.8612593	0.8516988	0.8574879	0.807317	0.9201995	0.9194422
14	0.4077669	0.4960826	0.4882154	0.5676168	0.5413523	0.5415362	0.8767546	0.666378
15	0.4477556	0.4855395	0.7985909	0.9118799	0.8671456	0.5645238	0.5738453	0.5596727
16	0.3969072	0.4427213	0.5159555	0.6269418	0.6586108	0.6633645	0.8038186	0.8321085
17	0.775662	0.7782269	0.706865	0.6969395	0.8324586	0.9428991	1.1215109	1.2717859
18	0.5217189	0.503615	0.6172357	0.647211	0.7240533	0.7716433	0.8185086	0.7770581
19	0.7193104	0.7524495	0.8013972	0.8092183	0.8985836	0.9162982	0.69002	1.5125525

Source : Annual Accounts and Reports

ANNEXURE - IV (9)

R-35, NET WORTH/TOTAL OUTSIDE LIABILITIES (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.2653736	0.2068603	0.4164904	0.3435764	0.1738095	0.0953014	-0.0752927	-0.1084975
2	0.6013215	0.5246179	0.9649122	0.769569	0.6920903	0.6318131	0.5653132	0.7357549
3	1.783	1.1683544	1.3345911	0.9338874	0.6647785	0.4259622	0.3245283	0.2608122
4	0.6143896	0.419286	0.692517	0.5578074	0.2751741	0.1273057	-0.0029952	-0.0728971
5	0.0653634	0.1363636	0.1187438	0.161144	-0.2945736	NA	NA	NA
6	0.4956369	0.4001192	0.4791907	0.4185943	0.2209347	-0.0031104	-0.342826	-0.4725803
7	0.9101731	0.8234649	0.8094262	1.0624472	0.4242744	0.4177326	0.2827586	-0.0440456
8	0.0794137	0.6467789	0.6782255	0.879094	0.6064392	0.4902894	0.2808971	0.1027097
9	-0.3751708	-0.4148524	-0.4709765	-0.396681	-0.4305181	-0.3088847	NA	NA
10	0.171516	0.2003367	0.2503863	0.3532423	0.0650263	0.3016659	0.5323721	0.685601
11	0.8672456	0.1025641	0.1382748	0.3121447	0.1433974	0.0495225	-0.1269095	-0.2063792
12	0.7787509	0.9699453	1.0204081	1.3065217	0.0636544	0.0666316	-0.0409764	-0.039986
13	0.1787941	0.1780104	0.1604708	0.1735849	0.1661971	0.2380664	0.0862691	0.0871946
14	1.4523809	1.0157932	1.0482758	0.7617517	0.8472222	0.8465984	0.3033921	0.5006496
15	1.233361	1.0595643	1.1084612	0.709684	0.7542595	0.7714042	0.7426296	0.7869674
16	1.5194805	1.258757	0.9374566	0.5950443	0.5183472	0.5074667	0.421041	0.3661048
17	0.2892213	0.2849721	0.4146971	0.4344876	0.2012609	0.0605587	-0.1156513	-0.2138098
18	0.9171861	0.9856437	0.6201264	0.5450909	0.3811137	0.2959355	0.2216216	0.2869049
19	0.3902202	0.3289927	0.2478206	0.2360043	0.1128624	0.0913477	-0.0549205	-0.3388659

Source : Annual Accounts and Reports

ANNEXURE- IV (10)

R-36, CURRENT ASSETS/CURRENT LIABILITIES (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.6419036	0.7362817	0.6806451	0.8172757	0.7424342	0.5577841	0.4983773	0.2728923
2	1.7184873	1.3689839	0.990196	1.117248	1.1563909	1.1787994	1.2263083	1.346115
3	2.2549842	0.7088444	0.8088332	0.8726287	0.7692506	0.746066	0.6716714	0.7225321
4	0.7416595	0.7582964	0.7646188	0.8147605	0.9131489	0.5663841	0.5372071	0.9446761
5	0.2779493	0.4219384	0.4528949	0.5807464	0.2569623	NA	NA	NA
6	1.0172532	0.8048275	0.9449966	0.9690873	0.7876984	0.667107	0.4142416	0.3120327
7	0.9447592	0.6293859	0.7059426	1.1738396	1.1076517	0.9272563	0.7087557	0.6585192
8	0.5724326	0.6590724	0.9685222	0.9869848	0.8923456	0.8289371	0.7180583	0.503837
9	0.2565457	0.266243	0.1404636	0.2091801	0.2547372	0.3499247	NA	NA
10	0.2894333	0.2121212	0.3415765	0.3003412	0.3195266	0.3611239	0.2416107	0.132823
11	0.5364806	0.5449183	0.7741356	0.6945493	0.6455696	0.6712664	0.5279161	0.500151
12	1.330516	1.4056503	1.3886699	1.5003046	0.569622	0.576989	0.5803729	0.734293
13	0.5044025	0.4162995	0.6630727	0.7783916	0.9107551	0.8992314	0.7427267	0.7816785
14	1.817931	1.4384313	1.3834154	1.1388163	1.1823899	1.119164	0.8973786	0.8775326
15	1.6439962	1.4873301	1.2522051	1.0966352	1.0539536	0.9808795	0.944861	1.0831339
16	0.9301919	1.017038	0.8868913	0.9416154	0.9505678	0.9996709	1.0136175	1.0409817
17	0.5684695	0.5406307	0.6595273	0.6261749	0.651302	0.5931665	0.9510234	0.4520838
18	2.4647112	1.2540415	1.0141749	0.9018578	1.4646306	1.5275539	1.6224611	1.3956148
19	0.4567901	0.5997702	0.7356785	0.7345663	0.7774196	0.7632029	0.864056	0.4412568

Source : Annual Accounts and Reports

ANNEXURE - IV (11)

R-37, QUICK ASSETS/CURRENT LIABILITIES (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.1172373	0.1998361	0.172258	0.1474252	0.2296052	0.1664278	0.1142018	0.0672014
2	1.4579831	1.1497326	0.862745	1.0474806	1.0984962	1.0900383	1.1478076	1.1251261
3	2.1332633	0.2982569	0.4086882	0.4754161	0.3025839	0.486428	0.2720694	0.4222653
4	0.0727117	0.034292	0.0688378	0.3093841	0.3580786	0.218644	0.3382636	0.1683407
5	0.2384187	0.3789901	0.3096172	0.2124171	0.1828883	NA	NA	NA
6	0.8191856	0.7041379	0.9025844	0.6604514	0.5746031	0.4815059	0.2742504	0.236561
7	0.365439	0.3125	0.3719262	0.4405063	0.2411609	0.1926358	0.1533026	0.0588514
8	0.4443576	0.0390561	0.2120609	0.1970354	0.228395	0.2108223	0.1372309	0.1162927
9	0.2094625	0.0448862	0.0906587	0.1459237	0.0729352	0.1602609	NA	NA
10	0.1776416	0.1599326	0.2952086	0.3003412	0.3186813	0.1547673	0.2041387	0.0607834
11	0.1008583	0.1284029	0.1652447	0.1726929	0.174367	0.1922991	0.1879402	0.1533232
12	0.7588967	0.7702558	0.8714285	1.187081	0.3472577	0.4190526	0.4396176	0.3375098
13	0.2276729	0.1530837	0.1657681	0.1731123	0.2110983	0.1195559	0.0912721	0.0784421
14	0.8096551	0.44	0.4047619	0.4869451	0.2753818	0.2796798	0.2018962	0.2926609
15	0.4451219	0.4531766	0.2522051	0.2437423	0.2806902	0.2086254	0.2640052	0.2386587
16	0.3438045	0.5674967	0.4434456	0.5149253	0.4856379	0.4814083	0.3857312	0.3442926
17	0.1530494	0.1562152	0.21935	0.1644974	0.146064	0.1557266	0.1282579	0.0836036
18	1.9670027	0.7769053	0.6477667	0.6165185	1.0819629	0.7560444	0.9976105	0.9354941
19	0.1566206	0.4122941	0.4765016	0.2017393	0.2876712	0.332831	0.1329386	0.2083097

Source: Annual Accounts and Reports

ANNEXURE - IV (12)

R-39, WORKING CAPITAL/TOTAL DEBTS (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	-0.2918637	-0.2254112	-0.2616279	-0.1629026	-0.2330357	-0.4104609	-0.4811027	-0.7062628
2	0.3766519	0.2325976	-0.0094466	0.0633245	0.1461864	0.1562847	0.1856148	0.2450142
3	1.196	-0.285443	-0.1823899	-0.1242916	-0.2335221	-0.2537313	-0.3261455	-0.2753309
4	-0.2433306	-0.2328183	-0.2163265	-0.1745739	-0.0566814	-0.3988048	-0.4311082	-0.051795
5	-0.7141111	-0.5730724	-0.5466143	0.4192535	-0.7717848	NA	NA	NA
6	0.0139616	-0.1681574	-0.0421965	-0.0258007	-0.2062572	-0.3135303	-0.5776086	-0.6472408
7	-0.0422077	-0.370614	-0.2940573	0.1738396	0.1076517	-0.0719011	-0.2842578	-0.335353
8	-0.3732106	-0.3067349	-0.0296782	-0.0125435	-0.1047573	-0.1677456	-0.278037	-0.4896561
9	-0.7373576	-0.728179	-0.488563	-0.786997	-0.7013795	-0.5285143	NA	NA
10	-0.7105666	-0.7878787	-0.6584234	-0.6996587	-0.741652	-0.6244934	-0.7377584	-0.8480845
11	-0.4466501	-0.4358974	-0.218032	-0.2925064	-0.3532934	-0.3280035	-0.461306	-0.4820856
12	0.2829398	0.3465391	0.3659554	0.4461956	-0.4303779	-0.4205141	-0.4196271	-0.265707
13	-0.4095634	-0.4633507	-0.260223	0.1946091	-0.0732394	-0.071299	-0.2037037	-0.1676495
14	0.6609977	0.4012921	0.3220689	0.1570912	0.1708754	0.119164	-0.0998643	-0.1177999
15	0.5707154	0.4516678	0.2522051	0.0966352	0.0539536	-0.0191204	-0.0537981	0.0298663
16	-0.05772	0.0146892	-0.1049339	-0.0491863	-0.0427622	-0.0002715	0.0101455	0.033146
17	-0.4315304	-0.4589981	-0.3404726	-0.3691538	-0.2824927	-0.2487903	-0.041182	-0.4643121
18	0.711487	0.2467474	0.013962	-0.0991801	0.2622274	0.2912457	0.2933558	0.1758722
19	-0.5432098	-0.4002297	-0.2630413	-0.2643005	-0.2086985	-0.2254026	-0.1359438	-0.5186165

Source : Annual Accounts and Reports

ANNEXURE - IV (13)

R-40, WORKING CAPITAL/TANGIBLE ASSETS (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	-0.2306542	-0.1867749	-0.1847014	-0.1212455	-0.1985294	-0.374747	-0.5202756	-0.792347
2	0.2371705	0.1123872	-0.0048409	0.0357852	0.0863939	0.0957736	0.1114594	0.1411571
3	0.429752	-0.1316403	-0.078125	-0.0642703	-0.1402721	-0.1779124	-0.2462686	-0.214152
4	-0.150726	-0.1525837	-0.1283292	-0.1120638	-0.0444499	-0.3538497	-0.25996	-0.055868
5	-0.5702981	-0.5040485	-0.4885964	-0.3610693	-1.0512319	NA	NA	NA
6	0.0093348	-0.1201022	-0.0285156	-0.0181875	-0.1689338	-0.3145085	-0.879219	-1.2271838
7	-0.0220963	-0.2032471	-0.1625141	0.0842535	0.0637898	-0.0506998	-0.2678722	-0.3508044
8	-0.2476815	-0.1862636	-0.0176842	-0.0066753	-0.0652011	-0.1125734	-0.2170642	-0.444048
9	-1.1800947	-1.2444367	-0.923123	-1.3049378	-1.2319739	-0.7646364	NA	NA
10	-0.6065359	-0.6563814	-0.5259259	-0.5170239	-0.7939793	-0.8879641	-1.5776614	-2.6974789
11	-0.5147759	-0.4859496	-0.1844517	-0.2225717	-0.3090708	-0.3112094	-0.5283599	-0.6076739
12	0.1590665	0.175913	0.1811294	0.1933584	-0.4046219	-0.3942449	-0.293781	-0.180681
13	-0.3477493	-0.4327628	-0.2241195	0.1657483	-0.0628019	-0.0575609	-0.127448	-0.154144
14	0.269533	0.199074	0.157239	0.0891676	0.0925039	0.0645316	-0.0875565	-0.0784992
15	0.255541	0.2193025	0.2014087	0.0881197	0.0467856	-0.0107939	-0.0308718	0.0167153
16	-0.0229095	0.0065032	-0.0541412	-0.030837	-0.0281636	-0.0001801	0.0081551	0.027581
17	-0.3347218	-0.3572047	-0.2406682	-0.2572779	-0.2351635	-0.2345842	-0.046187	-0.5905056
18	0.3711962	0.1242657	0.0086178	-0.0641905	0.1898666	0.2247378	0.2401142	0.136663
19	-0.3907365	-0.3011527	-0.2108006	-0.2138768	-0.1875331	-0.206536	-0.093804	-0.7844347

Source : Annual Accounts and Reports

ANNEXURE - IV (14)

R-41, CURRENT LIABILITIES/TANGIBLE ASSETS (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	0.6441121	0.7082366	0.5783582	0.6635436	0.770791	0.8474301	1.0371854	1.0897245
2	0.330097	0.3068088	0.5124481	0.5129224	0.5550918	0.5337423	0.4925113	0.4066475
3	0.3424362	0.4521307	0.4086745	0.5045907	0.5985153	0.7000826	0.7500678	0.7718083
4	0.585378	0.6312849	0.5451977	0.6049674	0.5117953	0.8160442	0.561721	1.0098566
5	0.9283256	0.8719635	0.8938596	0.8612195	1.3621431	NA	NA	NA
6	0.5635939	0.6175468	0.5894531	0.5390718	0.797216	0.9447737	1.5009927	1.8311603
7	0.4	0.5484064	0.5526613	0.4846625	0.5925578	0.6926905	0.9197513	1.0273037
8	0.5792807	0.5463436	0.5618019	0.512887	0.6056527	0.6588295	0.7698907	0.8952305
9	1.5873131	1.6964534	1.0739784	1.6505842	1.6530732	1.1762275	NA	NA
10	0.8535947	0.8330995	0.7987654	0.7389659	1.070555	1.3898847	2.0802792	3.1106442
11	1.1105815	1.0678294	0.8166483	0.7286669	0.8712434	0.9466919	1.1192078	1.2153478
12	0.4812673	0.4336569	0.4660238	0.3864813	0.9401549	0.931997	0.7001	0.6800011
13	0.7016769	0.7400162	0.791889	0.7479338	0.7037037	0.5712195	0.7285951	0.7060418
14	0.3351826	0.4540598	0.410101	0.5240592	0.507177	0.5415362	0.8532	0.6409812
15	0.3970944	0.4500082	0.7985912	0.9118802	0.8671456	0.5645238	0.5598913	0.5333722
16	0.3281786	0.3816908	0.4786661	0.5281706	0.5697431	0.5473703	0.5988691	0.6730077
17	0.775662	0.7782269	0.706865	0.6382309	0.6744045	0.7645327	0.9430634	1.0777299
18	0.2534262	0.4891549	0.5079674	0.5408696	0.40864	0.4259998	0.3857498	0.3454445
19	0.7193104	0.7524495	0.797516	0.8057639	0.8459441	0.8722069	0.69002	1.4403582

Source : Annual Accounts and Reports

ANNEXURE - IV (15)

R-46, SALES/TOTAL ASSETS (Secondary Sample)

CO CODE	1974	1975	1976	1977	1978	1979	1980	1981
1	1.0912149	0.7560904	1.1664179	1.1829705	1.1757099	1.3626062	0.9721109	1.3494969
2	0.9653259	0.8712059	0.7918395	0.889165	0.7161936	0.5855487	0.5698362	0.7033237
3	0.9223859	0.7708698	0.9350754	1.2330533	0.9242189	0.8679427	0.8925373	1.4983152
4	0.931397	0.5377094	1.1836158	0.9911295	0.6570648	0.6687413	0.6007809	0.6041218
5	1.0722477	0.8309716	0.8596491	0.8095524	1.0019554	NA	NA	NA
6	0.889926	0.7815161	1.0324218	0.8867983	0.9142676	0.8443057	0.8497683	1.2418513
7	0.9365439	0.8719182	0.8850509	0.9664621	0.6622889	0.6911353	0.5546764	0.549488
8	0.4288622	0.6425872	0.5763216	0.9768218	0.5456856	0.5126501	0.4685626	0.8170167
9	1.2366022	0.8299721	1.9466666	1.8601583	1.2408392	0.4657695	NA	NA
10	1.2	1.2903225	1.4111111	1.8348045	1.416745	0.4807938	0.6404886	0.8697478
11	1.005243	1.1497093	0.9970663	1.4506488	0.690102	0.6032448	0.6327629	0.6574261
12	0.9184328	0.7986592	1.216483	1.4465379	1.2582153	1.3867437	1.1668181	0.8841856
13	1.3159752	1.0766096	0.8004268	1.1207529	0.9311594	1.6541463	1.0507065	1.1409759
14	2.2473416	1.6456552	1.9888888	1.5354618	1.7363864	2.4278593	2.0176064	2.7483405
15	0.8422425	0.7392166	0.5584133	0.5285011	0.4305004	0.3739505	0.5813781	0.6501461
16	1.0097365	1.0375187	0.8268196	0.7356828	0.598097	0.6491354	0.5937597	0.5301617
17	0.404939	0.622004	0.7076481	0.8064195	0.5476382	0.3334805	0.4981252	0.5890263
18	1.2657375	1.1658382	1.1188617	1.2783745	0.8722133	0.7928922	1.0450732	1.1929747
19	0.7797318	0.6887608	0.5123087	1.111139	1.0671059	0.87382	1.0966568	2.1705116

Source : Annual Accounts and Reports

ANNEXURE - V

Mean Values and Standard Deviations of Financial Ratios of the Units of 'Good' and 'Sick' Groups (Initial Sample)

Ratio No.	Standard Deviation	Mean Values of Groups		Ratio No.	Standard Deviation	Mean Values of Groups	
		Good	Sick			Good	Sick
R-1	0.2167657	0.2288256	-0.0694734	R-26	10.068372	4.7046297	-5.7954201
R-2	0.1505031	0.1975709	-0.0180013	R-27	0.3824846	0.3355225	0.9994158
R-3	0.1170662	0.1540504	-0.0191152	R-28	0.3955552	0.7055998	1.3538687
R-4	7.400882	5.1304386	-1.4274788	R-29	0.0862734	0.0742311	0.1977901
R-5	0.1926776	0.179817	-0.0902476	R-30	0.6313013	0.2716564	1.324324
R-6	0.1458334	0.1599889	-0.0506136	R-33	0.3503423	0.2660713	0.8737674
R-7	0.1116208	0.1246177	-0.0374198	R-34	1.2020781	1.3564989	-0.3311307
R-8	6.9423101	3.9405	-1.7319501	R-35	0.4023501	0.4555721	-0.2349811
R-9	0.2106512	0.0884811	-0.2531613	R-36	0.3620772	1.166302	0.545666
R-10	0.1365852	0.0705841	-0.1586361	R-37	0.1259545	0.1838963	0.0418406
R-11	0.1060566	0.0581549	-0.1241993	R-39	0.469265	0.2885728	-0.5681986
R-12	0.3899593	0.3510136	-0.1626412	R-40	0.4123815	0.0736587	-0.5789135
R-13	0.1600584	0.1467223	-0.1318935	R-41	0.4108336	0.5510123	1.2024253
R-16	0.1289406	0.03248	-0.1816456	R-46	0.3208061	0.882998	0.6937481
R-18	0.3709129	0.3269737	-0.1603023	R-47	0.1017068	0.1771978	0.0379051
R-19	0.1044847	0.0546414	-0.1241993	R-49	0.102605	0.1606557	0.0792283
R-21	0.0408509	0.1020496	0.0672843				
R-22	0.019239	0.0578827	0.0381023				
R-23	0.1665953	0.1002991	-0.1816456				
R-24	1.2017273	1.3564989	-0.3297488				

NOTE : Units in the Good Group = 28
Sick Group = 36

Annexure - VI

Mean Values and the Absolute Difference between the Mean Values of the Units in 'Good', 'Semi-good/semi-sick' and 'Sick' Group.

Ratio No.	Mean Values of the 'Groups'			Absolute Difference between the Mean Values of		
	Good	Semi good/ semi-sick	Sick	Good and Sick	Good and Semi- good/semi-sick	Sick and Semi-good/ semi-sick
R-4	5.1304386	1.1013362	-1.4274788	6.5579174	4.0291024	2.528815
R-12	0.3510136	-0.0143022	-0.1626412	0.5136548	0.3653158	0.148339
R-18	0.3269737	-0.019163	-0.1603023	0.487276	0.3461367	0.1411393
R-19	0.0546414	-0.0059636	-0.1241993	0.1788407	0.060605	0.1182357
R-23	0.1002991	-0.006373	-0.1816456	0.2819447	0.1066721	0.1752726
R-24	1.3564989	0.3683413	-0.3297488	1.6862477	0.9831576	0.6980901
R-27	0.3355225	0.5630393	0.9994158	0.563893	0.2275168	0.4363765
R-28	0.7055998	0.9240206	1.3538687	0.648268	0.2184208	0.4298481
R-35	0.4555721	0.1728597	-0.2349811	0.6905532	0.2827124	0.4078408
R-36	1.166302	0.8419389	0.545666	0.620636	0.3243631	0.2962729
R-37	0.1838963	0.0810317	0.0418406	0.1420557	0.1028646	0.0391911
R-39	0.2885728	-0.3050222	-0.5681986	0.8567714	0.593595	0.2631764
R-40	0.0736587	-0.2050334	-0.5789135	0.6525722	0.2786921	0.3738801
R-41	0.5510123	0.7903585	1.2024253	0.651413	0.2393462	0.4120668
R-46	0.882998	0.8322933	0.5937481	0.1892499	0.0507047	0.1385452
R-47	0.1771978	0.0828251*	0.0379051	0.1392927	0.0943727	0.04492
R-49	0.1606557	0.0807805	0.0792283	0.0814274	0.0798752	0.0015522

NOTE: Number of Units in : Good Group = 28; Sick Group = 36; Semi-good/Semi-sick Group = 79

* Includes only 77 units.

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