FINANCIAL RATIOS AND CORPORATE FAILURE

A CASE OF NEPAL

A THESIS

Submitted by

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Declaration

I hereby declare that this thesis entitled **"Financial Ratios and Corporate Failure - A Case of Nepal"** submitted to Faculty of Management, Tribhuvan University, unless specifically indicated to the contrary in the text, is my original research work carried out under the supervision of Prof. Dr. Radhe Shyam Pradhan for the fulfillment of the requirement of the Degree of Doctor of Philosophy (Ph.D.). I have incorporated all the suggestions and comments obtained in pre-submission seminar. The resources that I have quoted and used have been indicated and acknowledged by means of complete references.

Ghanendra Fago
December 31, 2014

Date: December 31, 2014

Recommendation of Supervisor

I certify that the thesis entitled **"Financial Ratios and Corporate Failure - A Case of Nepal"** submitted by Ghanendra Fago to the Faculty of Management (FOM), Tribhuvan University for the degree of Doctor of Philosophy (Ph. D.) was completed under my supervision and guidance. This thesis is the candidate's original work. I have carefully read the substance of this thesis.

To the best of my knowledge, the candidate has also fulfilled all other requirements of the Ph.D. program of the Faculty of Management (FOM), Tribhuvan University.

I therefore, recommend that this thesis be considered and approved for the award of the Ph. D. Degree.

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Prof. Radhe Shyam Pradhan, Ph. D.
Thesis supervisor

VIVA-VOCE SHEET

We have conducted the viva-voce examination of the thesis

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Entitled

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is found the thesis to be the original work of the student and written according to the format prescribed by Faculty of Management, Tribhuvan University. We recommend the thesis to be accepted as the fulfillment of the requirements for the degree of Doctor of Philosophy (Ph. D.) in Management.

Viva-Voce Committee

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External Expert : ……..

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Financial ratios and prediction of corporate failure has become a major area of the study since 1960s. There are many corporate failure prediction models have been developed to provide an early warning signal of corporate failure abroad. However, very little attempts have been made in this area of the study in the Nepalese context. This study, therefore aims to examine financial ratios and their usefulness in the prediction of corporate failure. It is also assumed to be of great significance of the study to provide to the stakeholders that enables stakeholders to make strategies to avoid loses.

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LIST OF ABBREVIATIONS AND NOTATIONS

A/C	Account/Accounting
ABGU	Arun Banaspati Udhyog Ltd
AGCL	Agriculture Goods Co Ltd.
ATCL	Agriculture Tools Co Ltd.
B	Coefficients
BBCL	Bishal Bazar Co Ltd.
BBFL	Bhaktpur Brick Factory Ltd.
BNL	Bottlers Nepal Ltd.
BNTL	Bottlers Nepal (Terai) Ltd
BPL	Butwal Power Ltd.
BSCL	Birat Shoe Company Ltd.
BSFL	Birgunj Sugar Factory Ltd.
CA/CL	Current assets to current liabilities
CA/TA	Current assets to total assets
CEO	Chief Executive Officers
CF/CL	Cash flow to current liabilities
CF/NS	Cash flow to net sales
CF/TA	Cash flow to total assets
CF/TD	Cash flow to total debts
CFO	Chief Financial Officer
CL/TD	Current liabilities to total debts
Co.	Company
Cos.	Companies
DDC	Dairy Development Corporation.
DPS	Dividend per share
EBIT	Earnings before interest and tax
EBIT/INT	Earnings before interest and tax to Interest expenses

EBIT/TA	Earnings before interest and tax to total assets
EPS	Earning per share
exp	Exponential function
f	f-statistics
FHL	Fleur Himalayan Ltd.
FNCCI	Federation of Nepal Chamber of Commerce and Industries
GRUL	Gorakhakali Rubber Udhyog Ltd.
HCCL	Himal Cement Co. Ltd.
HCFL	Hetauda Cement Factory Ltd.
H-L	Hosmer Lemeshow
HTUL	Hetauda Textle Udhyog Ltd.
JCFL	Janakpur Cigarette Factory Ltd.
JSML	Jyoti Spinning Mills Ltd.
KCUL	Krishi Chun Udghyog Ltd.
LD/TD	Long term debt to total debts
LDA	Linear discriminant analysis
LR	Logistic regression
LSML	Lumbini Sugar Mills Ltd.
Max	Maximum
MDA	Multivariate discriminant analysis
Min.	Minimum
MOF	Ministry of Finance
MPS	Market price per share
MV/BV	Market value to book value
N	Numbers of observations
NBBL	Nepal Bitumen and Barrel Udhyog Ltd.
NBGU	Nepal Banaspati Ghee Udhyog Ltd.
NCAL	Necon Air Co. Ltd.

NCCL	National Construction Co Ltd.
NDL	Nepal Drugs Ltd.
NEPSE	Nepal Stock Exchange Ltd.
NFC	Nepal Food Corporation
NHPP	Nepal Herbs Products and Processing Ltd.
NI/NS	Net income to sales
NI/NW	Net profit to net worth
NI/TA	Net income to total assets
NLOL	Nepal Lube Oil Ltd.
NRTL	Nepal Rosin and Turpentine Ltd.
NS/CA	Net sakes to current assets
NS/CL	Net sales to current liabilities
NS/TA	Net sales to total assets
NS/WC	Net sales to working capital
NSCL	Nepal Seeds Co. Ltd
NTC	Nepal Telecom Ltd.
NTL	National Trading Ltd.
NTWL	Nepal Transport and Warehouse Ltd.
NUCL	Nepal United Co. Ltd.
NW/TA	Net worth to total assets
NW/TD	Net worth to total debt
OAG/N	The Office of Auditors General of Nepal
OCR	Office of Company Registrar
p	p-value
PEs	Public enterprises
R/TA	Receivable to total assets
RE/TA	Retained earnings to total assets
RJML	Raghupati Jute Mills Ltd.

ROA	Return on assets
ROI	Return on investment
S.D.	Standard deviation
S.E.	Standard error
SBPP	Sri Bhrikuti Pulp and Paper Nepal Ltd.
SE/TD	Shareholders' equity to total liabilities
SEBON	Securities Board of Nepal
Sig.	Significance level
SPSS	Statistical software for social sciences
SSSM	Sri Ram Sugar Mills Ltd.
STCL	Salt Trading Corporation Ltd.
t	t-statistic
TD/TA	Total debt to total assets
UCFL	Udaypur Cement Factory Ltd.
UK	United Kingdom
ULNL	Unilever Nepal Ltd.
US	United States
WC/TA	Working capital to total assets
Z	Z -score

Chapter I
INTRODUCTION

1.1 General background

The prediction of corporate failure has become a major area of study in finance and accounting since 1960s. Prior to 1960s, many studies (Ramser & Foster, 1931; Fitzpatrick, 1932; Smith & Winakar, 1935; and Marwin, 1942) used financial ratios to compare between failed and non-failed firms and revealed financial ratios of a firm begin to deteriorate many years prior to failure. Beaver (1966) concluded that a firm can be predicted as failed or non-failed at least five year prior to failure. Profitability ratios are most forewarning indicators of sickness found in private sectors and the government undertakings (Sethi, 1981). Altman (1968) used multivariate discriminant analysis (MDA) for prediction of corporate failure. Other studies used multivariate discriminant analysis for prediction of corporate failure (Deakin, 1972; Altman, Haldeman & Narayanan, 1977; Blum, 1974; Gupta, 1983; and Yadav, 1986). Similarly, corporate failure studies (Ohlson, 1980; Zavgren, 1985; Nam & Jinn, 2000; Charitou et al., 2004; Ugurlu & Aksoy, 2006) are the best know logistic studies in corporate failure. However, Edmister (1972), and Meyer and Pifer (1980) used regression analysis in prediction of corporate bankruptcy. Even though, different methodologies have been found to be used in literature, it is concluded that financial ratios can predict corporate failure, at least statistically, by developing and testing predictive models (Platt & Platt, 1990).

Corporate bankruptcy is not spontaneous outcome; rather it grows constantly in many stages with unique financial characteristics prior to failure. Its symptoms can be detected several years prior to failure (Bhunia, 2011; Winakor & Smith, 1931; and Shirata, 1998). Ohlson (1980) and Dombolena and Khoury (1980) demonstrated that the standard deviations of the financial ratios are different between bankrupt firms and non-bankrupt firms. Thus, if the symptoms are foreseen to be proceeding in the direction of potential failure, the remedial measures could be undertaken to mitigate from the corporate failure.

Corporate failure has been caused by many internal and external factors. A firm with heavy debt and inadequate equity base are more prone to failure (Gupta, 1983 and Yadav, 1986). One of the reasons for corporate failure is the mismatch between currently available liquid assets of firm and its current obligations (Teresa, 1993). Furthermore, industry-specific characteristics such as government regulation and the nature of operations can also contribute to a firm's financial distress (Charitou, Neophytou, & Charalambous, 2004). However, the major causes of failure are also attributed to pricing policy, inability of managerial personnel, non-availability of trained manpower, inadequate marketing efforts, and recessionary conditions in the context of developing countries (Sethi, 1981). Similarly, financial misappropriation, overspending in unproductive sectors, professional ethics of managers, inappropriate monetary policies, lack of transparency in the disclosure of information also contributes to corporate failure. Many economists have attributed the causes of corporate failure with high interest rates, tax rate, heavy debt burdens and lack of efficient management, corruption, irregularities, globalization, politics, and attitude of management. However, a firm is caused failed by either company-specific factors or external factors or a combination of both factors (Danilov, 2014).

Corporate failure is costly to business and to the economy of the country. Its impact and costs depend on the magnitude and types of corporate failure (Aktan, 2011). Andrade and Kaplan (1998) have revealed that the estimated financial distress costs to be 10-20 percent of a firm value. Thus, in order to minimize risk of corporate failure, many prediction models have been developed, and now widely used for a range of purposes including monitoring of the financial solvency by regulating agencies, assessment of loan security, going concern evaluations by auditors, the measurement of portfolio risk, and the pricing of defaultable bonds, credit derivatives and other securities exposed to credit risk. Since these models provide early warning signal of failure, the stakeholders can adopt corporate strategies to reduce bankruptcy risk (Danilov, 2014). Thus, the prediction of corporate failure using financial ratios have become an important area of the study for accountants, financial economists, academicians and researchers in developed and developing countries (Sharma & Mahajan,1980).

1.2 Statement of the problem

In 1914, DuPont Corporation began to use a ratio "triangle" system in evaluating operating results. The use of current ratio to measure solvency and credit worthiness was initiated in 1890s (Lough, 1917). However, Wall (1919) emphasized to use more types of financial ratios. Ramser and Foster (1931) revealed that ratios of net worth to debt (NW/TD) and net profit to net worth (NI/NW) have exhibited an opposite tendency between successful and less successful firms. The trends of the mean of twenty one ratios of failed firms were analyzed and revealed that ratio of working capital to total assets (WC/TA) was a far more steady and accurate as well as an easier indication of unfavorable trends in financial health of a firm (Winakor and Smith, 1935). Marwin (1942) concluded that financial ratios begin to deteriorate at least five year prior to failure. Beaver (1966) revealed the ratio of cash flow to total debt (CF/TD) as the best predictor ratio and also concluded that financial ratios have the ability to predict failure for at least five years before failure.

Although, studies revealed financial ratios of non-failed firms are better than ratios of failed firms, their relative importance was not so clear. Thus, Altman (1968) argued that the univariate analysis cannot answer the questions that which ratios are important in detecting potential bankruptcy, what weight should be attached to those selected ratios, and how the weights should be objectively established. A firm with a poor profitability and/or solvency may be regarded as a potential bankrupt. However, because of its above average liquidity, the situation may not be considered serious. Thus, Altman (1968) felt that it was necessary for appropriate extension of the previous studies and to develop a combination of several financial measures into a meaningful predictive model using multiple discriminant analysis. This study developed discriminant model of five financial ratios and concluded that discriminant analysis is a useful technique to classify failed and non-failed firms at least three year prior to failure.

In order to develop alternative model, Deakin (1972) justified that since failure of a business produces substantial losses to creditors and stockholders, the development of a model which predicts potential business failure as early as possible to reduce such losses to concerned parties. Deakin (1972) concluded that discriminant analysis can be used to predict business failure "as far as three years in advance with a fairly high accuracy.

As an alternative technique, Ohlson (1980) used logit analysis in prediction of corporate failure. Although predictive accuracy was not improved, the study revealed four factors: size, total loan to total assets (TD/TA), net income to total assets (NI/TA) and working capital to total assets (WC/TA) or current assets to current liabilities (CL/CL) are statistically significant to assess the probability of failure. Like previous studies, Kaveri (1980) evaluated the capability of financial ratios to predict the borrowers' health. Similarly, Gupta (1983) examined a wide variety of ratios to determine the best set of ratios not only for the specific purpose of identifying potential sick firms but also for the general purpose of ordering firms according to the financial health.

Using linear regression analysis, Edmister (1972) revealed that predictive power of ratio analysis depends upon the choice of analytical methods and selection of financial ratios. It was also concluded that predictive power of financial ratio is cumulative. Meyer and Pifer (1980) suggested that financial ratios should be used with other factors; like local economic conditions, general economic conditions, quality of management, and integrity of employees to make a better prediction of bank failure. Charitou et al. (2004) used logit and neural networks analysis for the development of failure classification models for UK public industrial companies and concluded that the profitability; operating cash-flow and financial leverage variable possess high discriminating power over others.

In the context of Nepal, Pradhan (1986) revealed that financial ratios are statistically insignificant between sick and non-sick corporations except the ratios of net working capital turnover (NS/WC), current assets to total assets (CA/TA), and receivable to total assets (R/TA). Thus, it is also concluded that financial ratios of sick companies are more deteriorating than that of non-sick companies. Short term liquidity ratio is an important in prediction of corporate sickness in Nepal. In another study, it is demonstrated that there is no significant difference between the choice of financial ratios by public and private enterprises leading to the stability of consensus on financial ratios as predictors of corporate failure (Pradhan, 2006). It is also showed that the net profit margin and short-term liquidity ratios are important indicators of financial distress (Pradhan, 2006). Similarly, the financially distressed enterprises have higher opearting expenses ratios, and lower profitabilites. Besides, their liquidity, turnover, coverage ratios were also significantly lower (Shrestha,

Manandhar, & Poudel, 2002). Fago (2006) revealed that financial ratios of bankrupt companies will start deteriorate at least three year prior to failure. It also showed the ratios of current assets to current liabilities (CA/CL), retained earnings to total assets (RE/TA), earnings before interest and tax to total assets (EBIT/TA) and total debts to total assets (TD/TA) are the important predictors of failed and non-failed companies. In another study, the ratios of net worth to total assets (NW/TA), retained earnings to total assets (RE/TA), cash flow to current liabilities (CF/CL), net income to total assets (NI/TA), and cash flow to net sales (CF/NS) are also found significant ratios in prediction of corporate bankruptcy (Fago, 2007).

Although, a number of studies on financial ratios as predictors of corporate failure have increased, there are no unanimous findings as to which ratio can best discriminate failed and non-failed companies. In addition, most bankruptcy prediction models have been developed to provide an early warning signal of corporate failure in large and developed countries. Very little attempts have been made in such area of study in small and emerging countries like Nepal. Moreover; due to differences in local conditions, size of economies, political and social factors; the ratio or set of ratios might be unsuitable in predicting corporate failure in the context of developing countries. Thus, the generalization has become a difficult task. Since very few attempts have been made in the area of prediction of corporate failure in Nepal, it has been felt necessary to assess which ratio or set of ratios can best predict corporate failure. Hence, this study deals with the issues of corporate failure in the context of Nepal.

- Whether the financial ratios of failed companies' are different from that of non-failed companies?
- Which ratio or set of ratios can predict corporate failure in a better way?
- How many years in advance, do financial ratios of failed companies begin to deteriorate? Which financial ratios are more differentiating? And whether financial ratios of failed companies are more deteriorating?
- Whether financial ratios are consistent in discriminating failed and non-failed companies?
- Is there any consensus among financial executives and practitioners on financial ratios as predictors of corporate failure?

1.3 Objective of the study

The main objective of this study is to examine financial ratios and their usefulness in prediction of corporate failure in Nepal. The specific objectives are as follows:

- To compare financial ratios of failed and non-failed companies.
- To determine ratio or set of ratios that can predict corporate failure.
- To find out how many years in advance, corporate failure can be predicted.
- To develop models of financial ratios for prediction of corporate failure.
- To assess the consensus of financial executives and practitioners on financial ratios as predictors of corporate failure.

1.4 Organization of the study

This study has been organized into eight chapters.

Chapter-I deals with introductory chapter of the study. As already mentioned, it includes background, the statement of problem, objectives of the study and organization of the study. Chapter II is devoted for conceptual framework and review of literature.

The research methodologies followed in this study have been described in Chapter-III. This chapter consists of research designs, selection of failed and non-failed companies, nature and sources of data, selection of financial ratios for the study, descriptions of methods of data analysis, limitation of the study and definitions of key terms and words used in this study.

Chapter-IV deals with the univariate analysis of financial ratios and corporate failure. It assesses the behaviour of liquidity, leverage, turnover, profitability and cash flow ratios of failed and non-failed companies five years prior to their failure. The findings and conclusions of this chapter have been described in discussion.

Chapter-V is devoted for discriminant analysis for prediction of corporate failure. It includes descriptive statistics and test of equality of group means, discriminant

analysis of failed and non-failed companies using financial data of five years prior to failure. It also develops discriminant model for practical application, assesses discriminating power of financial ratios of the model, and tests the validity of discriminant model. The findings and conclusions of this chapter have been described in discussion of the chapter.

Chapter VI describes financial ratios and corporate failure using logistic regression analysis. It describes logistic results of five years prior to failure, develops logistic regression models, selection of logistic model for practical application, assessment of relative importance of financial ratios, test of validity of model. It also compares discriminant and logistic classification accuracies. The discussion of this chapter has been described at the end of this chapter.

Chapter-VII imparts the financial ratios and corporate failure using the consensus. At last, summary, conclusions and implications of this study have been described in Chapter-VIII.

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Chapter II
REVIEW OF LITERATURE

This chapter deals with conceptual framework and review empirical studies carried out in the area of financial ratios and corporate bankruptcy. This chapter has been divided into three sections. Section-I deals with the conceptual framework of financial ratios and corporate failure. The review of literature has been further described in Section-II followed by discussion in Section-III.

2.1 Conceptual framework

Financial ratios can give a broad idea about a company and provide valuable information about its leverage, operating and financial risk, and investment potential among others. Financial ratios are useful information for assessment of financial strengths and weaknesses of a firm. It also whether a firm's financial position has been improving or deteriorating overtime (Brigham & Ehrhardt, 2004). Although, financial ratios used to analyze financial position of a firm are important; the type of ratio depends on the purpose of the users. Each financial ratio has a unique information and interpretation which differ substantially from one user to others. In order to add meaning to financial ratios, a benchmark is required. The benchmark is either its previous years' financial ratios or budgeted financial ratios for the same period, or financial ratios of another company either in the same industry or in a different industry.

The use of financial ratios to measure business performance began with the induction of the current ratio in late 1890s. In 1914, DuPont Corporation began to use a ratio "triangle" system in evaluating operating results. However, financial ratios started in early 1930s for the comparison of failed and non-failed firms. The use of financial ratios for prediction of corporate failure was increased since 1970s onwards following Beaver (1968) and Altman (1968). Nowadays, prediction of corporate failure has become a major area of study to identify irregularities, abnormalities many years prior to failure of a firm.

Concept of corporate failure

There are many definitions of corporate failure. Corporate failure is a common problem of both developed and developing countries. However, it does not necessarily mean that it is the situation for the collapse and dissolution of a firm. Chao and Cohen (1997) concluded that firms do not sell off poorly performing business units until the firm's other units experience significant relative to their industry peers. Thus, it is the inability of a firm to conform its strategic path of growth and development to attain its economic, social, legal and financial objective. It is also the situation of losing money or being insufficient assets for collateral of obligations.

Although corporate failure or bankruptcy is a relatively infrequent in its occurrence, its financial impact can be felt throughout national and global economy. Corporate failure includes economic and financial failure. Economic failure is the situation when a firm is unable to generate sufficient sales revenues to earn profit and cash flows. On other hand, financial failure is technical insolvency or bankruptcy. It is an inability of a firm to pay its liabilities that total assets are less than total liabilities. Some failed firms continuously show lower or negative returns and others are unable to meet their liabilities when due. However, corporate failure is not a spontaneous event; rather the symptoms of corporate failure can be felt many years prior to failure (Bhunia, 2011). When a firm starts to fail, financial structure of the firm starts to weaken and worsen. The stock prices begins to decline, the relationship with creditors, bankers, and supplies starts to deteriorate, and also firms increases in credit level and overdraft limits, delays on payments for expenses, wages that results into impacts not only for the stakeholders and company itself but also related sectors of industry, and the economy of the country

Winaker and Smith (1935) defined corporate failure as either entering receivership or bond default or material adjustment of rights or equities of owners and creditors while a firm financially distressed or bankrupt when it is not likely to continue its operations, or pay dividend to its shareholders or pay wages to its employees (Beaver, 1966 & John, 1993). It is an inability of a firm to pay debts as they become due, entrance into bankruptcy proceedings or an explicit agreement with creditors to reduce debts (Blum, 1974). Taffler and Tisshaw (1977) defined a company, if it was under receivership, voluntary liquidation, winding up by court or equivalent. 'Being

insolvent' means a state of being unable, or appearing to be unable, to pay any or all of the debts due and payable to or payable in the future to creditors or a situation where the amount of liabilities of a enterprise exceeds the value of the assets (Insolvency Act, 2006).

The terms: corporate bankruptcy, corporate failure, insolvency or liquidation, business closure; dissolution and receivership have been found to have been used interchangeably in prediction of corporate failure studies. Thus, this study has defined a company as failed company when its total assets have been found insufficient to meet its obligations or it has closed down its operations or was liquidated or has been decided to liquidate or under liquidation process. Otherwise, a company has been regarded as non-failed company.

If total assets >	total debts of company, non-failed company
If total assets <	total debts of company, failed company
If total assets >	total debts but liquidated or in liquidation process or closed down, failed company
If total assets <	total debts but liquidated or in liquidation process or closed down, failed company

When the value of firm (i.e. total assets) equals the value of its debts, then the firm is economically bankrupt in the sense that the equity has no value. However, the formal turning over of the assets to the bondholders is a legal process that allows creditors to takeover when a firm defaults. In bankruptcy, many people and groups are involved: lawyer, secured creditors, general creditors, tax authorities, stockholders. There is a time limit within which things are supposed to be done, but the process generally takes at least a year and probably much longer.

2.2 Review of literature

This section deals with the review of literature on financial ratios and corporate failure. The review of literature has been undertaken under following sub-headings.

- Review of major studies prior to 1960s
- Review of major studies during 1960s and 1970s.
- Review of major studies during 1980s and 1990s
- Review of major recent studies
- Review of Nepalese studies

2.2.1 Review of major studies prior to 1960s

The earliest literature on financial ratios as predictors of corporate failure has been observed by Gilman (1925), Ramser and Foster (1931), Fitzpatrick (1932), Smith and Winakor (1935) and Marwin (1942). The major findings and conclusions of the earliest studies have been presented in Table. 2.1.

Table 2.1
Review of major studies prior to 1960s

Studies	Major findings and conclusions
Gilman (1925)	The changes in ratios over time cannot be interpreted. The reliability of ratios as indicators varies because they are artificial measures.
Ramser and Foster (1931)	Firms which turned out to be less successful and those which failed tended to have ratios which were lower than the more successful firms.
Fitzpatrick (1932)	Financial ratios of the failed firms deteriorated as the year of failure approached and were persistently different from the non-failed firms at least three years prior to failure. The net worth to debt (SE/TD) and net profit to net worth ratios (NI/SE) were found the best indicators of failure among the ratios used.
Smith and Winakor (1935)	The ratios of failed firms are frequently below the mean value and showed deterioration as the date of failure drew near and also before the occurrence of failure. The ratio of working capital to total assets (WC/TA) was a far more steady and accurate as well as an easier indication of unfavorable trends in financial health.
Merwin (1942)	The ratios of current assets and current liabilities (CA/CL), net worth to total debt (SE/TD) and net working capital ratio were particularly good "portents of discontinuance".

The use of current ratio with 2 to 1 standard was initiated in corporate failure in 1900s (Lough, 1917). However, it was revealed that Wall (1919) emphasized the need for the use of different types of ratios. Gilman (1925) criticized the use of financial ratios in determining the health of a firm that changes in ratios over time cannot be interpreted because the denominator and numerator both vary. The ratios can divert the analysts' attention from a comprehensive view of the firm. The reliability of ratios as indicators varies because they are artificial measures. Using eleven types of financial ratios for 173 firms whose securities were registered in the State of Illinois, Ramser and Foster (1931) have analyzed and found that firms, which turned out to be less successful and those, which failed tended to have ratios which were lower than the more successful firms. However, two turnover ratios-sales to net worth (NS/NW) and sales to total assets (NS/TA) have exhibited an opposite tendency.

Fitzpatrick (1932) examined whether there was a significant difference in the trend of ratios for failed and non-failed firms. This study analyzed a matched sample of 19 non-failed firms. It demonstrated that financial ratios of the failed firms have been found to be deteriorated as the year of failure approached, and were persistently different from the non-failed firms at least three years prior to failure. This study also concluded that ratios of net worth to debt (NW/TD) and net profit to net worth (NP/NW) were found the best indicators of failure among the ratios used.

Winakor and Smith (1935) are credited with the first scientific empirical research with their sample of 183 firms which were failed between 1923 and 1931 for ten years. The prior to ten years, the trends of the mean of twenty one ratios of failed firms were analyzed. Twenty one ratios of each of firms were computed and examined after the financial statements had been standardized. The mean ratios of middle half of all the firms were used to compare individual changes for the whole group. Other groups which included four different industries and two size groups were also used. The average financial ratios of the groups were compared and concluded that the ratios of failed firms were frequently below the mean value, and showed deterioration as the date of failure drew near and also before the occurrence of failure. It has also concluded that the ratios of working capital to total assets (WC/TA) was a far more steady and accurate as well as an easier indication of unfavorable trends in financial health.

Marwin (1942) carried out a study on financial ratios on the basis of 200 firms discontinuing business during the year 1936-39 from five industries. Discontinuing firms were defined as those which stopped filing for federal income tax returns and he acknowledges that many of these have discontinued for reasons other than financial difficulty. Mervin plotted the highest and lowest ratios of the continuing business and the average of the discontinuing firms by industry on the same graph. This study examined a large number of ratios with trial and error method and found three ratios: current ratio, net worth to total debt ratio and the net working capital ratios were found the most sensitive as early as four to five year prior to failure.

2.2.2 Review of major studies during 1960s and 1970s

During 1960s and 1970s; major literature used and analyzed financial ratios as predictors of corporate failure. These literatures made a significant contribution in the field of financial ratios are corporate failure. The major literature that made significant contributions were Beaver (1966), Beaver (1968), Altman (1968), Horrigan (1968), Rao and Sharma (1971), Deakin (1972), Edmister (1972), Blum (1974), Libby (1975), Kennedy (1975), Altman et al.(1977), Taffler and Tisshaw (1977), Bilderbeek (1977), Van Frederkslust (1978), Takahashi et al.(1979) and so on, which are presented in Table. 2.2

Firstly, Beaver (1966) used the univariate statistical analysis of financial ratios as predictors of corporate failure. Seventy nine failed firms were paired with seventy nine non-failed firms on the basis of assets size and industry over the period of 1954-1964. For each of the firms five years prior to failure, thirty mean financial ratios of seventy nine and seventy nine non-failed firms were computed and compared the mean ratios of failed and non-failed firms. The ratios were selected on the basis of three criteria: (a) popularity in literature, (b) performance in previous studies and (c) definition of cash flow in term of cash flow concept. This study conducted three major experiments: (a) comparison of mean value-profile analysis, (b) dichotomous classification test and (c) analysis of likelihood ratios.

On the basis of mean value comparison, it was concluded that there were anticipated differences in the mean value of financial ratios of failed and non-failed companies. They are ratios of cash flow to total debt (CF/TD), net income to total assets (NI/TA) total debts to total assets (TD/TA), working capital to total assets (WC/TA), current ratio (CA/CL) and no credit interval are in all five years before failure. Out of them, the ratio of cash flow to total debt (CF/TD) was regarded as overall best predictors. This study also revealed that the average failed firms showed the substantial deterioration as the year of failure approached. In contrast, the performance of the average non-failed firm was relatively constant with only small deviations from trend. Thus, it is concluded that financial ratios or accounting data have the ability to predict failure for at least five years before failure. However, not all ratios predict with same degree of accuracy. Ratios have greater success predicting non-failure than failure.

Table 2.2
Review of major studies during 1960s and 1970s

Studies	Major findings and conclusion
Beaver (1966)	Financial ratios or accounting data have the ability to predict failure for at least five years before failure. However, not all ratios predict with same degree of accuracy. It also concluded that ratio of cash flow to total debts is the most important ratio to classify failed and non-failed companies.
Beaver (1968)	The non-liquid assets measures predict failure better than the liquid assets measures even in the year immediately before failure.
Altman (1968)	Four significant financial ratios are the ratios of earnings before interest and tax to total; assets, sales to total assets, market value to book value, retained earnings to total assets, and working capital to total assets are significant respectively.
Horrigan (1968)	Financial ratio possesses predictive ability at least in respect of financial difficulties.
Rao and Sharma (1971)	The ratio of working capital to total assets, retained earnings to total assets and EBIT to total assets were found to be significant in discrimination between sound and unsound companies.
Deakin (1972)	Business failure can be predicted as far as three years in advance with a fairly high accuracy using discriminant analysis.
Edmister (1972)	The predictive power of ratio depends upon the choice of analytical method and the selection of ratios. Predictive power of financial ratio is cumulative. No single ratio can predict failure nearly as well as small group of variables.
Blum (1974)	Discriminant analysis of financial ratios can classify failed and non-failed companies with overall accuracy of 93% - 95% one year prior to failure and 80% two year prior to failure.
Libby (1975)	Loan officers' random predictive accuracy was superior to random assignment and the ratio information was utilized correctly by loan officers.
Kennedy (1975)	Bankers judged financial ratio are approximately half as important as non- financial analysis. The impact of debt equity ratio and total assets were greater than current, quick and inventory turnover ratios in judgment of probability failure.
Altman et al. (1977)	The seven variables: ratio of EBIT/total assets, normalized measures of the standard error of estimate, EBIT/total interest payable, retained earnings/total assets, current assets/current liabilities, and common equity/tot al capital and total assets are significant in discrimination of failed and non-failed companies.
Taffler and Tisshaw (1977)	The ratios of profit after tax/current liabilities, current assets to total debts and the no of credit intervals are significant with 98.9% classification accuracy.
Bilderbeek (1977)	Ratios of retained earnings to total assets, value added to total assets, account payable to sales, sales to total assets, and net profit to equity were found significant to discriminate failed and non-failed companies.
Van Frederkslust (1978)	Liquidity (external coverage) ratio and profitability ratio (return on equity) are significant.
Takahashi et al.(1979)	Financial ratios from financial reports prepared for external users on the accrual accounting are more predictive than those prepared on cash basis.

In another study, Beaver (1968) has chosen 79 failed firms and 79 non-failed firms on the basis of assets size and industry over the period of 1954-1964. The main purpose of this study was twofold: (a) to emphasize the need for empirical verification of priori beliefs by citing one area where widely the same body based up on held beliefs were found to be erroneous when examined by empirical evidences and (b) to illustrate a method for empirically evaluating alternative accounting measures, it would be measured in term of their ability to predict events of interest to users of accounting data. Fourteen financial ratios were analyzed and tested at three level: (a) The dichotomous classification test, (b). the comparison of Mean value and (c) The likelihood ratios analysis. This study evidenced that the non-liquid assets measures predict failure better than the liquid assets measures even in the year immediately before failure.

Beaver's studies were criticized for being univariate in nature. Altman (1968) used multivariate discriminant analysis to discriminate between failed and non-failed companies using financial ratios. This study used thirty three bankrupt and thirty non-bankruptcy companies for period of 1946-1965. Specifically twenty two financial ratios have been investigated in bankruptcy prediction context using multiple discriminant analysis. These firms were selected on the basis of popularity in literature and potential relevancy to the study and some new ratios were also initiated in this study. Of twenty two financial variables, Altman (1968) developed discriminant functions of five financial ratios that were found significant indicators in failure prediction context.

$$Z = 0.012WC/TA + 0.14RE/TA+0.033EBIT/TA+0.006MV/BV +0.999S/TA$$

The discirmiant analysis correctly classififed 95% of the total sample for one year prior to failure, but predictive accurcy declined to 72% when data of two year prior to bankrutpcy were used. When the data of three, four and five years prior to failure were used, the predcitive accuracies were declined to 48%, 29% and 36% respectively and predictive power of the model became unreliable. This study further tested the model using secondary data irrespective of size and industry, and found the predictive accuracy of the model above 96%. Using scale vector, this study concluded that the ratio of earrings before interest and tax to total assets (EBIT/TA), sales to total assets (S/TA), market value to book values (MV/BV), retained earnings to total assets (RE/TA), and working capital to total assets (WC/TA) are the most powerful ratios in failure prediction context respectively.

The historical development of financial ratios was analyzed and presented by Horrigan (1968). The study presented financial ratios in a chronological form: (a) Origin, (b) 1900-1919, (c) 1920-1929, (d) 1930-1939, (d) 1940-1945 and 1946-1968. This study evidenced that use of ratios can be said to have begun with the advent of the current ratio in late 1890s. The criterion of 2 to 1 was appeared during 1900-19. The process of collecting average industry ratios and computing averages there from was begun by trade associations, universities, credit agencies, and individual analyst during 1920-1929. During 1930 -1945, studies focused on measuring efficiency of ratios as predictors of business financial difficulties. Studies on predictive power of financial ratios became more frequent after 1946. This study relates how ratio analysis has been developed in many countries and pointed out that ratio possess predictive ability at least in respect of financial difficulties.

Sharma and Rao (1971) used MDA technique to discriminate between sound and unsound companies. For this purpose, 26 ratios divided in into five categories were used: liquidity, profitability, leverage, activity and solvency ratios. A sample of 30 sound and 30 unsound firms were selected for building a discriminant function between sound and unsound from textile industries. List of unsound firms were selected from 18 takeovers by the government and 12 negative net worth during 1968-1973. This study revealed that the ratio of working capital to total assets (WC/TA), Retained earnings to total assets (RE/TA) and EBIT to total assets (EBIT/TA) were found to be significant in discrimination between sound and unsound companies.

In order to develop an alternative model to ones developed by either Beaver (1966) or Altman (1968), Deakin (1972) carried out a study on the basis of thirty two failed firms randomly from Moody's Industrial Manual for the year between 1964 and 1973. Each failed firm was matched with non-failed firms on the basis of industry classification, assets size and years of financial data.

Using fourteen financial ratios from Beaver (1968), Deakin found that Deakin's classification results using cash flow to total debt (CF/TA) ratios are quiet similar to and Beaver (1968). Deakin (1972) found that the ratio of net income to total assets (NI/TA) had the same overall accuracy as the cash flow to total debt ratio (CF/TD). It also revealed that the ratio of total debt to total assets (TD/TA) was the most accurate predictors except for three year prior. It attempted to improve the univariate

classification results linearly combining the fourteen variables for each of the five years prior to failure. The misclassification rates on the original samples for first three years were less than five percent. The descriptive classification indicated that the two groups are quite distinct that there is little group overlap. It also concluded that discriminant analysis can be used to predict business failure "as far as three years in advance with a fairly high accuracy.

With the objective to develop and test significance of financial ratios to predict the failure of small businesses, Edmister (1972) carried out a study. The study took sample firms: 42 loss borrowers and 262 non-loss borrowers were selected from small business administration (SBA) for the period of 1954 - 1969. Loss borrowers were designated as failures and non-loss borrowers were considered to be non-failures. This study tested 19 ratios that are found to be important in previous failure prediction studies using a zero one regression technique. It is concluded that the predictive power of ratio analysis depends upon the choice of analytical method and the selection of ratios. The ratios may be useful in predicting small business failure as it is also for predicting failure of medium and large business, where three annual statements are available for analysis. It also concludes that predictive power of financial ratio is cumulative. No single ratio predicted failure nearly as well as small group of variables and which were not significant predictors alone added discriminating ability to a function containing selected other variables.

Blum (1974) developed "The failing Enterprise Model" to assess the probability of business failure. In this study, discriminant model has been developed based on accounting data and financial market data which was designed to discriminate between the failed and non-failed firms. The sample of this study includes 115 failed firms during the years between 1954 and 1968 (with liabilities greater than $1million), and paired with non-failed firms similar with respect to industry, annual sales, number of employees, and fiscal years. Blum computed a function consisting of the following twelve variables: market rate of return, quick flow ratio, cash flow /total debt, fair market value of net worth to total debt, standard deviation of net quick assets/inventory, slopes of income and trend breaks of net quick assets/inventory. The independent variables include factors for both trend and variables. Data up to eight years prior to failure were collected when found available. However, five years of

data prior to failure were found optimal. The model has an overall accuracy of 93% - 95% when failure occurred within one year after the most recent statement date. The accuracy declined to 80% for prediction two years prior to failure and 70% for three years prior to failure.

Using fourteen financial ratios of Deakin (1972), Libby (1975) carried out a study to determine whether accounting ratios provide useful information to loan officers for predicting business failure. The accuracy of the information was judged on the basis of the accuracy of the loan officers' predictions. Libby's sample consisted of 60 firms out of 64 firms from Deakin (1972): thirty failed and thirty non-failed firms. Using principal component analysis-varimax rotation procedure, Libby identified five independent sources of variation within the 14 variable set. The reduced set classifications, comparing favorably with the entire 14 variables correctly re-classified 51 of the 60 firms based upon the derivation sample and 43 of 60 firms using double cross validation sample. The classification using all 14 variables were slightly better for the derivation sample but slightly worse of the five variables set. Libby used the reduced variable set in the study.

Libby concluded that the loan officers' random predictive accuracy was superior to random assignment and ratio information was utilized correctly by loan officers. Besides it concluded that (a) there is no significant difference between the mean predictive accuracy of small and large bank representatives. (b) There is no significant correlation between predictive accuracy and loan officers' characteristics. (c) There is no difference in short term, test-retest reliability between user groups and (d) there is uniform interpretation of the accounting data across bankers.

In contrast to the previous studies, Kennedy (1975) carried out a study with the experience of bank personnel using financial ratios (equity debt ratio, total assets, current ratio, quick ratio and inventory turnover ratio) to make subjective prediction of bankruptcy. In this study, Bays' theorem was used as human information processing for this problem. Twelve companies, six bankrupt and six non-bankrupts were selected from Beaver's sample of 79 pairs of failed and non-failed firms. Twenty four experienced loan officers and credit analyst were participated. Then, three industries home appliances, motor companies and electronics industries were

identified. The participants gave their judgment of probability of bankruptcy within each industry.

This study revealed that bankers judged financial ratios are approximately half as important as non-financial analysis. A Friedman multiple sample analysis of variance (MANOVA) by ranks was used to test for (1) main effect of industry class, (ii) items of information and (iii) iteration effect of industry and items of information. The stuyd revealed that the impact of debt to equity ratio and total assets was not significantly different. It is also found that the impact of current, quick and inventory turnover ratio were not different. However, the impact debt equity ratio and total assets was greater than current, quick and inventory turnover ratio. The equity debt ratio had greater accuracy of bankrupt firms in both electronic and motor companies while it was not found significantly different among household appliances of bankrupt and non-bankrupt firms. The current ratio was less accurate for bankrupt firms in both electronic and household firms while quick ratio less accurate for bankrupt firms in household appliance industries. The differences in accuracy of inventory turnover ratios were significantly in all industries. In house hold industries, it was found more accurate for bankrupt firms but in other industries it was less accurate. Total assets were less accurate for bankrupt firms of electronic industries.

Toffler and Tisshaw (1977) developed a Z model for the prediction of enterprise insolvency and the evaluation of corporate creditworthiness by bank, investment houses and credit controllers. A statistical technique linear discriminant analysis was applied to a sample of 46 failed and 46 non-failed companies matched by size and industry. The corporate failure was defined as the firm's entry into receivership, creditors' voluntary liquidation, compulsory winding up by order of the court or the government action undertaken as an alternative. Extensive statistical analysis finally isolated that set of ratios which discriminated best between the two sets of firms and resulted four financial ratios have been found significant in discriminant model.

This study concludes that a Z-score>0.2 indicates an enterprise with good long term prospects, with a score below 0.0 indicating probable failure. It is a zone of ignorance, where misclassifications are likely to occur Z scores between 0.00 to 0.20. The model was applied to the original ninety two companies and the correct classification into the failed and non-failed companies was found to be 98.9%.

Altman et al., (1977) developed a new ZETA model owing to change in financial reporting standards and accounting practices which included retailing companies and companies with large assets sizes. Their data sample consists of fifty three failed companies and fifty eight non-failed US manufacturing and retailing companies. Fifty of the companies failed during the 1975 and two in 1962 and one in 1967. Twenty eight variables were selected based on their popularity in previous studies. The new model also used multivariate discriminant analysis (MDA) but somewhat different variables to predict bankruptcy. Unfortunately, the ZETA model parameters were not published, as the model is the property of a private US enterprise specializing in investment analysis. However, the seven variables have been used in the model are as follows:

a = EBIT/total assets

b = Normalized measures of the standard error of estimate around a 10 year trend in 'a'.

c = EBIT/ total interest payable

d = Retained earnings/ total assets

e = Current assets/current liabilities

f = Common equity/total capital.

g = Total assets

Bilderbeek (1977) analyzed a sample of 38 firms which went bankrupt from 1950 through 1974 and 59 ongoing companies, but found that only 85 firms had sufficient data for analysis. Twenty (20) variables were selected and analyzed using stepwise procedure of MDA and arrived at a five variables model was developed.

$$Z = 0.45 – 5.03RE/TA – 1.57Valueadded/TA + 4.55AP/S + 0.N/TA + 0.15\ NI/E$$

Out of five financial ratios, the signs of two financial ratios: retained earnings to total assets (X_4) and value added to total assets two (X_5) are negative. On the contrary to expectations, for this model, the negative scores indicate a healthy situation and positive scores indicates a failure classification. The results were mildly impressive, with accuracies ranging from 70%-80% for one year prior and remaining surprisingly stable over five year period prior to failure due to the facts that there is no liquidity variables and the stable role of the value added measures.

Van Frederkslust (1978) model included tests on a sample of 20 failed and a matched non-failed sample of observations for 1954 through 1974. All firms were quoted on the Netherlands Stock Exchange. In additions to the traditional research structure that is, linear discriminant, single year ratio, equal a priori probability of group membership assumptions; it had performed several other tests. Those included (i) looking at the development of ratios overtime as well as analyzing ratio levels, (ii) varying the priori assumption of group membership likelihood to conform to specific users of the model and varying expected cost of models, taking into considerations the specific users' utility for losses. Van Frederkslust's developed the following initial model:

$$Z = 0.5293 + 0.4488 \text{ liquidity ratio} + 0.2863 \text{retarun on equity}$$

The result of the one period model indicates that the estimated chances of misclassification into the two groups are 5% for the failed group and 10% for the non-failed group.

Takahashi, Kurokawa, and Watase (1979) analyzed 36 pairs of failed and non-failed manufacturing firms listed in Tokyo Stock Exchange Ltd. which are listed from 1962-1976. The accuracy of the model on original and holdout samples (i.e. four failed and 44 non-failed firms) was stimulated based on various cut off score criteria. Type I error was found to be quite low for the original sample (range 0.00%- %16.7%) and nil or very low on holdout samples. The type II error rates ranged greatly, from 0.00% to 52.8%, indicating the trade-off between Type I and Type II errors as one varies the cut off score. This study concludes that the models with several years of data for each firm outperformed a similar model with data from only one year prior to failure. The study further found that absolute financial statement data contributed to improve classification accuracy and data from financial reports prepared for external users on the accrual accounting were more predictive than those prepared on cash basis.

2.2.3 Review of major studies during 1980s and 1990s

During the period 1980s and 1990s, many studies used discriminant analysis, linear repression and logistic regression analysis in prediction of corporate failure. Some of the notable studies are Ohlson (1980), Meyer and Pifer (1980), Gupta (1983), Zavgren (1985), Yadav (1986), Altman et al., (1994), and so on. The major findings and conclusions of these studies have been presented in Table. 2.3.

Table 2.3
Review of major studies during 1980s and 1990s

Studies	Major findings and conclusions
Ohlson (1980)	The standard deviations of the ratios were larger for bankrupt firms compared non-bankrupt firms.
Kaveri (1980)	The ratios of current assets to current liabilities, stock to cost of goods sold, current assets to sales, net profit to total capital employed and net worth to outside liabilities were found to be statistically significant and acceptable to the bankers.
Dombolena and Khoury (1980)	The standard deviation of ratios showed significant differences between failed and non-failed companies prior year to failure. In addition, the stability of the liquidity ratio constitutes a necessary measure of corporate solvency.
Meyer and Pifer (1980)	It is useful to use financial ratios along with other factors such as local economic conditions, general economic conditions, quality of management, and integrity of employees to make a better prediction of bank failure.
Sethi (1981)	Profitability ratios are most forewarning indicators of sickness found in private sectors and the government undertakings.
Srivanstava (1981)	The most important seven ratios are the ratios of net worth to total assets, net block to net worth, net profit to total assets, total debts to net worth, current assets to current liabilities, capacity utilization ratio and plant utilization ratio with 1% classification error.
Sharma and Mahajan (1980)	Only two indicators- return on assets and current ratios are found significant ratios in discriminant functions. It also concludes that failure can be predicted either by analysis of causes of failure or financial performance indicators.
Ko (1982)	Each sign was in agreement with each variable's economic meaning.
Vinod (1983)	Beaver (1968) financial ratios showed better result in discriminant function as against the function using the ratios of Altman (1968).
Gupta (1983)	An enterprise with an inadequate equity base and little 'reserve strength' are sickness prone. Liquidity ratios proved to be very poor predictors.
Kanta (1984)	The solvency ratios have better predictive power of corporate bankruptcy followed by profitability, cash flow, debt service, assets turnover and liquidity respectively.
Yadav (1986)	The companies with heavy debt and inadequate equity base are more prone to failure.
Zavgren (1985)	Logistic model of one year prior to failure can classify more accurately than models of many years prior data.
Ariyo (1986)	There is significant degree of consensus among judges regarding the relative importance of financial ratios to bankruptcy prediction tasks. Short-term liquidity as important predictors of financial distress
Aziz and Lawson (1989)	Debt levels were decreasing in proxies of financial distress costs.
Altman et al., (1994)	The excellent classification accuracy based on data from the two years prior to distress.
Matsumoto et al. (1995)	Ratios like Research and Development expenses/sales, profit/sales ratios and MV/BV price/sales were significant for manufacturers, while selling periods, collection period, sales/inventory, gross margin, sales/receivable, receivable/ inventory, cost of goods/inventory and return on investment are for retailers.
Shirata (1998)	Bankrupt firms had indicated their worse financial position for a considerable time before they actually went bankrupt.

Firsts of all, Ohlson (1980) used the econometric methodology of conditional logit analysis on a sample of 105 bankrupt manufacturing companies which had experienced bankruptcy during the period 1970-76 and compared with 2058 non-bankrupt manufacturing companies in contrast to paired sample design of previous studies. First, this study used profile analysis to explain that how ratio(s) deteriorate as one moves from two years prior to failure to one year prior or failure of firm. The standard deviations of the ratios were larger for bankrupt firms compared non-bankrupt firms, the differences were found to be significant as 5% level. Three sets of estimates were computed for the conditional logit model. The results indicated that the four factors derived from financial statements were statistically significant in assessing the probability of bankruptcy. They are: size, financial structure i.e. Total loan to total assets (TD/TA), performance measure (net Income to total assets) and measures of current liquidity (working capital to total assets or current assets to current liabilities and working capital to total assets jointly). The conclusions of this study are that (i) the predictive power of any model depends upon when the information (financial report) is assumed to be available and (ii) the predictive powers of linear transforms of a vector of ratios seem to be robust across (large sample) estimation procedures. Hence, more than anything else, significant improvement probably requires additional predictors.

Kaveri (1980) conducted a study to evaluate the capability of financial ratios to predict the borrowers' health on the basis of 524 small industry units comprising of goods, regular and sick units was taken for the period of 1967-1973. The units were defined as good, regular and sick on the basis of irregularity in the account. A set of twenty two (22) financial ratios were analyzed to build a discriminant model to predict good, regular and sick units. These financial ratios were grouped into working capital, turnover, assets utilization, profitability and financial stability. Of these ratios, five ratios: ratios of current assets to current liabilities, stock to cost of goods sold, current assets to sales, net profit to total capital employed and net worth to outside liabilities were found to be statistically significant and acceptable to the bankers.

MDA was applied to develop a model consisting of five ratios to assign units in the sample to one of the groups' viz., good, regular and sick. The model was tested on initial sample and hold out sample for a period up to seven years before the event. The

model correctly classified 76% of units in initial sample and 69% in the hold out sample for one year before the event. The accuracy of the model was reduced as the lead time before the event increased. It is logically true that as the lead period before the event increases, the ratios of a firm become less and less clear and therefore, the accuracy of the model would be reduced accordingly. The accuracy of the holdout sample was lower than the accuracy of the model in the initial sample.

Dambolena and Khoury (1980) developed a stability model using stability and levels of financial ratios as explanatory variables in the derivation of discriminant function. The main objective of this study was to test the effect of stability of financial ratios on the prediction of corporate failure. Nineteen financial ratios were selected as predictor variables and their measures of stability were used for the purpose of prediction in this stability model. A sample of 46 firms was taken and four measures of stability were computed for each of the 46 firms for the period of 1969-1975. The four measures of stability were:

- Standard deviation of the ratios over three years period
- Its standard deviations over four year period.
- Its standard error of estimates around a four linear trend and
- Its coefficient of variations over four year period.

When empirically tested, the ratios with their standard deviation and ratios alone provided almost same result for one year prior to failure. However, the improvement was observed for three years before failure. When ratios alone were used, there was 70% predictive accuracy of the model for five years before failure, but on the other hand it increased to 83% on initial sample and 78% on validated sample five years prior to failure, which indicates an improvement over the results of previous studies. The standard deviation of ratios showed significant differences between failed and non-failed companies prior year to failure. In addition, the stability of the liquidity ratio constitutes a necessary measure of corporate solvency.

Meyer and Pifer (1980) developed a linear regression model for prediction of bank failure. The 39 failed banks which have experienced failures during the period 1948-1965 were paired with solvent matching banks. The paired sample was taken on the

basis of location, size, age, and regulatory requirements. Thirty two (32) financial ratios were used as independent variables in the various regression models tested. Financial ratios were computed for the period of six years prior to failure. A stepwise regression program forward selection and backward reduction at each step was used. It correctly classified predicted 80% of initial sample a hold out sample 72% with a lead time of one to two years before failure. When lead time was three or more years, the model failed to discriminate between failed and non-failed banks. Thus, it was concluded that financial ratios were to be used along with other factors such as local economic conditions, general economic conditions, quality of management, and integrity of employees to make a better prediction of bank failure.

With the objective to test the reliability of financial ratios as forewarning indicators of sickness in the case in Indian central government undertakings to identify the symptoms of sickness and ascertain the causes of sickness in these undertakings, Sethi (1981) used non-parametric test to examine the reliability of various ratios to identify symptoms of sickness based on financial data of 1976 -1980 taking equal numbers of sick and non-sick undertakings from chemical and pharmaceutical industries (i.e. seven industries from each group). This study revealed that profitability ratios, debt service ratios, liquidity ratios correctly classified sick and non-sick undertakings. However, classification errors based on liquidity ratio were fairly high when the sick and non-sick undertakings were classified. Therefore, this study suggested that profitability ratios are most forewarning indicators of sickness found in private sectors and have proved equally efficient in case of government undertakings. This study also revealed that major causes of problems are pricing policy, inability of managerial personnel, non-availability of trained manpower, inadequate marketing efforts, and recessionary conditions.

To demonstrate between sick and healthy units, Srivastava (1981) used a combination of operational and financial parameters. The misclassification error was found smallest at 1% when seven ratios were used. The seven ratios were: the ratios of net worth to total assets, net block to net worth, net profit to total assets, total debts to net worth, current assets to current liabilities, capacity utilization ratio and plant utilization ratio. The classification error rate was 15% linear discriminant analysis which was reduced to 10% when only five variables were used. It is further reduced to

5% when the first three ratios were used with technical and operational ratio. The accuracy improved to 100% with the application of all the seven variables in the model.

Sharma and Mahajan (1980) selected 46 failed firms from Moody's Industrial Manual they were failed during 1970-1976. The failure firms were selected on the basis of availability of financial data. The firms were paired on the basis of firm types as classified by Moody's Industrial Manual. Eleven financial performances indicators were selected to Moody's Industrial Manual for five years prior to failure to discriminate the failed firms from non-failed firms. The main purpose of this study was to identify indicators of failure and develop mathematical model for predicting failure. Linear discriminant functions for the five years prior to failure were developed and tested its validity to predict business failure. The results showed that two indicators - return on assets (ROA) and current ratios (CA/CL) are significant in discriminant functions. The original sample classification accuracies of discriminant functions were 92%, 78%,74%, 75% and 81% for year one through five respectively. Using hold out sample, classification accuracies of discriminant functions for one to five years were 92%, 78%, 74%, 73% and 77% respectively. Thus, this study concludes that failure can be predicted either by analysis of causes of failure or financial performance indicators. Only through the investigation of failures and successes, the determinants of business performance can be identified and predicted.

Ko (1982) analyzed 41 pairs of bankrupt and non-bankrupt Japanese firms from 1960 through 1980. Several accounting corrections, adjustments and transformations, in addition to variable trends, were applied to the data set in order to reduce the bias held to be inherent in conventional Japanese reporting practices. It compared linear model against a linear model with first order interactions, and also a quadratic model. Besides, this study also examined the discriminant model using factor analysis for orthogonal variable transformation. On the basis of classification results, a five variable linear independent model was selected as the best model; it yielded 82.9% correct classification rate by Lachenbruch test verses 90.8% for original sample data. The model developed by Ko is as follows:

Z = 0.868EBIT/Sales + 0.198 inventory turnover two year prior/inventory turnover three year prior – 0.048 standard deviation of net income (four years) + 0.115market value/total debts.

This study concluded that with respect to the variable of the model, that each sign was in agreement with each variable's economic meanings and that three variables EBIT/sales, working capital/total debts, and market equity/total debts were similar to Altman (1968). Fourth variable in the model was inventory turnover change ratio and the standard deviation of net income over four years as fifth ratio of the model.

Vinod (1983) carried out a study to test the predictive capability of the ratios to predict the bankruptcy of a concern. The study selected 121 Indian companies comprising of 63 bankrupt/takeover firms and 58 and 58 matching firms for the period of 1967-1981. The study used 24 financial ratios and computed t-values to judge the statistical significance differences between two groups. This study concluded that MDA is inappropriate in Indian context. It also revealed that Beaver (1968) ratios showed are found better to discriminate failed and non-failed companies in comparison Altman (1968).

In order to refine the Beaver's Model, Gupta (1983) carried out a study to examine both statistically and in terms of logic, a wide variety of ratios, and to determine the best set of ratios not only for the specific purpose of identifying potential sick firm but also for the general purpose of ordering firms according to the financial health. This study was carried out on the basis of 41 textile companies of which 21 were non-sick and 20 were sick. The non-textile companies include 39 of which 21 were non-sick and 18 were sick. The matching was done on the basis of product or product manufactured, age and size measured in terms of paid up capital, assets and sales. In all, fifty six (56) ratios were tested for their efficiency in discriminating between sick and non-sick companies. Among the profitability ratios , the ratios of EBIT to total sales (EBIT/NS) and operating cash flow to sales (CF/NS) were found the be the best ratios in discriminating between sick and non-sick companies. The classification errors for these ratios were 11- 13% in 1962 and 8% in 1964 and still less thereafter. While little inferiors ratios were EBIT/TA+ Depreciation, OCF/TA + Depreciation, and EBDIT/Interest + debt installments. The classification errors for these ratios were around 11-16% in 1964 but thereafter it fell to just around 5% or less. Among the balance sheet ratios, net worth to debt and total debt to total tangible assets were found to be the best among the ratios. The average classification ratios for these ratios were 18.6% and 20.3% respectively. This study observed that companies with an

inadequate equity base had little 'reserve strength' are sickness prone. Besides, the liquidity ratios proved to be very poor predictors which contradict traditionally attached to liquidity analysis in appraising corporate health.

In Indian context, Kanta (1984) aimed to assess the specific ratios claimed to be efficient prediction of sickness by Beaver (1966), Altman (1968), Gupta (1983) and Vinod (1983). This study was based on financial data of public limited manufacturing companies in liquidation in the private corporate sector and includes companies' takeover by the government of India under Industrial Development Regulation Act. The sample includes 13 failed and 13 non-failed public manufacturing undertakings. Non-sick manufacturing companies were selected from the same industries and time being measured in terms of total assets and paid up capital. The data was collected mainly from the Bombay Stock Exchange official directory and also in the library of the department of Enterprise Law Board. The period of study is 1965-1980. The data collected for each enterprise for six years prior to year of failure. To achieve objective of the study, nineteen financial ratios: six profitability ratio, three cash flow ratio, two liquidity ratio, five solvency ratio, two debt service ratio and one turnover ratio, were analyzed using dichotomous classification test and t-test.

The dichotomous classification test showed that NPAT/TA, OCT/Total Debt, WC/TA, NW/TD, NW/TA, TD/TA, EBIT/ Interest and Sales/TA have been found to be important ratios with high discriminating power. The classification error rate of solvency ratios were lower than the best profitability and other group of ratios in all six years before failure which indicates that solvency ratios have better predictive power of corporate bankruptcy followed by profitability, cash flow, debt service, assets turnover and liquidity respectively. Thus liquidity ratios are poor predictor of insolvency in contrast to other ratios. This study also reveals that the mean ratios of EBDIT/Sales, EBDIT/TA+DEP, EBDIT/TA differs significantly up to five years before date of bankruptcy.

Using logistic analysis, Zavgren (1985) developed a model of financial variables to predict financial distress over five year period. This study consisted of forty five paired of failed and non-failed US companies. The failed companies consisted of entire population of companies that failed between 1972 and 1978 for which data was available. A failed enterprise defined as having filed for chapter-X or XI bankruptcy proceedings. Five log models for one to five years prior to failure were developed.

The outputs of models were analyzed for each enterprise and an optimal cut off probability for each of five models that minimized classification errors was determined and used to classify the companies as either failed or non-failed companies. On the basis of sixteen pairs of failed and non-failed companies from 1979 to 1980 periods, this study revealed that predictive classification accuracies of the models were 82%, 83%, 72%, 73% and 80% for 1, 2, 3, 4 and 5 year prior to failure and 69% accuracy in hold out samples. It evidenced that logistic model of one year prior to failure can classify more accurately than models of many years prior data.

In Indian context, Yadav (1986) assessed the quality of financial ratios as an analytical technique for Indian context to evaluate the performance of business enterprises and verify the widely held beliefs in accounting literature regarding the comparative utility of various financial ratios. This study had also attempted to test systematic analysis of role of financial ratios and develop a multivariate model performing the best overall job in the prediction of corporate failure. This study computed and empirically tested thirty six ratios using univariate as well as multivariate techniques on initial sample of 78 companies (39 failed companies and 39 non-failed companies). The financial statement of selected companies for the period from 1966-1978 were collected directly from the enterprise annual reports from Library of Enterprise Law Boards, Government of India and various issues of Bombay Stock Exchange Ltd. Directory. Using univariate analysis, it is concluded that there are relative difference in the predictive power of financial ratios. The ratio of cash flow to total tangle assets was found the ratio with high predictive power the followed by the ratio of the earnings before interest and taxes to total tangible assets. The solvency ratios were found to be more reliable predictors of corporate health over the liquidity ratios. All liquidity ratios were proved be very poor in prediction of corporate health. This study reveals that companies with heavy debt and inadequate equity base are more prone to failure. The study also developed a multivariate discriminant model containing four independent ratios serving as the best predictive variables using various statistical techniques: t-test, factor analysis, and discriminant analysis as follows:

Y = 19.892EBIT/TA+0.0047CA/CL+0.7141NS/TA+0.4860defensive assets/ total operating expenditure

The score falling between 1.33 and 1.52 is defined as "The Zone of Ignorance". If the individual discriminant score is less than 1.33, it is to be classified as potential failed enterprise and the z-score higher than 1.52 is non-failed enterprise.

Ariyo (1986) suggested that there is significant degree of consensus among judges regarding the relative importance of financial ratios to bankruptcy prediction tasks. It concluded that statistical models that use short-term liquidity as important predictors of financial distress. Aizi and Lawson (1989) attempted that how cash flow reporting is important to predict financial distress of a firm. The study used a sample of 49 bankrupt companies between 1973 and 1982 and was matched with non-bankrupt 49 companies. Taking liquidity or debt as dependent variable, two simple linear models of ratios were developed and tested. The descriptive statistics mean median, minimum, maximum and standard deviation of each ratio and overall coefficient of determination was computed. This study found that there was a positive relationship between the optimal liquidity and the cost of liquidity of its assets. The study evidenced that debt levels were decreasing in proxies of financial distress costs. It is also concluded that operations cash flow, lender cash flow, net capital investment, and taxes paid are important variables for distress. For the prediction purpose, the model proved to be very accurate in classification of companies into sick and non-sick groups.

Altman, Marco, and Varetto (1994) developed and tested a distress classification model for Korean Companies. Using a sample of 34 firms from the most recent data 1990-1993 period and a matched (by industry and year) samples on non-failed firms, the observed and classified the accuracy of two models. Both models used measures of firm size, assets turnover, solvency and leverage with one model available for testing only on publicly traded companies and one model is applicable to all public and private entities. It is observed that there is excellent classification accuracy based on data from the two years prior to distress. Although, the accuracy drops off after two year prior (t-2), the models still provided effective early warnings of distress in many cases. The results of this study were of particular relevance in the current financial market scenario of increased deregulation and greater individual financial institution decision making.

Matsumoto, Shivswamy, and Hoban (1995) attempted to find the financial ratios and group of ratios which were perceived important by security analyst when examining firms. By selecting 63 ratios from previous studies and grouping them into 13 groups, significance importance of these ratios and subgroup of ratios were studies to determine that the analyst perceived important while analyzing firms' retailers and manufactures firms. The study found that the most important ratios are growth rate, profitability and valuation ratios and least important is leverage and earnings per shares (EPS). Ratios like Research and Development expenses/sales, profit/sales, and MV/BV price/sales were significant for manufacturers, while selling periods, collection period, sales/inventory, gross margin, sales/receivable, receivable/ inventory, cost of goods/inventory and return on investment (ROI) are for retailers.

Shirata (1998) presented some empirical results regarding financial ratios as predictors. The model proposed in this study is a universal model which is independent of industry and size with more than 86.14% accuracy. This accuracy is significantly more accurate in predicting bankruptcy for Japanese firms. This study also proved that Japanese bankrupt firms had indicated their worse financial position for a considerable time before they actually went bankrupt.

2.2.4 Review of major recent studies

More recently, Bonginni et al. (2000), Charitou et al.(2004), Nam and Jinn (2000), Kim and Gu (2006), Ugurlu and Aksoy (2006), Minussi et al (2008), Appiah and Abor (2009), Yap et al, (2010), Pal (2013) and so on have been carried out studies for corporate failure. The major findings and conclusions of these studies have been presented in Table 2.4.

In the context of Korea; Bongini, Ferri, and Nah (2000) studied the relationship between corporate performance and financial vulnerability immediately before the Korean crisis and assess to what extent such financial vulnerability effectively led to corporate distress during the crisis and in its aftermath. This study used 555 firms, representing 73% of the total listings on the Seoul Stock Exchange. These data contain income statement and balance sheet information for the year end 1996.

Table 2.4
Review of major recent studies

Studies	Findings and conclusions
Bonginni et al.(2000)	Pre-crisis leverage is systematically high for both poor performing/slow growing firms and for profitable/fast-growing firms in Korea. Finally, It is concluded that liquidity constraints are more stringent for non-failed firms.
Charitou et al.(2004)	A parsimonious model of three financial variables, profitability, an operating cash-flow and a financial leverage variable can yield an overall correct classification accuracy of 83% one year prior to failure.
Nam and Jinn (2000)	Most of firms that went bankrupt during the Korean economic crisis from 1997 to 1998 had shown signs of financial distress long before the crisis.
Kim and Gu (2006)	A firm with low earnings before interest and taxes (EBIT) and high total debts are more likely to go bankrupt.
Ugurlu and Aksoy (2006)	Logistic regression model is found to have higher classification power and predictive accuracy over the four years prior to bankruptcy, than the discriminant model.
Zhou and Elhag (2007)	The signs of a potential business bankruptcy are evident well before actual bankruptcy occurs. A four-variable logit model built up in this study correctly predicted 81% with 92% accuracy from 100 matched-samples 1 year prior to bankruptcy.
Minussi et al (2008)	When current assets and current liabilities are split into two sub-groups - financial and operational - they are more effective in explaining default than the traditional ratios associated with liquidity.
Appiah and Abor (2009)	Only two ratios cash flow to sales and days sales in receivable in model are found significant to discriminate among failed and non-failed companies.
Jalil and Sori (2009)	MDA can classify with more than 80 percent accuracy. Two ratios cash flow to sales (CF/NS) and days sales in receivable (DSO) were determined significant in discriminating failed and non-failed companies.
Yap et al, (2010)	Liquidity and profitability ratios are most useful in predicting an enterprise's success or failure.
Pal (2013)	Three financial ratios: return on investment, debtor turnover ratio and fixed assets turnover ratio are found statistically significant to classify failed and non-failed Indian steel companies.

The crisis precipitated in November 1997, the Korean economy had clearly worsened since August 1997. The study found that pre-crisis leverage is systematically high for both poor performing/ slow growing firms and for profitable/fast-growing firms. Pre-crisis leverage raises the probability of bankruptcy, which is lower for firms: (a) relying more on (renegotiable) bank credit; (b) with less inter-firm debt; and (c) having higher interest coverage ratios. Finally, none of these liquidity variables help to predict bankruptcies for failed firms suggesting that liquidity constraints are more

stringent for non-failed firms. Thus, in a systemic crisis, it is not necessary that only the strong healthy firms that survive.

Charitou et al. (2004) carried out this study with the purpose of the development and validation of a failure classification model for UK public industrial companies using logit analysis and neural networks. The dataset consists of 51 matched-pairs of failed and non-failed UK public industrial firms over the period 1988-1997. Prediction models are developed for up to three years prior to the failure event. The models are validated using an out of sample period ex-ante test and the Lachenbruch technique. This study indicated that profitability, an operating cash-flow and a financial leverage variable can yield an overall correct classification of failed and non-failed companies one year prior to failure. It can assist managers, shareholders, financial institutions, auditors and regulatory agents in the UK to forecast financial distress.

Another study in the context of Korea; Nam and Jinn (2000) studied the predictive model of business failure using the sample of listed companies that went bankrupt during the period from 1997 to 1998 when deep recession driven by the International Monetary Fund (IMF) crisis started in Korea. Logit maximum likelihood estimator is employed as the statistical technique. The model demonstrated decent prediction accuracy and robustness. The Type I accuracy is 80.4 per cent and the Type II accuracy is 73.9 percent. The accuracy remains almost at the same level when the model is applied to an independent holdout sample. In addition to building a bankruptcy prediction model, it is found that that most of firms that went bankrupt during the Korean economic crisis from 1997 to 1998 had shown signs of financial distress long before the crisis. Bankruptcy probabilities of the sample are consistently high during the period from 1991 to 1996. The evidence of study can be seen as complementary to the perspective that traces Asian economic crisis to the vulnerabilities of corporate governance of Asian countries.

Ugurlu and Aksoy (2006) applied discriminant and logit models to identify predictors of corporate financial distress on the basis of a sample of 27 failed and 27 non-failed manufacturing firms listed in the Istanbul Stock Exchange over the 1996-2003. The study found that the logistic regression model is found to have higher classification power and predictive accuracy, over the four years prior to bankruptcy, than the discriminant model.

Kim and Gu (2006) developed a logit model and compared its prediction accuracy with discriminant model. The two-variable logit model, resulting from a forward stepwise selection procedure, correctly predicted 94% of the in-sample restaurant companies and 93% of the out-of-sample firms 1 year prior to bankruptcy. Although the results showed that the two models are equally effective in predicting restaurant bankruptcy, the logit model is preferred for restaurant bankruptcy prediction because of its theoretical soundness. The estimated logit model suggests that restaurant firms with low earnings before interest and taxes (EBIT) and high total debts are more likely to go bankrupt. To reduce bankruptcy risk, restaurant operators should not only adopt a prudent financing policy but also have tight operating cost control to increase EBIT.

Zhou and Elhag (2007) evidenced that signs of a potential business bankruptcy are evident well before actual bankruptcy occurs. For managers, creditors, and all other concerned parties this lag allows time to take remedial action. Therefore, building models, which signal approaching financial failure, have been an important part of corporate finance literature to help management refocus their energy, revaluate their corporate strategy and eliminate losses. Setting the optimized cut-off point process is employed in this study; and in-sample t test is chosen to examine the selected predictors. A four-variable logit model, resulting from a forward-stepwise selection procedure, were built up in this study, it correctly predicted 81% one year prior to bankruptcy.

Minussi, Soopramanien, and Worthington (2008) dealt with statistical modeling to predict failure of Brazilian companies using a new set of explanatory variables. Initially, a model is constructed using 22 traditional ratios, but the multi-co linearity was found in this model. Thus, adding a group of 6 non-conventional ratios alongside traditional ratios improves the model substantially. The main findings in this study were: (a) logistic regression performs well yielding a sound model applicable in the decision making process; (b) the complementary list of financial ratios plays a critical role in the model proposed; (c) the variables selected in the model showed that when current assets and current liabilities are split into two sub-groups - financial and operational - they are more effective in explaining default than the traditional ratios associated with liquidity; and (d) those variables also indicate that high interest rates

in Brazil adversely affect the performance of those companies which have a higher dependency on borrowing.

In the context of UK, Appiah and Abor (2009) carried out a study of private medium-sized failed and non-failed manufacturing firms during the period 1994-2004 to determine whether corporate failure can be predicted. The estimation sample consists of 62 firms, grouped into two, 31 failed and 31 non-failed firms. The failed firms are classified group 0 and the non-failed firms are classified as group 1. The paired sample approach was adopted, because it is simple, easily understood, and relatively manageable to the researchers. Using multivariate discriminant analysis, this study concluded that the net profit margin is superior to the gross profit margin in discriminating between failed and non-failed UK manufacturing companies.

In order to recognize the indicative financial ratios, which discriminate between failed and non-failed firms, Sori and Jalil, (2009) carried out a study to accommodate some important results relevant to authorities and stakeholders. The capability to detect potential financial problems at a premature stage is absolutely essential because it helps to ensure business, financial, economic and political environment stability.

A total of 17 failed companies were identified during the year of determination that was paired to the non-failed companies using the criteria: same industry, failure year and closest asset size. Paired samples of failed and non-failed companies from year of 1990 to 2000 were used in this analysis. The prediction model was derived are as follows:

$$Z = 0.873 + 8.951CF/TA - 0.138 \text{ square root days sales in receivable}$$

The results of this study showed good performance with more than 80 percent accuracy. Two ratios cash flow to sales (CF/NS) and days sales in receivable (DSO) were determined significant out of 64 financial ratios to discriminate among failed and non-failed Singaporean companies.

Yap, Yong, and Poon (2010) attempted to develop a discriminant model of financial ratios in Malaysian context. Financial Statement data from the annual reports of selected failed and non-failed public companies listed in the Bursa Malaysia were used from a ten-year period starting 1996 until the end 2005. Data of failed companies

were obtained for five years prior to failure. Companies selected are from the manufacturing sector and a total of 32 failed companies are matched with 32 non-failed companies. Paired samples of failed and non-failed companies are used. Each of the group will be divided into half, of which 16 from each group will be used for the development of the model and the other 16 will be used as secondary or validation sample (the holdout sample).

Pal (2013) carried out a study to determine financially healthy and weak steel companies in India using discriminant analysis for the period of 1992-2011. This study initially used eight financial ratios and developed a discriminant function of three financial ratios: return on investment, debtor turnover ratio and fixed assets turnover ratio are found statistically significant to classify failed and non-failed companies. This study concluded that to become financially healthy, a company should improve return on investment (ROA) by managing its debtors and fixed assets effectively and efficiently.

A strong discriminant function was constructed with seven ratios: Seven financial ratios were selected among the sixteen ratios, namely CF/TD, CF/TD, TD/TA, WC/TA, RE/TA, EBIT and NI/NS found to be significant in its discriminating power and the classification results showed high predictive accuracy rates. More specifically, MDA model has good predictive abilities with accuracy rates of 90% on average for the analysis sample and 89% on average for the hold-out sample for the five years prior to actual failure. As compared to the previous studies carried out in Malaysia, it was found that the correct classification rates are the highest when both the analysis and holdout samples are considered. Results suggested that there is a conclusive relationship between financial ratios and enterprise health and business failures and financial ratios do have predictive power as to whether an enterprise will be successful or fail. Results revealed that the ratios that measures liquidity and profitability are most useful in predicting an enterprise's success or failure.

2.2.5 Review of Nepalese studies

Apart from the studies above, some attempts have been made to assess financial ratios as predictors of corporate failure in Nepalese context. Pradhan (1986) analyzed and interpreted financial ratios so as to determine their behavior in Nepalese manufacturing and non-manufacturing group of corporations, and also in sick and non-sick groups of corporations. This study selected 10 manufacturing and 10 non-manufacturing corporations. The necessary data for this study was chosen from the financial statements from 1973-1984. Twenty one ratios were computed and grouped them into five groups: liquidity, turnover, profitability, leverage, assets structure ratios.

Using univariate approach, each ratio was examined individually for the two groups - (a) manufacturing and non-manufacturing and (b) sick and non-sick groups. Although liquidity, turnover, assets structure, and leverage ratios of sick corporations were higher, they were statistically insignificant between sick and non-sick corporations except the ratios of net working capital turnover (NS/WC), current assets to total assets (CA/TA), and receivable to total assets (R/TA). Thus, financial ratios of sick companies are more deteriorating than that of non-sick companies. Short term liquidity ratio is an important in prediction of corporate sickness in Nepal.

Another study, Pradhan (1994) cocnluded that the major causes of financial distress in Nepal are frequent changes in govermnet policies, problems of raw materials, power, skill labour, and poor manangement. It is also revealed that the major symptoms of financial distress perceived by the executives are decline in capacity utilization, and quality product and services.Similarly, persistent shortage of cash and default in the payment to creditors have been appeared to the important symptoms of financial distress. It is also revealed that the net profit margin and short term liquidity ratios are important indicators of financial distress (Pradhan, 2006). It is concluded that there are no significant differences between the choice of financial ratios by the private and public sectors enterprises both in the year 1992 and 2006 surveys. It was found that there is the stability of consensus on financial ratios as predictors of financial distress. Since financial distress in Nepalese entrprises in quit significant, financially distressed enterprises have higher opearting expenses ratios, and lower

profitabilites. Besides, their liquidity, turnover, coverage ratios were also significantly lower (Shrestha et al., 2002). It is also found that profit is positively related to liquidity and sales while negatively with interest coverage and labor productivity.

As an attempt, Fago (2006) used profile and discriminant analysis for prediction of corporate failure in Nepalese context. This study used paired sample of 11 bankrupt companies and 14 non-bankrupt companies. The study used financial data of selected companies for the years between 1986 and 2005. It is concluded that financial ratios of bankrupt companies are found always lowers at least three years prior to bankruptcy. The ratios of current assets to current liabilities (CA/CL), retained earnings to total assets (RE/TA), earnings before interest and tax to total assets (EBIT/TA) and total debts to total assets (TD/TA) are found the significant ratios to discriminate failed and non-failed companies. In another study, Fago (2007) has chosen seven failed and fourteen non-failed companies to determine financial ratios as predictors of corporate failure. This study also concluded that out of twelve ratios, the ratios of net worth to total assets (NW/TA), retained earnings to total assets (RE/TA), cash flow to current liabilities (CF/CL), net income to total assets (NI/TA), and cash flow to net sales (CF/NS) are significant ratios in prediction of corporate bankruptcy in Nepal.

2.3 Discussion

The review of literature revealed that previous studies on prediction of corporate failure mainly focused on two issues: (i) search of financial ratios that lead to lowest misclassification rates, and (ii) searching the statistical techniques that would also lead to improve prediction accuracy. No advanced statistical techniques were used prior to 1960s. Since, Beaver (1966) used statistical techniques, called univariate analysis and concluded that ratio of cash flow to total debts (CF/TD) is the most important predictors of corporate failure. It was also concluded that corporate failure can be predicted at least five years prior to failure. Altman (1968), Deakin (1972), Ohlson (1980), Yadav (1986), Yap et al. (2010), and other studies have used statistical techniques and developed statistical models for prediction of corporate failure. Although, studies defined corporate failure differently, and used different criteria for selecting financial ratios, they revealed that financial ratios are the predictors of corporate failure. However, there is no unanimous on a ratio(s) or group

of ratio as a predictor(s) of corporate failure. Apart from this, there is no consensus how early; financial ratios of a failed firm begin to deteriorate. Since, these studies have carried in large and developed countries; the generalization of conclusions may not be desirable and sufficient towards development of theory of corporate failure in small and developing countries.

In Nepal, little attempts have been made in this area. No advance statistical techniques were used to validate findings and conclusions of the previous studies in the context of Nepal. This study therefore, attempts to assess the usefulness of financial ratios to classify failed and non-failed companies. It also aims to develop statistical models for prediction corporate failure. Similarly total dependence on statistical models is not desirable (Pradhan, 2006). This study also attempts to use opinions of Nepalese financial executives and practitioners to determine which financial ratio(s) are more useful in predicting corporate failure in Nepal.

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Chapter III
RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is a collective term used for the structured process of conducting a study. Its aim is to give the conceptual and theoretical the work plan of the research. It includes research design, defining sample sizes, data gathering and method of data analysis. This chapter has been divided into six sections to deal with the research methodology adopted for this study. Following introduction, Section-II and III of this chapter explains research designs adopted and selections of failed and non-failed companies respectively. The nature and sources of data for this study have been described in Section-IV. Section-V deals with selection of financial ratios for the study. Methods of data analysis are described in Section-VI that is followed by the limitations of the study in Section-VII. At last, definitions of terms and words used are described in Section-VIII.

3.2 Research designs

This study has employed descriptive, correlation, causal comparative research designs to deal with various issues raised in this study. The descriptive research design has been applied to undertake fact finding operation searching for adequate information about financial ratios and corporate failure in the context of Nepal. It has also assessed the opinions of financial executives and practitioners on the issues of financial ratios and corporate failure. An attempt has also been made to describe the situations, and time period of occurring corporate failure in the context of Nepal. This study has also adopted correlation research design to establish the directions, magnitudes, and the relationships between financial ratios and corporate failure. Moreover, it has also adopted casual comparative research design in order to determine the effect of financial ratio in classification of failed and non-failed companies. This research design has also been followed to understand the fact that whether it is possible to predict corporate failure on the basis of historical financial ratios information.

3.3 Selection of failed and non-failed companies

For the purpose of this study, the annual reports containing Income Statements and Balance Sheets of thirty seven (38) public enterprises and thirty (30) disinvested public enterprises as of July 15, 2009 have been collected from Corporation Coordination Division of Ministry of Finance (MOF) and Office of the Auditors General of Nepal (OAG/N). Similarly, financial statement of thirty two (32) public listed companies including liquidated and closed down companies have also collected from Nepal Stock Exchange Ltd (NEPSE), Security Board of Nepal (SEBON) and Office of Company Registrar (OCR). Then, a list of public enterprises and listed companies has been prepared for selection of failed and non-failed companies in the context of Nepal.

Failed companies

This study attempts to define failed company in order to include maximum number of observations as possible. Thus, this study defines a company as a failed company, if its total liabilities are either greater than its total assets or it is liquidated or under liquidation or closed down its operations. Using these criteria, twenty failed companies have been selected from the list of thirty eight public enterprises; thirty disinvested and liquidated pubic enterprises and thirty two pubic listed companies. The list of failed companies has been presented in Table 3.1.

Table 3.1 presents that twenty failed companies include both state owned enterprises (i.e. public enterprises) and private owned listed companies in Nepal Stock Exchange Ltd (NEPSE). Failed companies include eleven public enterprises and nine privately owned listed companies. Failed companies also represent manufacturing, trading and utilities sectors of businesses. However, financial and insurance sectors businesses have not been considered in this study.

Table 3.1
Failed companies

S.N.	Name of companies	Types	Period covered	Remarks
1	Agriculture Tools Co Ltd (ATCL)	Listed Co.	1993-97	Liquidated in 2004
2	Arun Vanaspati Udhyog Ltd (ABGU)	Listed Co.	2004-08	Assets<Liabilities
3	Bhaktpur Brick Factory Ltd.(BBFL)	PEs	1999-03	Privatized in 2004
4	Birat Shoe Co. Ltd.(BSCL)	Listed Co.	2004-08	Assets< Liabilities
5	Birgunj Sugar Factory Ltd. (BSFL)	PEs	1999-03	Liquidated in 2003
6	Fleur Himalayan Ltd.(FHL)	Listed Co.	2004-08	Negative net worth
7	Gorakhakali Rubber Udhyog Ltd.(GRUL)	PEs	2004-08	Negative net worth
8	Hetauda Textile Udhyog Ltd. (HTUL)	PEs	2001-04	Liquidated in 2002
9	Himal Cement Co Ltd. (HCCL)	PEs	1988-92	Liquidated in 2002
10	Janakpur Cigarette Factory Ltd. (JCFL)	PEs	2004-08	Closed down in 2012
11	Jyoti Spinning Mills Ltd. (JSML)	Listed Co.	2003-07	Liquidated in 2008
12	Krishi Chun Udhyog Ltd. (KCUL)	PEs	2001-04	Liquidated in 2006
13	Lumbini Sugar Factory Ltd. (LSFL)	PEs	2001-04	Liquidated in 2006
14	Necon Air Ltd (NCAL)	Listed Co.	1997-01	Closed down in 2002
15	Nepal Banaspati Ghee Udhyog Ltd. (NBGU)	Listed Co.	2004-08	Assets<Liabilities
16	Nepal Drugs Ltd. (NDL)	PEs	2004-08	Assets<Liabilities
17	Nepal Herbs Products and Processing Ltd.(NHPL)	PEs	2005-09	Assets<Liabilities
18	Nepal Rosin and Turpentine Ltd. (NRTL)	PEs	2000-04	Liquidation in 2006
19	Sribhrikuti Pulp and Paper Nepal Ltd.(SBPP)	Listed Co.	2004-08	Assets<Liabilities
20	Sriram Sugar Mills Ltd.(SSSM)	Listed Co.	2004-08	Assets<Liabilities

Non-failed companies

In this study, a company is regarded as non-failed company; if it is not yet failed. It means that a company is non-failed company, if its total assets are greater than its total liabilities. In this study, twenty non-failed companies have been selected to pair twenty failed companies. The list of non-failed companies is presented in Table 3.2.

Table 3.2
Non-failed companies

S.N.	Name of Companies	Ownership type	Period Covered
1	Agriculture Goods Co Ltd. (AGCL)	Public Enterprises	2003-07
2	Bishal Bazar Co Ltd (BBCL)	Listed Co.	1989-05
3	Bottlers Nepal (Terai) Ltd.(BNTL)	Listed Co.	2004-08
4	Bottlers Nepal Ltd. (BNL)	Listed Co.	1998-09
5	Butwal Power Ltd. (BPL)	Listed Co.	2004-08
6	Dairy Development Corporation. (DDC)	Public Enterprises	2003-08
7	Hetauda Cement Factory Ltd. (HCFL)	Public Enterprises	2003-08
8	National Construction Co Ltd (NCCL)	Public Enterprises	2005-09
9	National Seeds Co Ltd. (NSCL)	Public Enterprises	2004-08
10	National Trading Ltd. (NTL)	Public Enterprises	2002-08
11	Nepal Bitumen and Barrel Udhyog Ltd.(NBBL)	Public Enterprises	1999-08
12	Nepal Food Corporation. (NFC)	Public Enterprises	2003-08
13	Nepal Lube Oil Ltd.(NLOL)	Listed Co.	1993-08
14	Nepal Telecom Ltd. (NTC)	Public Enterprises	2004-08
15	Nepal Transport and Warehouse Ltd. (NTWL)	Public Enterprises	2004-08
16	Nepal United Co. Ltd (NUCL)	Listed Co.	1989-97
17	Raghupati Jute Mills Ltd. (RJML)	Listed Co.	2000-07
18	Salt Trading Co Ltd (STCL)	Listed Co.	1989-06
19	Udaypur Cement Factory Ltd. (UCFL)	Public Enterprises	2003-07
20	Unilever Nepal Ltd.(ULNL)	Listed Co.	1995-09

Twenty non-failed companies include eleven pubic enterprises and nine listed companies. Like failed companies, non-failed companies are chosen from manufacturing, trading and utilities sectors of business. Non-failed company includes a company that is operating but its assets are greater than its liabilities.

3.4 Nature and sources of data

This study is based on primary data and secondary data. The main source of secondary data is financial statements of failed and non-failed companies that have been collected from the Office of Auditors General of Nepal (OAG/N), Corporation Coordination Division of Ministry of Finance (MOF), Security Board of Nepal (SEBON), Nepal Stock Exchange Ltd (NEPSE) and the Office of the Company Registrar (OCR), Ministry of Industry and Commerce (MOIC). In this study, financial statements from fiscal years 1988 through 2009 has been used to compute twenty one financial ratios to assess their usefulness as predictors of corporate failure in the context of Nepal.

The primary data required for this study has been collected through structured questionnaire distributed to financial executives and practitioners of public enterprises and listed companies *(Appendix-III)*. A yes or no questionnaire is developed to assess the financial analysis practices in Nepal. Another questionnaire is designed for ranking of ratio groups as predictors of corporate failure. Similarly, respondents are asked a questionnaire for rating financial ratios as predictors of corporate failure in the context of Nepal. A questionnaire is designed and asked to rate whether the respondents agree on findings and conclusions of previous studies on financial ratios as predictors of corporate failure. To assess the determinants of corporate failure, respondents are asked rate the causes of corporate failure in the context of Nepal.

3.5 Selection of financial ratios for the study

In this study, dependent variable is a dichotomous event called failed and non-failed company. Failed company is referred as zero (0) and non-failed company as one (1). The independent variables are twenty one financial ratios that have been selected for the study. These financial ratios represent liquidity, profitability, leverage, activity and cash flow ratios. For the selection of these financial ratios under study, three basis criteria have been used: (a) a ratio found significant in prior studies (b) popularity of ratios in academics courses of finance and accounting and (c) data availability for computation of financial ratio. Presence of any one of the criteria has been considered sufficient for inclusion of a financial ratio in this study. Twenty one financial ratios selected to classify failed and non-failed company have been presented in Table 3.3.

Table 3.3
Selected financial ratios for the study

S.N.	Financial ratios	Previous studies revealed significant
1.	Current assets to current assets (CA/CL)	Beaver (1966), Deakin (1972), Blum (1974), Yadav (1986),Altman et al. (1977),
2.	Working capital to total assets (WC/TA)	Beaver (1966), Altman (1968), Sharma and Rao (1971), Deakin (1972),
3.	Current assets to total assets (CA/TA)	Beaver (1966), Deakin (1972) Pradhan (1986)
4.	Current liabilities to total debts (CL/TD)	Taffler and Tisshaw (1977), Altman et al. (1977)
5.	EBIT to interest (EBIT/INT)	Sharma and Mahajan (1982),
6.	Total debt to total assets (TD/TA)	Altman (1968), Beaver (1966), Deakin (1972), Ohlson (1980),
7.	Shareholders' equity to total assets (SE/TA)	Blum (1982), Kaveri (1980)
8.	Retained earnings to total assets (RE/TA)	Beaver (1966), Altman (1968), Deakin (1972), Sharma and Rao (1971), Altman et al. (1977)
9.	Long term debt to total debts(LD/TD)	New
10.	Net sales to working capital (NS/WC)	Beaver (1966), Deakin (1972), Edmister (1972), Pradhan (1986)
11.	Net sales to current assets (NS/CA)	Beaver (1966), Deakin (1972), Kaveri (1980)
12.	Net sales to fixed assets (NS/FA)	New
13.	Net sales to total assets (NS/TA)	Altman (1968), Altman et al. (1977), Yadav (1986), Bilderbeek (1977)
14.	EBIT to total assets (EBIT/TA)	Altman (1968), Sharma and Rao (1971), Altman et al. (1977), Gupta (1983
15.	EBIT to total debts (EBIT/TD)	Blum (1974)
16.	Net income to net sales (NI/NS)	Ko (1982)
17	Net income to total assets (NI/TA)	Beaver (1966), Kaveri (1980), Sharma and Mahajan (1982)
18.	Cash flow to net sales (CF/NS)	Beaver (1966), Deakin (1972), Gupta (1983)
19.	Cash flow to total assets (CF/TA)	Beaver (1966), Deakin (1972)
20.	Cash flow to current liabilities (CF/CL)	Beaver (1966), Deakin (1972), Blum (1974), Sharma and Mahajan (1982)
21.	Cash flow to total debts (CF/TD)	Beaver (1966), Altman (1968), Deakin (1972)

3.6 Methods of data analysis

In this study, methods of data analysis have been divided into two sub-sections. First sub-section deals with the methods of secondary data analysis that includes univariate analysis, multivariate discriminant analysis and logistic regression analysis. Second sub-section presents the methods for primary data analysis

3.6.1 Methods of secondary data analysis

The methods of secondary data analysis used in this study are (I) univariate analysis, (ii) multivariate discriminant analysis and (iii) logistic regression analysis.

Univariate analysis

It is also called profile analysis that compares mean values of failed and non-failed companies to identify the behavior of each financial ratio many years prior to failure. It is not predictive test; it is only a convenient approach of outlining the general relationship between financial ratios of failed and non-failed companies. Like Beaver (1966), this study is used univariate analysis to study the behaviour of financial ratios of failed and non-failed Nepalese companies. Thus, it is expected that financial ratio(s) of failed companies begins to deteriorate many years prior to their failures. The following are the expected relationship of financial ratios and status of failed and non-failed companies.

Financial ratios	Failed companies	Non-failed companies
Liquidity ratios	Low	High
Turnover ratios	Low	High
Leverage ratios	High	Low
Profitability ratios	Low	High
Cash flow ratios	Low	High

Multivariate discriminant analysis

In this study, multivariate discriminant analysis (MDA) has been used as a technique of data analysis to discriminate failed and non-failed companies. MDA became popular following the study of Altman (1968) and it is still dominating techniques in prediction of corporate failure. It is a statistical technique that provides a score of

financial ratios. Comparing scores to cut-off value, a company can be separated into failed and non-failed companies. It is also a sequential process, which includes or excludes variables based on various statistical criteria to develop a discriminant model. In this study, following discriminant model has been used to test the significant of financial ratios in prediction of corporate failure.

$$Z\text{ - }Model = b_0 + b_1X_1, + b_2X_2 + b_3X_3 + \ldots\ldots\ldots\ldots\ldots\ldots b_nX_n\ [i]$$

Where,

Z	=	Z score
$X_1, X_2, X_3 \ldots X_n$	=	Financial ratio(s)
'n'	=	Number of ratios or observations
$b_1 \ldots b_n$	=	Coefficients in the discriminant function

Z-score of each company can be computed for the purpose of the classifying the company either failed or non-failed company. If Z-score of the company is greater than cut off value, then it is classified as non-failed company. If Z -score is less than cut off value, it concludes failed company.

The predictive accuracy of discriminant model of financial ratios is ascertained by computing the percentage of classification errors over a period of five years prior to corporate failure. The discriminant classification rates have been computed by comparing predicted results of discriminant model with the actual status of sampled companies. The predictive accuracy of the model is measured in two dimensions: Type I error and Type II error. A Type I error would be predicting a failed company to non-failed company and Type II error would be a non-failed company to failed company. The overall classification error indicates total errors in classifying failed and non-failed companies.

In order to test differences in average financial ratios of failed and non-failed companies, it has applied t-statistics, the Wilk's Lambda, f-statistics and p-values. In order to test normality of data, Shapiro test has been used in this study *(Appendix-IV).* Box's-M test has been used to assess the equality if group variances. The p-values, canonical correlations (r), classification accuracies, Type-I and Type II errors are also used as test statistics of discriminant models. The Wilk's Lambda, f-statistics, standard coefficient and scale vectors have been used to assess the predictive power of financial ratios of developed discriminant model.

Logistic regression analysis

Logistic regression analysis has also been used to investigate the relationship between binary or ordinal response probability and explanatory variables. Ohlson (1980) indicated the major reasons for using logistic regression are: (i) Logistic regression analysis do not assume a linear relationship between dependents and independents variables. (ii) The dependent variables need not be normally distributed and (iii) The dependent variable need not be homoscedastic for each level of the independents that there is no homogeneity of variance assumption and independent variables need not to be interval and unbounded. Thus, the logistic regression model has been used in this study.

$$P(Y = 1) = 1/(1 + exp\{[b_0 + b_1X_1, + b_2X_2, + \ldots b_nX_n]\})$$

Where,

$Pt(Y = 1)$ = Probability of failure for entity j at the end of year t;

Z = $[b_0 + bX_1 + b_2X_2, + \ldots$ bnXn]

exp = Exponential function;

b_1, $b_{2, b3}$ = Coefficients;

$X_1, X_2, \ldots X_n$ = Financial ratios (covariates)

The critical value (i.e. cut off point) is 0.50 is used to classify failed and non-failed companies that assumes an equal probability of group membership. If probability of a company is greater than 0.50, it is classified as non-failed otherwise, failed company. In logistic regression analysis, the coefficients of the independent variables have been used to compute odd ratios that odd ratios to assess the predictive power of each independent variable in prediction of probability of corporate failure.

Under logistic regression analysis, the Cox & Snell and the Negelkerke r-squares, the Hosmer Lemeshow test, the -2log likelihood, Wald and Chi-square have been used as test statistics of the variables and models.

3.6.2 Methods of primary data analysis

The primary data collected from 168 financial executives and practitioners have been tabulated and analyzed using percentage, frequencies, weighted mean, and rank. For ranking data, the overall mean rank has been used as techniques of primary data analysis.

3.7 Limitations of the study

The followings are the limitations of this study

- Though, this study aims to examine the financial ratios as predictors of corporate failure, all types of financial ratios and dimensions of corporate failure have not been considered in this study. This study has not considered qualitative and macro economic factors like goodwill/reputations, political changes, fiscal policy, and structure of management, age of business, nature and types of business on corporate failure.

- To predict corporate failure, it is essential to consider the market price fluctuation of shares of the company. But, this study could not obtain the market price of all failed companies and non-failed companies either in annual reports or financial statements collected from different sources of data. Since the majority of failed companies are either not listed in or delisted from Nepal Stock Exchange Ltd. (NEPSE); market related ratios have not been considered.

- This study is limited in assessing financial ratios as predictors of corporate failure using statistical techniques such as univariate, discriminant and logistic regression analysis using financial data of failed and non-failed companies for the period 1988 to 2009. Since, number of public and listed companies are small, this study used paired sample, thus ignoring matching sample by size, fiscal year, age and nature of business. Similarly, most of financial data of failed companies are relatively old data as compared to non-failed companies. Thus, conclusions drawn might be less relevant for the generalization.

- Like Ohlson (1980), Zmijewski (1984) and other studies, it is worthwhile to note that while assessing financial ratios as predictors of corporate failure using discriminant analysis, two major problems: violation of assumptions of normality and assumption of equal group covariance have been also identified in this study. However, discriminant classification accuracies have been found high and significant in prediction of corporate failure.
- Since, most of Head Offices of public enterprises and listed companies are located in Kathmandu; the survey has been conducted among financial executives and practitioners representing manufacturing, trading and service enterprises of Kathmandu Valley.

3.8 Definitions of key terms and words used

In order to avoid misunderstandings, this study provides the definition of key terms and words used in this study.

Current assets

Current assets are cash and other resources that are reasonably expected to be realized in cash or sold or consumed in business within one year of the balance sheet date or company's operating cycle, whichever is longer. Current assets are: cash, marketable securities, short term investment, receivables inventories, and prepaid expenses.

Current liabilities

Current liabilities are obligations that are reasonably expected to be paid from existing current assets or through the creation of other current liabilities in the time period of one year or operating cycle whichever is longer. Thus, current liabilities include notes payable, account payable, dividend payable, interest payable, tax payable and accrued liability within one fiscal year.

Failed company

In this study, a company has been classified as failed company or insolvent on the basis of definition of Insolvency Act of Nepal 2006. Thus, if total assets of a company are insufficient to meet its obligations, it is referred as a failed company. It is a state of being unable or appearing to be unable, to pay any or all of the debts due and

payable to or payable in the future to creditors or a situation where the amount of liabilities of a company exceeds the value of the assets. Besides if a company is either liquidated or under liquidation, it is also classified as failed company. Thus, corporate failure is used to refer financial distress, corporate bankruptcy, liquidation and insolvency of a firm too.

Fixed assets

Fixed assets are property, plant, and equipment that represent the tangible, long-lived, productive assets used by a company in its operations to produce revenue. This category includes land, buildings, machinery, manufacturing equipment, office equipment, and furniture.

Listed companies

Listed companies are state owned or listed companies which are enlisted in Nepal Stock Exchange Ltd (NEPSE) for buying and selling of their stock and bonds. It may be manufacturing, trading or service or utilities.

Long-term debts

Long-term debts are long term sources of fund for a company, which are obtained for investment in long term assets. Long term debts include long term note payables, bond payables and other long term debts that are to be paid after one year.

Net income before interest and tax

It refers to profit available to pay interest payable of a company. It has been computed by adding interest expenses and provision of tax expenses in net income after tax of the year.

Net income

It refers to profit after tax of a company. It is net income shown in the income statement of a company. It is also called profit available to shareholders.

Net sales

Net sales refer to gross sales less sales return and allowances. It is net sale revenues generated from sell of main goods and services. Thus, it does not include other incomes like discount, interest incomes, commission incomes etc.

Non-failed company

A company other than failed company is regarded as non-failed company. In other word, if total assets of a company exceed total obligations, it is non-failed company. However, liquidated, disinvested or closed or company under liquidation is not been included into non-failed company even if their assets are sufficient to meet their liabilities.

Operating cash flow

Operating cash flow refers to the net cash inflows from regular business activities. It can be computed by deducting operating payments for purchase of goods, payment made to employees and other operating expenses from the cash collection from sales revenues. In the absence of cash flow statement of all companies, it has been computed by adding depreciation and other non-cash expenses in profit after tax for this study purpose.

Public enterprises

Public enterprises are state owned organizations. Some of them have been established under special act and others under Company Act 2063. They are involved in manufacturing, trading, services, utilities and banking and insurance sectors. However, this study considered public enterprises other than banking and insurance.

Retained earnings

It is accumulated profit earned by a company from date of inception to the date. The increase in retained earnings increases the shareholders' equity or vice-versa. It includes reserve and surplus, undistributed profits, special reserves etc.

Shareholders' equity

A company's equity account in divided into two accounts: capital stock and retained earnings. Capital stock account is maintained to record the contribution of the

shareholders that include preferred stock and common stock. Retained earnings account is maintained to record the net income retained for future growth of business. Thus, the shareholders' equity is the excess value of total assets over its liabilities. It can be obtained by deducting total debts and liabilities from total net assets. Alternatively, it can be also computed by summing up share capital, retained earnings less accumulated loss and fictitious assets.

Total assets

Total assets refer to total capitalization of a business which includes current assets, investment, fixed assets and intangibles assets less accumulated depreciation and amortization. It does not include fictitious assets.

Total debts

Total debts refer to total liabilities of a company. It includes both current liabilities and provisions of expenses and long term liabilities. The current liabilities are notes payable, account payable, dividend payable, interest payable, tax payable and accrued liabilities and long term liabilities are long term notes payable bond payables, and other long term liabilities.

Working capital

Working capital is current assets less current liabilities of a company. It is also called net current assets. Working capital of a successful business is always positive and high. Negative working capital indicates severe liquidity problem in business.

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Chapter IV
FINANCIAL RATIOS AND CORPORATE FAILURE - UNIVARIATE ANALYSIS

4.1 Introduction

The use of financial ratios for measuring business performance was begun with the induction of the current ratio in late 1890s. The current ratio was initially used to measure solvency and credit worthiness (Lough, 1917). Ramser and Foster (1931) used financial ratios to compare less successful and successful firms. It is revealed that firms which turned out to be less successful have lower financial ratios than the more successful firms. Financial ratios of failed firms were also found to be frequently below the mean value and that starts to deteriorate as the date of failure drew near (Winakor & Smith, 1935).

Prior to 1960s, no advanced statistical methods or computers were available for analysis. Thus, studies were unable to clear the relative importance of financial ratios (Altman, 1968). Using univariate statistics, Beaver (1966) revealed the ratio of cash flow to total liabilities (CF/TD) as the best predictor of corporate failure. Likewise, Sharma and Mahajan (1980) revealed the ratio of current assets to current liabilities (CA/CL) as an important predictor of corporate failure. Gupta (1983) showed that the ratios of earnings before interest and tax to total sales (EBIT/TA) and operating cash flow to sales (CF/NS) are best predictors. Altman (1968), Deakin (1972), Ohlson (1980), and other studies also evidenced financial ratios as important predictors of corporate failure. Thus, this study attempts to assess the usefulness of financial ratios and their behaviours to classify failed and non-failed companies in the context of Nepal.

This chapter has been divided into six sections. Section-I deals with liquidity ratios of failed and non-failed companies, which is followed by leverage and turnover ratios in Section-II and III respectively. Section IV describes profitability ratios while cash flow ratios are described in Section V. At last section VI describes the discussion of the chapter.

4.2 Liquidity ratios of failed and non-failed companies

Liquidity is used to measure ability of a business to meet its short term obligations. It is a relationship between current assets and current liabilities. The large size of current assets is associated with high liquidity. On other hand, lesser liquidity may lead to severe cash problem that can results inability to pay its obligations on time (Pradhan, 1997). Liquidity ratios are important for any types of business. Thus, in this study, the ratios of current assets to current liabilities (CA/CL), working capital to total assets (WC/TA), current assets to total assets (CA/TA) and current liabilities to total debts (CL/TD) have been used to assess liquidity position of failed and non-failed companies.

Current assets to current liabilities

The ratio of current assets to current liabilities (CA/CL), also called current ratio is widely used liquidity ratio for measuring liquidity position of a firm. High current ratio indicates the greater assurance of ability to pay current liabilities or vice versa. The standard current ratio is 2:1. It differs from one sector to another. However, higher current ratio refers huge investment in current assets which ultimately results low profit of a business. Beaver (1966), Deakin (1972), Blum (1974), Altman et al. (1977), Yadav (1986), Kaveri (1980), Sharma and Mahajan (1982) have revealed current ratio as an important predictors of corporate failure. The current ratios of failed and non-failed companies for five years prior to failure have been presented in Table 4.1

Table 4.1
Ratios of current assets to current liabilities of failed and non-failed companies (in times)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	1.27	1.59	1.89	1.25	0.96	1.39
2	GRUL	0.46	0.51	0.51	0.22	0.39	0.42
3	BSCL	0.42	0.42	0.46	0.57	0.77	0.53
4	NBGU	0.21	0.21	0.26	0.43	0.55	0.33
5	FHL	0.33	0.29	0.30	0.30	0.34	0.31
6	AGUL	0.73	0.53	0.89	0.86	0.79	0.76
7	SBPP	0.47	0.56	0.54	0.54	0.54	0.53
8	HTUL	0.71	1.12	1.17	1.18	1.00	1.03
9	KCUL	1.65	0.83	0.31	0.44	0.68	0.78
10	NRTL	1.23	1.24	1.76	2.03	3.38	1.93
11	ATCL	0.27	0.37	0.49	0.68	0.92	0.55
12	BBFL	0.57	0.32	0.40	0.57	0.77	0.52
13	LSML	0.82	3.17	24.83	48.43	1.89	15.8
14	BSML	0.07	0.57	1.01	3.16	4.72	1.90
15	NHPL	0.35	1.59	1.67	0.72	0.69	1.00
16	NDL	0.97	0.97	t0.99	1.42	0.85	1.04
17	SSML	0.40	0.54	0.48	0.34	0.50	0.45
18	HCCL	0.66	0.91	0.79	0.70	0.70	0.75
19	JCFL	1.38	1.42	1.18	2.80	1.72	1.70
20	NCAL	1.08	1.28	1.75	1.13	1.07	1.26
	Mean	**0.70**	**0.92**	**2.08**	**3.39**	**1.16**	**1.65**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	1.36	1.18	1.23	5.76	2.22	2.35
2	RJML	0.50	0.53	1.36	1.71	1.39	1.10
3	HCFL	0.86	0.76	0.57	0.66	0.58	0.69
4	ULNL	1.56	1.98	1.66	2.10	2.41	1.94
5	NTL	1.04	1.04	1.43	1.21	1.56	1.26
6	DDC	3.52	4.47	3.58	3.27	3.54	3.67
7	AGCL	0.76	0.40	0.78	0.79	0.88	0.72
8	NTC	3.05	3.52	5.21	5.77	7.59	5.03
9	NLOL	1.59	1.57	1.35	1.41	1.43	1.47
10	NBBL	1.18	1.18	1.23	1.21	1.13	1.19
11	NTWL	2.35	2.32	2.05	1.54	1.93	2.04
12	NSCL	4.83	1.87	1.92	2.37	2.38	2.67
13	UCFL	1.01	1.05	1.11	1.08	1.16	1.08
14	NFC	0.84	1.09	1.11	1.79	1.27	1.22
15	BNTL	1.85	1.35	1.44	1.80	4.15	2.12
16	NCCL	3.27	2.88	2.10	1.88	2.10	2.45
17	BNL	1.12	1.27	1.04	2.18	2.95	1.71
18	NUCL	2.13	1.63	1.67	3.87	2.59	2.38
19	STCL	1.01	1.06	3.78	4.42	3.74	2.80
20	BBCL	0.46	0.34	0.29	0.48	1.10	0.53
	Mean	**1.71**	**1.57**	**1.75**	**2.26**	**2.30**	**1.92**

Source: Appendix V

Table 4.1 shows that the average current ratio of failed companies is 1.65 times in last five year prior to failure. The maximum average ratio is 15.8 times (LSFL) and minimum is 0.31 times (FHL). Out of twenty failed companies, the average current ratios of eleven (11) failed companies are less than one (1). None of average current ratios of failed companies are found to be above standard ratio 2:1 except 15.8 times (LSML). The average current ratios are 0.70 times (year 1), 0.92 times (year 2), 2.08 times (year 3), 3.39 times (year 4) and 1.16 times (year 5). As far as behaviour is concerned, the average current ratio of failed companies is found to be started to deteriorate at least three years prior to their failure. As a result, the current assets of failed companies are less than their current liabilities at least two years prior to failure.

It is found that the majority of non-failed companies have maintained sufficient current assets to meet their current liabilities. Prior to one year, the current ratios of RJML (0.50 times), HCFL (0.86 times), AGCL (0.76 times), NFC (0.84 times), and BBCL (0.46 times) are less than one (1). It is less than one (1) for BBCL in last four years and for HCFL and AGCL in last five years. The minimum average current ratio is 0.53 times (BBCL) and maximum 5.03 times (NTC). The average current ratio of non-failed companies is 1.92 times. It is 1.71 times in prior one year; 1.75 times in three year and 2.30 times in prior five year prior. It shows that current ratios of non-failed companies are relatively stable during last three years.

Working capital to total assets

The ratio of working capital to total assets (WC/TA) is a measure of the net current assets relative to the total capitalization. It is regarded as an important ratio by Beaver (1966), Altman (1968), Deakin (1972) and Sharma and Rao (1971). The current assets must be sufficient to meet current liabilities. If they are insufficient, the company faces short term liquidity problems. Thus, the working capital is expected to be positive and high for non-failed companies. The ratios of working capital to total assets (WC/TA) of failed and non-failed companies for five year prior to failure have been presented in Table 4.2.

Table 4.2
Ratios of working capital to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	7	15	19	7	-1	9
2	GRUL	-52	-41	-36	-51	-27	-42
3	BSCL	-90	-79	-63	-40	-16	-58
4	NBGU	-275	-271	-202	-109	-74	-186
5	FHL	-136	-154	-142	-133	-108	-135
6	AGUL	-15	-60	-9	-13	-18	-23
7	SBPP	-37	-26	-27	-21	-18	-26
8	HTUL	-26	9	12	13	0	1
9	KCUL	37	-18	-140	-84	-32	-47
10	NRTL	15	14	31	32	49	28
11	ATCL	-216	-135	-83	-38	-8	-96
12	BBFL	-63	-163	-116	-60	-25	-86
13	LSML	-8	35	71	74	23	39
14	BSML	-439	-43	1	49	48	-77
15	NHPL	-141	34	37	-32	-35	-27
16	NDL	-2	-2	-1	23	-13	1
17	SSML	-22	-31	-21	-26	-18	-24
18	HCCL	-18	-3	-8	-12	-12	-11
19	JCFL	0	21	10	44	28	21
20	NCAL	3	12	19	5	3	8
	Mean	**-74**	**-44**	**-32**	**-19**	**-13**	**-36**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	10	5	6	19	17	12
2	RJML	-26	-27	7	10	7	-6
3	HCFL	-9	-18	-37	-30	-15	-22
4	ULNL	24	35	25	34	47	33
5	NTL	4	4	28	16	31	16
6	DDC	47	48	41	38	36	42
7	AGCL	-11	-35	-11	-10	-7	-15
8	NTC	33	39	46	48	54	44
9	NLOL	34	33	4	4	25	20
10	NBBL	15	15	17	16	10	15
11	NTWL	46	47	43	32	46	43
12	NSCL	56	22	20	24	22	29
13	UCFL	0	1	1	1	1	1
14	NFC	-15	7	9	38	17	11
15	BNTL	30	17	17	21	59	29
16	NCCL	51	46	51	62	68	55
17	BNL	4	7	2	31	35	16
18	NUCL	52	38	39	71	60	52
19	STCL	0	0	0	0	0	0
20	BBCL	1	1	1	1	2	1
	Mean	**20**	**17**	**17**	**22**	**26**	**20**

Source: Appendix V

Table 4.2 shows that out of twenty failed companies, the average working capital to total assets ratios (WC/TA) of six failed companies: LSFL (39%), NRTL (28%), JSML (9%), HTUL (1%), NDL (1%), JCFL (21%) and NACL (8%) are positive. The average working capital to total assets ratio (WC/TA) of failed companies is -36%. It varies among failed companies. The maximum average ratio is 39% (LSFL) and minimum -186% (NBGU). It is -13% in five year and -74% in one year prior to failure. The results show that severe working capital problems in failed companies deepen at least five years prior to failure.

The average working capital to total assets ratio (WC/TA) of non-failed companies is 20%. It is positive for seventeen (17) non-failed companies. The maximum average ratio is 55% (NCCN) and minimum ratio is 22% (HCFL). However, it is 26% in five year and 20% in one year. The working capital positions for non-failed companies are relatively positive, stable and sound in last five years.

Current assets to total assets

The ratio of current assets to total assets (CA/TA) measures the proportion of current assets on total assets. The larger the current assets, higher will be the liquidity or vice versa. Table 4.3 exhibits the ratio of current assets to total assets (CA/TA) of failed and non-failed companies' five years prior to failure.

The average current assets to total assets (CA/TA) of failed companies are 59%. The maximum ratio is 83% (NPHL) and minimum is 20% (SSML). The average levels of current assets to total assets (CA/TA) of failed companies are 58% for one, four and five year prior to failure. Thus, it is relatively stable for failed companies during five year prior to failure.

The average ratio of current assets to total assets (CA/TA) is 61% which varies among non-failed companies between 14% (UFCL) to 98% (NUCL). Out of twenty non-failed companies, the ratios of current assets to total assets (CA/TA) of twelve non-failed companies are higher than 50%. The average ratio is 63% in year 1, 2 and 5 years and 58% in prior 3 and 4 years. Like failed companies, the proportions of currents assets to total assets (CA/TA) are relatively stable during five year. But, it is slightly higher indicating good liquidity over failed companies.

Table 4.3
Ratios of current assets to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	35	39	39	37	34	37
2	GRUL	45	43	37	14	17	31
3	BSCL	64	58	53	53	55	56
4	NBGU	73	71	71	81	90	77
5	FHL	65	62	60	57	56	60
6	AGUL	39	67	73	80	70	66
7	SBPP	33	32	32	25	21	29
8	HTUL	64	84	85	85	88	81
9	KCUL	94	86	62	65	67	75
10	NRTL	81	72	71	63	69	71
11	ATCL	81	81	80	82	85	82
12	BBFL	83	77	77	80	83	80
13	LSML	36	50	74	75	48	57
14	BSML	35	57	69	72	61	59
15	NHPL	77	92	91	80	77	83
16	NDL	78	69	70	79	74	74
17	SSML	14	37	19	13	19	20
18	HCCL	35	30	30	27	29	30
19	JCFL	71	71	67	69	67	69
20	NCAL	48	44	35	31	40	40
	Mean	**58**	**61**	**60**	**58**	**58**	**59**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	39	36	31	23	31	32
2	RJML	27	30	26	25	26	27
3	HCFL	52	55	50	58	21	47
4	ULNL	67	70	64	64	81	69
5	NTL	96	95	92	89	86	92
6	DDC	66	62	57	54	50	58
7	AGCL	33	23	38	36	52	37
8	NTC	49	54	57	58	62	56
9	NLOL	92	90	17	13	84	59
10	NBBL	96	96	93	91	89	93
11	NTWL	81	82	84	92	96	87
12	NSCL	71	46	42	42	38	48
13	UCFL	16	15	14	13	11	14
14	NFC	83	89	88	86	79	85
15	BNTL	65	67	54	48	77	62
16	NCCL	98	96	97	97	96	97
17	BNL	40	34	40	57	53	45
18	NUCL	99	99	98	96	98	98
19	STCL	57	93	97	97	96	88
20	BBCL	40	29	25	20	31	29
	Mean	**63**	**63**	**58**	**58**	**63**	**61**

Source: Appendix V

Current liabilities to total debts

It is the proportion of current liabilities to total liabilities (CL/TD). If it is one (1), it time indicates that current liabilities equals to total debts. Since, the high proportion of current liabilities increases short term liquidity problems but low insolvency risk or vice versa. The ratios of current liabilities to total debts (CL/TD) of failed and non-failed companies have been presented in Table 4.4.

Table 4.4 reveals that the average ratio of current liability to total liabilities (CL/TD) of failed companies is 52%. It varies among failed companies. The maximum ratio is 100% times (FHL) and the minimum ratio is 11% (NRTL). Ten failed companies' ratios of current liabilities to total debts (CL/TD) are found decreased over the period. The average ratio of current liabilities to total debts (CL/TD) of failed companies is slightly decreased from 56% (year 5) to 48% (year 1). It indicates that the risk of insolvency begins at least five year prior to failure.

The average ratios of current liabilities to total debts (CL/TD) of eighteen non-failed companies' are higher than 50%. Ten non-failed companies' ratios of current liabilities to total debts (CL/TD) are 100%. The minimum ratios are 26% (UCFL) and 48%% (STCL). The average current liability to total debt (CL/TD) of non-failed companies is 86%. It was 83% prior five year and 89% in one year prior to failure. Since the proportions of current liabilities are increasing, the risks of insolvency are found decreasing among non-failed companies for last five years.

Table 4.4
Ratios of current liabilities to total debts of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	23	22	21	27	32	25
2	GRUL	52	49	73	38	32	49
3	BSCL	77	73	66	61	56	66
4	NBGU	100	100	97	98	100	99
5	FHL	100	100	100	100	100	100
6	AGUL	15	58	56	83	75	58
7	SBPP	25	24	26	35	32	28
8	HTUL	22	39	40	40	52	39
9	KCUL	21	25	100	100	100	69
10	NRTL	18	14	10	7	6	11
11	ATCL	61	90	96	97	94	88
12	BBFL	22	30	23	66	74	43
13	LSML	25	14	5	4	21	14
14	BSML	73	47	51	21	15	41
15	NHPL	71	66	63	62	60	64
16	NDL	36	22	26	29	53	33
17	SSML	69	72	56	53	48	60
18	HCCL	61	36	44	45	51	47
19	JCFL	47	84	100	66	68	73
20	NCAL	38	42	26	37	46	38
	Mean	**48**	**50**	**54**	**53**	**56**	**52**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	100	100	100	100	100	100
2	RJML	86	92	50	37	43	61
3	HCFL	100	100	100	100	100	100
4	ULNL	100	100	100	100	100	100
5	NTL	100	100	100	100	100	100
6	DDC	62	60	61	60	56	60
7	AGCL	98	100	100	100	100	100
8	NTC	100	85	100	99	75	92
9	NLOL	100	100	100	100	100	100
10	NBBL	100	100	100	100	100	100
11	NTWL	100	100	100	100	100	100
12	NSCL	75	96	100	100	100	94
13	UCFL	32	28	25	24	20	26
14	NFC	100	100	100	61	57	84
15	BNTL	100	100	100	100	100	100
16	NCCL	60	71	84	88	82	77
17	BNL	77	61	100	100	100	88
18	NUCL	100	100	100	100	100	100
19	STCL	86	82	26	22	25	48
20	BBCL	100	100	76	100	100	95
	Mean	**89**	**89**	**86**	**85**	**83**	**86**

Source: Appendix V

4.3 Leverage ratios of failed and non-failed companies

Leverage ratios measures how much of a company's assets are financed by debt and equity. If an excessive debt has been used, it is difficult in additional debt financing in future and increases the probability of failure. The proper combination of debt and equity is must for proper balance between risk and return. This study examines leverage ratios to assess capital structure of failed companies and non-failed companies. The ratios of earnings before interest and tax to interest (EBIT/INT), total debt to total assets (TD/TA), shareholders equity to total assets (SE/TA), long term debt to total debt (LD/TD), and retained earnings to total assets (RE/TA) have been used to compare the behaviours of failed and non-failed companies.

Earnings before interest and tax to Interest

The ratio of earnings before interest and tax to interest (EBIT/INT) is also called times interest earned ratio. It determines the ability of a business to pay interest from its earnings. It is expected to be high and positive for the non-failed companies. If it is greater than one (1), it indicates ability to pay interest on debt is strong and vice versa. Table 4.5 exhibits that ratio of earnings before interest and tax to interest (EBIT/INT) of failed and non-failed companies' five years prior to failure.

The average earnings before interest and tax to interest (EBIT/INT) of seventeen failed companies are nil. Only three failed companies: JSML (0.71 times); JCFL (13.35 times) and NACL (0.62 times) are positive but very low. Only five failed companies earned nominal profit before interest and tax (EBIT) to meet their interest expense one year prior to failure. It is positive for three failed companies in prior two year and six companies three years prior to failure. The results reveal that failed companies are unable to generate operating profit for payment of their interest expenses. Sixteen non-failed companies could earn some profit to make contribution on payment of their interest expenses for last five years. However, six non-failed companies could not earn profit. The ratios of times interest earned (EBIT/INT) are very high because non-failed companies have low levels debts or no interest bearing debts.

Table 4.5
Ratios of earnings before interest and tax to interest expenses of failed and non-failed companies (In times)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	0	0.30	1.42	1.15	0.94	0.71
2	GRUL	0	0	0	0	0	0
3	BSCL	0	0	0	0	0	0
4	NBGU	0.29	0	0	0	0	0
5	FHL	0.70	0	0	0	0.44	0
6	AGUL	0	0	0	1.03	1.01	0
7	SBPP	0	0	0	0.24	0	0
8	HTUL	0	0.40	0.91	0.72	0	0
9	KCUL	0	0	0	0	0	0
10	NRTL	0	0	0	0	0	0
11	ATCL	0	0	0	0	0	0
12	BBFL	0	2.47	0	0	8.40	0
13	LSML	0	0	0	6.44	0	0
14	BSML	0	0	0	0	0	0
15	NHPL	0.84	0	1.51	0	0.82	0
16	NDL	4.41	0	0	0	0	0
17	SSML	0	0	0.60	1.32	1.17	0
18	HCCL	1.13	0	0	0	0	0
19	JCFL	0	0	1.28	1.39	84.61	13.35
20	NCAL	0	0	1.05	2.27	3.24	0.62
	Mean	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	52.29	27.61	288.42	197.76	235.41	160.30
2	RJML	1.53	0	2.05	1.58	1.66	1.00
3	HCFL	5.08	22.30	19.80	1.66	0	9.44
4	ULNL	444	2,598	249.41	134.06	108.5	706.75
5	NTL	1.17	0	0	0	43.31	8.35
6	DDC	0	5.07	0	0	4.27	0
7	AGCL	20.00			1,015	4,661	0
8	NTC	772	549	4,456.5	5,090.7	194.53	2212
9	NLOL	1.59	1.37	1.05	2.27	1.09	1.47
10	NBBL	1.44	1.56	1.25	1.45	1.57	1.45
11	NTWL	5,530	5,530	0	0	0	0
12	NSCL	9.08	2,383	5,534	2,553	3,133	2722
13	UCFL	2.75	0.43	0	0	0	0.49
14	NFC	1.35	2.69				0
15	BNTL	133.9	2,585	0.95	1.07	1,956	935.4
16	NCCL	0	0	0	0	9.83	0
17	BNL	2.16	2.46	4.42	24.96	132.09	33.22
18	NUCL	2.03	1.45	4.38	3.18	3.23	2.85
19	STCL	1.02	1.42	1.63	1.45	1.25	1.35
20	BBCL	25.22	40.82	65.91	19.51	247.86	79.86
	Mean	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Source: Appendix V

Total debt to total assets

Total debt includes both current liabilities and long term debt obligations whereas total assets include current assets plus fixed assets and investments. Total debt divided by total assets, which is a measure of company's leverage. It is the ratio of total funds financed by long term and short term liabilities to total assets. Low debt ratio is preferred by creditors because it provides sufficient cash against losses in the event of liquidation. On other hand, owners prefer high debt ratio that magnifies their earnings and enables them to maintain control over business. High debt ratio also creates risk of bankruptcy by creditors. It is found as a significant ratio in corporate failure study by Altman (1968), Beaver (1966), Deakin (1972) and Ohlson (1980). The ratios of total debt to total assets (TD/TA) for failed and non-failed companies prior five years to failure have been presented in Table 4.6.

Table 4.6 exhibits that the average ratios of total debt to total assets (TD/TA) of eighteen failed companies are higher than 100%. The minimum ratio is 64% (JCFL) and maximum is 528% (BBFL). The yearly average total debt to total assets ratio (TD/TA) is 200% of failed companies. The average ratio is found to be started to increase from 135% five year prior to 286% in one year prior to failure. It also shows that total debts of failed companies are many times higher than total assets least five year prior to failure.

The average debt to total assets ratios (TD/TA) of non-failed companies vary among non-failed companies. The maximum debt to total assets ratios are 95% (STCL) and minimum ratio is 13% (NTC). The ratio of total debts to total assets (TD/TA) higher than 50% are 69% (HCFL), 71% (BBCL), 75% (NTL), 79% (NBBL), 89% (NFC), and 95% (STCL). The average total debt to total assets (TD/TA) is 49%. It is 44% in four and five years and 51% in one year prior to failure. It is slightly increased in year one in comparison of year five prior to failure. It shows that total assets (TD/TA) of non-failed companies are sufficient to safeguard claims of both long term and short term creditors.

It is concluded that the behaviours ratios of total debt to total assets (TD/TA) of failed companies' increases gradually with increase in the levels of total debts and total assets become insufficient to meet their total debts and obligations at least five year prior to failure.

Table 4.6
Ratios of total debts to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	121	109	100	111	111	110
2	GRUL	189	172	100	170	140	154
3	BSCL	200	188	174	154	126	169
4	NBGU	348	342	281	194	164	266
5	FHL	201	215	202	190	165	195
6	AGUL	364	216	145	111	117	191
7	SBPP	279	245	222	129	122	199
8	HTUL	411	194	182	181	172	228
9	KCUL	266	408	203	149	99	225
10	NRTL	360	425	408	461	369	405
11	ATCL	485	240	170	123	98	223
12	BBFL	653	788	836	214	147	528
13	LSML	177	112	63	37	122	102
14	BSML	650	211	134	109	86	238
15	NHPL	309	87	86	181	187	170
16	NDL	222	318	275	193	162	234
17	SSML	156	123	76	75	80	102
18	HCCL	104	123	108	108	91	107
19	JCFL	110	59	56	38	57	64
20	NCAL	115	81	76	76	82	86
	Mean	**286**	**233**	**195**	**150**	**135**	**200**
S.N.	**Non-failed cos.**	**Prior five years**					
		1	**2**	**3**	**4**	**5**	**Mean**
1	BPL	29	30	25	4	14	20
2	RJML	62	62	39	40	43	49
3	HCFL	61	72	88	88	35	69
4	ULNL	43	35	38	31	34	36
5	NTL	92	92	64	73	55	75
6	DDC	30	23	26	28	25	26
7	AGCL	44	58	49	46	59	51
8	NTC	16	18	11	10	11	13
9	NLOL	58	58	12	9	59	39
10	NBBL	81	81	76	76	79	79
11	NTWL	34	35	41	60	50	44
12	NSCL	20	26	22	18	16	20
13	UCFL	49	50	49	49	47	49
14	NFC	98	82	79	78	109	89
15	BNTL	35	50	37	27	19	34
16	NCCL	30	33	46	52	46	41
17	BNL	47	44	38	26	18	35
18	NUCL	46	61	59	25	38	46
19	STCL	66	107	98	101	104	95
20	BBCL	87	86	112	43	28	71
	Mean	**51**	**55**	**50**	**44**	**44**	**49**

Source: Appendix V

Shareholders' equity to total assets

Equity is the total value of all the ordinary and preferred stocks owned by the firm. The shareholders' equity is obtained by deducting total liabilities from total assets. The ratio of shareholders' equity to total assets (SE/TA) is the proportion of shareholders' equity to total assets over time. If it is high, it is risky for the shareholders. Thus, low shareholders' equity to total assets ratio is essential to protect the interest of shareholders. Blum (1982) and Kaveri (1980) showed that the ratios of shareholders' equity to total assets ratio (SE/TA) are significant to classify failed and non-failed companies. The ratios of twenty failed and twenty non-failed companies have been presented in Table 4.7 for five years prior to failure.

The shareholders' equity of failed companies is poor. The average ratios of shareholders' equity to total assets (SE/TA) for failed companies are negative in one year prior to failure. Out of twenty failed companies, the average ratios of all failed companies are negative. However, it is positive for SSML, JCFL and NACL in prior 2, 3, 4 and 5 years to failure. As far as average ratio is concerned, it is -113 %. It is -50% in five year and -194% in one year prior to failure. It exhibits that there is no contribution of shareholders' equity in total assets of failed companies since at least five year prior to failure.

The shareholders' equity of non-failed companies is positive and high. However, it varies among non-failed companies. Halves of failed companies' ratios of shareholders' equity to total assets (SE/TA) are above 50%. The maximum average ratios are 80% (NSCL), 79% (BPL), 75% (BBCL), 67% (NTC), NLUL (56%), 54% (BNTL, BNL, NUCL) and 51% (RJML). The ratios of shareholders' equity to total assets (SE/TA) below 20% are -5% (NFC), 6% (HCFL) 14% (NTL), 15% (NBBL) and 18% (AGCL). The average shareholders' equity to total assets (SE/TA) of non-failed company is 44%. It is 45% in five year and 41% in one year prior to failure. Thus, it is evident that the contributions of shareholders' equities to total assets have been found almost stable and positive for last five years.

Table 4.7
Ratios of shareholders' equity to total assets of failed companies and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-6	5	0	-11	-11	-4
2	GRUL	-89	-72	0	-70	-40	-54
3	BSCL	-100	-88	-74	-54	-26	-69
4	NBGU	-248	-242	-181	-94	-64	-166
5	FHL	-101	-115	-102	-90	-65	-95
6	AGUL	-264	-116	-45	-11	-17	-91
7	SBPP	-179	-145	-122	-29	-22	-99
8	HTUL	-311	-95	-84	-83	-73	-129
9	KCUL	-178	-361	-276	-170	-68	-211
10	NRTL	-355	-412	-395	-446	-357	-393
11	ATCL	-385	-161	-85	-38	-8	-135
12	BBFL	-553	-688	-736	-114	-47	-428
13	LSML	-130	-47	22	53	-40	-28
14	BSML	-608	-148	-59	-30	-16	-172
15	NHPL	-209	-42	-37	-183	-189	-132
16	NDL	-122	-218	-175	-93	-62	-134
17	SSML	-1	7	29	28	25	17
18	HCCL	-0.02	-0.28	-0.10	-0.06	-0.12	-0.07
19	JCFL	-36	36	37	51	35	25
20	NCAL	-15	19	24	24	18	14
	Mean	**-194**	**-144**	**-112**	**-67**	**-50**	**-113**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	70	69	74	96	85	79
2	RJML	38	38	61	60	57	51
3	HCFL	9	0	-14	-16	54	6
4	ULNL	57	25	23	36	20	32
5	NTL	3	5	23	13	26	14
6	DDC	30	43	37	43	44	39
7	AGCL	25	6	22	22	16	18
8	NTC	70	65	68	66	67	67
9	NLOL	35	36	86	90	34	56
10	NBBL	12	12	17	18	16	15
11	NTWL	21	21	54	34	50	36
12	NSCL	80	74	78	82	84	80
13	UCFL	51	50	51	51	53	51
14	NFC	2	9	12	14	-63	-5
15	BNTL	51	40	50	62	66	54
16	NCCL	61	54	45	41	44	49
17	BNL	41	45	45	64	73	54
18	NUCL	54	39	41	75	62	54
19	STCL	47	83	37	31	43	48
20	BBCL	63	68	73	100	72	75
	Mean	**41**	**39**	**44**	**49**	**45**	**44**

Source: Appendix V

Long term debt to total debts

It indicates the proportion of long term debt on total debts. The long term debt to total debt ratios (LD/TD) measure the long term solvency of a business. Table 4.8 shows the ratios of the long term debt to total debt ratios (LD/TD) of failed companies and non-failed companies five years prior to their failures.

The average ratios of long debt to total debts (LD/TD) vary among failed companies. More than 50% of failed companies are using average long-term debt to total debts (LD/TD) is higher than 50%. The maximum average ratio is 89% (NRTL) and minimum is nil (FHL). Majority failed companies: JSML, ABGU, SBPP, HTUC, KCUL, ATCL, BBFL, NDL, JCFL and NACL have been increased from five year to one year prior to failure. On the contrary, it is found decreased for GRUL, BSCL, NRTL, LSML, BSFL, NPHL, SSML, and HCCL. However, it remained nil for FHL (five years) and NBGU (year 1, 2 and 5). It shows that the average proportion of long term debt to total debts of failed companies are found to be increasing at least five years prior to their failure.

Out of 20 non-failed companies, the average long term debt to total debts (LD/TD) ratios of eleven (11) non-failed companies are nil. The maximum average ratios of other non-failed companies are 74% (UCFL), 52% (STCL), 40 % (DDC), 39% (RJML), 16% (NFC), 12% (BNL), 8% (NTC), 6% (NSCL), and 5% (BBCL). The average ratios of long term debt to total debts (LD/TD) of majority non-failed companies are found to be decreased in year one in comparison to five year prior. However, the ratios of non-failed companies: NSCL, AGCL, and BNL are to be found increased. The average ratios are decreased from 16% in prior five year to 9% prior one year. Thus it is concluded that the risk of insolvency of a non-failed company is found low and decreasing in last five years.

Table 4.8
Ratios of long term debt to total debts of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	77	78	79	73	68	75
2	GRUL	48	51	27	62	68	51
3	BSCL	23	27	34	39	44	34
4	NBGU	0	0	3	2	0	1
5	FHL	0	0	0	0	0	0
6	AGUL	85	42	44	17	25	42
7	SBPP	75	76	74	65	68	72
8	HTUL	78	61	60	60	48	61
9	KCUL	79	75	0	0	0	31
10	NRTL	82	86	90	93	94	89
11	ATCL	39	10	4	3	6	12
12	BBFL	78	70	77	34	26	57
13	LSML	75	86	95	96	79	86
14	BSML	27	53	49	79	85	59
15	NHPL	29	34	37	38	40	36
16	NDL	64	78	74	71	47	67
17	SSML	31	28	44	47	52	40
18	HCCL	39	64	56	55	49	53
19	JCFL	53	16	0	34	32	27
20	NCAL	62	58	74	63	54	62
	Mean	**52**	**50**	**46**	**47**	**44**	**48**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	0	0	0	0	0	0
2	RJML	14	8	50	63	57	39
3	HCFL	0	0	0	0	0	0
4	ULNL	0	0	0	0	0	0
5	NTL	0	0	0	0	0	0
6	DDC	38	40	39	40	44	40
7	AGCL	2	0	0	0	0	0
8	NTC	0	15	0	1	25	8
9	NLOL	0	0	0	0	0	0
10	NBBL	0	0	0	0	0	0
11	NTWL	0	0	0	0	0	0
12	NSCL	25	4	0	0	0	6
13	UCFL	68	72	75	76	80	74
14	NFC	0	0	0	39	43	16
15	BNTL	0	0	0	0	0	0
16	NCCL	0	0	0	0	0	0
17	BNL	23	39	0	0	0	12
18	NUCL	0	0	0	0	0	0
19	STCL	14	18	74	78	75	52
20	BBCL	0	0	24	0	0	5
	Mean	**9**	**10**	**13**	**15**	**16**	**13**

Source: Appendix V

Retained earnings to total assets

Retained earnings generally consist of a company's cumulative net incomes less any net losses, fictitious assets and dividends declared. This ratio takes into account the age of a company. Thus, those firms with high retained earnings relative to total assets (RE/TA) have lower financial leverage and hence, less risk of bankruptcy. Beaver (1966), Altman (1968), Deakin (1972), Sharma and Rao (1971), and Altman et al. (1977) found this ratio as important predictors of corporate failure. The ratio of retained earnings to total assets (RE/TA) of failed and non-failed companies are presented in presented in Table 4.9

Table 4.9 exhibits that the average ratio of retained earnings to total assets of failed companies is -113%. The average ratio of retained earnings to total assets (RE/TA) of failed companies are negative except SBPP (58%), JCFL (33%). It is -185% in one year and -55% in five year prior to failure. The contribution of retained earnings to total assets ratios (RE/TA) of failed companies is nil over five years prior to failure. It shows that the accumulated losses have been found increasing gradually in failed companies at least five years before its failure.

In fourteen (14) non-failed companies, the average ratios of retained earnings to total assets (RE/TA) are positive. The ratios of retained earnings to total assets (SE/TA) for non-failed companies: RJML (-59%), NTL (-10%), DDC (-32), AGCL (-6%), UFCL (-20), and NFC (-88), are negative. However, the maximum of retained earnings to total assets (SE/TA) is 47% (BNL & STCL). The average ratio of retained earnings to total assets of non-failed companies is 6%. It is 11% prior five year and 1% in one year.

This study concludes that ratio of retained earnings to total assets (RE/TA) of non-failed companies are low but positive. However, due to continuous operating losses, the retained earnings of the failed companies have been found nil and retained earnings have been found began to deteriorate at least five years prior to failure.

Table 4.9
Ratios of retained earnings to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-33	-19	-23	-37	-36	-29
2	GRUL	-166	-147	-130	-126	-100	-134
3	BSCL	-116	-108	-94	-70	-42	-86
4	NBGU	-266	-260	44	28	25	-86
5	FHL	-139	-160	-145	-132	-107	-137
6	AGUL	-303	-135	-59	-21	-33	-110
7	SBPP	168	135	112	-66	-58	58
8	HTUL	-358	-150	-135	-134	-101	-176
9	KCUL	-197	-396	-367	-263	-173	-279
10	NRTL	-76	-66	-51	-47	-20	-52
11	ATCL	-227	-213	-133	-80	-40	-139
12	BBFL	-578	-652	-639	-178	-99	-429
13	LSML	-331	-189	-73	-47	-62	-141
14	BSML	-669	-188	-85	-52	-49	-209
15	NHPL	-232	-61	-57	-125	-131	-121
16	NDL	-181	-314	-264	-154	-133	-209
17	SSML	-19	-23	-5	-3	-4	-11
18	HCCL	2	-3	-1	1	3	0
19	JCFL	45	2	29	43	47	33
20	NCAL	-34	3	12	11	4	-1
	Mean	**-185**	**-147**	**-103**	**-73**	**-55**	**-113**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	28	24	27	38	32	30
2	RJML	0	-1	3	0	3	1
3	HCFL	-78	-92	-115	-7	-3	-59
4	ULNL	50	17	14	12	11	21
5	NTL	-14	-13	-15	-7	0	-10
6	DDC	-48	-27	-30	-29	-27	-32
7	AGCL	-5	-5	-5	-7	-6	-6
8	NTC	41	30	22	16	59	34
9	NLOL	15	14	3	2	18	10
10	NBBL	1	2	2	2	-4	1
11	NTWL	3	4	43	62	45	32
12	NSCL	3	5	5	2	0	3
13	UCFL	-18	-22	-22	-20	-19	-20
14	NFC	-131	-80	-87	-8	-135	-88
15	BNTL	23	17	34	45	46	33
16	NCCL	35	31	28	26	31	30
17	BNL	27	29	46	67	66	47
18	NUCL	21	17	13	15	35	20
19	STCL	47	82	36	30	41	47
20	BBCL	19	19	25	52	33	30
	Mean	**1**	**3**	**1**	**15**	**11**	**6**

Source: Appendix V

Figure 4.1 Profile analysis of failed and non-failed companies prior to failure

Figure 1:Current assets to current liabilities

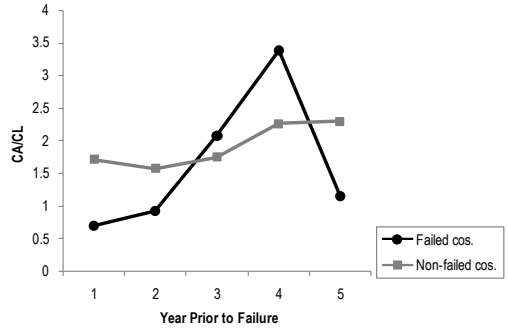


Figure 2:Working capital to total assets

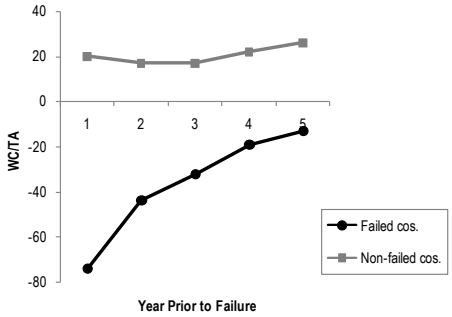


Figure 3:Current assets to total assets

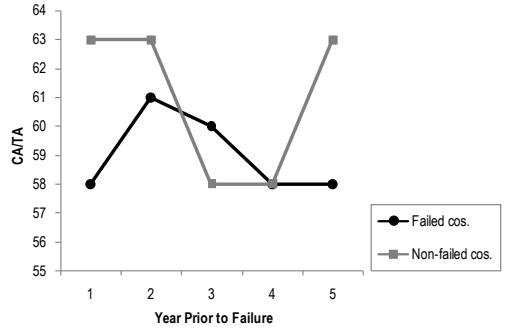


Figure 4:Current liabilities to total assets

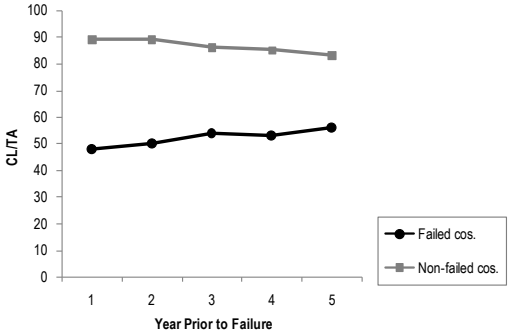


Figure 5: Earnings before interest and tax to Interest

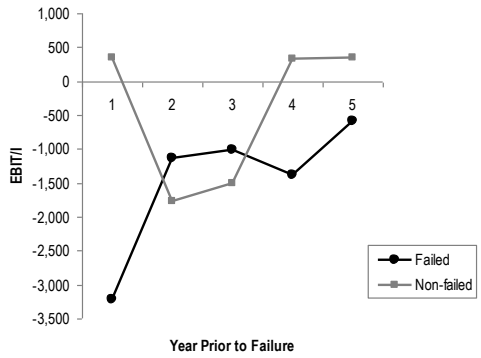


Figure 6: Total debt to total assets

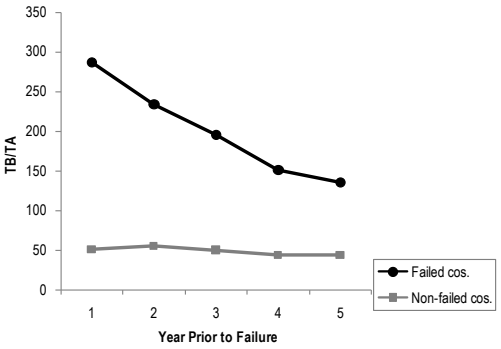


Figure 7: Shareholder's equity to total assets

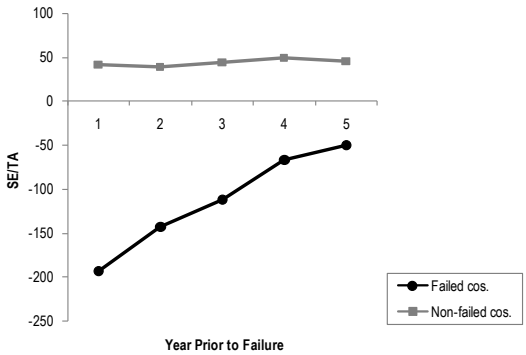


Figure 8: Long term debts to total debts

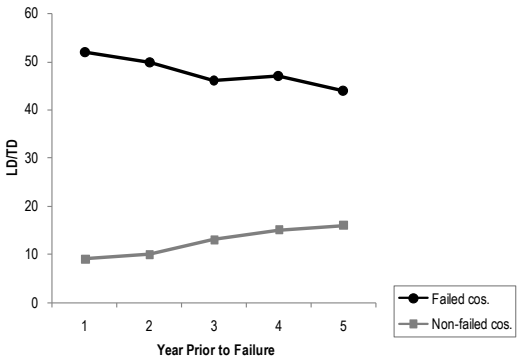


Figure 9: Retained earnings to total assets

Figure 10: Working capital turnover

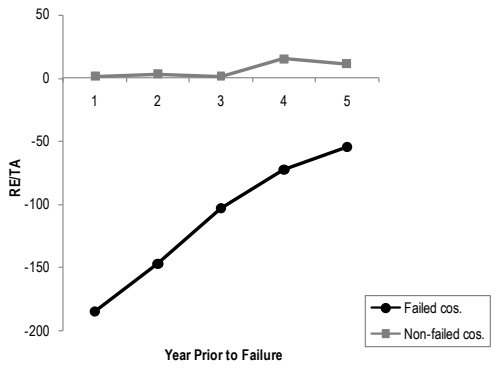


Figure 11: Current assets turnover

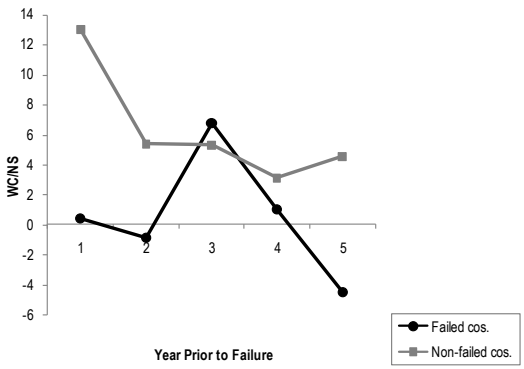


Figure 12: Fixed assets turnover

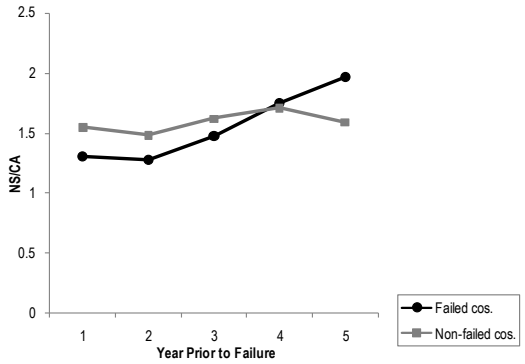


Figure 13: Assets turnover

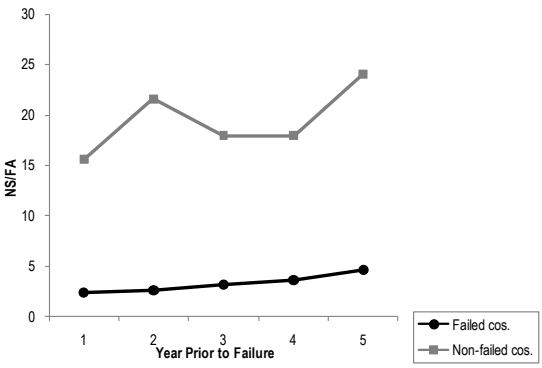


Figure 14: Earnings before interest and tax to total assets

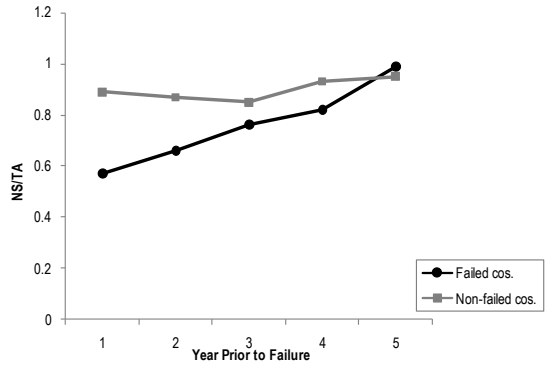


Figure 15: Earnings before interest and tax to total debts

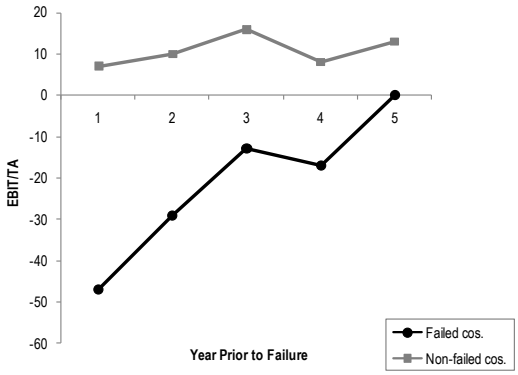


Figure 16: Net income to net sales

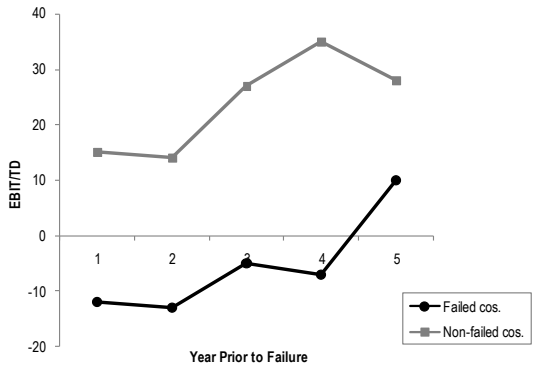


Figure 17: Net income to total assets

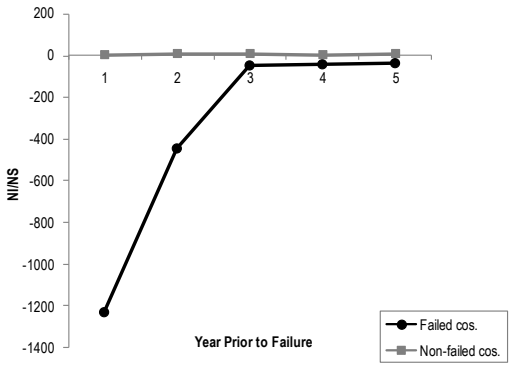


Figure 18: Cash flow to total assets

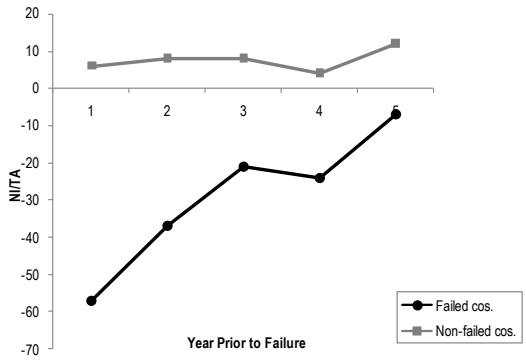


Figure 19: Cash flow to net sales

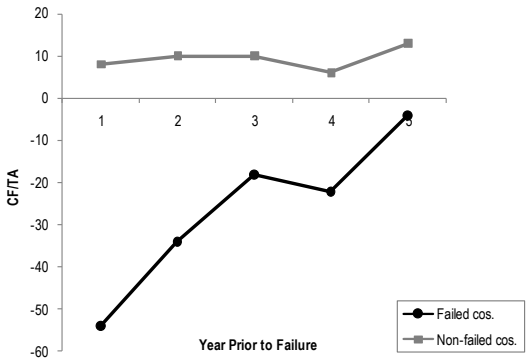
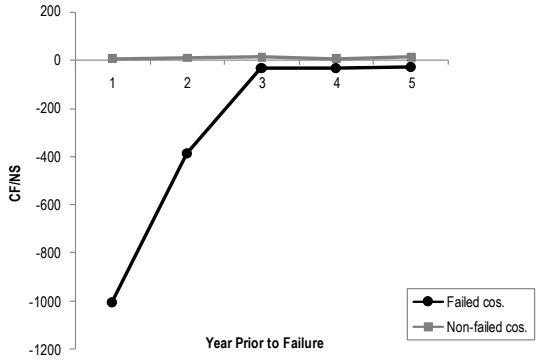


Figure 20: Cash flow to total debt



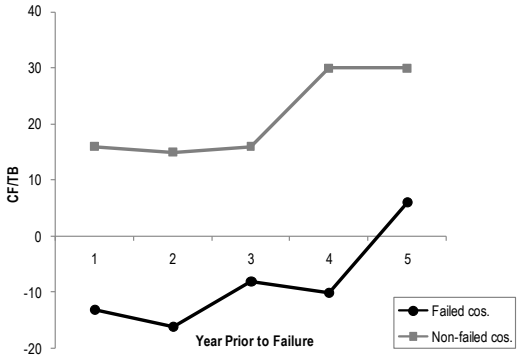
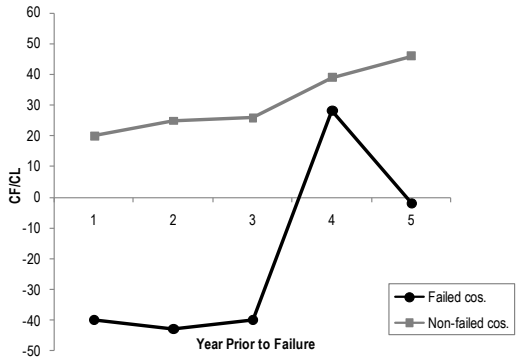


Figure 21: Cash flow to current liabilities



4.4 Turnover ratios of failed and non-failed companies

Turnover ratios are also called assets management ratios that measure how efficiently a company has utilized its resources to generate revenues. It reveals the relationship of levels of sales with various assets and capitals of the balance sheet items. Thus, it is expected that a turnover ratio of a failed company is low because a failed company is unable to utilize its assets properly. In this study, the ratios of net sales to working capital (NS/WC), net sales to current assets (NS/CA), net sales to fixed assets (NS/FA), and net sales to total assets (NS/TA) are used to analyze assets management of failed and non-failed companies.

Working capital turnover

It is the relationship between net sales and net working capital (NS/WC). It is an alternative measure of liquidity ratio. It assesses the ability of generating sales revenues of a firm from its working capital. The high working capital ratio indicates the efficiency in utilization of working capital of a firm to generate its sales revenues. It was revealed as a significant ratio in prediction of corporate failure (Beaver, 1966; Deakin, 1972 and Edmister, 1972). Table 4.10 exhibits the working capital turnover ratios (NS/WC) of failed and non-failed companies for five years prior to their failure.

Table 4.10 shows that the average ratios of net sales to working capital (NS/WC) of fifteen (15) failed companies are negative. The working capital turnover ratios NRTL (2.13 times), LSML (0.32 times), BSML (37.23 times), JSML (11.37 times) and UCFL and NACL (20.99 times) are positive. The average working capital turnover is 0.57 times. It is -4.51 times in five year and -0.41 times in one year prior to failure. It is found positive in three and four year prior to failure due to huge positive working capital of BSFL (184 times) and NACL (25.13 times). It reveals that one of the biggest problems of failed company is working capital problem that deepens close to failure.

Table 4.10
Ratios of working capital turnover of failed and non-failed companies (in Times)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	16.33	7.04	6.22	13.11	-71.79	-5.82
2	GRUL	-1.03	-1.62	-1.86	-1.36	-2.67	-1.71
3	BSCL	-0.48	-0.42	-0.55	-0.69	-1.41	-0.71
4	NBGU	0.00	0.00	-0.46	-1.09	-2.65	-0.84
5	FHL	-0.48	-0.42	-0.38	-0.31	-0.29	-0.38
6	AGUL	-6.27	-1.89	-12.81	-9.14	-8.07	-7.64
7	SBPP	-2.44	-3.36	-2.50	-2.84	-2.68	-2.76
8	HTUL	-0.02	0.29	0.07	0.19	-22.35	-4.36
9	KCUL	0.45	-1.33	-1.09	-3.37	-9.72	-3.01
10	NRTL	1.20	3.60	2.00	2.72	1.15	2.13
11	ATCL	-0.02	-0.19	-0.46	-2.37	-19.29	-4.47
12	BBFL	-0.25	-0.23	-0.70	-0.91	-1.28	-0.68
13	LSML	-8.00	4.64	0.69	0.36	3.90	0.32
14	BSML	-0.03	-2.28	184.26	1.21	3.19	37.27
15	NHPL	-0.78	0.91	0.94	-2.37	-2.05	-0.67
16	NDL	-11.31	-23.21	-62.67	1.44	-3.90	-19.93
17	SSML	-2.12	-1.74	-3.27	-1.67	-3.12	-2.38
18	HCCL	-4.63	-13.75	-0.83	-2.93	-4.05	-5.24
19	JCFL	10.97	9.06	23.19	5.15	8.48	11.37
20	NCAL	17.08	8.18	6.14	25.13	48.41	20.99
	Mean	**0.41**	**-0.84**	**6.80**	**1.01**	**-4.51**	**0.57**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	2.17	3.85	3.64	1.21	1.11	2.40
2	RJML	-5.25	-3.92	18.17	11.58	18.80	7.87
3	HCFL	-7.84	-3.87	-2.15	-2.72	-1.43	-3.60
4	ULNL	9.27	5.68	7.15	3.78	2.84	5.75
5	NTL	26.41	24.13	2.02	6.07	5.16	12.76
6	DDC	5.43	3.87	4.60	5.48	5.52	4.98
7	AGCL	-3.52	-0.75	-3.95	-2.68	-8.76	-3.93
8	NTC	1.10	0.84	0.57	0.50	0.45	0.69
9	NLOL	3.00	3.59	4.40	3.69	2.92	3.52
10	NBBL	7.77	10.65	8.09	10.93	16.19	10.73
11	NTWL	0.40	0.38	0.32	0.56	0.26	0.39
12	NSCL	0.61	2.47	2.91	1.97	1.86	1.96
13	UCFL	106.73	13.76	7.78	10.34	6.80	29.08
14	NFC	-5.42	6.01	4.24	0.68	2.77	1.66
15	BNTL	3.64	5.33	5.12	3.03	1.28	3.68
16	NCCL	0.14	0.13	0.48	0.70	0.80	0.45
17	BNL	18.96	9.06	36.20	2.64	2.05	13.78
18	NUCL	3.35	6.12	4.84	6.51	6.44	5.45
19	STCL	95.98	22.21	3.32	1.90	2.31	25.14
20	BBCL	-2.14	-1.73	-1.61	-4.01	23.63	2.83
	Mean	**13.04**	**5.39**	**5.31**	**3.11**	**4.55**	**6.28**

Source: Appendix V

The average working capital turnover ratios two non-failed companies: HCFL (-3.6 times) and AGCL (-3.93 times) are found to be negative. The maximum ratios are 29.08 times (UFCL), 256.14 times (STCL), 13.78 times (BNL), 12.76 times (NTL), 10.73 times (NBBL), 7.87 times (RJML), 5.78 times (ULL) and 5.45 times (NUCL). The minimum positive ratios are: 0.39 times (NTWL), 0.69 times (NTC) 1.66 times (NFC), 1.96 times (NSCL), 2.4 times (BPL), 3.52 (NLOL) and 3.68 (BNTL). The average working capital turnover ratio of non-failed companies is 6.28 times. It is 4.55 times in five year which is found to be increased to 13.04 times in one year prior. Thus, it is evident that the working capital turnover ratios of non-failed companies are positive and increasing during last five year.

Current assets turnover

Current assets turnover is the proportion of net sales to current assets (NS/CA) of the period. It is the numbers of times sales over current assets. If current assets turnover ratio (NS/CA) is high, it is said to have achieved efficiency in the utilization of current assets over a period of time. Thus, a successful company also maintains optimum level of currents assets to generate sales revenues. Beaver (1966), Deakin (1972), and Kaveri (1980) showed ratio as a significant predictor of corporate failure. Thus, current assets turnover ratios (NS/CA) of failed companies and non-failed companies are presented in Table 4.11.

The average current assets turnover ratios (NS/CA) vary among individual failed companies. The maximum average current assets turnover ratio is 2.93 times (SSML) and the minimum is 0.03 times (HTC). The average current assts turnover ratios of nine (9) failed companies: BSCL, NBGU, FHL, HTUC, NRTL, ATCL, BBFL, NHPL, and NDL are less than one (1). The average current assets turnover ratio of failed companies is 1.55 times. It is 1.97 times in five year and 1.30 times in one year prior years to failure. It indicates that the current assets management of failed companies is very poor so, they are unable to use their current assets for generating more sales revenues.

Table 4.11
Ratios of current assets turnover of failed and non-failed companies (in Times)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	3.44	2.62	2.94	2.58	2.74	2.86
2	GRUL	1.20	1.56	1.79	4.92	4.14	2.72
3	BSCL	0.67	0.58	0.66	0.52	0.41	0.57
4	NBGU	0.00	0.00	1.29	1.47	2.18	0.99
5	FHL	1.00	1.05	0.90	0.72	0.55	0.84
6	AGUL	2.36	1.69	1.57	1.48	2.10	1.84
7	SBPP	2.72	2.66	2.12	2.45	2.30	2.45
8	HTUL	0.01	0.03	0.01	0.03	0.08	0.03
9	KCUL	0.18	0.28	2.44	4.37	4.62	2.38
10	NRTL	0.22	0.70	0.86	1.38	0.81	0.80
11	ATCL	0.05	0.31	0.48	1.09	1.70	0.73
12	BBFL	0.19	0.49	1.06	0.69	0.39	0.56
13	LSML	1.77	3.18	0.67	0.35	1.83	1.56
14	BSML	0.40	1.73	1.61	0.83	2.51	1.42
15	NHPL	1.43	0.34	0.38	0.94	0.93	0.81
16	NDL	0.35	0.78	0.67	0.42	0.66	0.58
17	SSML	3.24	1.47	3.57	3.27	3.10	2.93
18	HCCL	2.42	1.44	0.22	1.28	1.77	1.43
19	JCFL	3.02	2.68	3.51	3.31	3.54	3.21
20	NCAL	1.27	1.80	2.63	2.88	3.00	2.32
	Mean	**1.30**	**1.27**	**1.47**	**1.75**	**1.97**	**1.55**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	0.58	0.59	0.69	1.00	0.61	0.69
2	RJML	5.18	3.50	4.77	4.80	5.25	4.70
3	HCFL	1.31	1.24	1.59	1.41	1.04	1.32
4	ULNL	3.31	2.82	2.84	1.98	1.66	2.52
5	NTL	1.03	0.91	0.61	1.06	1.84	1.09
6	DDC	3.89	3.00	3.32	3.80	3.96	3.59
7	AGCL	1.11	1.12	1.13	0.71	1.22	1.06
8	NTC	0.74	0.60	0.46	0.42	0.39	0.52
9	NLOL	1.11	1.30	1.14	1.07	0.88	1.10
10	NBBL	1.21	1.61	1.52	1.86	1.86	1.61
11	NTWL	0.23	0.22	0.16	0.20	0.12	0.19
12	NSCL	0.48	1.15	1.39	1.14	1.08	1.05
13	UCFL	0.85	0.70	0.78	0.74	0.92	0.80
14	NFC	1.00	0.49	0.42	0.30	0.58	0.56
15	BNTL	1.67	1.37	1.57	1.34	0.97	1.39
16	NCCL	0.07	0.07	0.21	0.28	0.34	0.19
17	BNL	1.99	1.92	1.52	1.43	1.36	1.64
18	NUCL	1.78	2.37	1.94	4.83	3.96	2.97
19	STCL	0.98	1.25	2.45	1.47	1.69	1.57
20	BBCL	2.54	3.39	3.87	4.41	2.14	3.27
	Mean	**1.55**	**1.48**	**1.62**	**1.71**	**1.59**	**1.59**

Source: Appendix V

On the contrary, the average current assets turnover ratios of fourteen (14) non-failed companies are higher than one (1) time. The maximum current assets turnover ratios of non-failed companies are: 4.70 times (RJML), 3.59 times (DDC), 3.27 times (BBCL), 3.15 times (RJMS), 2.97 times (NUCL) and 2.52 times (ULL). The minimum ratios less than one (1) are: 0.19 times (NTWL), 0.52 times (NTC), 0.56 times (NFC), 0.69 times (BPL), and 0.80 times (UFCL). The average current turnover ratio is 1.59 times with 1.59 times in five year and 1.55 times one year prior. Like failed companies, the current assets turnover ratios of non-failed companies are low and relatively stable during the five years period.

Fixed assets turnover

Fixed assets turnover ratio (NS/FA) indicates the numbers of times the average fixed assets is turned over during the period. It measures the relationship between sales and fixed assets and demonstrates how efficiently fixed assets are utilized by a company. Generally, the higher ratio refers to the more efficient in the utilization of fixed assets of a company. Table 4.12 shows fixed assets turnover ratios (NS/FA) of failed and non-failed companies.

Of twenty failed companies, the maximum fixed assets turnover ratios of eight (8) failed companies are 22.34 times (JCFL), 5.67 times (NBGU), 5.21 times (KCUL), 4.06 times (AGUL), 3.87 times, (NPHL), 3.61 (ATCL) 3.26 times (BSML) , and 2.22 times (BBFL). Similarly the minimum fixed assets turnover ratios are 0.19 times (HTUL), 0.76 times (BSCL), 0.82 times (SSML), 0.87 times (HCCL) 0.98 times (GRUL) and one (1) time (ABPP). Out of twenty failed companies, the average fixed assets turnover ratio is 3.26 times. It is 4.61 times in five year and 2.36 times in one year prior to failure. It shows that fixed assets turnover ratios (NS/FA) of failed companies are to be found in decreasing trend at least five years prior to their failure.

The average fixed assets turnover ratio (NS/FA) of non-failed companies is 19.46 times. Fixed assets ratios (NS/FA) of four failed companies below one (1) are 0.50 times (BPL), 0.72 times (AGCL), 0.87 times (NTC) and 0.13 times (UCFL). The maximum ratio is 167.56 times (NUCL), followed by 39.32 times (STCL), 35.56 times (NTL), 25.21 times (NBBL) and 1.48 times (ULNL).

Table 4.12
Ratios of fixed assets turnover of failed and non-failed companies (in Times)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	1.87	1.68	1.90	1.51	1.45	1.68
2	GRUL	0.98	1.18	1.06	0.81	0.87	0.98
3	BSCL	1.18	0.80	0.74	0.59	0.49	0.76
4	NBGU	0.00	0.01	3.21	6.20	18.95	5.67
5	FHL	1.89	1.68	1.34	0.96	0.72	1.32
6	AGUL	1.50	3.39	4.35	5.96	5.09	4.06
7	SBPP	1.36	1.27	0.98	0.80	0.61	1.00
8	HTUL	0.01	0.16	0.06	0.17	0.58	0.19
9	KCUL	3.00	1.64	4.06	8.01	9.31	5.21
10	NRTL	0.93	1.80	2.14	2.40	1.82	1.82
11	ATCL	0.21	1.31	1.96	4.86	9.69	3.61
12	BBFL	0.97	1.71	3.61	2.85	1.97	2.22
13	LSML	1.03	3.32	1.92	1.10	1.74	1.82
14	BSML	0.31	3.15	4.77	2.83	5.24	3.26
15	NHPL	4.71	3.95	3.84	3.71	3.11	3.87
16	NDL	1.26	1.82	1.66	1.63	1.99	1.67
17	SSML	1.21	0.85	0.86	0.49	0.70	0.82
18	HCCL	1.73	0.98	0.13	0.66	0.84	0.87
19	JCFL	20.97	19.39	22.11	24.89	24.34	22.34
20	NCAL	1.98	2.03	1.75	1.54	2.67	1.99
	Mean	**2.36**	**2.61**	**3.12**	**3.60**	**4.61**	**3.26**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	0.62	0.53	0.50	0.47	0.41	0.50
2	RJML	1.88	1.49	1.68	1.62	1.83	1.70
3	HCFL	2.81	2.49	2.31	2.11	0.27	2.00
4	ULNL	18.22	15.30	12.21	10.08	11.59	13.48
5	NTL	34.98	41.14	17.62	37.15	46.91	35.56
6	DDC	7.39	6.46	5.68	5.81	5.04	6.08
7	AGCL	0.61	0.37	0.78	0.44	1.40	0.72
8	NTC	1.06	0.93	0.83	0.75	0.76	0.87
9	NLOL	12.39	12.35	9.71	6.93	4.55	9.19
10	NBBL	31.11	38.75	20.52	20.05	15.59	25.21
11	NTWL	2.83	2.37	1.59	3.15	2.99	2.59
12	NSCL	1.46	1.20	1.14	0.90	0.69	1.08
13	UCFL	0.17	0.12	0.13	0.11	0.12	0.13
14	NFC	5.17	4.08	3.16	2.02	2.32	3.35
15	BNTL	3.14	2.84	1.83	1.25	3.35	2.48
16	NCCL	2.91	1.45	6.70	10.54	9.30	6.18
17	BNL	1.57	1.16	1.00	1.92	1.50	1.43
18	NUCL	131.09	227.38	121.52	124.17	233.67	167.56
19	STCL	1.33	15.75	83.85	53.35	42.31	39.32
20	BBCL	1.67	1.40	1.29	1.12	0.94	1.28
	Mean	**15.59**	**21.61**	**17.98**	**17.98**	**24.12**	**19.46**

Source: Appendix V

In twelve failed companies, fixed assets turnover ratios (NS/FA) are found to have increased in one year prior when it is compared with five year prior. Similarly, the average fixed assets turnover ratios of non-failed companies are 24.12 times in five year and 15.59 times in one year prior. Thus, it is evident that fixed assets turnover ratios of failed companies starts to deteriorate at least five year prior to their failure. On the contrary, it is found to be increasing in non-failed companies during the period.

Assets turnover

It measures a firm's ability to generate sales from its total assets. Total assets includes fixed assets, current assets and others assets like investments. High assets turnover ratio (NS/TA) shows the efficient utilization of total assets in a business or vice versa. Total assets turnover ratios (NS/TA) of failed and non-failed companies have been presented in Table 4.13.

The average total assets turnover ratio (NS/TA) of failed companies is 0.76 times. Out of twenty failed companies, the assets turnover ratios of 16 failed companies are below one (1) times. The maximum ratios are 2.21 times (JCFL), 1.57 times (KUCL), 1.17 times (ABGU) and 1.06 times (JSML). The minimum assets turnover ratios are 0.03 times (HTUL), 0.32 times (BSCL), 0.42 times (NDL), 0.45 times (BBFL), 0.51 times (FHL) and 0.55 times (NRTL). Similarly, fourteen failed companies' assets turnover ratios are found to be decreased over five years prior to failure. As a result, it is 0.99 times in five year that is gradually decreased to 0.57 times in one year prior to failure.

In non-failed companies, the average total assets turnover ratio (NS/TA) is 0.90 times which is slightly higher than that of failed companies (0.76 times). However, it varies among non-failed companies. Thirteen failed companies' assets turnover ratios have been found increased over the period of five years. The maximum average assets turnover ratio is 2.91 times (NUCL), and 0.11 times (UFCL) as the minimum. The average ratio is 0.89 times in one year, 0.85 times in three year and 0.95 times in prior five year. Thus, it is found to have increased in last three years.

Table 4.13
Ratios of assets turnover of failed and non-failed companies (in Times)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	1.21	1.02	1.15	0.95	0.95	1.06
2	GRUL	0.54	0.67	0.67	0.70	0.72	0.66
3	BSCL	0.43	0.33	0.35	0.28	0.22	0.32
4	NBGU	0.00	0.00	0.92	1.19	1.96	0.81
5	FHL	0.65	0.65	0.54	0.41	0.31	0.51
6	AGUL	0.92	1.13	1.15	1.18	1.47	1.17
7	SBPP	0.91	0.86	0.67	0.60	0.48	0.70
8	HTUL	0.00	0.03	0.01	0.02	0.07	0.03
9	KCUL	0.17	0.24	1.52	2.83	3.09	1.57
10	NRTL	0.18	0.51	0.61	0.88	0.56	0.55
11	ATCL	0.04	0.25	0.38	0.89	1.45	0.60
12	BBFL	0.16	0.38	0.81	0.55	0.33	0.45
13	LSML	0.64	1.60	0.49	0.26	0.88	0.78
14	BSML	0.14	0.98	1.10	0.60	1.53	0.87
15	NHPL	1.10	0.31	0.35	0.75	0.72	0.65
16	NDL	0.27	0.54	0.47	0.33	0.49	0.42
17	SSML	0.47	0.54	0.70	0.43	0.57	0.54
18	HCCL	0.84	0.43	0.07	0.34	0.50	0.44
19	JCFL	2.16	1.89	2.34	2.28	2.36	2.21
20	NCAL	0.60	0.79	0.91	0.91	1.21	0.88
	Mean	**0.57**	**0.66**	**0.76**	**0.82**	**0.99**	**0.76**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	0.22	0.21	0.22	0.23	0.19	0.21
2	RJML	1.38	1.04	1.25	1.21	1.35	1.25
3	HCFL	0.68	0.68	0.80	0.82	0.21	0.64
4	ULNL	2.22	1.98	1.81	1.28	1.35	1.73
5	NTL	0.98	0.87	0.56	0.95	1.58	0.99
6	DDC	2.55	1.87	1.89	2.06	1.99	2.07
7	AGCL	0.37	0.26	0.43	0.26	0.64	0.39
8	NTC	0.36	0.32	0.27	0.24	0.24	0.29
9	NLOL	1.02	1.18	0.19	0.14	0.74	0.65
10	NBBL	1.16	1.55	1.41	1.70	1.66	1.50
11	NTWL	0.19	0.18	0.14	0.18	0.12	0.16
12	NSCL	0.34	0.53	0.58	0.48	0.41	0.47
13	UCFL	0.13	0.10	0.11	0.09	0.10	0.11
14	NFC	0.83	0.43	0.37	0.26	0.46	0.47
15	BNTL	1.09	0.93	0.85	0.65	0.75	0.85
16	NCCL	0.07	0.07	0.20	0.27	0.33	0.19
17	BNL	0.80	0.65	0.60	0.82	0.71	0.72
18	NUCL	1.75	2.34	1.91	4.65	3.89	2.91
19	STCL	0.56	1.16	2.38	1.43	1.62	1.43
20	BBCL	1.01	0.99	0.97	0.89	0.66	0.90
	Mean	**0.89**	**0.87**	**0.85**	**0.93**	**0.95**	**0.90**

Source: Appendix V

Assets turnover ratios (NS/TA) of both failed and non-failed companies are below one (1). It indicates that assets management of both failed and non-failed companies are not satisfactory. However, it has been declining trend over five years prior to their failure among failed companies and has improved among non-failed companies during the same period. It indicates that the assets utilization of non-failed companies slightly better than failed companies.

4.5 Profitability ratios of failed and non-failed companies

Profit is the excess of revenues over costs for a period. It is used to measure the overall performance of a business. High profit indicates good performance or vice versa. This study describes the behaviour of profitability ratios of failed and non-failed companies. The main profitability ratios analyzed in this study are earnings before interest and tax to total assets (EBIT/TA), earnings before interest and tax to total debts (EBIT/TD), net income to net sales (NI/NS) and net income to total assets (NI/TA). Profitability ratios of failed and non-failed companies are given in Table 4.14.

Earnings before interest and tax to total assets

It is the ratio of earnings before interest and tax to total assets (EBIT/TA). It measures the ability of a company to earn earnings before interest and tax from its total investment. It is also an alternative measure of return on assets (ROA). It is the real productivity of the firm's assets without consideration of tax and leverage factors. Altman (1968), Sharma and Rao (1971), Yadav (1986), Altman et al. (1977) and Gupta (1983) revealed this ratio as a predictor of corporate failure. Table 4.14 presents the ratio of EBIT to total assets (EBIT/TA) of failed and non-failed companies five years prior to their failure.

The average earnings before interest and tax to total assets ratios (EBIT/TA) of three failed companies: JSML (6%), NHPL (1%) and NACL (3%) are positive. It is found negative for seventeen failed companies. One year prior to failure, it is found to be negative in failed companies except HCCL (5%). The average ratio of earnings before interest and tax to total assets (EBIT/TA) of failed companies is -21%. It is nil in five year and -47% one year prior to failure. It indicates that return on assets (ROA) of failed companies begins to deteriorate at least five year prior to their failure.

Table 4.14
Ratios of earnings before interest and tax to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-2	2	12	9	10	6
2	GRUL	-4	-3	-3	-99	-79	-38
3	BSCL	-114	-105	-6	-9	-9	-49
4	NBGU	2	-9	-8	-6	5	-3
5	FHL	4	-10	-10	-5	5	-3
6	AGUL	-10	-42	-8	6	12	-8
7	SBPP	-8	-1	-4	2	-1	-2
8	HTUL	-4	3	6	5	-26	-3
9	KCUL	-29	-232	-63	-57	-32	-82
10	NRTL	-29	-14	-13	-21	-7	-17
11	ATCL	-45	-66	-59	-105	-145	-84
12	BBFL	-310	48	-42	-47	60	-58
13	LSML	-56	-30	-14	18	-20	-21
14	BSML	-350	-44	-10	-15	-17	-87
15	NHPL	5	-8	3	0	4	1
16	NDL	66	-13	-32	-33	-17	-6
17	SSML	-1	-15	2	6	6	0
18	HCCL	5	-2	-13	-1	0	-2
19	JCFL	-30	-29	3	3	240	37
20	NCAL	-26	-1	8	15	17	3
	Mean	**-47**	**-29**	**-13**	**-17**	**0**	**-21**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	18	14	17	14	15	15
2	RJML	4	-3	5	4	4	3
3	HCFL	13	68	76	7	-3	32
4	ULNL	37	31	26	21	17	27
5	NTL	3	-1	-3	-4	175	34
6	DDC	-12	2	-3	-4	2	-3
7	AGCL	0	-4	-2	0	0	-1
8	NTC	16	13	13	10	10	12
9	NLOL	4	6	0	1	3	3
10	NBBL	4	5	9	17	8	9
11	NTWL	3	3	-6	-2	-2	-1
12	NSCL	1	1	3	2	2	2
13	UCFL	5	1	0	-1	-1	1
14	NFC	3	4	-2	-9	-18	-4
15	BNTL	3	9	119	38	3	35
16	NCCL	-12	-9	-2	-6	-2	-6
17	BNL	5	4	4	3	4	4
18	NUCL	9	9	16	20	11	13
19	STCL	5	9	11	9	11	9
20	BBCL	41	37	41	34	25	36
	Mean	**7**	**10**	**16**	**8**	**13**	**11**

Source: Appendix V

Fifteen non-failed companies have positive ratio of earnings before interest and tax to total assets (EBIT/TA). The maximum ratio is 36% (BBCL) which is followed by 35% (BNTL), 34% (NTL), 32% (HCUL), 27% (ULNL), 15% (BPL) and 12% (NTC). Similarly the minimum ratios are DDC (-3%), AGCL (-1%) and NTWL (-1%) and NFC (-4%). Although, the average ratio of non-failed companies is decreased to 7% (year 1) from 13% (year 5), majority of non-failed companies' ratios of earnings before interest and tax to total assets (EBIT/TA) have either improved or remained stable in one year as compared to five year prior to failure. It reveals that non-failed companies are earning return of total assets (EBIT/TA), but fluctuating during last five years.

Income before interest and tax to total debts

It is used to assess the ability of a company to generate profits for repayment of interest and principal of both long term and short term liabilities. The high ratio indicates enough earnings for interest expenses and its principal in a particular period. Blum (1974) found is as an important predictor of corporate failure. The ratios of interest before interest and tax to total debt (EBIT/TD) of failed and non-failed companies of five years prior to failure have been presented in Table 4.15.

Table 4.15 exhibits that the ratios of interest before interest and tax to total debt (EBIT/TD) of two failed company: JSML (6%) and JCFL (5%) are to be found positive. One year prior to failure, it is found positive in four failed companies: NBGU (1%), FHL (2%), NHPL (1%) and NDL (30%). The average ratio of failed companies is -5%. It is 10% in five year, which is gradually decreased to -12% in one year prior to failure. It shows that failed companies are unable to generate operating profits to meet their costs of debts since at least during four year prior to their failure.

The higher return on total debt is expected in a non-failed company. The average return on total debt (EBIT/TD) is 24% of non-failed companies. It varies among non-failed companies individually. The maximum return on debt (EBIT/TD) is 122% (BPL), 73% (BNTL), 59% (BBCL), 46% (NTL), 43% (ULNL), 38% (NTC) and 34% (STCL). The minimum ratios are -13 % (NCCL), -4% (DDC), -3% (NFC), -2% (NTWL), and -1% (AGL). The average ratio of return on total debt (EBIT/TD) is 28% prior five year and 15% in one year. Despite decreasing trend, the non-failed companies are generating some profits to their pay interest expenses and debts principals during last five years.

Table 4.15
Ratios of earnings before interest and tax to total debts of failed and non-failed companies (in %)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-2	3	12	8	9	6
2	GRUL	-2	-2	-3	-58	-57	-24
3	BSCL	-57	-56	-4	-6	-7	-26
4	NBGU	1	-3	-3	-3	3	-1
5	FHL	2	-5	-5	-3	3	-1
6	AGUL	-3	-19	-6	6	10	-2
7	SBPP	-3	0	-2	2	-1	-1
8	HTUL	-1	2	3	3	-15	-2
9	KCUL	-10	-50	-17	-21	-19	-23
10	NRTL	-8	-3	-3	-5	-2	-4
11	ATCL	-9	-25	-32	-76	-135	-55
12	BBFL	-47	6	-5	-22	41	-6
13	LSML	-24	-20	-18	38	-15	-8
14	BSML	-49	-18	-7	-12	-15	-20
15	NHPL	1	-5	2	0	1	0
16	NDL	30	-4	-12	-17	-10	-3
17	SSML	-1	-16	3	9	7	0
18	HCCL	5	-2	-15	-1	0	-3
19	JCFL	-28	-46	5	6	369	61
20	NCAL	-23	-1	11	19	21	5
	Mean	**-12**	**-13**	**-5**	**-7**	**10**	**-5**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	61	45	65	337	101	122
2	RJML	7	-4	12	11	10	7
3	HCFL	14	68	67	6	-6	30
4	ULNL	87	41	34	32	22	43
5	NTL	3	-1	-4	-5	237	46
6	DDC	-18	4	-4	-8	4	-4
7	AGCL	0	-4	-3	0	0	-1
8	NTC	53	37	39	30	31	38
9	NLOL	6	9	3	6	5	6
10	NBBL	5	6	11	20	10	10
11	NTWL	4	4	-13	-3	-4	-2
12	NSCL	3	4	15	9	14	9
13	UCFL	10	2	0	-1	-2	2
14	NFC	3	4	-2	-11	-11	-3
15	BNTL	7	16	236	99	10	73
16	NCCL	-25	-19	-4	-11	-4	-13
17	BNL	8	8	7	9	15	9
18	NUCL	19	16	28	81	28	34
19	STCL	7	8	12	9	11	9
20	BBCL	47	43	37	81	89	59
	Mean	**15**	**14**	**27**	**35**	**28**	**24**

Source: Appendix V

Net income to net sales

This is the ratio of net income after tax to sales (NI/NS) of the period, is determined as in the form of percentage. It is also called net profit margin. It measures the ability of a business to generate profit from sales. If it is low, it is unable to give return to its owners. It is one of the widely used ratios to measure the overall performance of a business. Ko (1982) evidenced it as a significant ratio in corporate failure study. The ratio of net income to net sales (NI/NS) of failed and non-failed companies for five years prior to failure have been given in Table 4.16.

Table 4.16 shows that presents that the maximum average losses on sales are -3789% (NBGU), -1178% (HTC), -551% (BSFL), -546% (ATCL), -390% (BBFL), -248% (KCUL) and -189% (BSCL). It is due to either low sales volume or high operating costs in failed companies. The minimum losses are -2% (JSML), -7% (NPHL), -8% (SSML) and -10% (NACL). The average ratio is -359%. It is -35%prior five year and -1230% in one year prior to failure. Thus, failed companies profit margins (NI/NS) of failed companies are negative at least five year prior to their failure.

Table 4.16 also shows that the average profits margins of thirteen non-failed companies are found to be positive. The maximum average profit margins are 72% (BPL), 43% (NTC), 39% (BBCL), 37% (HCL and JCFL), 17% (NTL) and 15% (ULNL). However, seven non-failed companies are unable to generate net profit. The average net profit margin (NI/NS) of non-failed companies is 6%. It is 9% in five year and 3% in one year prior. Despite net profits on sales (NI/NS) of non-failed companies are positive, they are found deteriorated.

Table 4.16
Ratios of net income to net sales of failed and non-failed companies (in %)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-10	-5	3	1	-1	-2
2	GRUL	-25	-19	-20	-158	-125	-70
3	BSCL	-305	-373	-71	-94	-102	-189
4	NBGU	-12225	-6662	-37	-19	-3	-3789
5	FHL	-2	-22	-27	-27	-22	-20
6	AGUL	-30	-47	-14	0	0	-18
7	SBPP	-19	-12	-19	-11	-19	-16
8	HTUL	-5101	-175	-77	-79	-461	-1178
9	KCUL	-177	-987	-44	-21	-11	-248
10	NRTL	-162	-28	-21	-24	-13	-50
11	ATCL	-1900	-375	-210	-138	-106	-546
12	BBFL	-2020	75	-66	-102	163	-390
13	LSML	-113	-26	-37	56	-29	-30
14	BSML	-2617	-61	-21	-37	-18	-551
15	NHPL	-1	-30	3	-6	-1	-7
16	NDL	187	-50	-83	-118	-55	-24
17	SSML	-7	-35	-2	4	1	-8
18	HCCL	5	-5	-198	-3	-1	-40
19	JCFL	-16	-17	0	0	100	14
20	NCAL	-57	-10	0	9	10	-10
	Mean	**-1230**	**-443**	**-47**	**-38**	**-35**	**-359**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	79	64	77	59	80	72
2	RJML	1	-4	2	1	1	0
3	HCFL	15	96	90	4	-22	37
4	ULNL	17	16	14	16	13	15
5	NTL	0	-4	-13	-7	108	17
6	DDC	-5	1	-2	-2	1	-1
7	AGCL	0	-16	-5	0	0	-4
8	NTC	44	40	47	41	43	43
9	NLOL	1	1	0	3	0	1
10	NBBL	1	1	1	3	2	2
11	NTWL	15	17	-44	-10	-16	-7
12	NSCL	2	2	6	3	5	4
13	UCFL	23	-10	-17	-26	-26	-11
14	NFC	1	6	-12	-46	-50	-20
15	BNTL	3	10	-7	4	5	3
16	NCCL	-184	-134	-9	-24	-7	-72
17	BNL	3	4	5	4	6	4
18	NUCL	-1	1	5	2	2	2
19	STCL	0	2	2	2	1	1
20	BBCL	40	37	42	39	38	39
	Mean	**3**	**7**	**9**	**3**	**9**	**6**

Source: Appendix V

Net income to total assets

The ratio of net income to total assets (NI/TA) is alternative measure of return on assets (ROA). It measures the return on investment of a business. It measures whether a business is utilizing its assets or not to give enough return to its shareholders and creditors. It is one of the important predictors of corporate failure revealed by Beaver (1966), Kaveri (1980) and Sharma and Mahajan (1982). The return on assets computed for failed and non-failed companies has been presented in Table 4.17.

Table 4.17 shows that the average ratio of failed companies is -29%. It is -57% in one year to -7% five year prior to failure. The average ratios found negative in failed companies except JCFL (34%). Out of failed companies; only NDL (51%) and HCCL (5%) could earn profit in year one prior to their failure. Similarly BBFL could earn 29% two year prior to failure. Prior three year; JSML earned 3% and 1% (NHPL and JCFL) profit on total assets (NI/TA). Thus, failed companies are seemed unable to earn profit on their investment at least five years prior to their failure.

On the contrary, it is expected that there would be high profit to net sales (NI/TA) among non-failed companies. Like other profitability ratios, the average ratios of net income to total assets (NI/TA) of non-failed companies are positive except DDC (-3%), AGCL (-1%), NTWL (-1%), UCFL (-1%), NCCL (-6%) and NFC (-7%). The maximum ratio is 35% (BBCL) which is followed by 31% (NTL), 29% (HTC), 27% (ULL), 15% (BPL) and 12% (NTC) respectively. This ratio is found to have increased for eight non-failed companies' during last five years period. The average ratio of non-failed companies is 6% in one year and 12% in five year prior. It indicates that although, it is decreasing, non-failed companies are able to generate profit on their investment (NI/TA).

Table 4.17
Ratios of net income to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-12	-6	3	1	-1	-3
2	GRUL	-14	-13	-14	-110	-90	-48
3	BSCL	-131	-125	-25	-26	-23	-66
4	NBGU	-4	-11	-34	-22	-6	-16
5	FHL	-2	-14	-15	-11	-7	-10
6	AGUL	-27	-53	-17	0	0	-19
7	SBPP	-17	-11	-13	-7	-9	-11
8	HTUL	-21	-4	-1	-2	-31	-12
9	KCUL	-29	-234	-67	-60	-34	-85
10	NRTL	-29	-14	-13	-21	-7	-17
11	ATCL	-77	-95	-80	-123	-153	-106
12	BBFL	-324	29	-54	-56	53	-71
13	LSML	-72	-42	-18	15	-26	-29
14	BSML	-372	-59	-23	-22	-27	-101
15	NHPL	-1	-9	1	-4	-1	-3
16	NDL	51	-27	-39	-39	-27	-16
17	SSML	-3	-19	-2	2	1	-4
18	HCCL	5	-2	-13	-1	0	-2
19	JCFL	-35	-31	1	1	237	34
20	NCAL	-34	-8	0	8	12	-4
	Mean	**-57**	**-37**	**-21**	**-24**	**-7**	**-29**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	18	13	17	14	15	15
2	RJML	1	-4	2	2	2	1
3	HCFL	10	65	72	3	-5	29
4	ULNL	37	31	26	21	17	27
5	NTL	0	-4	-7	-7	171	31
6	DDC	-13	2	-3	-5	2	-3
7	AGCL	0	-4	-2	0	0	-1
8	NTC	16	13	13	10	10	12
9	NLOL	1	2	0	0	0	1
10	NBBL	1	2	2	5	3	3
11	NTWL	3	3	-6	-2	-2	-1
12	NSCL	1	1	3	2	2	2
13	UCFL	3	-1	-2	-2	-3	-1
14	NFC	1	3	-4	-12	-23	-7
15	BNTL	3	9	-6	3	3	2
16	NCCL	-12	-9	-2	-6	-2	-6
17	BNL	2	3	3	3	4	3
18	NUCL	-2	2	9	10	7	5
19	STCL	0	3	4	3	2	2
20	BBCL	41	36	41	34	25	35
	Mean	**6**	**8**	**8**	**4**	**12**	**7**

Source: Appendix V

4.6 Cash flow ratios of failed and non-failed companies

Cash flow measures the ability of a business to generate cash from its sales revenues over a period. If a business is unable to generate sufficient cash flow, it leads to severe cash problem which leads to inability to pay for its short term obligations. As a result, it should depend on short term and long term debts to meet its obligations and its existence becomes doubtful. On the contrary, high operating cash flow refers to the ability of a business to convert sales into cash. If cash flow is positive in a business, cash can be used to meet short term and long term obligations. Thus, cash flow of a successful business should be positive enough to meet its current liabilities and loan obligations. Table 4.18 presents cash flow ratios of failed and non-failed companies five years prior to their failure. The main cash flow ratios used in this study are ratios of cash flow to sales (CF/NS), cash flow to current liabilities (CF/CL), cash flow to total assets (CF/TA) and cash flow to total debts (CF/TD).

Cash flow to total assets

It is the relationship of operating cash flow to total assets (CF/TA) over a period. Generally, it is expected high or positive operating cash flow in a successful business. It is low or negative cash flow in failed companies. Beaver (1966) and Deakin (1972) evidenced this ratio (CF/TA) as important predictors of corporate failure. The cash flow to total assets ratios (CF/TA) of twenty failed and twenty non-failed companies are presented in Table 4.18.

Table 4.18 shows that the operating cash flow to total assets ratios of failed companies are negative or very low. Out of twenty failed companies, the average ratios of three companies are positive. They are 3% (JSML), 2% (SSML) and 36% (JCFL) The average ratio of cash flow to total assets (CF/TA) of failed companies is -26%. It is -4% in five year and -54% in one year prior to failure. It is evident that failed companies are unable to generate cash flow to make investment in assets of the business.

Table 4.18
Ratios of cash flow to total assets of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-5	0	9	7	5	3
2	GRUL	-9	-8	-9	-104	-83	-43
3	BSCL	-129	-122	-22	-23	-22	-63
4	NBGU	-3	-9	-32	-22	-6	-14
5	FHL	0	-14	-14	-11	-7	-9
6	AGUL	-21	-50	-14	2	4	-16
7	SBPP	-8	-2	-4	0	-2	-3
8	HTUL	-20	-4	0	-1	-31	-11
9	KCUL	-29	-232	-63	-56	-31	-82
10	NRTL	-28	-13	-12	-19	-5	-16
11	ATCL	-77	-94	-80	-122	-153	-105
12	BBFL	-324	29	-53	-56	54	-70
13	LSML	-68	-38	-16	17	-22	-25
14	BSML	-371	-59	-23	-20	-24	-99
15	NHPL	1	-9	2	-2	2	-1
16	NDL	66	-13	-32	-38	-26	-9
17	SSML	3	-9	11	3	3	2
18	HCCL	9	-1	-12	0	5	0
19	JCFL	-34	-31	2	2	238	36
20	NCAL	-32	-4	1	11	17	-1
	Mean	**-54**	**-34**	**-18**	**-22**	**-4**	**-26**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		Y-1	**Y-2**	**Y-3**	**Y-4**	**Y-5**	
1	BPL	18	14	17	14	15	15
2	RJML	5	-1	7	5	8	5
3	HCFL	12	67	75	6	-3	32
4	ULNL	39	33	28	22	19	28
5	NTL	1	-4	-7	-6	171	31
6	DDC	-8	5	1	-1	6	1
7	AGCL	1	-3	-2	1	1	0
8	NTC	19	16	16	13	14	15
9	NLOL	2	3	0	1	2	2
10	NBBL	2	2	2	6	3	3
11	NTWL	3	4	-5	-1	-1	0
12	NSCL	1	1	3	2	2	2
13	UCFL	5	1	0	-1	-1	1
14	NFC	2	3	-4	-11	-22	-6
15	BNTL	12	18	8	5	7	10
16	NCCL	-12	-8	-2	-6	-2	-6
17	BNL	8	8	9	12	10	9
18	NUCL	-2	3	9	11	7	6
19	STCL	0	3	5	3	2	3
20	BBCL	45	42	46	41	30	41
	Mean	**8**	**10**	**10**	**6**	**13**	**9**

Source: Appendix V

On the contrary, the average ratio of cash flow to total asset s (CF/TA) of non-failed companies is 9%. Sixteen non-failed companies are generating cash flows. The maximum cash flow to total assets ratio is 41% (BBCL) and minimum is -6% (NFC and NCCL). The average cash flow to total assets (CF/TA) is 13% in five year prior and 8% in one year. From the results, it is evident that non-failed companies are generating cash flows from their operations for investment in current and fixed assets.

Cash flow to net sales

The ratio of cash flow to sales (CF/NS) is the relationship between operating cash flow and sales over a period. It is expected that a successful company always generates high or positive cash flow from its sales. Beaver (1966), Deakin (1972) and Gupta (1983) revealed it as an important predictor of corporate failure. The ratios of cash flow to sales (CF/NS) of failed and non-failed companies of last five years are presented in Table 4.19.

Table 4.19 shows that the average cash flow to net sales ratio of failed companies is -298%. The average ratios of failed companies are negative except ratios of JSML (3%), HCCL (3%) and JCF (14%). It is -30% in 5 year and -1005% in one year prior to failure. Thus, it shows that failed companies are unable to generate cash from sales rather it deteriorates gradually at least five year prior to failure.

The average ratios of cash flow to net sales (CF/NS) vary among non-failed companies. The ratios of sixteen non-failed companies are found to be positive. The ratios of four non-failed companies: AGCL (-2%), NTWL (-3%) and NFC (-18%) and NCCL (-70%) are negative. The minimum ratio is -70% (NCCL) and maximum is 54% (NTC). Besides, the average cash flows to sales ratios (NI/NS) of non-failed companies is 10%. It is 13% in five year and 6% in on year prior. Thus, the ratio of cash flow to sales of non-failed companies is fluctuating but positive during five years.

Table 4.19
Ratios of cash flow to net sales of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-4	0	8	7	5	3
2	GRUL	-18	-12	-13	-148	-115	-61
3	BSCL	-300	-366	-63	-82	-98	-182
4	NBGU	-8315	-5652	-34	-18	-3	-2804
5	FHL	0	-22	-27	-26	-22	-19
6	AGUL	-23	-45	-13	1	3	-15
7	SBPP	-9	-3	-6	1	-5	-4
8	HTUL	-4665	-144	13	-49	-452	-1059
9	KCUL	-173	-982	-41	-20	-10	-245
10	NRTL	-159	-27	-19	-22	-10	-47
11	ATCL	-1886	-371	-208	-137	-106	-542
12	BBFL	-2016	78	-65	-101	165	-388
13	LSML	-106	-24	-33	64	-24	-25
14	BSML	-2614	-60	-21	-33	-16	-549
15	NHPL	1	-28	5	-3	2	-4
16	NDL	242	-24	-69	-115	-52	-3
17	SSML	6	-17	16	7	5	3
18	HCCL	11	-2	-177	1	10	-31
19	JCFL	-16	-16	1	1	101	14
20	NCAL	-54	-5	1	12	14	-6
	Mean	**-1005**	**-386**	**-37**	**-33**	**-30**	**-298**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	81	66	77	59	80	72
2	RJML	4	-1	5	5	6	4
3	HCFL	18	99	94	8	-14	41
4	ULNL	18	17	16	18	14	16
5	NTL	1	-4	-13	-7	108	17
6	DDC	-3	3	0	-1	3	1
7	AGCL	2	-12	-3	3	1	-2
8	NTC	53	50	59	53	56	54
9	NLOL	2	2	1	4	3	3
10	NBBL	1	1	2	3	2	2
11	NTWL	18	21	-38	-5	-11	-3
12	NSCL	2	2	6	3	5	4
13	UCFL	35	6	-1	-8	-5	5
14	NFC	2	7	-10	-43	-47	-18
15	BNTL	11	19	9	8	10	12
16	NCCL	-181	-131	-8	-23	-6	-70
17	BNL	10	13	14	14	14	13
18	NUCL	-1	1	5	2	2	2
19	STCL	0	2	2	2	2	2
20	BBCL	45	42	48	46	46	45
	Mean	**6**	**10**	**13**	**7**	**13**	**10**

Source: Appendix V

Cash flow to total debt

The ratio of cash flow to total debts (CF/TD) measures the ability of a business to meet its liabilities. The higher the cash flow to total debts ratio (CF/TD) refers to more cash to pay for current and long term liabilities or vice versa. It is one of the significant ratios found by Beaver (1966), Altman (1968) and Deakin (1972). Table 4.20 presents ratios of cash flow to total debts (CF/TD) of failed and non-failed companies' five years prior to failure

Table 4.20 shows that Out of twenty failed companies, the ratios of cash flow to total debts of only four failed companies (JSML 3%, SSML 4%, HCCL 1% and JCFL 59%) are positive. The average cash flow to total debt of failed company is -8%. It is 6% in year 5 and -13% in year 1 prior to failure. It shows that failed companies are unable to generate cash flows to their pay current and long term obligations since at least five year prior to their failure.

The average ratios of cash flow to total debt (CF/TD) of non-failed companies are found to be positive except AGCL (0%), NTWL (-1%), NFC (-5%), and NCCL (-12%). The maximum ratio is 69% (BBCL) and minimum is -12% (NCCL). The average ratio of non-failed companies is 21%. It is 30% in five year and 16% in year one prior. It shows that ratio of cash flow to total debt (CF/TD) remains stable at least last three years.

Table 4.20
Ratios of cash flow to total debts of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-5	0	9	6	4	3
2	GRUL	-5	-5	-9	-61	-59	-28
3	BSCL	-64	-65	-13	-15	-17	-35
4	NBGU	-1	-3	-11	-11	-4	-6
5	FHL	0	-7	-7	-6	-4	-5
6	AGUL	-6	-23	-10	2	3	-7
7	SBPP	-3	-1	-2	0	-2	-1
8	HTUL	-5	-2	0	-1	-18	-5
9	KCUL	-10	-50	-17	-21	-19	-23
10	NRTL	-8	-3	-3	-4	-1	-4
11	ATCL	-16	-36	-43	-88	-142	-65
12	BBFL	-50	4	-6	-26	36	-8
13	LSML	-30	-26	-21	36	-15	-11
14	BSML	-52	-24	-14	-15	-20	-25
15	NHPL	0	-6	1	-1	1	-1
16	NDL	30	-4	-12	-20	-16	-4
17	SSML	5	-10	15	4	4	4
18	HCCL	11	-1	-14	1	6	1
19	JCFL	-31	-48	4	4	367	59
20	NCAL	-28	-5	1	14	20	0
	Mean	**-13**	**-16**	**-8**	**-10**	**6**	**-8**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	61	44	65	337	101	121
2	RJML	9	-1	17	14	19	11
3	HCFL	13	67	66	5	-6	29
4	ULNL	90	44	37	35	23	46
5	NTL	1	-4	-9	-7	232	42
6	DDC	-11	10	1	-2	10	2
7	AGCL	1	-3	-2	1	1	0
8	NTC	63	46	49	38	41	47
9	NLOL	4	4	2	6	4	4
10	NBBL	2	2	3	7	4	4
11	NTWL	4	5	-11	-1	-3	-1
12	NSCL	3	4	15	9	14	9
13	UCFL	10	1	0	-2	-1	2
14	NFC	2	3	-4	-13	-13	-5
15	BNTL	25	30	15	14	22	21
16	NCCL	-24	-18	-3	-11	-3	-12
17	BNL	13	15	16	32	37	23
18	NUCL	-4	4	15	44	19	16
19	STCL	0	3	5	3	2	3
20	BBCL	52	48	42	97	108	69
	Mean	**16**	**15**	**16**	**30**	**30**	**21**

Source: Appendix V

Cash flow to current liabilities

The ratio of cash flow to current liabilities (CF/CL) indicates the ability of a business to generate operating cash to pay its current liabilities for the period. If it is higher than one (1), it indicates that operating cash flow is enough to meet its current liabilities or vice versa. Beaver (1966); Deakin (1972); Blum (1974); and Sharma and Mahajan (1982) identified this ratio as a significant ratio in prediction of corporate failure. The ratios of cash flow to current liabilities (CF/CL) of failed and non-failed companies for last five years prior to their failure are given in Table 4.21.

The average ratios of cash flow to current liabilities (CF/CL) of failed companies vary among failed companies. Like other cash flow ratios, the average ratios of cash flow to current liabilities (CF/CL) of four failed companies: JSML (13%), LSML (11%), SSML (7%) and JCFL (100%) are found to be positive. The minimum ratio is -88% (BSML) and maximum is 100% (JCFL). In failed companies, the average ratios are -40%, -43%, -40%, 28% and -2% prior years 1, 2, 3, 4 and 5 respectively. Thus, it indicates that failed companies are unable to generate operating cash flow for payment of current liabilities at least three year prior to their failure.

However, the ratios of operating cash flow to current liabilities (CF/CL) of non-failed company are found to be positive except AGGL (-1%), NFC (-11%) and NCCL (12%). The maximum average ratio is 132% (NTC) and minimum is -12% (NCCL). The average cash flow to current liabilities (CF/CL) of non-failed companies is 31 %. It is 46% in five year and 20% one year prior. Although the average ratios of cash flow to current liabilities (CF/CL) are decreasing, non-failed companies are generating operating cash flow to contribute in payments of their current liabilities during five years.

Table 4.21
Ratios of cash flow to current liabilities of failed and non-failed companies (%)

S.N.	Failed cos.	Five years prior to failure					Mean
		1	2	3	4	5	
1	JSML	-18	2	44	22	13	13
2	GRUL	-10	-10	-12	-158	-187	-75
3	BSCL	-84	-89	-19	-24	-31	-49
4	NBGU	-1	-3	-12	-11	-4	-6
5	FHL	0	-7	-7	-6	-4	-5
6	AGUL	-39	-40	-18	2	4	-18
7	SBPP	-11	-4	-7	1	-6	-5
8	HTUL	-22	-5	0	-2	-35	-13
9	KCUL	-50	-225	-31	-38	-32	-75
10	NRTL	-43	-23	-29	-61	-27	-37
11	ATCL	-26	-43	-49	-102	-165	-77
12	BBFL	-222	12	-27	-40	49	-45
13	LSML	-154	-240	-552	1085	-85	11
14	BSML	-78	-59	-33	-86	-184	-88
15	NHPL	1	-15	3	-2	1	-2
16	NDL	82	-18	-46	-69	-30	-16
17	SSML	7	-14	27	8	8	7
18	HCCL	17	-2	-31	1	12	-1
19	JCFL	-65	-61	4	9	613	100
20	NCAL	-74	-12	3	39	44	0
	Mean	**-40**	**-43**	**-40**	**28**	**-2**	**-19**
S.N.	**Non-failed cos.**	**Prior five years**					**Mean**
		1	**2**	**3**	**4**	**5**	
1	BPL	63	45	65	340	109	125
2	RJML	10	-2	34	37	44	25
3	HCFL	20	93	86	7	-8	40
4	ULNL	90	93	73	73	56	77
5	NTL	1	-4	-11	-9	310	57
6	DDC	-41	39	5	-7	40	7
7	AGCL	2	-5	-3	2	1	-1
8	NTC	119	105	142	129	166	132
9	NLOL	4	5	2	7	4	4
10	NBBL	2	3	3	8	4	4
11	NTWL	10	11	-13	-2	-3	1
12	NSCL	5	5	15	9	14	9
13	UCFL	30	5	-1	-6	-5	4
14	NFC	2	4	-5	-23	-35	-11
15	BNTL	35	36	21	20	40	30
16	NCCL	-24	-18	-3	-11	-3	-12
17	BNL	22	31	23	45	55	35
18	NUCL	-4	4	15	44	19	16
19	STCL	0	3	18	14	10	9
20	BBCL	52	48	55	97	108	72
	Mean	**20**	**25**	**26**	**39**	**46**	**31**

Source: Appendix V

4.7 Discussion

On the basis of comparison of twenty one financial ratios of failed and non-failed companies prior to five years of their failure, this study reveals the following conclusions.

The current ratio (CA/CL) of failed company is poor. It also begins to deteriorate at least five year prior to their failure. On the contrary, it remains relatively stable during the period for non-failed companies. Similarly, the analysis of ratios of working capital to total assets (WC/TA) revealed that working capital problem of failed company deepens at least five year prior to failure. However, it is positively and relatively stable in non-failed companies.

Although, the average proportions of current assets to total assets (CA/TA) of failed and non-failed companies are relatively stable during last five years prior to failure, it is found lower in failed companies. It is also found that the ratios of current liabilities to total liabilities (CL/TD) begin to decrease at least five year prior to failure. Thus, it concludes that the risk of liquidity problem seems higher in failed companies during last five years.

As far as leverage ratio is concerned, the ratios of total debt to total assets (TD/TA) of failed companies' starts to deteriorate gradually, and total assets become insufficient to meet their total debts and obligations at least five year prior to their failure. The equity bases of failed companies are very poor in least five prior to failure. Thus, the average proportion of long term debt to total debt (LD/TD) starts to increase at least five year prior to failure. Besides, assets are insufficient to pay the debt-holders and the shareholders. It is demonstrated that operating profit of failed companies are insufficient at least to meet their interest expenses at least prior five year to their failure.

Although, the current assets and assets turnover ratios of both failed and non-failed companies are poor, fixed assets turnover ratios of non-failed companies are higher. It

evidenced that failed companies are unable to utilize their both current and fixed assets efficiently and effectively.

This study also reveals that profitability ratios of failed companies are very poor in last five year prior to their failure. The main reason of poor profitability is decreasing trend of sales revenuers but high operating costs in failed companies.

Like profitability ratios, operating cash flow ratios are negative at least five year prior to failure. It is found negatively increasing due to continuous decrease in sales revenues and increase in operating expenses during five years prior to failure. However, profitability and cash flow ratios are found decreasing but positive in non-failed companies.

In conclusion, financial ratios of failed companies are poor in terms of liquidity, leverage, turnover, profitability, and cash flow that begin to deteriorate at least five years prior to failure.

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Chapter V

FINANCIAL RATIOS AND CORPORATE FAILURE – DISCRIMINANT ANALYSIS

5.1 Introduction

There were no advanced statistical methods available for the researchers (Altman, 1968). The mean values of financial ratios of failed and non-failed companies were widely used to compare failed and non-failed firms till 1960s. Thus, Altman (1968) felt that it was necessary for appropriate extension of the previous studies and to develop a combination of several financial measures into a meaningful predictive model using multiple discriminant analysis. Using Altman (1968) as a benchmark; Deakin (1972), Edmister (1972), Blum (1974), Moyer (1977), Dambolena and Khoury, (1980), Sharma and Mahajan (1982), Yadav (1986), Shirata (1998), Sori and Jalil (2009) and so on used multivariate discriminant analysis for prediction of corporate failure. Although, there is no unanimous of particular ratio or set of ratios as predictors of corporate failure, these studies revealed that MDA can discriminate failed and non-failed companies several years prior to failure. Although, these studies revealed MDA is an important technique for predicting corporate failure, very little attempts have been made such studies in the context of Nepal. Thus, this chapter deals with discriminant analysis of financial ratios for prediction of failed and non-failed companies in the context of Nepal.

Following introduction, Section-II of this chapter deals with descriptive analysis of failed and non-failed companies. Section-III is devoted for discriminant analysis of failed and non-failed companies five years prior to their failure. Section-IV describes development of discriminant model for application and the cut-off point is determined in Section-V. Using various criteria, the predictive powers of financial ratios of discriminant model have been assessed in Section-VI. The validity of discriminant model has been tested in Section-VII. Section-VIII has compared discriminant classification errors. At last, the conclusion of this chapter been described in discussion.

5.2 Descriptive analysis of failed and non-failed companies

Studies like Marwin (1942), Beaver (1966), Deakin (1972), Ohlson (1980), Dombolena and Khoury (1980), and Yadav (1986) revealed financial ratios of failed companies are poor than that of non-failed companies. Thus, using descriptive statistics of twenty one financial ratios, failed and non-failed companies have been presented in Table 5.1.

Liquidity

Table 5.1 exhibits that the average ratio of current assets to current liabilities (CA/CL) of failed companies is 1.47 times with standard deviation 4.49 times. For non-failed companies, the same ratio is 1.71 times with 1.19 times standard deviation. The mean ratio of working capital to total assets (WC/TA) is 0.10 times and standard deviation 0.68 times for failed companies. On the contrary, the average ratio is 0.43 times with standard deviation 0.30 for non-failed companies. The averages proportions of current assets to total assets (CA/TA) and current liabilities to total debts (CL/TD) of non-failed companies are 0.62 times and 0.82 times respectively. These ratios are higher than that of failed companies. This study shows that the standard deviations of liquidity ratios of failed companies are higher except for the ratios of current assets to total assets (CA/TA). This study therefore, reveals that the liquidity ratios of failed companies are poor in the context of Nepal.

Leverage

The average proportions of total debt to total assets (TD/TA) and long term debt to total debt (LD/TD) of failed companies are 177% and 48% respectively. These ratios are lower in non-failed companies. Tough, the average ratios of times interest (EBIT/INT) are negative; the average ratios of non-failed companies are found slightly better to failed companies. Moreover, the average contribution of retained earnings and shareholders' equity to total assets of failed companies are also nil. However, it is positive and with low standard deviation in non-failed companies.

Table 5.1
Descriptive statistics and test of equality of group means between failed and non-failed companies

This table presents the descriptive statistics; mean and standard of twenty one financial ratios of failed companies and non-failed companies. Panel A presents Liquidity, Panel B- Leverage, Panel C - Turnover, Panel D- Profitability and Panel E - Cash flow ratios. To test significant differences between failed and non-failed companies, it also presents Wilk's Lambda, f-statistics and significance value (.i.e. p-values) of each financial ratio. Low Lambda refers significant difference and vice versa. Similarly, high f-statistics refers significant difference and low insignificant. P-values explain significance of each financial ratio. If p≤ 0.01 and p≤ 0.05.

	Failed cos.			Non-failed cos.			Test of Group Means		
	N	Mean	SD	N	Mean	SD	Wilks' Lambda	F-statistics	Sig.
Panel A: Liquidity (Times)									
CA/CL	146	1.47	4.49	170	1.71	1.19	0.998	0.482	0.488
WC/TA	146	0.10	0.68	170	0.43	0.30	0.827	65.899	0.000*
CA/TA	146	0.55	0.24	170	0.62	0.29	0.980	6.377	0.012**
CL/TD	146	0.52	0.28	170	0.82	0.26	0.756	101.10	0.000*
Panel B: Leverage (%)									
EBIT/INT	146	-1003	6315	170	-182	4734	0.995	1.735	0.189
TD/TA	146	177	130	170	60	32	0.706	130.59	0.000*
LD/TD	146	48	28	170	17	25	0.749	105.27	0.000*
SE/TA	146	-79	1.42	170	60	58	0.698	135.63	0.000*
RE/TA	146	-89	1.34	170	10	33	0.785	85.976	0.000*
Panel C: Turnover (Times)									
NS/WC	146	0.19	18.82	170	0.27	73.82	0.999	0.224	0.637
NS/CA	146	1.68	1.18	170	1.99	1.55	0.988	3.929	0.048
NS/FA	146	3.15	4.94	170	21.28	60.28	0.960	13.127	0.000*
NS/TA	146	0.75	0.58	170	1.19	1.22	0.952	15.70	0.000*
Panel D: Profitability (%)									
EBIT/TA	146	-13.14	57.69	170	12.30	25.44	0.921	26.966	0.000*
EBIT/TD	146	-0.94	49.50	170	25.38	49.36	0.934	22.262	0.000*
NI/NS	146	-285.74	1299.67	170	6.99	31.33	0.973	8.623	0.004*
NI/TA	146	-23.23	58.90	170	8.08	22.94	0.885	40.827	0.000*
Panel E: Cash flow (%)									
CF/NS	146	-201.26	968.12	170	10.77	31.82	0.975	8.148	0.005*
CF/CL	146	-16.06	132.87	170	28.58	49.79	0.950	16.496	0.000*
CF/TA	146	-20.19	59.26	170	10.30	23.05	0.891	38.265	0.000*
CF/TD	146	-5.48	49.69	170	22.05	44.76	0.921	26.823	0.000*
*Significant at 1%, ** Significant at 2% , *** Significant at 5%.*									

Source: Appendix VI

Turnover

The working capital turnover ratio (NS/WC) of failed companies is low with high standard deviation in comparison to non-failed companies. The current assets turnover (NS/CA), fixed assets turnover (NS/FA) and assets turnover ratios (NS/TA) ratios are high in non-failed companies than in failed companies. On the contrary to previous studies, it is found that the standard deviations of turnover ratios are also found higher in non-failed companies. Thus, it is evident that despite assets management of non-failed companies are more efficient and effective; it varies highly among non-failed companies.

Profitability

Profitability ratios are most forewarning indicators of sickness found in private sectors and the government undertakings (Sethi,198; and Yap et al., 2010). The profitability ratios (the ratios of earnings before interest and tax to total assets (EBIT/TA), earnings before interest and tax to total debts (EBIT/TD), net income to net sales (NI/NS), and net income to total assets (NI/TA)) are negative. The main reasons for poor operating profit (i.e. the losses or negative profits) are poor assets management (i.e. turnover) and huge operating expenses including interest on long term debts. The standard deviations of profitability ratios of failed companies are also higher than that of non-failed companies. However, profitability ratios are positive with low standard deviations in non-failed companies. This study also revealed that profitability ratios are statistically significant between failed and non-failed companies.

Cash flow

Like profitability ratios, the average operating cash flow ratios of failed companies are highly negative. It is evident that the failed companies are unable to generate operating cash flows due to low turnovers. However, there is positive and high operating cash flow among non-failed companies. The standard deviations of operating cash flow ratios of non-failed companies are lower. It is also evident that operating cash flow ratios are statistically significant to classify failed and non-failed companies.

5.3 Discriminant analysis of failed and non-failed companies

In order to perform discriminant analysis of failed and non-failed companies, twenty one financial ratios have been selected initially. Using yearly data, discriminant results have been obtained, which have been presented in Table 5.2.

Table 5.2
Discriminant analysis using yearly data of five years prior to failure

This table presents the multivariate discriminant functions, classification accuracies, Type I errors and Type II errors for five years prior to failure. In addition, Wilk's Lambda, chi-squares, p-values and classification accuracy of five discriminant models have been presented. Wilks' Lambda ranges from 0 to 1. Small value indicates strong group differences and values close to 1 indicate no group difference. P-value explains significance of each function. If p≤ 0.05 and p≤ 0.10, the model is significant. Models refer discriminant functions derived from yearly data prior years to failure.

Ratios	Prior year to failure				
	1	2	3	4	5
1. WC/TA	-1.089	1.31	1.108	-	1.347
2. TD/TA	-	-	-	0.477	-
3. LD/TD	4.834	-3.87	-2.973	1.72	-
4. RE/TA	-	-	-	-0.87	-0.955
5. NI/TA	-	-	2.529	-	-
6. CF/TD	-	3.074	-	-	-
Constant	-1.800	1.428	1.161	-1.56	-1.47
Chi-square	45.97	48.16	30.20	27.49	22.75
Wilk's lambda	0.289	0.267	0.437	0.47	0.541
P- values	0.00	0.00	0.00	0.00	0.00
Type I error (%)	10%	5%	10%	20%	20%
Type II error (%)	5%	5%	15%	15%	5%
Classification accuracy (%)	92.5%	95%	87.5%	82.5%	87.5%
Canonical correlation (r)	84.3%	85.6%	75%	72.7%	67.8%

Table 5.2 shows that ratios of working capital to total assets (WC/TA) and long term debt to total debts (LD/TD) are found significant with high classification accuracy one year prior to failure. However, the sign of working capital is negative, which is contradictory in prediction of corporate failure. While ratio of cash flows to total debts (CF/TD) is also significant prior two year to failure with improved classification accuracies from 92.5% to 95%. The ratios of net income to total assets (NI/TA) is found significant in addition to ratio of working capital to total assets (WC/TA) and long term debts to total debts (LD/TD) in three year prior to failure, but the

classification accuracy has been found dropped to 87.5%. Four year prior to failure, the ratios of total debts to total assets (TD/TA), long term debts to total debts (LD/TD) and retained earnings to total assets (RE/TA) are found significant. The sign of ratio of retained earnings to total assets (RE/TA) is contradictory in prior four and five year to failure. However, the ratios of working capital to total assets (WC/TA) and retained earnings to total assets (RE/TA) are significant in five year prior to failure.

As far as classification accuracy is concerned, the overall discriminant classification accuracies are: 92.5%, 95%, 87.5%, 82.5% and 87.5%% in prior year 1, 2, 3, 4 and 5 prior to failure respectively. Type I errors are 10% in year 1 and 3, 5% in year 2 and 20% in year 4 and 5 prior year to failure. Type II errors are 5% in year 1, 2 and 5; and 15% in year 3 and 4 prior to failure. It reveals the classification accuracies have been found increased, when a company approached towards failure.

At the 5% significance levels, discriminant results are significant. Although, discriminant analysis of yearly financial ratios prior year to corporate failure are enough to classify failed and non-failed companies more accurately in the years as the firm approaches its failure, financial ratios are inconsistent and their signs are contradictory. Thus, it reveals that ratios of working capital to total assets (WC/TA) and long term debts to total debts (LD/TD) are consistent at least three year prior to failure.

Table 5.3 reveals that ratios of working capital to total assets (WC/TA), long term debt to total debts (LD/TD), earnings before interest and tax to total assets (EBIT/TA) and cash flow to total debts (CF/TD) are significant to discriminate failed and non-failed companies in average data of prior two years and three years to failure. The signs of each ratio are as expected except for the sign of EBIT/TA which is negative. Of these four financial ratios, the ratio of earnings before interest and tax to total assets (EBIT/TA) is insignificant on average data of four years. On five years data, the ratios of working capital to total assets (WC/TA), long term debt to total debts (LD/TD) and shareholders' equity to total assets (SE/TA) are found significant to discriminate failed and non-failed companies.

Table 5.3
Discriminant analysis using average data of five years prior to failure

This table presents discriminant results: discriminant functions, classification accuracies, Type I errors and Type II errors computed on the basis of the average data of five years prior to failure. The Wilk's Lambda, chi-squares, p-values and classification accuracy of discriminant models have also been presented in this table. Wilks' Lambda ranges from 0 to 1. Small value indicates strong group differences and values close to 1 indicate no group difference. P-value explains significance of each function. If p≤ 0.05 and p≤ 0.10, the models are significant. Since canonical correlation explains the relationship between z-score and independent variables (i.e. financial ratios), high correlation is expected.

Ratios	Average data prior years			
	2 Years	3 Years	4 Years	5 Years
1. WC/TA	1.216	1.209	1.212	1.098
2. LD/TD	-4.244	-3.658	-3.545	-3.230
3. SE/TA	-	-	-	0.228
4. EBIT/TA	-.737	-0.667	-	-
5. CF/TD	2.700	2.762	0.943	-
Constant	1.432	1.202	1.189	1.159
Chi-square	96.87	123	135.41	147.8
Wilk's Lambda	28	34.6	0.421	47.1
P- values	0.00	0.00	0.00	0.00
Canonical correlation (R)	84.9%	80.9%	76.1%	72.7%
Type I error (%)	2.5%	5%	7%	12%
Type II error (%)	5%	8.3%	9%	12%
Overall classification accuracy (%)	96.3%	93.3%	90.6%	88%

The classification accuracies are 96.3%, 93.3%, 90.6%, and 88% on the basis of average data of two, three, four, and five years prior to failure respectively. Type-I and Type II errors are also low. The canonical correlations (r) are found increasing on average data prior years to corporate failure. This study demonstrates that discriminant analysis is more useful on the average data than yearly prior to failure. In addition to the ratios of working capital to total assets (WC/TA) and long term debt to total debts (LD/TD), and ratio of cash flow to total debts (CF/TD) is found more useful and consistent to classify failed and non-failed companies.

5.4 Development of discriminant model for prediction of corporate failure

Though, discriminant analysis is useful to classify failed and non-failed companies; discriminant results are insufficient and unreliable due to inconsistencies of financial ratios, and their contradictory signs. Thus, the following discriminant model has been developed and presented in Table 5.4.

Table 5.4
Discriminant model for prediction of corporate failure

This table presents discriminant model of financial ratios developed from sixteen financial ratios that are found significant between failed and non-failed companies using stepwise procedure of discriminant analysis. It also presents numbers of observations (N), discriminant classification accuracy, Type I error, Type II error, canonical correlation (r), Wilk's Lambda, Chi-Square, and p- value of the model:

Model Z = 1.069 + 1.308WC/TA – 3.086LD/TD+ 0.296SE/TA

Financial ratios	**Coefficients**
1. Working capital to total assets (WC/TA)	1.308
2. Long term debts to total debts (LD/TD)	-3.086
3. Shareholders' equity to total assets (SE/TA)	0.296
Constant	1.069
Model statistics	
No of observations (N)	316
Wilk's Lambda	0.509
Chi-square	211.04
P-value	0.00
Canonical correlation (%)	70.1%
Type-I error	15.1%
Type-II error	16.5%
Classification accuracy (%)	84.2%

Source: Appendix VI

Table 5.4 shows that the ratios of working capital to total assets (WC/TA), long term debt to total debt (LD/TD), and shareholders' equity to total assets (SE/TA) are statistically significant to discriminate failed and non-failed companies. Since the Wilk's Lambda of Model 0.509 with p-values 0.00, the model is statistically significant. The goodness of fit of the model has been measured by canonical correlation (r), which is 70.1% with 84.2% original classification accuracy The Type I and Type II errors are 15.1% and 16.5% respectively.

Working capital to total assets (WC/TA)

Working capital is defined as the difference between current assets and current liabilities. It is a measure of the net liquid assets relative to the total capitalization. A successful company should have sufficient levels of current assets to meet its current liabilities. Working capital to total assets ratio, frequently found in studies of corporate problems, is a measure of the net liquid assets of the firm relative to the total capitalization. In case of insufficiency, the company faces short term liquidity problems leading towards its failure. It is one of the best predictors of corporate failure. The inclusion of ratio of working capital to total assets (WC/TA) in discriminant model is consistent with Altman (1968), Beaver (1966), Deakin (1972), and Sharma and Rao (1971).

Shareholders' equity to total assets (SE/TA)

The ratio of shareholders' equity to total assets measures the contribution of equity in total assets of business. The high ratios indicates string capital base, thus less chances of corporate failure. If the ratio greater than 1, it indicates that there is no contribution of shareholders' equity in total assets. The ratio of shareholders' equity to total assets (SE/TA) is expected to be lower in a failed business. Like Sharma and Mahajan (1982); Blum,(1982); and Kaveri (1980); this study also revealed the ratio of shareholders' equity to total assets (SE/TA) as an important ratio to discriminate failed and non-failed companies in Nepal.

Long term debts to total debts (LD/TD)

It is the proportion of long term debts to total liabilities. If it is close to one, it indicates that a long term liability is almost equal to total debt. It refers high risk of insolvency. Beaver (1966), Deakin (1972), Taffler and Tisshaw (1977) and Altman et al., (1977) revealed the ratio of current liabilities to total debts (CL/TD) as important predictor of corporate failure. This study also revealed the ratio of long term debts to total debts (LD/TD) as second important ratio for prediction of corporate failure.

5.5 Determination of cut off point to classify failed and non-failed companies

It is very essential to determine "cut off point" to classify a firm as either failed or non-failed company. It is the most difficult to assign a firm into one of the two groups: failed and non-failed group. The groups' centroids: are -1.056 (Failed company and 0.907 (Non-failed companies); can be used to assign group membership. A company with z-score close to -1.056 is failed company and non-failed companies, if it is close to 0.907. However, it cannot give exact "cut off point" to indicate a company is failed or non-failed company. The maximum likelihood procedure also assigns firm to each group on the basis of individual discriminant score as most likely. According to this procedure, if the average of the cancroids is nil (0), it can be said that a company is failed, if its Z-score is zero (0) or less, and it is a non-failed company, Z-score is more than zero (0). Thus, z-score and misclassifications results have been used to determine cut off point.

In this study, the empirical results have been used for determining the critical value which results minimum cases of misclassification. Therefore, the results have been presented in Table 5.5.

Table 5.5
Actual group vs. predicted group membership

This table describes the actual group, predicted group membership of a firm and Z-score derived from discriminant function. Based on theses scores and misclassifications, the failed zone, zone of ignorance and non-failed zones have been determined.

Cases	Actual group	Z-score	Predicted group	Remarks
20	0	-0.228	0	Z-Score less than -0.188 (Failed Zone)
56	0	-0.223	0	
96	0	-0.218	0	
157	1	-0.204	0	
290	1	-0.188	0	
130	0	-0.187	0	Z-score between -0.188 and -0.067 (Zone of ignorance)
286	1	-0.156	0	
25	0	-0.115	1	
40	0	-0.087	1	
47	0	-0.067	1	
168	1	-0.030	1	Z-score more than -0.067 (Non-Failed Zone)
60	0	0.020	1	
205	1	0.080	1	
220	1	0.121	1	
303	1	0.127	1	

Source: Appendix VI

Table 5.5 demonstrates the Z-score, misclassification cases of discriminant model. It also revealed that all companies having a Z- scores less than - 0.188 clearly falls into the failed group of companies, and while those companies having a Z-score above -0.067 in non- failed group of companies. The z-score between -0.188 and -0.067 will be defined the "*the zone of ignorance" (i.e. neither failed nor non-failed company)* because of the susceptibility to error classification (Altman, 1968).

5.6 Assessing discriminating power of financial ratios

One of the major objectives of this study is to assess the relative importance of financial ratios in discriminant function. Although, there is no definite way to assess the relative contribution of the variable(s) in the discriminant model, this study has also applied four approaches: (a) Wilk's Lambda, (b) Univariate F value, (c) Standardized coefficient and (c) Scaled vector (i.e. adjusted coefficient) to test the discriminating ability of financial ratios in corporate failure.

Table 5.6
Discriminating power of financial ratios in discriminant analysis

This table presents Wilk's Lambda, f-statistics, standard coefficient, and scale vector of each financial ratio in the discriminant model to test the discriminating power. Low Wilk's Lambda, high f-statistics, standard coefficient and scale vector indicate that the discriminating power of the ratio is high and vice versa. Scale vectors have been obtained by multiplying square root of diagonal elements of variance-covariance matrix and standard coefficient.

Ratios	Wilks' Lambda		f- statistic		Standard coefficient		Scale vector	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
WC/TA	0.829	3	64.86	3	0.667	2	0.340	1
LD/TD	0.749	2	105.27	2	-0.819	1	-0.217	3
SE/TA	0.698	1	135.63	1	0.321	3	0.329	2

This study used f - statistics, and the Wilk's Lambda to test the individual discriminating ability of the variables in the model. Under these criteria, the ratio of shareholders' equity to total assets (SE/TA is the most important ratio that is followed by ratios of working capital to total assets (WC/TA) and long term debts to total debts (LD/TD) respectively.

Like Taffler (1972), the contribution of ratio has been assessed by comparing the absolute values of the discriminant coefficients after ignoring the signs in standardized function. Under this criterion, ratio of long term debt to total debts (LD/TD)

has been rated as most important ratio. The other important ratios are the ratio of working capital to total assets (WC/TA), and shareholders' equity to total assets (SE/TA) respectively.

Since, the standard coefficient, f- statistics, and Wilk's lambda do not take into account the inter-correlation in the constituent model variables because of different assumptions underlying use of discriminant model, the scale vector has been used by widely (Altman (1968), Deakin (1972), Yadav (1986) as the best approach to test the discriminating power of financial ratios for corporate failure studies. Since, the highest scale vector is 0.340; the ratio of working capital to total assets (WC/TA) is regarded as the most predictor of corporate failure. Similarly, the scale vectors are high; the ratio of shareholders' equity to total assets (SE/TA) and long term debts to total debts (LD/TD) are other important predictors of corporate failure respectively.

5.7 Validity of discriminant model in prediction of corporate failure

It is essential to test validity of discriminant model for practical application. In order to test the validity of the model, financial ratios of twenty failed and twenty non-failed companies' five years financial data have been selected from initial sample companies. On the basis of cut-off point determined, a company is classified as failed and non-failed company.

1. Predictive classification accuracy: one year prior to failure

Using discriminant functions of financial ratios, Z-score of twenty failed and twenty non-failed companies have been computed from the financial ratios of one year prior to failure. Applying the cut-off point determined from initial samples data, the following classification accuracy matrix of the initial sample and unselected cases one year prior to failure have been obtained separately.

Table 5.7 shows the original classification accuracies (84.2%), cross validation accuracy (84.2%), Type I (15.1%), and Type II (16.5%) error of the discriminant model. When the model is applied to discriminate failed and non-failed companies using the financial data one year prior to failure, out of forty companies, thirty nine companies have been correctly classified. Thus, the classification accuracy is 97.5% with Type I error nil and Type II error (5%).

Table 5.7
Predictive accuracy: one year prior to failure

Group	Basis	Predicted Group Membership		Total
		Failed cos.	Non-failed cos.	
Failed cos.	N	124	22	146
Non-failed cos.	N	28	142	170
Failed cos.	%	84.9	15.1	100
Non-failed cos.	%	16.5	83.5	100
Original classification accuracy	**%**	**84.2**		
Original classification error	**%**	**15.8**		
Failed cos.	N	124	22	146
Non-failed cos.	N	28	142	170
Failed cos.	%	84.9	15.1	100
Non-failed cos.	%	16.5	83.5	100
Cross-validation classification	**%**	**84.2**		
Cross validation error	**%**	**15.8**		
Failed cos.	N	20	0	20
Non-failed cos.	N	1	19	20
Failed cos.	%	100	.0	100
Non-failed cos.	%	5	95	100
Predicted correct classification	**%**	**97.5**		
Predicted classification error	**%**	**2.5**		

2. Predictive accuracy: two year prior to failure

The second test is made to observe the discriminating ability of the model for companies using data from two year prior to failure. The discriminating score of forty companies are calculated. Applying the cut-off point determined on the basis of initial sample, the predictive classification accuracy of the model have been calculated and presented in Table 5.8.

Table 5.8
Predictive accuracy: two year prior to failure

Group	Basis	Predicted Group Membership		Total
		Failed co.	Non-failed co.	
Failed cos.	N	18	2	20
Non-failed cos.	N	1	19	20
Failed cos.	%	90	10	100
Non-failed cos.	%	5	95	100
Classification accuracies	**%**	**92.5%**		
Classification errors	**%**	**7.5%**		

From Table 5.8, it is evident that out of forty companies, thirty seven companies have been correctly classified as failed and non-failed companies. It is 92.5% classification accuracy with Type I error- 10% and Type II error -5% respectively. It shows that the model can predict a company into failed or non-failed at least two years prior to failure high percentage of accuracy.

3. Long-term predictive accuracy of model

The predictive results of discriminant model two years prior to failure are encouraging. However, it also requires its justification in long term predictive accuracy beyond two years (Altman, 1968). In order to determine long term predictive classification accuracy up to five year prior to failure, the classification accuracies prior three year or more have been computed using parameters of discriminant model of financial ratios for assessing long term predictive classification accuracy. By developed discriminant model, this study computed Z-score of forty companies for each of the year prior three, four and five year to failure and obtained. Applying the cut-off point determined, the predictive accuracies of the model for three, four and five year prior to failure have been calculated and presented in Table 5.9.

Table 5.9
Predictive accuracy: three to five year prior to failure

Cases	Group	Basis	Predicted groups	
			Failed cos.	Non-failed cos.
Prior three year	Failed cos.	%	90	10
	Non-failed cos.	%	15	85
Classification accuracy		**%**	**87.5**	
Overall Classification error		**%**	**12.5**	
Prior four year	Failed cos.	%	85.0	15
	Non-failed cos.	%	15.0	85
Classification accuracy		**%**	**85**	
Overall Classification error		**%**	**15**	
Prior five year	Failed cos.	%	75.0	25.0
	Non-failed cos.	%	20.0	80.0
Classification accuracy		**%**	**77.5**	
Overall Classification error		**%**	**22.5**	

The predictive classification accuracy of the model prior three year is 87.5%. Type I error and Type II error are 10% and 15% respectively. In four year prior to failure, the overall classification accuracies have slightly dropped to 85% with Type I error and Type II error 15% each. However, it is found that the classification accuracy is 77.5% in five year to failure. Type I error and Type II errors have been also found increased to 25% and 20% respectively. Since, the overall classification accuracies are high, low Type I and Type II errors, discriminant model is also useful for prediction of corporate failure.

5.8 Comparison of classification errors

To assess the usefulness of discriminant analysis for prediction of corporate failure in the context of Nepal, prediction classification errors of the model have been compared with other studies some better know studies (Beaver,1966; Altman,1968; Deakin, 1972; Altman et al., 1977; and Blum, 1974) and presented in Table 5.10.

Table 5.10
Comparison of discriminant classification errors (in %)

Prior year to failure	Present Study	Beaver (1966)	Altman (1968)	Deakin (1972)	Altman et al. (1977)	Blum (1974)
1	2.5%	13%	5%	3%	7%	7%
2	7.5%	21%	28%	4.5%	11%	20%
3	12.5%	23%	52%	4.5%	17.5%	30%
4	15%	24%	71%	21%	21%	NA
5	22.5%	22%	64%	17%	24%	NA

Table 5.10 shows that the discriminant classification errors for last five years prior to failure. The discriminant classification errors of this study are very low in comparison to other studies except 22.5% five year prior to failure. Like other studies, this study also concludes that discriminant model demonstrated good discriminant to discriminate failed and non-failed Nepalese companies.

5.10 Discussion

On the basis of discriminant analysis of failed and non-failed companies, the major conclusions have been drawn as follows.

The average ratio of current assets to current liabilities (CA/CL) of failed companies is lower than non-failed companies. It is also revealed that the proportion of current assets to total assets (CA/TA) and working capital to total assets (WC/TA) are lower for failed companies. Although the proportion of current liabilities to total debts (CL/TD) is low in failed companies, the overall liquidity positions of failed companies are poor.

As far as total debt to total assets (TD/TA) is concerned, it is very high in failed companies in comparison to non-failed companies. The average ratio of total debts to total assets (TD/TA) reveals that failed companies have been found dominated by long term debts. Since continuous decrease in ratios of retained earnings to total assets (RE/TA) of failed companies; there is no contribution of shareholders' equity (capital and retained earnings) of failed companies to total assets over the period. In term of times interest earned ratio (EBIT/INT) ratios, it is found negative in failed companies.

Since, assets turn over ratios are high, non-failed companies are managing their assets to generate efficiently and effectively to generate high level of sales revenues. However, it is found poor in failed companies. Again, standard deviations of turnover ratios are found higher in non-failed companies.

Since, the average profitability ratios and cash flow ratios of failed companies are negative; failed companies are unable to generate profit and operating cash flows. As a result, failed companies depend on long term debt to meet its cash needs. Like other ratios, standard deviations of profitability ratios and cash flow ratios of failed companies are also high.

Discriminant classification accuracies based on the average data of five years prior are found higher than classification accuracies of yearly data. Out of twenty one financial ratios, only three financial ratios statistically significant and their signs are as expected in the model. Thus, it concludes that all financial ratios are not equally important to discriminate failed and non-failed companies. Thus, the following

multivariate discriminant function has been developed for prediction of corporate failure in Nepal.

$$Model\ Z = \quad 1.069 + 1.308WC/TA - 3.086LD/TD + 0.296SE/TA$$

If Z-Score of a company is less than -0.188 clearly falls into the failed group and while those companies having a Z-score -0.067 or more in non-failed group of companies. The area between -0.188 and -0.067 will be defined the "*zone of ignorance"* because of the susceptibility to error classification (i.e. neither failed nor non-failed company).

This study revealed that the ratio of working capital to total assets (WC/TA) is the most important financial ratio followed by shareholders' equity to total assets (SE/TA) and ratio of long term debts to total debt (LD/TD) respectively.

Since predictive classification accuracies are high, this study concludes that the discriminant model is useful for practical application.

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Chapter VI
FINANCIAL RATIOS AND CORPORATE FAILURE-LOGISTIC REGRESSION ANALYSIS

6.1 Introduction

During 1970s; many studies used discriminant analysis in prediction of corporate bankruptcy. However, MDA is often criticized because of its assumptions - normality of independent variables and equal group co-variance of two groups are often violated in reality. Thus, logistic regression analysis has been used in corporate failure prediction context, particularly since 1980s. Ohlson (1980) initiated to use logit regression analysis that does not require the assumptions of normality and equal co-variance matrices. Although, the classification accuracy has not improved, it has been claimed to be superior over multivariate discriminant analysis. Following this study, many other studies have used logistic regression analysis as technique for prediction of corporate failure. The other prominent studies are Zavgren (1985); Joy and Tollefson (1995); Platt and Platt (1991); Kim and Gu (2006); Nam and Jinn (2000); Charitou et al., (2004); Ugurlu and Aksoy (2006); and Minussi et. al., (2008). Thus, this chapter aims to examine usefulness of logistic regression analysis in prediction of corporate failure in Nepalese context.

This chapter has been divided into seven sections. Following introduction, Section-II deals with logistic analysis of failed and non-failed companies using yearly data and average data of five years prior to corporate failure. The development of logistic regression models for the prediction of corporate failure have been described in Section-III. Using odd ratio, the relative importance of financial ratios has been explained in Section-IV. Section-V deals with predictive classification accuracy of the logistic regression model. The comparison of discriminant and logistic analysis has been made in Section-VI. At last, Section-VII deals with discussion of the chapter.

6.2 Logistic analysis of failed and non-failed companies five years prior to failure

This study uses dichotomous variables (i.e. zero for failed company and one for, non-failed company) as dependent variable and financial ratios of failed and non-failed companies have been used as independent variables to test the usefulness of logistic regression analysis for prediction of corporate failure. The yearly logistic regression results of failed and non-failed companies five years prior to their failure have been presented in Table 6.1.

Table 6.1

Logistic regression results of yearly data five years prior to failure

This table summarizes logistic results of five years prior to failure. It includes coefficient (ß), classification accuracies, type I and type II errors, -the log likelihood ratios, chi-square and p-value. The -2log likelihood test is used to determine the goodness of fit of the logistic regression model. The smaller the value of the -2 log likelihood, the better is the prediction capability of the model. Similarly, p-value is higher than 0.05, it indicates that there is no linear relationship model between dependent and independent variables. Thus, model is fit. Besides, the Nagelkerke R-square are alternatives for R-squared are used to estimate of the variance that can be predicted through combination of all the variables in the model. The cut-off point is 0.50.

Ratios	Prior year to failure				
	1	2	3	4	5
1. WC/TA	-	23.792	-	-	-
2. TD/TA	-86.80	-844.3	-	-5.567	-4.93
3. SE/TA	-61.51	1926.0	6.54	-	
4. RETA		24.76			
5. CF/CL		669.40		-0.49	
6. LD/TD	-	-	-4.92		
Constant	99.63	103.97	0.86	4.93	4.18
The -2loglikelihood	0.00	0.00	17.9	23.82	29.03
The Nagelkerke R Square(%)	100	100	81.1	82.9	64.5
p-values	1.00	1.00	0.68	0.467	0.30
Classification accuracies (%)	100	100	92.5	85	85
Type I Error I (%)	Nil	Nil	10	15	15
Type I Error II (%)	Nil	Nil	5	15	15

Table 6.1 shows that only six financial ratios are found statistically significant in prediction of corporate failure. However, these ratios are also found inconsistent in classification of failed and non-failed companies over the period five years prior to failure. The classification accuracies have been found increasing, when a company eventual approaches towards failure. It is found 85% in five year and 100% in one year prior. Prior one year to its failure, ratios of shareholders' equity to total assets (SE/TA) and total debts to total assets (TD/TA) have been found significant to classify failed and non-failed companies with 100% accuracy. However, ratios of working capital to total assets (WC/TA), total debt to total assets (TD/TA), the shareholder equity to total assets (SE/TA), retained earnings to total assets (RE/TA), and cash flow to current liabilities (CF/CL) are found sufficient for cent percent classification accuracy prior two year. The ratios of shareholder equity to total assets (SE/TA) and long term debt to total debt (LD/TD) can predict corporate failure with 92.5% accuracy at least three year prior. The ratios of total debts to total assets (TD/TA) and cash flow to current liabilities (CF/CL) prior four year; and ratio of total debts to total assets (TD/TA) alone can classify failed and non-failed companies with 85% accuracy in five year prior to failure

Since, the-2 log likelihood ratios are low, logistic regression models are significant in classification of failed and non-failed companies. Since, p-values are higher than 0.05, there is no linear relationship between dependent and independent variables. The Nagelkerke R squares are found 100% in year 1 and 2, and 92.5% in 3, and 85% in 4 and 5 years. Despite the inconsistencies of financial ratios in yearly logistic regression results, logistic regression analysis is found to be useful to classify failed and non-failed companies with high classification accuracies at least five year prior to failure.

Like yearly analysis, attempt has been made to assess the usefulness of logistic regression analysis on average data of five years prior to company failure. The logistic results of average data have been presented in Table 6.2.

Table 6.2

Logistic regression results using average data five years prior to failure

This table summarizes logistic models developed on the basis of average data of five years prior to failure. It includes coefficient (ß), classification accuracies, type I and type II errors, - the 2log likelihood ratios, chi-square and p-value. The smaller the value of the -2 log likelihood, the better is the prediction capability of the model. Similarly, p-value is higher than 0.05, it indicates that there is no linear relationship model between dependent and independent variables. Thus, model is fit. The Nagelkerke R- is used to estimate of the variance that can be predicted through combination of all the variables in the model. The cut-off point is 0.50.

Ratios	**Average data prior years to failure**			
	2 Years	**3 Years**	**4 Years**	**5 Years**
1. CL/TD	32.858	-	-	-
2. TD/TA	-131.51	-	-	-
3. SE/TA	-	9.122	7.567	7.529
4. LD/TD	-69.10	-7.717	-6.540	-6.307
5. EBIT/TD	288.30	10.269	-	-
Constant	116.096	1.530	1.300	1.233
The-2loglikelihood	Nil	28.854	54.29	73.149
the Nagelkerke R Square	1.00	0.909	0.865	0853
p-values	1.00	0.111	0.346	0.720
Type I Error I (%)	Nil	5%	6.3%	7%
Type I Error II (%)	Nil	1.7%	2.5%	4%
Classification Accuracies (%)	100%	96.7%	95.6%	94.5%

Table 6.2 shows that out of twenty one financial ratios; ratios of current liabilities to total debts (CL/TD), total debt to total assets (TD/TA), shareholder equity to total assets (SE/TA), long term debt to total debt (LD/TD), retained earnings to total assets (RE/TA), and earnings before interest and tax to total debts (EBIT/TD) are found significant in either model to classify failed and non-failed companies at the 0.01 significance level. As far as classification accuracies are concerned, the classification accuracy of average data of two years prior to failure is 100%. It is 96.7%, 95.6%, and 94.5% in average data of three, four the five years prior to failure respectively. Similarly, Type I errors and Type II errors are low.

Since the -2 log likelihood ratios are low and p-values are greater than 0.01, logistic regression models are significant. The Nagelkrke R squares are found one (1) for average of prior two years, 0.909 for three years, 0.865 for four years and 0.853 for five years prior to failure.

To sum up, it is evident that logistic regression analysis is useful to classify failed and non-failed companies with high accuracy at least five year prior to failure. However, financial ratios are inconsistent on average data; only the ratio of long term debt to total debt (LD/TD) has been found consistent over the average data of five years.

6.3 Development of logistic regression models for practical application

In order to develop logistic regression model for practical application in Nepalese context, the following logistic regression models have been developed and presented in Table 6.3.

Table 6.3 shows that Model-I consists ratios of total debt to total assets (TD/TA) and long term debt to total debts (LD/TD). The classification accuracy of the Model-I is 85.4%. Likewise, the classification accuracy of Model-II is 86.4%. Model-II includes ratios of working capital to total assets (WC/TA), long term debt to total debts (LD/TD) and retained earnings to total assets (RE/TA). The classification accuracy of Model-III is 91.5%. This model includes ratios of working capital to total assets (WC/TA), current liabilities to total debts (CL/TD), and shareholders' equity to total assets (SE/TA).

Adding fixed assets turnover ratio (NS/FA) in Model III, Model-IV is developed that increased classification accuracy from 91.5% to 92.4%. Model V is developed by adding ratios of net sales to total assets (NS/TA), retained earnings to total assets (RE/TA) and earnings before interest and tax to total debts (EBIT/TD) in Model IV. Addition of these ratios, the classification accuracy has been increased to 95.25%. Again, addition of ratio of cash flow to total debts (CF/TD) in Model-V, improved the classification accuracy to 95.3%. Thus, the classification accuracies of logistic regression analysis are ranged between 85% and 95.30%.

Table 6.3
Logistic regression models for prediction of corporate failure

This table summarizes logistic models of financial ratios, coefficient (ß), and p-value of models. P-value tests the significance of each of the covariates (variables) and independents in the model. If p-values (i.e. sig. values) are less than 0.05, then the parameter are significant in the model. The odd ratio is used to assess importance of each financial ratios of the model. Hosmer Lemeshow test measure the linear relationship between dependent and independent variables. If p value of the model is greater than 0.05 it is insignificant meaning that there is no linear relationship. The -2log likelihood and Pseudo R^2 are used to measure the goodness-of-fit of the model. The cut- off point is 0.50.

Models	Ratios	B	S.E.	Wald	Sig.	Exp(B)	Hosmer Lemeshow test	-2log likelihood	Cox & Snell r^2	Negelkerke r^2	Correct Classification (%)
I	TD/TA	-4.37	0.54	64.94	0.00	0.01					
	LDTD	-3.14	0.65	23.27	0.00	0.04					
	Constant	5.43	0.61	80.74	0.00	229	0.093	197.0	0.53	0.71	85.4
II	WC/TA	3.77	0.59	41.29	0.00	43.2					
	LDTD	-5.68	0.73	60.17	0.00	0.00					
	RE/TA	1.50	0.36	17.40	0.00	4.47	0.234	205.4	0.52	0.69	86.4
	Constant	2.61	0.36	53.83	0.00	13.59					
III	WC/TA	3.21	0.73	19.35	0.00	24.85					
	CL/TD	5.62	0.91	38.40	0.00	276.5					
	SE/TA	5.03	0.87	33.45	0.00	153.2					
	Constant	-4.12	0.63	43.40	0.00	0.02	0.10	145.2	0.60	0.80	91.5
IV	WC/TA	1.98	0.82	5.93	0.02	7.27					
	CL/TD	5.49	0.94	34.47	0.00	243.3					
	NS/FA	0.05	0.02	9.16	0.00	1.06					
	SE/TA	5.52	0.96	33.13	0.00	249.3					
	Constant	-4.69	0.70	44.38	0.00	0.01	0.02	132.1	0.62	0.83	92.41
V	WC/TA	2.38	0.95	6.25	0.01	10.8					
	CL/TD	7.35	1.25	34.82	0.00	1556					
	NS/FA	0.15	0.04	18.19	0.00	1.17					
	NS/TA	-1.31	0.51	6.59	0.01	0.27					
	SE/TA	10.45	1.77	34.71	0.00	34410					
	RE/TA	-3.57	0.95	14.06	0.00	0.03					
	EBIT/TD	-0.94	0.44	4.49	0.03	0.39					
	Constant	-6.82	1.12	37.20	0.00	0.00	0.86	102.1	0.65	0.87	95.25
VI	WC/TA	2.52	0.99	6.42	0.01	12.42					
	CL/TD	7.73	1.35	32.76	0.00	2267					
	NS/FA	0.16	0.04	18.19	0.00	1.17					
	NS/TA	-1.38	0.52	7.07	0.01	0.25					
	SE/TA	10.35	1.77	34.36	0.00	31130					
	RE/TA	-3.59	0.99	13.19	0.00	0.03					
	EBIT/TD	-2.18	0.74	8.78	0.00	0.11					
	CF/TA	2.33	1.19	3.82	0.05	10.29					
	Constant	-6.83	1.14	35.93	0.00	0.00	0.66	98.5	66%	88%	95.3%

Source: Appendix VII

Using Hosmer Lemeshow test, linearity has been tested in this study. Since, p-values of logistic regression models are greater than 0.05, there are no linear relationship between dependent and independent variables in these model. Similarly, Omnibus test has been used to test the significance of each financial ratio in the model. Since p-values of coefficients are less that 0.05, the financial ratios are significant in these models. The goodness of fit of these models is measured by the Cox & Snell R square and the Negelkerke R Squares. The Cox & Snell R Square ranges between 52% (Model-II) and 66% (Model-VI) and the Negelkerke R Square are minimum 69% (Model III) and maximum is 88% (Model-VI).

6.4 Logistic regression model for practical application

On the basis of classification accuracy, the goodness of fit, significance of model; logistic regression Model-VI has been selected for prediction of corporate failure in the context of Nepal (*Appendix-VII*). The model has been presented below.

Logistic model

$$P = 1/[1 + \exp\{-6.82 + 2.52WC/TA + 7.73CL/TD + 0.16NS / FA - 1.38NS/TA + 10.35SE/TA - 3.59RE/TA - 2.18EBIT/TD + 2.33CF/TA\}]$$

Model statistics

P-value			=	0.66
The -2loglikelihood		=	98.5	
Chi-square		=	5.90	
The Cox & Snell R2		=	66%	
Nagelkerke R Square		=	88%	
Classification accuracy	=	95.3%		
Type I error			=	6.23%
Type II error			=	3.52%

There are eight financial ratios that are found to be significant and best fit in logistic regression model for practical application. Using Omnibus test for coefficients, the significance of each financial ratio is tested. Since p-values are less than 0.05 significance level, this study concludes that the coefficients are statistically significant in the model at the 0.05 significance level.

Using standard error (SE) for the coefficients (B), multi-collinearity in the logistic regression has been detected. Since, the standard deviations of coefficients are less than 2, there is no numerical problem, such as multi-collinearity among the independent variables in logistic regression analysis.

The goodness of fit of the model is assessed by Hosmer Lemeshow test: Chi-square and p-value. The Chi-square value is 5.90 and p-value is greater 0.66 (i.e. $p > 0.05$), it is concluded that there is no linear relationship between the dependent and the predictor variables (financial ratios). Thus, the model is statistically fit. The goodness-of-fit of the model has been also measured by the -2log likelihood and Pseudo R^2. The -2 Log Likelihood statistics is 98.5. Since, it is smaller, this model is better. The Cox & Snell R Square is 66%. The Nagelkerke R- Square is an improvement to the Cox smell R Square. Therefore, while going through Nagelkerke R- Square, 88% of the variation in dependent variable can be explained by the developed logistic model. However, a more useful measure to assess the usefulness of a logistic regression model is classification accuracy, which compares predicted group membership and actual group membership. The classification accuracy of the model is 95.3% with Type I error 6.23% and Type II error 3.52%. Since the overall classification accuracy is high, the model is fit for practical application.

6.5 Relative importance of financial ratios in logistic model

The predictive ability of each financial ratio of logistic model has been assessed by using odd ratio (Table 6.3). Since the highest odd ratio is 31130, the ratio of shareholders' equity to total assets (SE/TA) is the most powerful and ratio of retained earnings to total assets (RE/TA) is the least important in the context of Nepal.

Working capital to total assets (WC/TA)

The ratio of working capital to total assets (WC/TA) is a measure of the net current to assets relative to the total capitalization. As it decreases, the probability of failure increases. The inadequacy and insufficiency of net current assets leads towards liquidity and financial insolvency. Like Altman (1968), Beaver (1966), Deakin (1972), and Sharma and Rao (1971), the ratio of working capital to total assets

(WC/TA) is found third important ratio in logistic regression analysis in corporate failure.

Current liabilities to total debts (CL/TD)

The ratio of current liabilities to total liabilities (CL/TD) refers to the proportion of current liabilities on total debts. The high proportion refers to high current liabilities and low long term debts or vice versa. Taffler and Tisshaw (1977) and Altman et al., (1977) found this ratio as an important predictor ratio of corporate failure. In this study, it is revealed second important ratio.

Fixed assets turnover (NS/FA)

This study evident that fixed assets turnover ratio is as fifth important ratio in logistic regression analysis of corporate failure. The fixed turnover ratio (NS/FA) measures the relationship between net sales and net fixed assets. It reflects sales generating ability of a company's fixed assets. Generally, the higher ratio refers to more efficient in the utilization of fixed assets of the company. One of the major problems of a company failure is inability to utilize high level of its fixed assets efficiently and effectively than a successful one. Hence, a high fixed assets turnover ratio indicates a successful business.

Assets turnover (NS/TA)

The assets turnover ratio (i.e. also called assets management ratio) is the relationship between net sales and total assets. A successful business manages its asset properly and generates high revenues and profits. Like Altman (1968); Altman et al. (1977); Yadav (1986); Bilderbeek (1977); this study also revealed assets turnover ratio as a significant in prediction of corporate failure.

Shareholders' equity to total assets (SE/TA)

Blum (1982), Kaveri (1980) and Sharma and Mahajan (1982) revealed the ratio of shareholders' equity to total assets (SE/TA) as a predictor of corporate failure. The ratio of shareholders' equity to total assets (SE/TA) in evidenced as the most important predictor in logistic analysis. Low ratio of shareholders' equity to total assets (SE/TA), indicates insufficiency of assets over the shareholders contributions. If the ratio is greater than one, assets are insufficient to pay shareholders in case of

liquidation. As debt increases, the ratio of shareholders' equity to total assets (SE/TA) decreases causing likelihood of corporate failure.

Retained earnings to total assets (RE/TA)

Like Beaver (1966), Altman (1968), Deakin (1972), Sharma and Rao (1971), Bilderbeek (1977) and Altman et al., (1977); this study also revealed ratio of retained earnings and total assets (RE/TA) as predictor of corporate failure. However, it is the least important predictor of corporate failure.

Earnings before interest and tax to total debt (EBIT/TD)

It is only one profitability ratio- earnings before interest and tax to total debts (EBIT/TD) is found significant in the logistic model. It measures the ability of a company to generate profit to pay its debt obligations. Since, non-failed companies do not use debts, the ratio of earnings before interest and tax to total debts (EBIT/TD) are high. Like Blum (1974), probability of corporate failure decreases, if profitability ratio increase or vice versa. However, it is the second least important predictor of corporate failure.

Operating cash flow to total assets (CF/TA)

The operating cash flow refers to the ability of a company to generate cash from its regular operating activities. A successful business usually generates high operating cash for payment of dividend, debts installments and new investment. If a company fails to use resources efficiently, cash flow of company consequently shrinks leading to a decline in the firm's ability to meet its short term liabilities. It is evident that the ratio of cash flow to total assets (CF/TA) as the fourth important predictors of corporate failure.

6.6 Correlation analysis of independent variables

It is assumed that independent variables should not be highly correlated in logistic model for the best fit. To test the correlation among eight significant financial ratios of logistic regression model, correlation matrix has been developed and presented in Table 6.4.

Table 6.4
Correlation matrix of financial ratios

Ratios	WC/TA	CL/TD	NS/FA	NS/TA	SE/TA	RE/TA	EBIT/TD	CF/TA
WC/TA	1							
CL/TD	0.48	1						
NS/FA	-0.15	0.35	1					
NS/TA	-0.14	-0.36	-0.76	1				
SE/TA	-0.07	0.44	0.52	-0.26	1			
RE/TA	-0.03	-0.32	-0.40	0.15	-0.69	1		
EBIT/TD	-0.19	-0.38	-0.13	0.15	-0.20	0.05	1	
CF/TA	0.12	0.26	0.09	-0.15	0.09	-0.09	-0.85	1

Table 6.4 showed that there is high correlation is - 0.89 between earnings before interest and tax to total debts (EBIT/TD) and cash flow to total assets (CF/TA). However, other correlations are found low. By adding ratio of cash flow to total assets (CF/TA), the reliability and classification accuracy of the model is improved. Thus, logistic regression model is significant for classifying failed and non-failed companies.

6.7 Validity of logistic regression model

Although, logistic regression model is statistically significant; the practical validity of the logistic regression has been tested on the basis of predictive classification accuracy. Using five years financial data of twenty failed and twenty non-failed companies, the predictive classification accuracies have been computed and tested the validity of the model. The predictive classification accuracies of logistic model have **presented in** Table 6.5.

Table 6.5 exhibits that logistic regression model can classify failed and non-failed companies with cent percent accuracy in one year prior to failure. The classification accuracies prior two, three, four and five year to failure are 97.5%; 92.5%, 95% and 97.5 % respectively. Thus, the overall classification error is nil in one year prior to failure. It is 2.5%, 7%, 5% and 2.5% for year 2, 3, 4 and 5 year prior to failure respectively. Type I error is 5% in year 2, and 10% in year 3 and 4 year. It is nil in 5 year prior to failure. On the basis of classification accuracies, Type I and Type II errors, it is concluded that logistic model can predict corporate failure at least five year prior to failure.

Table 6.5
Predictive classification accuracy of logistic regression model (in %)

This table presents the Type I error, Type II error, the overall classification accuracy (%) and error of logistic model of financial ratios for five years prior to failure. Thus, low Type I error and high overall classification accuracy has been expected. The higher classification accuracy indicates that model is significant to classify failed and non-failed companies.

Prior year to failure	Actual group	Predicted group		Classification accuracy (%)
		Failed cos. (N)	Non-failed cos. (N)	
1	Failed cos.	20	0	100%
	Non-failed cos.	0	20	100%
	Overall classification accuracy			100%
	Overall classification error			100%
2	Failed cos.	19	1	95%
	Non-failed cos.	0	20	100%
	Overall classification accuracy			97.5%
	Overall classification error			2.5%
3	Failed cos.	18	2	90%
	Non-failed cos.	1	19	95%
	Overall classification accuracy			92.5%
	Overall classification error			7.5%
4	Failed cos.	18	2	90%
	Non-failed cos.	0	20	100%
	Overall classification accuracy			95%
	Overall classification error			5%
5	Failed cos.	20	0	100%
	Non-failed cos.	1	19	95%
	Overall classification accuracy			97.5%
	Overall classification error			2.5%

6.8 Comparison of discriminant analysis and logistic analysis

Generally, the superiority of discriminant models can be assessed by predictive classification accuracy of the model. In order to assess the superiority of the models, this study also compared predictive classification accuracies, Type I errors and Type II errors of discriminant and logistic models that have been presented in Table 6.6.

Table 6.6
Predictive accuracies discriminant and logistic models (in %)

Prior to failure	Discriminant model			Logistic model		
	Type I error (%)	Type II error (%)	Accuracy (%)	Type I error (%)	Type II error (%)	Accuracy (%)
1	Nil	5	97.5	Nil	Nil	100.0
2	10	5	92.5	5	Nil	97.5
3	10	15	87.5	10	5	92.5
4	15	15	85.0	10	Nil	95.0
5	25	20	77.5	Nil	5	97.5

Table 6.6 demonstrates that the predictive classification accuracies of logistic model are 100%, 97.5%, 92.5%, 95%, 97.5% for one, two, three, four and five year prior to corporate failure respectively. These predictive classification accuracies are found higher than predictive discriminant classification accuracies for the same years prior to failure.

As far as Type-I and Type-II errors are concerned, both Type I and Type II errors of logistic regression model are also found lower than discriminant model. Under logistic analysis, Type I error is nil in prior year 1 and 5 year. It is 5% in prior year 2 and 10% in year 3, and 4 year prior to failure. Under discriminant analysis, Type I error is nil % in year 1, 10% in year 2 and 3 year , 15% in year 4, and 25% in year 5 prior to failure. Under logistic regression analysis, Type II errors are nil for year 1, 2 and 4 years and 5% in year 3 and year 5. The type II errors are also lower in logistic regression analysis in comparison to discriminant analysis. Thus, the results showed that logistic regression model is more useful to predict corporate failure many years prior to failure with low classification errors.

6.8 Discussion

On the basis of logistic regression analysis in prediction of corporate failure, the following conclusions have been drawn.

Although financial ratios are inconsistent, logistic analysis is useful to classify failed and non-failed companies many years prior to their failure using yearly and average data. The classification accuracies have been found to be increased, when a company

moves towards failure. On the basis of average data, the classification accuracies are 100%, 96.7%, 95.6% and 94.5% on average data for two, three, and four and five years prior to failure respectively, which are higher than yearly classification accuracies.

Logistic regression analysis is found useful to classify failed and non-failed companies with high classification accuracy. Since the classifications accuracies are found to be increasing with addition of financial ratios, this study also concludes the predictive powers of financial ratios are cumulative. Although, financial ratios are found to be inconsistent, ratios of shareholders' equity to total assets (SE/TA), working capital to total asset (WC/TA) and current liabilities to total debts (CL/TD) are found more consistently significant in logistic regression analysis.

This study developed logistic regression model for practical application in Nepalese context as follows:

Logistic model

$$P = 1/[1 + \exp\{-6.82 + 2.52WC/TA + 7.73CL/TD + 0.16NS / FA - 1.38NS/TA + 10.35SE/TA - 3.59RE/TA - 2.18EBIT/TD + 2.33CF/TA\}]$$

Using exp(B) (i.e. odd ratio) as criteria, the ratio of shareholders' equity to total assets (SE/TA) is revealed as the most important ratio, which is followed by ratios of current liabilities to total debt (CL/TD), working capital to total assets (WC/TA), cash flow to total assets (CF/TA), fixed assets turnover ratios (NS/FA), assets turnover (NS/TA), and earnings before interest and tax to total debts (EBIT/TD) respectively.

This study also concludes that logistic regression model can predict corporate failure at least five year prior to failure. Moreover, predictive classification accuracies showed that logistic regression model is found to be more useful over discriminant model for prediction of corporate failure in the context of Nepal

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Chapter VII
FINANCIAL RATIOS AND CORPORATE FAILURE – A CONSENSUS APPROACH

7.1 Introduction

Academic researchers have used financial ratios to compare failed and non-failed companies, and developed models for prediction of corporate failure. Marvin (1942) found that current ratios of firms were less than those of the industry as a whole. Beaver (1966), Altman (1968), Deakin (1972), and Ohlson (1980) concluded that financial ratios are useful to discriminate failed and non-failed companies many years prior to failure. Thus, financial ratio possesses predictive ability at least in respect of financial difficulties (Horrigon, 1968). Similarly, a firm with an inadequate equity base and little 'reserve strength' are sickness prone (Gupta, 1983; and Yadav,1986). Gupta (1983) also revealed that liquidity ratios are very poor predictors. However, these studies concluded that financial ratios are useful to classify failed and non-failed companies many years prior to failure.

There are considerable debates in the literature as to which ratios are the most useful for assessing the likelihood of failure. Moreover, prediction of corporate failure is essentially a judgmental task. Total dependence of statistical models may not be desirable. Still little studies have been done in behavioral insights into the use of financial ratios (Barnes, 1987). Thus, this chapter is directed towards finding out the degree of consensus on financial ratios and corporate failure in the context of Nepal.

Following the introduction, Section-II deals with respondents' profile. Section-III deals with financial statement analysis practices and ranking of financial ratio groups in Section-IV. The ranking of financial ratios as predictors of corporate failure have been described in Section-V. Section VI describes survey responses on findings and conclusions of previous study on financial ratios as predictors of corporate failure and determinants of corporate failure in Section VII. At last, the discussion of this chapter has been described in Section-VIII.

7.2 Respondents' profile

In this study, 168 financial executives and practitioners were asked questions regarding financial ratios and corporate failure. The respondents' profile of this study has been presented in Table 7.1.

Table 7.1
Respondents' profile

Categories	Respondents' Types	No of respondents (N)	Percent (%)
Position	Chief Executive Officers	15	9
	Chief Financial Officers	32	19
	Account and Credit Officers	71	43
	Internal Auditors	50	30
	Total	**168**	**100**
Qualification	Bachelors degree or below	28	16.7
	Masters degree	112	66.7
	Charted Accountants	28	16.7
	Total	**168**	**100**
Sectors	Manufacturing sectors	168	100
	Non-manufacturing sectors	101	60
	Total	**168**	**100**
Experience	Below five years	77	46
	Five to ten years	57	34
	Above ten years	34	20
	Total	**168**	**100**

Table 7.1 shows that 40% (N=67) of the respondents represents manufacturing sectors and 60% (N=100) non-manufacturing sectors. On the basis of position, Chief Executive Officers (CEOs) represents 9% of total respondents, while Chief Financial Officers (CFOs)-19% (N=32); Account and Credit Officers-43% (N=73); and Internal Auditors-30% (N=50). The 46% of respondents have less than five years of experience, while five to ten years experience with 34% (N=57), and more than 10 years experience 20% (N=34).

7.3 Financial statement analysis practices

In order to know financial analysis practices, a questionnaire was developed and asked to financial executives and practitioners of Nepalese companies. The results have been presented in Table 7.2.

Table 7.2
Responses on financial statement analysis practices

This table presents frequencies (N) and percentage (%) of the financial executives and practitioners on the practices on financial analysis practice in Nepal. This table has been divided into five (5) Panels. Panel A deals with importance of financial analysis which is followed by frequency of financial analysis (Panel B). Panel C and D describe the responsibilities and techniques of financial analysis respectively. At last, Panel E describes the statistical tools and software used in financial analysis.

Panel A: How is financial analysis important in decision making?	**Frequency (N)**	**Percent (%)**
Yes	168	100
No	0	0
Total	**168**	**100**
Panel B: How often do you compute financial ratios?	**N**	**%**
Seldom	10	6
Daily	22	13
Monthly	60	36
Quarterly	47	28
Yearly	29	17
Total	**168**	**100**
Panel C: Who is responsibility for financial analysis?	**N**	**%**
CEOs	8	5
CFOs	123	73
Internal auditors	22	13
Financial analyst/experts	15	9
Total	**168**	**100**
Panel D: Which technique(s) of financial analysis is used?	**N**	**%**
Univariate	121	72
Multivariate	47	28
Total	**168**	**100**
Panel E: What types of statistical software do you use?		
Excel spread sheet	99	59
Accounting softwares and simulations	62	37
Statistical tools and others	7	4
Total	**168**	**100**

Table 7.2 shows that financial practitioners are agreed that financial analysis is essential for decision making in business. This study also reveals that 36% of financial executives and practitioners used to compute financial ratios monthly, quarterly -28%, yearly (17%), and daily -13%. However, 6% of financial executives and practitioners seldom use these ratios.

The 73% of financial executives and practitioners answered that Chief financial officers (CFO) is the main authority for financial analysis. It is found 13% for internal auditors and 9%-financial analysts and 5% - Chief executive offices (CEOS).

As far as methods of financial analysis are concerned, the survey results have showed that the majority of the financial executives and practitioners (72%) used univariate approach of financial analysis. 59% of financial executives and practitioners use Ms Excel while computing ratios and 37% of them use accounting software in financial analysis. The rest of financial executives and practitioners use statistical software and other tools.

7.4 Ranking of ratio groups as predictors of corporate failure

As far as importance of financial ratio group is concerned, this section examines the relative importance of ratio groups in prediction of corporate failure. On the basis of the responses obtained from a structure questionnaire on the importance of ratio groups, the weighted means of each ratio group have been computed and presented in Table 7.3.

Table 7.3 exhibits that liquidity ratio group has been ranked as the most important ratio groups in corporate failure prediction context. The profitability ratio is second important ratios group, which is followed by leverage ratio group. The turnover ratio group and cash flow ratio group are revealed as the least important ratios for corporate failure prediction in the context of Nepal.

Table 7.3
Rank-wise weighted mean of ratio groups as predictors of corporate failure

This table examines the relative importance of ratio groups in corporate failure. Five financial ratio groups: liquidity, profitability, turnover, leverage and cash flow were randomly arranged in survey questionnaire and financial executives were asked to rate according to their importance in corporate failure prediction context. Financial executives were asked to rank one (1) for the most important ratio group and five (5) for the least important. Total numbers of financial executives (N), and weighted mean were computed by using SPSS and Ms. Excel spread sheet. While weighted ratio group with the lowest mean weight is ranked one (1) as the most important ratio and so on.

Ratio groups	1	2	3	4	5	Total (N)	Weighted Mean	Rank
Liquidity ratios	71	56	20	8	13	168	2.02	1
Leverage ratios	28	35	60	36	9	168	2.78	3
Profitability ratios	44	39	40	26	19	168	2.63	2
Turnover ratios	1	17	23	62	65	168	4.03	5
Cash flow ratios	25	21	24	36	62	168	3.53	4

7.5 Ranking of financial ratios as predictors of corporate failure

In spite of significant increase in the studies on financial ratios as predictors of corporate bankruptcy, there are no unanimous findings with respect to usefulness financial ratio or ratios for predicting corporate failure. Studies are available in the context of developed and large capital markets. Thus, in order to find consensus on financial ratios and corporate failure, a questionnaire was developed and asked to financial executives and practitioners to rate each financial ratio as predictor of corporate failure. The results have been presented in Table 7.4.

The ratio of current assets to current liabilities (CA/CL) is popularly used literature to measure liquidity of a business. Like Beaver (1966), Deakin (1972), Altman et al. (1977) and Blum (1974); this study revealed that the ratio of current assets to current liabilities (CA/CL) is found as the most important predictor of corporate failure. However, ratios of working capital to total assets (WC/TA), current assets to total assets (CA/TA), and current liabilities to total debts (CL/TD) are rated less important ratios in this context.

Table 7.4
The overall weighted mean and ranking of financial ratios as predictors of corporate failure

This table shows the numbers of financial executives and practitioners (N), total weight, mean weight and rank of twenty one financial ratios randomly arranged in survey questionnaire to 168 financial executives and practitioners. Each financial ratio was given in seven point likert scale and required them to rate according to their important for prediction of corporate failure. The financial executives and practitioners were asked to rate one (1) for the least important ratio and seven (7) for the most important. Using Ms Excel, the weighted mean of each variable has been computed. The high mean weight close to seven (7) refers the ratio with high predictive power and close to one (1) is the least important. Based on this criterion, each financial ratio is ranked from one to twenty one.

Ratio Groups	Ratios	1	2	3	4	5	6	7	N	Total weight	Mean	Overall rank
Panel A: Liquidity	Current assets to current liabilities (CA/CL)	2	0	2	15	21	43	83	166	1012	6.10	1
	Working capital to total assets (WC/TA)	1	8	10	30	55	42	20	166	834	5.02	12
	Current assets to total assets (CA/TA)	4	0	15	45	53	32	19	168	819	4.88	16
	Current liabilities to total debts (CL/TD)	12	10	16	30	40	34	22	164	758	4.62	18
Panel B: Leverage	EBIT to interest (EBIT/INT)	1	6	16	22	35	32	54	166	894	5.39	5
	Total debt to total assets (TD/TA)	4	4	11	16	31	45	53	164	905	5.52	3
	Long term debt to total debts (LD/TD)	4	14	29	30	27	38	20	162	742	4.58	19
	Shareholders' equity to total assets (SE/TA)	4	0	11	50	39	39	21	164	813	4.96	14
	Retained earnings to total assets (RE/TA)	2	8	26	47	27	36	22	168	789	4.70	17
Panel C: Turnover	Net sales to working capital (NS/WC)	0	2	10	17	41	49	47	166	930	5.60	2
	Net sales to current assets (NS/CA)	2	3	3	37	39	46	34	164	874	5.33	6
	Net sales to fixed assets (NS/FA)	16	17	15	17	6	1	0	72	377	5.24	8
	Net sales to total assets (NS/TA)	1	2	6	29	51	48	27	164	871	5.31	7
Panel D: Profitability	EBIT to total assets (EBIT/TA)	3	0	18	39	56	29	19	164	800	4.88	16
	EBIT to total debts (EBIT/TD)	2	4	21	36	27	48	26	164	822	5.01	13
	Net income to sales (NI/NS)	0	4	8	30	32	50	40	164	892	5.44	4
	Net Income to Total Assets (NI/TA)	4	8	16	31	38	43	26	166	822	4.95	15
Panel E: Cash flow	Cash flow to net sales (CF/NS)	0	2	7	49	38	47	19	162	826	5.10	9
	Cash flow to current liabilities (CF/CL)	2	2	16	18	54	41	31	164	859	5.24	8
	Cash flow to total assets (CF/TA)	8	6	31	28	47	28	16	164	740	4.51	20
	Cash flow to total debts (CF/TD)	0	8	22	23	40	40	29	162	817	5.04	10

Like Beaver (1966), Altman (1968), Deakin (1972), and Ohlson (1980), this study has also revealed that ratio of total debt to total assets (TD/TA) is third important ratio followed by the ratio of earnings before interest and tax (EBIT) to interest (EBIN/INT) is ranked as fifth useful financial ratio. Other leverage ratios have been revealed as less important ratios in corporate failure studies.

Like Beaver (1966) and Deakin (1972), financial executives and practitioners have rated the ratio of working capital turnover (NS/WC) as second important ratio as predictor of corporate failure. The ratios of net sales to current (NS/CA), net sales to total assets (NS/TA) and net sales to fixed assets (NS/FA) are revealed as sixth, seventh and eight important ratios in this context respectively.

The survey results also revealed that only ratio of net income to net sales (NI/NS) as fourth important predictor of corporate failure. The ratios of cash flow to current liabilities (CF/CL), cash flow to net sales (CF/NS), and cash flow to total debts (CF/TD) are rated a eight, nine and tenth important ratios respectively. However, the ratio of cash flow to total assets (CF/TA) is revealed as a least important in corporate failure.

In conclusions, financial executives and practitioners revealed the ratios of current assets to current liabilities (CA/CL), net sales to working capital (NS/WC), total debt to total assets (TD/TA), net income to net sales (NI/NS) and earnings before interest and tax to interest (EBIT/INT) are as the most important predictors of corporate failure in the context of Nepal.

7.6 A survey responses on findings and conclusions of previous study on financial ratios as predictors of corporate failure

Financial ratios are important predictors of corporate failure (Beaver, 1966; Altman, 1968; Deakin, 1972; Ohlson, 1980; Charitou et al., 2004; Yap et al., 2010; and Pal, 2013). However, there is no consensus on findings and conclusions on financial ratios and corporate failure. Thus, a questionnaire was designed and asked to financial executives and practitioners to rate on findings and conclusions of previous studies on financial ratios as predictors of corporate failure. The survey results have been presented in Table 7.5.

Table 7.5
Degree of consensus on findings and conclusions of past studies on financial ratios as predictors of corporate failure

This table presents numbers (N) and percentage (%) of agree or disagree with seventeen (17) statement of findings and conclusions of previous studies on financial ratios as predictors of corporate failure. To determine it, a question was designed in seven point likert scale and asked financial executives to rate each statement according to their knowledge and experience. They were asked to rate one (1) for the strongly agree and seven (7) for the strongly disagree on the statement. The values in the parentheses indicate percentage (%) of rating. The percentage of agreeing in the statements among financial executives and practitioners is computed by sum of indicating 7, 6, and 5). If summation of importance is above 50% refers that they agreed with the statement and below 50% indicates disagreed.

Statements	Basis	1	2	3	4	5	6	7	Total	Total Agree	Total Disagree
Financial ratios are useful to predict corporate failure	N (%)	1 (1)	2 (1)	2 (1)	12 (7)	32 (20)	37 (23)	78 (48)	164 (100)	147 (90)	5 (3)
Financial ratios begin to deteriorate at least three years prior to failure.	N (%)	12 (7.3)	6 (3.7)	23 (14)	27 (16.5)	39 (23.8)	39 (23.8)	18 (11.0)	164 (100)	96 (59)	41 (25)
Financial ratios can detect the early warning signals of corporate failure	N (%)	6 (3.7)	2 (1.2)	0 (0)	12 (7.3)	34 (20.7)	58 (35.4)	52 (31.7)	164 (100)	144 (88)	8 (2.5)
There is no consistency on predictive power do financial ratios	N (%)	9 (5.5)	10 (6.1)	6 (3.7)	49 (29.9)	31 (18.9)	31 (18.9)	28 (17.1)	164 (100)	90 (55)	25 (15)
There are differences of financial ratios between failed and non-failed firms.	N (%)	2 (1.2)	5 (3.0)	7 (4.3)	38 (23.2)	40 (24.4)	40 (24.4)	32 (19.5)	164 (100)	112 (68)	14 (8.5)
Predictive power of ratios differs when it is used with two or more ratios.	N (%)	11 (6.6)	4 (2.4)	10 (6.0)	46 (27.7)	45 (27.1)	26 (15.7)	24 (14.5)	166 (100)	95 (57)	25 (15)
Predictive power of ratio is not consistent over the year.	N (%)	11 (6.7)	10 (6.1)	14 (8.54)	54 (32.9)	27 (16.5)	30 (18.3)	18 (11)	164 (100)	75 (46)	35 (21.3)
There is high standard deviation of financial ratios of failed firms	N (%)	0 (0)	4 (2.4)	4 (2.4)	28 (15)	36 (21.7)	54 (32.5)	40 (24.1)	166 (100)	130 (78)	8 (4.8)
Debt equity of successful firms is lower than failed firms.	N (%)	6 (3.7)	2 (1.2)	4 (2.44)	26 (15.9)	49 (29.9)	42 (25.6)	35 (21.3)	164 (100)	126 (77)	12 (7.34)
High debt ratios increase the probability of failure	N (%)	10 (6)	2 (1.2)	4 (2.41)	24 (14.5)	46 (27.7)	47 (28.3)	33 (19.9)	166 (100)	126 (76)	16 (9.61)
Default of payment of debt is the symptoms of failure.	N (%)	8 (4.8)	4 (2.4)	12 (7.2)	21 (12.7)	38 (22.9)	53 (31.9)	30 (18.1)	166 (100)	121 (73)	24 (14.4)
Highly profit making firms do not use debt.	N (%)	50 (29.8)	21 (12.5)	17 (10.1)	36 (21.4)	24 (14.3)	9 (5.4)	11 (6.6)	168 (100)	44 (26)	88 (52.4)
Liquidity of failed firm is poorer as compared to non-failed firm.	N (%)	10 (6)	1 (0.6)	10 (6)	15 (9)	27 (16)	50 (29.8)	55 (32.7)	168 (100)	132 (79)	21 (12.6)
Profitability of failed firms is lower than non-failed firms	N (%)	8 (4.80	2 (1.2)	8 (4.8)	8 (4.8)	30 (17.9)	63 (37.5)	49 (29.2)	168 (100)	142 (85)	18 (11)
The small sizes of business has more chances of failure than large ones	N (%)	50 (29.8)	22 (13.1)	24 (14.3)	29 (17.3)	21 (12.5)	13 (7.7)	9 (5.4)	168 (100)	43 (26)	96 (57)
Cash flow of failed firms is lower than cash flow of non-failed firms.	N (%)	10 (6)	7 (4.2)	13 (7.7)	22 (13.1)	45 (26.8)	38 (22.6)	33 (19.6)	168 (100)	116 (69)	30 (18)
Market price fluctuation is symptoms of failure or success of a firm.	N (%)	19 (11)	7 (4)	15 (9)	25 (15)	43 (26)	35 (21)	24 (14)	168 (100)	102 (61)	41 (24)

Table 7.5 indicates that ninety percent financial executives are found to agree on the conclusion that financial ratios are useful to predict corporate failure. They also believed that financial ratios can detect early warning signal of corporate failure (88%). Like Sharma and Mahajan (1980), seventy eight percent financial executives have agreed that standard deviations of financial ratios are higher in failed firms. Fifty nine percent financial executives have agreed that financial ratios begin to deteriorate at least three years prior to failure (Beaver, 1966; Altman, 1968; Deakin, 1972). While, sixty eight percent have agreed that financial ratios differ between failed and none failed companies.

Table 7.5 also shows that financial ratio possesses the ability to predict corporate failure. However, the majority of the financial executives believe that predictive power of ratio differ when it is used with two or more ratios. It also supports that the predictive power of financial ratios are inconsistent over years. The survey results also revealed that there are poor liquidity, profitability and cash flow in failed companies.

Seventy seven percent financial executives believed that debt equity of non-failed firms is lower. The majority of financial executives and practitioners also agreed that (i) Default on payment of debt (71%) and market price fluctuation is symptoms of failure (61%). However, majority of financial executive and practitioners disagreed that (i) There is inconsistent of predictive power of ratios over time, (ii) small sized business are more failure prone, and (iii) profit making firms do not use debt.

7.7 A survey on determinants of corporate failure

This study has also dealt with the opinions survey among financial executives with respect to major causes of corporate failure in Nepal. The causes of failure were randomly arranged without classifying into internal and external causes. For this purpose, a structured questionnaire was developed and asked financial executives and practitioners to rate determinants of corporate failure on the basis of their experience, knowledge and importance. The responses of survey on determinants of corporate failure have been presented in Table 7.6.

Table 7.6
The weighted mean and ranking of factors determining corporate failure

This table presents the external and internal factors of corporate failure that were randomly arranged in survey questionnaire. Financial executives were asked to rate each seven (7) for the most important factor and one (1) for the least important factor. This table also presents total financial executives (in numbers of response and percentage), numbers of responses (N) and percentage (%) for importance and based on percentage of importance ranking of factors as main causes of corporate failure. The values in the parentheses indicate percentage (%) of rating. The percentage of financial executives and practitioners indicating very important factor (sum of indicating 7, 6, and 5), total number of financial executives and practitioners; If summation of importance is above 50%, it refers an important factor while the percentage below 50% indicates low important factor. The factor is ranked one (1) if it has the highest percentage of importance and so on.

Determining factors	Basis	1	2	3	4	5	6	7	Total	Total importance	Rank	
											Group	Overall
Panel A: External factors												
General economic factors	N (%)	4 (2)	2 (1)	5 (2)	18 (11)	23 (14)	63 (38)	53 (32)	168 (100)	139 (83)	3	5
Political interferences	N (%)	2 (1)	6 (4)	2 (1)	15 (9)	34 (20)	59 (35)	50 (30)	168 (100)	143 (85)	1	3
Rapid technological changes	N (%)	2 (1)	4 (2)	13 (8)	21 (13)	53 (32)	45 (27)	30 (18)	168 (100)	128 (76)	5	11
Government policy	N (%)	4 (2)	2 (1)	2 (1)	18 (11)	27 (16)	62 (37)	52 (31)	167 (100)	141 (84)	2	4
High market competition	N (%)	4 (2)	0 (0)	13 (8)	28 (17)	38 (23)	40 (24)	45 (27)	168 (100)	123 (73)	6	12
Shortage of resources	N (%)	2 (1)	2 (1)	8 (5)	20 (12)	41 (24)	51 (30)	44 (26)	168 (100)	136 (81)	4	6
Poor industrial relations	N (%)	4 (2)	7 (4)	15 (9)	32 (19)	53 (32)	25 (15)	32 (19)	168 (100)	110 (66)	7	13
Panel B: Internal factors												
High debt	N (%)	4 (2.4)	0 (0)	17 (10.1)	39 (23.2)	27 (16.1)	39 (23.2)	42 (25)	168 (100)	108 (64)	7	14
Weak managerial leadership	N (%)	4 (2.4)	5 (3)	2 (1.2)	5" (3)	26 (15.5)	48 (28.6)	78 (46.4)	168 (100)	152 (91)	1	1
Wrong attitude and culture of managers	N (%)	6 (3.6)	2 1.2)	4 (2.4)	23 (13.7)	32 (19)	49 (29.2)	52 (31)	168 (100)	133 (79)	4	8
High operating costs	N (%)	0 (0)	3 (1.8)	4 (2.4)	30 (17.9)	43 (25.6)	65 (38.7)	23 (13.7)	168 (100)	131 (78)	6	10
Poor strategy and policy	N (%)	1 (0.6)	2 (1.2)	5 (3)	28 (16.7)	21 (12.5)	55 (32.7)	56 33.3)	168 (100)	132 (79)	5	9
Inefficiency and overstaffing	N (%)	2 (1.2)	4 (2.4)	4 (2.4)	22 (13.1)	55 (32.7)	57 (33.9)	24 (14.3)	168 (100)	136 (81)	3	7
Ineffective planning, supervision and control	N (%)	3 (1.8)	1 (0.6)	4 (2.4)	13 (7.7)	47 (28)	46 (27.4)	54 (32.1)	168 (100)	147 (87.5)	2	2

Panel-A exhibits the responses of external causes of corporate failure. Out of which, the political interference is rated as the most importance external factor of corporate failure. Similarly, the government policy is ranked as the second most important factor followed by general economic factors and shortage of resources respectively. However, it was also found that poor industrial relations, high market competition, and rapid technological changes are revealed as least important determinants of corporate failure in Nepal.

Panel-B shows that the weak managerial leadership, and the ineffective planning, supervision and control are as the main internal causes of corporate failure. These factors are followed by the inefficiency and over staffing, wrong attitude and culture of managers as third and fourth important factors causing corporate failure. However, as determinants of corporate failure; high debts, high operating costs, poor strategy and policy have been rated as the least important ones.

This study reveals that the main causes of corporate failure are weak managerial leadership and ineffective planning, the government policy, political interference, general economic factors, and shortages of resources respectively. Thus, the primary causes of corporate failure are internal factors and external factors are secondary.

7.8 Discussion

On the basis of survey on financial ratios and corporate failure, this study summarizes the following major findings.

Liquidity has been considered as most important ratio group among financial executives in prediction of corporate failure. Although, the earning profit is the main objective of a business; profitability ratio group is ranked second important ratio group, which is followed by leverage ratio group in corporate failure. In this context, the turnover and cash flow ratio groups are revealed as the least important for prediction of corporate failure.

This study also revealed that out of twenty one financial ratios, the ratio of current assets to current liabilities (CA/CL), working capital turnover (NS/WC), total debt to total assets (TD/TA), net income to net sales (NI/NS) and earnings before interest and

tax to interest (EBIN/INT) are the most important predictors of corporate failure respectively.

Like Fitzpatrick (1932), Ramser and Foster (1931), Winakor and Smith (1935), Beaver (1966), Altman (1968), Deakin (1972) and Libby (1975), financial executives agreed that financial ratios are useful to provide the early warning signal of corporate failure. It is also supported that liquidity and debt of failed firms are poorer in comparison to non-failed enterprises. It is concluded that financial executives have been found agreed on findings and conclusions of previous studies on financial ratios and corporate failure.

As the main determinants of corporate failure, it is evident that the weak managerial leadership is the main cause of corporate failure, which is followed by ineffective planning and control, political interference, and government policies respectively. Thus, it concludes that the main causes of corporate failure are internal causes that are aided by external causes for failure.

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Chapter VIII
SUMMARY, CONCLUSION AND IMPLICATIONS OF THE STUDY

8.1 Summary

The prediction of corporate failure has become a major area of finance and accounting since 1960s. Prior to 1960s, Ramser and Foster (1931); Fitzpatrick (1932); Smith and Winakar (1935); and Marwin (1942) used financial ratios to compare failed and non-failed firms. Beaver (1966) used univariate analysis of financial ratios to determine financial ratios as predictors of corporate failure. Altman (1968) used multivariate discriminant analysis for prediction of corporate failure. Ohlson (1980) used logistic analysis for prediction of corporate failure. The better known discriminant studies are Deakin (1972); Altman at el., (1977); Blum (1974); Gupta (1983); and Yadav (1986). Similarly, Edmister (1972); Meyer and Pifer (1980) used linear regression and Zavgren (1985); Nam and Jinn (2000); Charitou et al., (2004); and Ugurlu and Aksoy (2006) using logistic regression analysis for prediction of corporate failure. These studies developed corporate failure prediction models to provide early warning signal of corporate failure to the stakeholders, so that they can adopt corporate strategies to reduce risk of bankruptcy (Danilov, 2014). However, there is no unanimous in a financial ratio or a set of financial ratios as predictors of corporate failure abroad. Little attempts have been made to assess usefulness of financial ratios as predictors of corporate failure in the context developing country Nepal.

The main objective of this study is to examine financial ratios and their usefulness in prediction of corporate failure of Nepal. The specific objectives are: (i) to compare financial ratios of failed and non-failed companies; (ii) to determine ratio or set of ratios that can predict corporate failure; (iii) to find out how many years in advance, corporate failure can be predicted; (iv) to develop models of financial ratios for prediction of corporate failure; and (v) to assess the consensus of financial executives and practitioners on financial ratios as predictors of corporate failure.

This study has used descriptive, correlation, causal comparative research designs to deal with various issues raised in this study. For this purpose, a list of listed companies and public enterprises including liquidated, closed down, under liquidation, delisted from NEPSE) have been collected from the Office of Auditors

General of Nepal (OAG/N), Corporation Coordination Division of Ministry of Finance (MOF), Security Board of Nepal (SEBON), Nepal Stock Exchange Ltd (NEPSE) and the Office of the Company Registrar (OCR). In this study, a company is defined as a failed company, if its total liabilities are greater than total assets or liquidated or under liquidation process or closed down operations. A company is regarded as a non-failed company, if it is not failed company. On the basis of these criteria, twenty failed companies have been selected. These twenty one failed companies have been paired with twenty non-failed companies. Both failed and non-failed companies have been selected from the list of thirty three privately owned listed companies and liquidated or delisted companies; thirty seven public enterprises, and thirty privatized and dissolved public enterprises.

The main source of secondary data of this study is the financial statements from fiscal years 1988 through 2009 that have been used to assess financial ratios and their usefulness for prediction of corporate failure. The major source of primary data is structured questionnaire. A structured questionnaire was designed to find consensus among financial executives and practitioners on financial ratios and corporate failure in the context of Nepal. In this study, opinions of one hundred sixty eight (168) financial executive and practitioners have been used to assess the consensus on the issue. The questionnaires were designed in seven point likert scales for measuring the predictive power of financial ratios, determinants of corporate failure and consensus on findings and conclusions of previous studies, and others for ranking, and yes or no format as well.

In this study, twenty one financial ratios have been have been selected to assess the predictive power on the basis of basically using three criteria: (a) financial ratios that are significant in corporate bankruptcy studies; (b) popularity in academics courses of finance and accounting; and (c) data are generally available for computation of financial ratios.

In this study; univariate analysis, discriminant analysis, and logistic regression analysis have been used as methods of secondary data analysis. Financial ratios of failed and non-failed companies have been compared to measure the behaviour of financial ratios of failed and non-failed companies five years prior to failure. Similarly, to test differences in average financial ratios of failed and non-failed

companies, it has applied t-statistics, the Wilk's Lambda, f-statistics and p-values. Using Shapiro test, normality of independent variables have been tested; and attempted to maintain normality following various procedures. Similarly, the assumption of equality of group variance has been tested by using Box's M test. The Wilk's Lambda, f-statistics, standard coefficient and scale vectors have been used to assess predictors of corporate failure. The p-values, canonical correlations (r), classification accuracies, Type-I and Type-II errors are also used as test statistics of discriminant models.

Under logistic regression analysis, the Negelkerke r-squares, the Hosmer Lemeshow test, the -2log likelihood, and Wald and Chi-square have been used as test statistics of the variables and models. The exp (B) (i.e. odd ratio) has been used to assess the importance of financial ratios to classify failed and non-failed companies in logistic regression analysis. The percentage, frequency, weighted mean, and rank have been used as methods of primary data analysis.

Major findings of the study

On the basis of primary and secondary data analysis, the major findings of the study have been summarized below:

- This study revealed that ratios of current assets to current liabilities (CA/CL) are found low and started to deteriorate at least three year prior to failure. Similarly, the ratios of working capital to total assets (WC/TA) of majority failed companies are negative. The working capital problem started to deteriorate at least five year prior to failure. However, it is positive and relatively stable in non-failed companies. Similarly, ratios of current liabilities to total liabilities (CL/TD), the average current assets to total assets (CA/TA) of failed companies are lower in comparison to non-failed companies, and begins to deteriorate at least five years prior to failure. Thus, liquidity positions of failed companies are found poorer than non-failed companies.
- As far as leverage ratio is concerned, it is found that totals debts of failed companies are many times higher than their assets at least five year prior to failure. The main reason for high debt ratio is continuous increase in long term debts at least five year prior to their failure due the poor equity base of failed

companies. Similarly, the average contributions of shareholders' equity to total assets (SE/TA) of failed companies are increasing negatively in last five years prior to their failure. Thus, it also concludes that failed companies are dominated by debts due to poor equity base at least five year prior to failure.

- Although, the turnover ratios of failed companies are found very low and deteriorated in last five years prior to their failure, these ratios are remained relatively stable for non-failed companies during the period. Thus, it is concluded that assets management of failed companies is poor in comparison to non-failed companies.
- Since, there is poor assets management; failed companies are unable to earn both earnings before interest and tax (EBIT) and net income after (NAT), and operating cash flows at least last five year prior to failure. However; non-failed companies could generate profit and operating cash flow from sales during the period.
- Like Ohlson (1980) and Dombolena and Khoury (1980), this study also showed that the standard deviations of liquidity, leverage, profitability and cash flow ratios are found high.
- Discriminant analysis is useful technique to discriminate failed and non-failed companies in Nepalese context. However, the discriminant classification accuracies are found higher on average data in comparison to yearly data. This study also reveals that financial ratios are inconsistent to discriminate failed and non-failed companies over the years prior to failure.
- This study developed the following discriminant model of three significant financial ratios for practical application.

$$Z = 1.069 + 1.308WC/TA – 3.086LD/TD+ 0.296SE/TA$$

- This study concludes that all companies having a Z- Score of lesser than -0.188 clearly falls into the failed group and while those companies having a Z-score -0.067 or more in non-failed groups of companies. The area between -0.188 and -0.067 will be defined the “zone of ignorance” because of the susceptibility to error classification.
- It also revealed that the ratio of working capital to total assets (WC/TA) is the most important predictor of corporate failure, which is followed by shareholder

equity to total assets (SE/TA), and long term debts to total debts (LD/TD) respectively.

- On the basis of predictive classification accuracy, this study concludes that multivariate discriminant model can discriminate failed and non-failed company at the least five year prior to failure with 85% accuracy.
- This study also revealed that logistic regression analysis is useful to classify failed and non-failed companies. Using logistic regression, this study developed the following logistic model of eight financial ratios for practical application.

  $$P = 1/[1 + \exp\{-6.82 + 2.52WC/TA + 7.73CL/TD + 0.16NS/FA - 1.38NS/TA + 10.35SE/TA - 3.59RE/TA - 2.18EBIT/TD + 2.33CF/TA\}]$$

- As far as predictive classification accuracy is concerned, this study found that logistic regression model reveals a better overall fit and yields an average correct classification of 95% accuracy in five year prior to failure.
- Under logistic regression model, the ratio of shareholders' equity to total assets (SE/TA), current liabilities to total debt (CL/TD), working capital to total assets (WC/TA), cash flow to total assets (CF/TA), fixed assets turnover (NS/FA), assets turnover (NS/TA), earnings before interest and tax to total debts (EBIT/TD) and retained earnings to total assets (RE/TA) are the important predictors of corporate failure respectively.
- On the basis of original and predictive classification accuracy, logistic analysis is found superior over multivariate discriminant analysis for prediction of corporate failure.
- On the basis of survey results, this study revealed that the ratios of current assets to current liabilities (CA/CL), working capital to net sales (NS/WC), total debts to total assets (TD/TA), net income to net sales (NI/NS), and earnings before interest and tax to tax expenses (EBIT/INT) are important predictors corporate failure respectively.
- The survey results revealed that financial executives and practitioners are found agreed with findings and conclusions of previous studies on financial ratios as predictors of corporate failure. Moreover, this study also revealed that the primary causes of corporate failure are internal factors that are supported by external factors.

8.2 Conclusion

The conclusion of this study is as follows:

The main conclusion of this study is that financial ratios of failed companies are poor that begin to deteriorate many years prior to failure. Specifically, liquidity positions of failed companies are poor that current assets to current liabilities which begin to deteriorate at least three year prior to failure. Although, the proportions of current liabilities to total debts (CL/TD) are low; the current assets are found insufficient to meet current liabilities of failed companies. Thus, it concludes that the risk of liquidity problem seems higher in failed companies during last five years.

It also concludes that assets management of failed companies is very poor. As a result; liquidity, profitability, and cash flows of failed companies begin to deteriorate at least five year prior to failure. Thus, the shareholders and cash flow of failed companies are found deteriorated at least five year prior to failure. As a result, failed companies' begin to depend up on the long term debts to meets their expenses and current liabilities. Consequently, total debts of failed companies become many times higher than their total assets at least five years prior to their failure.

This study also concludes that all financial ratios are not equally significant, and consistent overtime to classify failed and non-failed companies. However, financial ratios possess some quality of predicting corporate failure, and also depend on methods of data analysis. If financial data are available, discriminant and logistics analysis can classify failed and non-failed companies as early as at least five year prior to their failure.

8.3 Implications of the study

The following recommendation and implications have been made in this study.

- The study observed that liquidity of failed company is very poor that starts to deteriorate many years prior to failure. Thus, it is suggested that a firm should maintain sufficient level of working capital to meet its liabilities to avoid chances of failure.

- This study also revealed that there are poor shareholders equity bases of failed companies. Consequently, total debts of failed companies are many times higher than total assets. Thus, it is recommended that a firm should maintain acceptable level of long term debts to minimize chances of bankruptcy.

- This study also revealed that failed companies are unable to generate profits and cash flows since many years prior to failure. The main reason for poor profitability and cash flow is poor assets management of failed companies. Thus, it is suggested that a business should manage its assets effectively and efficiently to generate sufficient revenues to earn profit and cash flow for success.

- This study evidenced that the predictive power of financial ratios are inconsistent over time, and also depends on methods of analysis. Hence, this study recommends that a firm should to observe many financial ratios of a firm continuously to ensure that a firm is not approaching towards failure.

- It is also found that many failed companies have been operating with inefficiency and ineffectiveness since last many years prior to failure. Thus, it is suggested to the government and other stakeholders for the establishment of an agency for continuous monitoring, and supervision of financial positions of business firms for efficient and effective utilization of available resources to minimize the risk of failure.

- Since the conclusions of the study are based on listed companies and public enterprises; further study can be extended in the area of particular sector like small sized firms, and unincorporated enterprises, where the incident of failure is greater than large enterprises.

- Although, financial ratios are useful to classify failed and non-failed companies; non-financial and macro-economic variables may be also contributed in corporate failure. Thus, it also recommended that further study can be made by incorporating macro-economic and non-financial variables to improve classification accuracies in prediction of corporate failure in future.

- It may also be an issue on reliability of financial statement information especially for those companies approaching failure. Future study may, therefore, be more useful to incorporate market driven variables, which can be observed more frequently than accounting data, and that are generally less subject to manipulation.

- In this study, the conclusions have been drawn on the basis of responses of respondents that represents; public enterprises and listed companies. Thus, it would be more worthwhile to incorporate the opinion, and views of respondents from customers, regulating authorities, employees of dissolved or disinvested or liquidated companies in future studies.

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Appendix-I

Disinvested and Liquidated Public Enterprises

SN	Name of companies	Year of Disinvestment	Privatization Process
1	Bhrikuti Papers Factory	1992	Assets sales
2	Harisiddhi Bricks and Tile Factory Ltd	1992	Assets sales
3	Bansbari Leather Shoes Ltd	1992	Assets sales
4	Motion Pictures Development Co Ltd	1993	Share Disinvestment
5	Balaju Textile Industry	1993	Share Disinvestment
6	Raw Hide Collection and Sales Center	1993	Share Disinvestment
7	Nepal Bitumen and Barrel Co Ltd	1994	Share Disinvestment
8	Nepal Lube Oil Ltd	1994	Share Disinvestment
9	Nepal Jute Development and Trading Co Ltd	1993	Liquidation
10	Tobacco Development Co Ltd.	1994	Liquidation
11	Nepal Metal Co. Ltd	1996	Share Disinvestment
12	Raghupati Jute Mills Ltd	1996	Share Disinvestment
13	Nepal Bank Ltd	1997	Share Disinvestment
14	Agriculture Project Service Center	2001	Liquidation
15	Nepal Tea Development Corporation	2000	Share Disinvestment
16	Biratnagar Jute Mills	2002	Share Disinvestment
17	Himal Cement Industry Ltd	2002	Liquidation
18	Cottage Handicraft Sales Emporium	2002	Liquidation
19	Nepal Coal Ltd	2002	Liquidation
20	Hetauda Textile Ltd	2002	Liquidation
21	Nepal Transport Corporation	2002	Dissolved
22	Butwal Power Ltd	2003	Share Disinvestment
23	Birgunj Sugar Factory Ltd	2003	Liquidation
24	Agriculture Tools factory Ltd	2003	Liquidation
25	Bhaktpur Bricks Factory Ltd	2004	Assets sales/renting out
26	Lumbini Sugar Mills Ltd	2006	Assets sales/renting out
27	Nepal Rosin and Turpentine Ltd	2006	Assets sales/renting out
28	Agriculture Lime Industry Ltd	2006	Liquidation
29	Nepal Drilling Company	2006	Liquidation
30	Nepal Telecommunication Co Ltd.	2008	Share Sale

Source: Economic Survey 2010, Ministry of Finance pp160-161

Appendix-II

List of Public Enterprise

S.N	Name of Public enterprises	Remarks
1	Dairy Development Corporation	
2	Herbs Production and Processing Company Ltd.	
3	Hetauda Cement Industry Ltd.	
4	Janakpur Cigarette Factory Ltd	Manufacturing Sector
5	Nepal Drugs Ltd	
6	Udayapur Cement Industry Ltd	
7	Nepal Orient Magnesite Pvt. Ltd	
8	Agricultural Inputs Company Ltd	
9	National Seed Company Ltd	
10	National Trading Corporation Ltd	Trading Sector
11	Nepal Food Corporation	
12	Nepal Oil Corporation Ltd	
13	The Timber Corporation of Nepal Ltd	
14	Industrial District Management Ltd	
15	National Construction Company Nepal Ltd	
16	Nepal Transit and Warehouse Company Ltd	
17	Nepal Engineering Consultancy Service Centre Ltd.	
18	Nepal Airlines Corporation	
19	National Productivity and Economic Development Centre Ltd	
20	Civil Aviation Authority of Nepal	
21	Cultural Corporation	
22	Gorkhapatra Corporation	
23	Janak Education Materials Centre Ltd	
24	Nepal Television	
25	Rural Housing Company Ltd.	Social Sector
26	Public Utility Sector	
27	Nepal Water Supply Corporation	
28	Nepal Electricity Authority	
29	Nepal Telecom Ltd.	
30	Agricultural Development Bank Ltd.	
31	Rastriya Beema Sansthan (Life/Non-life)	
32	NIDC Development Bank	
33	Rastriya Banijya Bank Ltd.	
34	Deposit and Credit Guarantee Corporation Ltd.	Financial Sector
35	Nepal Housing Development Finance Company Ltd.	
36	Nepal Stock Exchange Ltd.	
37	Citizen Investment Trust	
38	Hydroelectricity Investment & Development Company Ltd.	

Appendix - III

Financial Ratios and Corporate Failure – A Case of Nepal

Respondent's profile

Name of Respondent (Optional) :

Name of Company and Department :

Position and years of experience :

Academic qualification :

Q.1. Do you think that financial analysis is important for a firm? Please give a tick mark in appropriate answer.

Yes [……] No [……] Don't Know [……]

Q.2. In your company, how often do you compute financial ratios? Please give a tick in appropriate answer.

Never [……] Seldom [……] Monthly [……]

Quarterly [……] Yearly [……] If any other [……]

Q.3. In your company, who is responsible for financial analysis of company? Please circle in appropriate answer.

Chairman/President [……]

General Manager (CEO) [……]

Finance Manager/Chief Accountant/CFO [……]

Internal Auditors [……]

Financial Analyst/Consultants [……]

Others if any …… [……]

Q.4. In financial analysis, which is the following statistical method/technique(s) do you use in your firm? Please tick in appropriate answer.

Univariate analysis (Single ratio individually) […….]

Multivariate Discriminant analysis […….]

Logistic regression analysis […….]

Linear regression […….]

Others if any specify …… […….]

Q.5. What types of statistical programs/soft-wares do you use in financial analysis? Please tick in appropriate answer.

Simple excels	[…….]
Accounting soft-wares	[…….]
Computer simulations	[…….]
Statistical softwares	[…….]
Others if any …….	[…….]

Q.6. In your opinion, which of the following **financial ratios** possesses high predictive power in corporate failure prediction context. Please **Rank 1** for the ratio with very high predictive power and so on.

Group of ratios	Rank
Liquidity ratios	[…….]
Financial leverage ratios	[…….]
Profitability ratios	[…….]
Activity/turnover ratios	[…….]
Cash flow based ratios	[…….]
Other if any ……..	[…….]

Q.7. In your opinion, which of the following **leverage ratios** can predict the corporate failure of a firm? Please, rate seven (7) to the ratio with high predictive power and 1(one) with low predictive power.

	Predictive Power						
Ratios	**High ……**						**Low**
EBIT to interests (EBIT/INT)	7	6	5	4	3	2	1
Total debt to total assets (TD/TA)	7	6	5	4	3	2	1
Shareholders' equity to total assets (SE/TA)	7	6	5	4	3	2	1
Retained earnings to total assets (RE/TA)	7	6	5	4	3	2	1
Long term debt to total debt (LD/TD)	7	6	5	4	3	2	1
Others if any	7	6	5	4	3	2	1

Q.8 The operating cash flow plays very important role in business. In your opinion, which of the following **Cash flow Ratios** can you rate relatively importance in corporate failure prediction. Please give tick mark on seven (7) to the ratio with high predictive power and one (1) to the ratio with the least predictive power.

	Predictive Power						
Ratios	**High ……**						**Low**
Cash flow to net sales (CF/NS)	7	6	5	4	3	2	1
Cash flow to total assets (CF/TA)	7	6	5	4	3	2	1
Cash flow to current liabilities (CF/CL)	7	6	5	4	3	2	1
Cash flow to total debts (CF/TD)	7	6	5	4	3	2	1
Others if any	7	6	5	4	3	2	1

Q.9. **Profitability ratios** are important predictors of corporate failure of a firm. Which of the following profitability ratios do possess high predictive power in failure prediction context?

Please rate seven (7) for very important ratio and one (1) for the least important.

	Predictive Power						
Ratios	**High ……**						**Low**
EBIT to total assets (EBIT/TA)	7	6	5	4	3	2	1
Net income to sales (NI/NS)	7	6	5	4	3	2	1
EBIT to total debts (EBIT/TD)	7	6	5	4	3	2	1
Net income to total assets (NI/TA)	7	6	5	4	3	2	1
Others if any	7	6	5	4	3	2	1

Q.10. **Assets management (activity) ratios** measure the utilization rate of assets of a firm. Which of the following activity ratios can best predict the corporate failure of firm? Please give tick mark on seven (7) to the ratio with high predictive power and 1 (one) to the ratio with the least predictive power.

	Predictive Power						
Ratios	**High ……**						**Low**
Net sales to working capital (NS/WC)	7	6	5	4	3	2	1
Net sales to current assets (NS/CA)	7	6	5	4	3	2	1
Net sales to total assets (NS/TA)	7	6	5	4	3	2	1
Net sales to fixed assets (NS/FA)	7	6	5	4	3	2	1
Others if any	7	6	5	4	3	2	1

Q.11. Liquidity position of business is important in a firm. In your opinion, which of the following **liquidity ratios** are relatively important in failure prediction context? Please give tick mark on seven (7) to the ratio with high predictive power and one (1) to the ratio with the least predictive power.

	Predictive Power						
Ratios	**High ……**						**Low**
Current assets to current liabilities(CA/CL)	7	6	5	4	3	2	1
Working capital to total assets (WC/TA)	7	6	5	4	3	2	1
Current assets to total assets (CA/TA)	7	6	5	4	3	2	1
Current liabilities to total liabilities (CL/TD)	7	6	5	4	3	2	1
Others if any	7	6	5	4	3	2	1

Q.12. The study on corporate failure has been being carried out since 1966. The following statements are the statements of the major findings and conclusions of previous studies in abroad. Do agree or disagree that these findings? Please give tick mark on seven (7) for strongly agree and one (1) for strongly disagree and so on.

Statements	**General**
Financial ratios are useful to predict corporate failure/bankruptcy	[…….]
Financial ratios begin to deteriorate at least three year prior to failure	[…….]
Financial ratio can detect the early warning signal of corporate failure	[…….]
There is no consistency on predictive power of financial ratio(s).	[…….]
There are differences of ratios between failed and non-failed firms.	[…….]
Predictive power of a ratio differ when it is used with two or more ratios	[…….]
The predictive power of ratio is not consistent over the year.	[…….]
Leverage	
There is high standard deviation of financial ratios of failed firms.	[…….]
Debt equity ratio of a successful firm's is lower than failed firms.	[…….]
High debt or debt ratio increases the probability of failure of a firm.	[…….]
Default on payment of debt installment is a symptom of failure.	[…….]
Highly profit making firms do not use debts	[…….]
Liquidity	
Liquidity of failed firm is poorer as compared to non-failed ones.	[…….]

Profitability:

Profitability of failed company is lower than that of non-failed company […….]

Size

The small sized business has more chances of failure than large ones. […….]

Cash flow

Cash flow of failed firm is lower than cash flow non-failed firms. […….]

Market based

Market price fluctuation is a symptom of success or failure of a firm. […….]

Other s if any ……. […….]

Q.13. How for the following factors are playing role in failure of a company? Please rate seven (7) for very important and one (1) for least important).

	High……Low
External factors	**7 6 5 4 3 2 1**
1. General economic factors	……...
2. Political Interference	……...
3. Rapid Technological changes	……...
4. Government policy	……...
5. High market competition	……...
6. High debt	……...
7. Poor industrial relations	……...
Internal factors	
1. Weak managerial leadership	……...
2. Wrong attitude and culture of managers	……...
3. High operation costs	……...
4. Poor strategy and policy	……...
5. Inefficiency and overstaffing	……...
6. Ineffective planning, control and supervisions	……..…
7. Ineffective communications systems	……...

Appendix-IV

Tests of Normality

Financial ratios	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CA/CL	0.33	516.00	0.00	0.26	516.00	0.00
WC/TA	0.16	516.00	0.00	0.78	516.00	0.00
CA/TA	0.08	516.00	0.00	0.95	516.00	0.00
CL/TD	0.20	516.00	0.00	0.87	516.00	0.00
NS/WC	0.36	516.00	0.00	0.23	516.00	0.00
NS/CA	0.12	516.00	0.00	0.91	516.00	0.00
NS/FA	0.38	516.00	0.00	0.27	516.00	0.00
NS/TA	0.16	516.00	0.00	0.75	516.00	0.00
EBIT/INT	0.50	516.00	0.00	0.21	516.00	0.00
TDTA	0.20	516.00	0.00	0.71	516.00	0.00
LD/TD	0.22	516.00	0.00	0.85	516.00	0.00
SE/TA	0.21	516.00	0.00	0.76	516.00	0.00
RE/TA	0.20	516.00	0.00	0.73	516.00	0.00
EBIT/TA	0.25	516.00	0.00	0.61	516.00	0.00
EBIT/TD	0.26	516.00	0.00	0.57	516.00	0.00
NI/NS	0.43	516.00	0.00	0.16	516.00	0.00
NI/TA	0.22	516.00	0.00	0.61	516.00	0.00
CF/NS	0.42	516.00	0.00	0.19	516.00	0.00
CF/CL	0.23	516.00	0.00	0.54	516.00	0.00
CF/TA	0.23	516.00	0.00	0.61	516.00	0.00
CF/TD	0.24	516.00	0.00	0.59	516.00	0.00

a. Lilliefors Significance Correction

Appendix-V

Financial ratios of failed and non-failed companies

S.N.	Companies	YR	P-Y	Group	CACL	WCTA	CATA	CLTD	NSWC	NSCA	NSFA	NSTA	EBITINT	TDTA	LDTD	SETA	RETA	EBITTA	EBITTD	NINS	NITA	CFNS	CFCL	CFTA	CFTD
1	Jyoti Spinning Mills Ltd.	1997	11	0	0.90	-0.04	0.33	0.37	-17.83	2.01	1.00	0.66	0.85	0.98	0.63	0.02	-0.13	0.11	0.12	-0.03	-0.02	0.03	0.05	0.02	0.02
2	Jyoti Spinning Mills Ltd.	1998	10	0	0.62	-0.17	0.28	0.42	-3.54	2.17	0.80	0.61	0.30	1.08	0.58	-0.07	-0.23	0.04	0.04	-0.16	-0.10	-0.09	-0.12	-0.05	-0.05
3	Jyoti Spinning Mills Ltd.	1999	9	0	0.58	-0.22	0.31	0.47	-2.66	1.95	0.90	0.60	0.68	1.12	0.53	-0.10	-0.28	0.09	0.08	-0.07	-0.04	0.00	0.00	0.00	0.00
4	Jyoti Spinning Mills Ltd.	2000	8	0	0.59	-0.23	0.33	0.51	-3.27	2.28	1.10	0.74	1.14	1.10	0.49	-0.09	-0.25	0.15	0.14	0.02	0.02	0.08	0.11	0.06	0.06
5	Jyoti Spinning Mills Ltd.	2001	7	0	0.58	-0.24	0.34	0.52	-3.28	2.36	1.20	0.79	0.71	1.12	0.48	-0.10	-0.26	0.09	0.08	-0.04	-0.04	0.01	0.02	0.01	0.01
6	Jyoti Spinning Mills Ltd.	2002	6	0	0.73	-0.11	0.31	0.38	-7.27	2.69	1.20	0.83	0.52	1.10	0.62	-0.15	-0.34	0.07	0.06	-0.08	-0.06	-0.02	-0.03	-0.01	-0.01
7	Jyoti Spinning Mills Ltd.	2003	5	0	0.96	-0.01	0.34	0.32	-71.79	2.74	1.45	0.95	0.94	1.11	0.68	-0.11	-0.36	0.10	0.09	-0.01	-0.01	0.05	0.13	0.05	0.04
8	Jyoti Spinning Mills Ltd.	2004	4	0	1.25	0.07	0.37	0.27	13.11	2.58	1.51	0.95	1.15	1.11	0.73	-0.11	-0.37	0.09	0.08	0.01	0.01	0.07	0.22	0.07	0.06
9	Jyoti Spinning Mills Ltd.	2005	3	0	1.89	0.19	0.39	0.21	6.22	2.94	1.90	1.15	1.42	1.00	0.79	0.00	-0.23	0.12	0.12	0.03	0.03	0.08	0.44	0.09	0.09
10	Jyoti Spinning Mills Ltd.	2006	2	0	1.59	0.15	0.39	0.22	7.04	2.62	1.68	1.02	0.30	1.09	0.78	0.05	-0.19	0.02	0.03	-0.05	-0.06	0.00	0.02	0.00	0.00
11	Jyoti Spinning Mills Ltd.	2007	1	0	1.27	0.07	0.35	0.23	16.33	3.44	1.87	1.21	-0.26	1.21	0.77	-0.06	-0.33	-0.02	-0.02	-0.10	-0.12	-0.04	-0.18	-0.05	-0.05
12	Gorakhakali Rubber Udhyog Ltd	1998	11	0	1.88	0.08	0.16	0.07	8.24	3.85	0.70	0.62	0.18	1.30	0.93	-0.04	-0.35	0.03	0.03	-0.24	-0.15	-0.13	-0.94	-0.08	-0.06
13	Gorakhakali Rubber Udhyog Ltd	1999	10	0	2.11	0.09	0.17	0.06	6.62	3.48	0.70	0.58	0.28	1.41	0.94	-0.07	-0.42	0.02	0.02	-0.11	-0.06	0.02	0.13	0.01	0.01
14	Gorakhakali Rubber Udhyog Ltd	2000	9	0	0.56	-0.16	0.21	0.32	-3.41	2.65	0.70	0.55	0.05	1.14	0.68	0.14	-0.45	0.01	0.01	-0.19	-0.11	-0.09	-0.14	-0.05	-0.04
15	Gorakhakali Rubber Udhyog Ltd	2001	8	0	0.42	-0.25	0.18	0.33	-2.49	3.42	0.80	0.63	-0.52	1.30	0.67	0.01	-0.66	-0.06	-0.04	-0.26	-0.16	-0.15	-0.22	-0.09	-0.07
16	Gorakhakali Rubber Udhyog Ltd	2002	7	0	0.34	-0.34	0.17	0.36	-1.84	3.60	0.80	0.63	-0.18	1.45	0.64	-0.07	-0.83	-0.02	-0.01	-0.19	-0.12	-0.08	-0.10	-0.05	-0.04
17	Gorakhakali Rubber Udhyog Ltd	2003	6	0	0.39	-0.27	0.17	0.32	-2.67	4.14	0.90	0.72	-7.59	1.40	0.68	-0.16	-1.00	-0.79	-0.57	-1.25	-0.90	-1.15	-1.87	-0.83	-0.59
18	Gorakhakali Rubber Udhyog Ltd	2004	5	0	0.39	-0.27	0.17	0.32	-2.67	4.14	0.87	0.72	-7.59	1.40	0.68	-0.40	-1.00	-0.79	-0.57	-1.25	-0.90	-1.15	-1.87	-0.83	-0.59
19	Gorakhakali Rubber Udhyog Ltd	2005	4	0	0.22	-0.51	0.14	0.38	-1.36	4.92	0.81	0.70	-8.75	1.70	0.62	-0.70	-1.26	-0.99	-0.58	-1.58	-1.10	-1.48	-1.58	-1.04	-0.61
20	Gorakhakali Rubber Udhyog Ltd	2006	3	0	0.51	-0.36	0.37	0.73	-1.86	1.79	1.06	0.67	-0.27	1.00	0.27	0.00	-1.30	-0.03	-0.03	-0.20	-0.14	-0.13	-0.12	-0.09	-0.09
21	Gorakhakali Rubber Udhyog Ltd	2007	2	0	0.51	-0.41	0.43	0.49	-1.62	1.56	1.18	0.67	-0.34	1.72	0.51	-0.72	-1.47	-0.03	-0.02	-0.19	-0.13	-0.12	-0.10	-0.08	-0.05
22	Gorakhakali Rubber Udhyog Ltd	2008	1	0	0.46	-0.52	0.45	0.52	-1.03	1.20	0.98	0.54	-0.35	1.89	0.48	-0.89	-1.66	-0.04	-0.02	-0.25	-0.14	-0.18	-0.10	-0.09	-0.05
23	Birat Shoe Company Ltd.	1998	11	0	1.37	0.20	0.74	0.69	1.42	0.38	1.10	0.28	-0.14	0.78	0.31	0.38	-0.01	-0.01	-0.02	-0.36	-0.10	-0.30	-0.16	-0.08	-0.11
24	Birat Shoe Company Ltd.	1999	10	0	0.82	-0.15	0.71	0.76	-1.07	0.23	0.60	0.16	-1.65	1.13	0.24	-0.04	-0.39	-0.23	-0.21	-2.26	-0.37	-2.15	-0.41	-0.35	-0.31

25	Birat Shoe Company Ltd.	2000	9	0	0.66	-0.38	0.75	0.80	-0.60	0.30	0.90	0.23	-0.60	1.41	0.20	-0.24	-0.64	-0.11	-0.08	-1.31	-0.30	-1.25	-0.25	-0.28	-0.20
26	Birat Shoe Company Ltd.	2001	8	0	0.77	-0.16	0.55	0.56	-1.41	0.41	0.50	0.22	-0.61	1.26	0.44	-0.16	-0.42	-0.09	-0.07	-1.02	-0.23	-0.98	-0.31	-0.22	-0.17
27	Birat Shoe Company Ltd.	2002	7	0	0.57	-0.40	0.53	0.61	-0.69	0.52	0.60	0.28	-0.56	1.54	0.39	-0.31	-0.70	-0.09	-0.06	-0.94	-0.26	-0.82	-0.24	-0.23	-0.15
28	Birat Shoe Company Ltd.	2003	6	0	0.46	-0.63	0.53	0.66	-0.55	0.66	0.70	0.35	-0.35	1.74	0.34	-0.42	-0.94	-0.06	-0.04	-0.71	-0.25	-0.63	-0.19	-0.22	-0.13
29	Birat Shoe Company Ltd.	2004	5	0	0.77	-0.16	0.55	0.56	-1.41	0.41	0.49	0.22	-0.61	1.26	0.44	-0.26	-0.42	-0.09	-0.07	-1.02	-0.23	-0.98	-0.31	-0.22	-0.17
30	Birat Shoe Company Ltd.	2005	4	0	0.57	-0.40	0.53	0.61	-0.69	0.52	0.59	0.28	-0.56	1.54	0.39	-0.54	-0.70	-0.09	-0.06	-0.94	-0.26	-0.82	-0.24	-0.23	-0.15
31	Birat Shoe Company Ltd.	2006	3	0	0.46	-0.63	0.53	0.66	-0.55	0.66	0.74	0.35	-0.35	1.74	0.34	-0.74	-0.94	-0.06	-0.04	-0.71	-0.25	-0.63	-0.19	-0.22	-0.13
32	Birat Shoe Company Ltd.	2007	2	0	0.42	-0.79	0.58	0.73	-0.42	0.58	0.80	0.33	-5.27	1.88	0.27	-0.88	-1.08	-1.05	-0.56	-3.73	-1.25	-3.66	-0.89	-1.22	-0.65
33	Birat Shoe Company Ltd.	2008	1	0	0.42	-0.90	0.64	0.77	-0.48	0.67	1.18	0.43	-6.77	2.00	0.23	-1.00	-1.16	-1.14	-0.57	-3.05	-1.31	-3.00	-0.84	-1.29	-0.64
34	Nepal Banaspati Ghee Udhyog Ltd.	1998	11	0	5.73	0.64	0.78	0.13	2.22	1.83	6.50	1.43	0.31	1.08	0.87	0.67	0.54	0.04	0.04	-0.06	-0.09	-0.06	-0.65	-0.09	-0.08
35	Nepal Banaspati Ghee Udhyog Ltd.	1999	10	0	3.62	0.61	0.84	0.18	2.23	1.62	8.40	1.35	-0.16	1.31	0.82	0.44	0.43	-0.02	-0.02	-0.11	-0.15	-0.11	-0.65	-0.15	-0.11
36	Nepal Banaspati Ghee Udhyog Ltd.	2000	9	0	0.62	-0.55	0.89	0.54	-1.41	0.86	7.00	0.77	-0.99	2.66	0.46	0.16	0.33	-0.13	-0.05	-0.33	-0.25	-0.33	-0.18	-0.25	-0.09
37	Nepal Banaspati Ghee Udhyog Ltd.	2001	8	0	0.60	-0.62	0.92	1.00	-1.72	1.17	12.60	1.07	-0.23	1.54	0.00	0.21	0.23	-0.04	-0.02	-0.18	-0.19	-0.18	-0.13	-0.19	-0.13
38	Nepal Banaspati Ghee Udhyog Ltd.	2002	7	0	0.55	-0.74	0.90	1.00	-2.65	2.18	18.90	1.96	0.46	1.64	0.00	0.21	0.25	0.05	0.03	-0.03	-0.06	-0.03	-0.04	-0.06	-0.04
39	Nepal Banaspati Ghee Udhyog Ltd.	2003	6	0	0.43	-1.09	0.81	0.98	-1.09	1.47	6.20	1.19	-0.40	1.94	0.02	0.20	0.28	-0.06	-0.03	-0.19	-0.22	-0.18	-0.11	-0.22	-0.11
40	Nepal Banaspati Ghee Udhyog Ltd.	2004	5	0	0.55	-0.74	0.90	1.00	-2.65	2.18	18.95	1.96	0.46	1.64	0.00	-0.64	0.25	0.05	0.03	-0.03	-0.06	-0.03	-0.04	-0.06	-0.04
41	Nepal Banaspati Ghee Udhyog Ltd.	2005	4	0	0.43	-1.09	0.81	0.98	-1.09	1.47	6.20	1.19	-0.40	1.94	0.02	-0.94	0.28	-0.06	-0.03	-0.19	-0.22	-0.18	-0.11	-0.22	-0.11
42	Nepal Banaspati Ghee Udhyog Ltd.	2006	3	0	0.26	-2.02	0.71	0.97	-0.46	1.29	3.21	0.92	-0.31	2.81	0.03	-1.81	0.44	-0.08	-0.03	-0.37	-0.34	-0.34	-0.12	-0.32	-0.11
43	Nepal Banaspati Ghee Udhyog Ltd.	2007	2	0	0.21	-2.71	0.71	1.00	0.00	0.00	0.01	0.00	-4.46	3.42	0.00	-2.42	-2.60	-0.09	-0.03	-66.6	-0.11	-56.5	-0.03	-0.09	-0.03
44	Nepal Banaspati Ghee Udhyog Ltd.	2008	1	0	0.21	-2.75	0.73	1.00	0.00	0.00	0.00	0.00	0.29	3.48	0.00	-2.48	-2.66	0.02	0.01	-122	-0.04	-83.1	-0.01	-0.03	-0.01
45	Fleur Himalayan Ltd.	2000	9	0	0.50	-0.39	0.39	0.58	-0.63	0.62	0.40	0.25	-0.84	1.34	0.42	-0.02	-0.47	-0.07	-0.05	-0.64	-0.16	-0.64	-0.20	-0.16	-0.12
46	Fleur Himalayan Ltd.	2001	8	0	0.39	-0.58	0.37	0.62	-0.64	1.00	0.60	0.37	-0.87	1.55	0.38	-0.14	-0.69	-0.09	-0.06	-0.51	-0.19	-0.51	-0.20	-0.19	-0.12
47	Fleur Himalayan Ltd.	2002	7	0	0.34	-0.76	0.39	1.00	-0.35	0.68	0.40	0.27	0.69	1.16	0.00	-0.46	-1.03	0.68	0.59	-1.14	-0.30	-1.09	-0.25	-0.29	-0.25
48	Fleur Himalayan Ltd.	2003	6	0	0.32	-1.10	0.51	1.00	-0.39	0.85	0.90	0.43	-0.50	1.61	0.00	-0.38	-1.05	-0.04	-0.03	-0.30	-0.13	-0.30	-0.08	-0.13	-0.08
49	Fleur Himalayan Ltd.	2004	5	0	0.34	-1.08	0.56	1.00	-0.29	0.55	0.72	0.31	0.44	1.65	0.00	-0.65	-1.07	0.05	0.03	-0.22	-0.07	-0.22	-0.04	-0.07	-0.04
50	Fleur Himalayan Ltd.	2005	4	0	0.30	-1.33	0.57	1.00	-0.31	0.72	0.96	0.41	-0.77	1.90	0.00	-0.90	-1.32	-0.05	-0.03	-0.27	-0.11	-0.26	-0.06	-0.11	-0.06
51	Fleur Himalayan Ltd.	2006	3	0	0.30	-1.42	0.60	1.00	-0.38	0.90	1.34	0.54	-2.09	2.02	0.00	-1.02	-1.45	-0.10	-0.05	-0.27	-0.15	-0.27	-0.07	-0.14	-0.07
52	Fleur Himalayan Ltd.	2007	2	0	0.29	-1.54	0.62	1.00	-0.42	1.05	1.68	0.65	-2.25	2.15	0.00	-1.15	-1.60	-0.10	-0.05	-0.22	-0.14	-0.22	-0.07	-0.14	-0.07
53	Fleur Himalayan Ltd.	2008	1	0	0.33	-1.36	0.65	1.00	-0.48	1.00	1.89	0.65	0.70	2.01	0.00	-1.01	-1.39	0.04	0.02	-0.02	-0.02	0.00	0.00	0.00	0.00
54	Arun Vanaspati Udhyog Ltd	1998	11	0	1.84	0.33	0.71	0.35	3.80	1.74	4.30	1.24	-2.26	1.10	0.65	-0.09	-0.31	-0.22	-0.20	-0.25	-0.31	-0.24	-0.77	-0.30	-0.27
55	Arun Vanaspati Udhyog Ltd	1999	10	0	2.06	0.33	0.64	0.28	4.93	2.54	4.50	1.62	-1.91	1.09	0.72	-0.08	-0.33	-0.22	-0.20	-0.20	-0.33	-0.18	-0.94	-0.29	-0.26
56	Arun Vanaspati Udhyog Ltd	2000	9	0	0.79	-0.18	0.69	0.68	-5.73	1.54	3.40	1.06	-0.56	1.28	0.32	-0.22	-0.48	-0.07	-0.06	-0.19	-0.20	-0.17	-0.21	-0.18	-0.14
57	Arun Vanaspati Udhyog Ltd	2001	8	0	0.83	-0.15	0.74	0.72	-7.92	1.57	4.50	1.16	1.04	1.23	0.28	-0.19	-0.41	0.11	0.09	0.00	0.00	0.02	0.02	0.02	0.02
58	Arun Vanaspati Udhyog Ltd	2002	7	0	0.81	-0.17	0.71	0.75	-11.02	2.61	6.40	1.84	0.67	1.17	0.25	-0.15	-0.33	0.08	0.07	-0.02	-0.04	0.00	-0.01	-0.01	-0.01

59	Arun Vanaspati Udhyog Ltd	2003	6	0	0.79	-0.18	0.70	0.75	-8.07	2.10	5.10	1.47	1.01	1.17	0.25	-0.15	-0.33	0.12	0.10	0.00	0.00	0.03	0.04	0.04	0.03
60	Arun Vanaspati Udhyog Ltd	2004	5	0	0.79	-0.18	0.70	0.75	-8.07	2.10	5.09	1.47	1.01	1.17	0.25	-0.17	-0.33	0.12	0.10	0.00	0.00	0.03	0.04	0.04	0.03
61	Arun Vanaspati Udhyog Ltd	2005	4	0	0.86	-0.13	0.80	0.83	-9.14	1.48	5.96	1.18	1.03	1.11	0.17	-0.11	-0.21	0.06	0.06	0.00	0.00	0.01	0.02	0.02	0.02
62	Arun Vanaspati Udhyog Ltd	2006	3	0	0.89	-0.09	0.73	0.56	-12.81	1.57	4.35	1.15	-1.00	1.45	0.44	-0.45	-0.59	-0.08	-0.06	-0.14	-0.17	-0.13	-0.18	-0.14	-0.10
63	Arun Vanaspati Udhyog Ltd	2007	2	0	0.53	-0.60	0.67	0.58	-1.89	1.69	3.39	1.13	-3.72	2.16	0.42	-1.16	-1.35	-0.42	-0.19	-0.47	-0.53	-0.45	-0.40	-0.50	-0.23
64	Arun Vanaspati Udhyog Ltd	2008	1	0	0.73	-0.15	0.39	0.15	-6.27	2.36	1.50	0.92	-0.54	3.64	0.85	-2.64	-3.03	-0.10	-0.03	-0.30	-0.27	-0.23	-0.39	-0.21	-0.06
65	Sri Bhrikuti Pulp & Paper Nepal Ltd.	1999	10	0	0.42	-0.23	0.16	0.41	-1.48	2.08	0.40	0.34	-0.21	0.94	0.59	0.35	0.00	-0.02	-0.02	-0.38	-0.13	-0.35	-0.31	-0.12	-0.13
66	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2000	9	0	0.34	-0.31	0.16	0.46	-1.19	2.33	0.40	0.37	0.18	1.03	0.54	-0.03	-0.36	0.02	0.02	-0.23	-0.08	-0.20	-0.16	-0.07	-0.07
67	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2001	8	0	0.49	-0.18	0.17	0.32	-2.84	3.01	0.60	0.52	0.27	1.12	0.68	-0.09	-0.44	0.02	0.02	-0.12	-0.06	0.01	0.01	0.00	0.00
68	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2002	7	0	0.54	-0.18	0.21	0.32	-2.68	2.30	0.60	0.48	-0.08	1.22	0.68	-0.18	-0.58	-0.01	-0.01	-0.19	-0.09	-0.05	-0.06	-0.02	-0.02
69	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2003	6	0	0.54	-0.21	0.25	0.35	-2.84	2.45	0.80	0.60	0.24	1.29	0.65	-0.22	-0.66	0.02	0.02	-0.11	-0.07	0.01	0.01	0.00	0.00
70	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2004	5	0	0.54	-0.18	0.21	0.32	-2.68	2.30	0.61	0.48	-0.08	1.22	0.68	-0.22	-0.58	-0.01	-0.01	-0.19	-0.09	-0.05	-0.06	-0.02	-0.02
71	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2005	4	0	0.54	-0.21	0.25	0.35	-2.84	2.45	0.80	0.60	0.24	1.29	0.65	-0.29	-0.66	0.02	0.02	-0.11	-0.07	0.01	0.01	0.00	0.00
72	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2006	3	0	0.54	-0.27	0.32	0.26	-2.50	2.12	0.98	0.67	-0.41	2.22	0.74	-1.22	1.12	-0.04	-0.02	-0.19	-0.13	-0.06	-0.07	-0.04	-0.02
73	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2007	2	0	0.56	-0.26	0.32	0.24	-3.36	2.66	1.27	0.86	-0.11	2.45	0.76	-1.45	1.35	-0.01	0.00	-0.12	-0.11	-0.03	-0.04	-0.02	-0.01
74	Sri Bhrikuti Pulp & Paper Nepal Ltd.	2008	1	0	0.47	-0.37	0.33	0.25	-2.44	2.72	1.36	0.91	-0.82	2.79	0.75	-1.79	1.68	-0.08	-0.03	-0.19	-0.17	-0.09	-0.11	-0.08	-0.03
75	Hetauda Textle Udhyog Limited	2001	6	0	1.00	0.00	0.88	0.52	-22.35	0.08	0.58	0.07	-4.96	1.72	0.48	-0.73	-1.01	-0.26	-0.15	-4.61	-0.31	-4.52	-0.35	-0.31	-0.18
76	Hetauda Textle Udhyog Limited	2002	5	0	1.18	0.13	0.85	0.40	0.19	0.03	0.17	0.02	0.72	1.81	0.60	-0.83	-1.34	0.05	0.03	-0.79	-0.02	-0.49	-0.02	-0.01	-0.01
77	Hetauda Textle Udhyog Limited	2003	4	0	1.17	0.12	0.85	0.40	0.07	0.01	0.06	0.01	0.91	1.82	0.60	-0.84	-1.35	0.06	0.03	-0.77	-0.01	0.13	0.00	0.00	0.00
78	Hetauda Textle Udhyog Limited	2004	3	0	1.12	0.09	0.84	0.39	0.29	0.03	0.16	0.03	0.40	1.94	0.61	-0.95	-1.50	0.03	0.02	-1.75	-0.04	-1.44	-0.05	-0.04	-0.02
79	Hetauda Textle Udhyog Limited	2005	2	0	0.71	-0.26	0.64	0.22	-0.02	0.01	0.01	0.00	-0.25	4.11	0.78	-3.11	-3.58	-0.04	-0.01	-51.0	-0.21	-46.6	-0.22	-0.20	-0.05
80	Hetauda Textle Udhyog Limited	2006	1	0	6.97	0.54	0.63	0.03	0.00	0.00	0.00	0.00	0.92	3.34	0.97	-2.34	-3.64	0.16	0.05	-45.1	-0.01	15.6	0.05	0.00	0.00
81	Krishi Chun Udghyog Ltd	2001	5	0	0.68	-0.32	0.67	1.00	-9.72	4.62	9.31	3.09	-13.59	0.99	0.00	-0.68	-1.73	-0.32	-0.19	-0.11	-0.34	-0.10	-0.32	-0.31	-0.19
82	Krishi Chun Udghyog Ltd	2002	4	0	0.44	-0.84	0.65	1.00	-3.37	4.37	8.01	2.83	-18.44	1.49	0.00	-1.70	-2.63	-0.57	-0.21	-0.21	-0.60	-0.20	-0.38	-0.56	-0.21
83	Krishi Chun Udghyog Ltd	2003	3	0	0.31	-1.40	0.62	1.00	-1.09	2.44	4.06	1.52	-15.16	2.03	0.00	-2.76	-3.67	-0.63	-0.17	-0.44	-0.67	-0.41	-0.31	-0.63	-0.17
84	Krishi Chun Udghyog Ltd	2004	2	0	0.83	-0.18	0.86	0.25	-1.33	0.28	1.64	0.24	-119.71	4.08	0.75	-3.61	-3.96	-2.32	-0.50	-9.87	-2.34	-9.82	-2.25	-2.32	-0.50
85	Krishi Chun Udghyog Ltd	2005	1	0	1.65	0.37	0.94	0.21	0.45	0.18	3.00	0.17	-30.49	2.66	0.79	-1.78	-1.97	-0.29	-0.10	-1.77	-0.29	-1.73	-0.50	-0.29	-0.10
86	Nepal Rosin and Terpentine Ltd	2000	5	0	3.38	0.49	0.69	0.06	1.15	0.81	1.82	0.56	-11,869	3.69	0.94	-3.57	-0.20	-0.07	-0.02	-0.13	-0.07	-0.10	-0.27	-0.05	-0.01
87	Nepal Rosin and Terpentine Ltd	2001	4	0	2.03	0.32	0.63	0.07	2.72	1.38	2.40	0.88	-27,503	4.61	0.93	-4.46	-0.47	-0.21	-0.05	-0.24	-0.21	-0.22	-0.61	-0.19	-0.04
88	Nepal Rosin and Terpentine Ltd	2002	3	0	1.76	0.31	0.71	0.10	2.00	0.86	2.14	0.61	-20,145	4.08	0.90	-3.95	-0.51	-0.13	-0.03	-0.21	-0.13	-0.19	-0.29	-0.12	-0.03
89	Nepal Rosin and Terpentine Ltd	2003	2	0	1.24	0.14	0.72	0.14	3.60	0.70	1.80	0.51	-22,523	4.25	0.86	-4.12	-0.66	-0.14	-0.03	-0.28	-0.14	-0.27	-0.23	-0.13	-0.03
90	Nepal Rosin and Terpentine Ltd	2004	1	0	1.23	0.15	0.81	0.18	1.20	0.22	0.93	0.18	-64,171	3.60	0.82	-3.55	-0.76	-0.29	-0.08	-1.62	-0.29	-1.59	-0.43	-0.28	-0.08
91	Agriculture Tools Co Ltd	1993	5	0	0.92	-0.08	0.85	0.94	-19.29	1.70	9.69	1.45	-17.71	0.98	0.06	-0.08	-0.40	-1.45	-1.35	-1.06	-1.53	-1.06	-1.65	-1.53	-1.42
92	Agriculture Tools Co Ltd	1994	4	0	0.68	-0.38	0.82	0.97	-2.37	1.09	4.86	0.89	-5.85	1.23	0.03	-0.38	-0.80	-1.05	-0.76	-1.38	-1.23	-1.37	-1.02	-1.22	-0.88

93	Agriculture Tools Co Ltd	1995	3	0	0.49	-0.83	0.80	0.96	-0.46	0.48	1.96	0.38	-2.84	1.70	0.04	-0.85	-1.33	-0.59	-0.32	-2.10	-0.80	-2.08	-0.49	-0.80	-0.43
94	Agriculture Tools Co Ltd	1996	2	0	0.37	-1.35	0.81	0.90	-0.19	0.31	1.31	0.25	-2.34	2.40	0.10	-1.61	-2.13	-0.66	-0.25	-3.75	-0.95	-3.71	-0.43	-0.94	-0.36
95	Agriculture Tools Co Ltd	1997	1	0	0.27	-2.16	0.81	0.61	-0.02	0.05	0.21	0.04	-1.39	4.85	0.39	-3.85	-2.27	-0.45	-0.09	-19	-0.77	-18.9	-0.26	-0.77	-0.16
96	Bhaktpur Brick Factory Ltd	2000	5	0	0.77	-0.25	0.83	0.74	-1.28	0.39	1.97	0.33	8.40	1.47	0.26	-0.47	-0.99	0.60	0.41	1.63	0.53	1.65	0.49	0.54	0.36
97	Bhaktpur Brick Factory Ltd	2001	4	0	0.57	-0.60	0.80	0.66	-0.91	0.69	2.85	0.55	-5.25	2.14	0.34	-1.14	-1.78	-0.47	-0.22	-1.02	-0.56	-1.01	-0.40	-0.56	-0.26
98	Bhaktpur Brick Factory Ltd	2002	3	0	0.40	-1.16	0.77	0.23	-0.70	1.06	3.61	0.81	-3.43	8.36	0.77	-7.36	-6.39	-0.42	-0.05	-0.66	-0.54	-0.65	-0.27	-0.53	-0.06
99	Bhaktpur Brick Factory Ltd	2003	2	0	0.32	-1.63	0.77	0.30	-0.23	0.49	1.71	0.38	2.47	7.88	0.70	-6.88	-6.52	0.48	0.06	0.75	0.29	0.78	0.12	0.29	0.04
100	Bhaktpur Brick Factory Ltd	2004	1	0	0.57	-0.63	0.83	0.22	-0.25	0.19	0.97	0.16	-21.74	6.53	0.78	-5.53	-5.78	-3.10	-0.47	-20.2	-3.24	-20.2	-2.22	-3.24	-0.50
101	Lumbini Sugar Factory Ltd	2001	5	0	1.89	0.23	0.48	0.21	3.90	1.83	1.74	0.88	-3.82	1.22	0.79	-0.40	-0.62	-0.20	-0.15	-0.29	-0.26	-0.24	-0.85	-0.22	-0.15
102	Lumbini Sugar Factory Ltd	2002	4	0	48.4	0.74	0.75	0.04	0.36	0.35	1.10	0.26	6.44	0.37	0.96	0.53	-0.47	0.18	0.38	0.56	0.15	0.64	10.9	0.17	0.36
103	Lumbini Sugar Factory Ltd	2003	3	0	24.8	0.71	0.74	0.05	0.69	0.67	1.92	0.49	-3.01	0.63	0.95	0.22	-0.73	-0.14	-0.18	-0.37	-0.18	-0.33	-5.52	-0.16	-0.21
104	Lumbini Sugar Factory Ltd	2004	2	0	3.17	0.35	0.50	0.14	4.64	3.18	3.32	1.60	-2.50	1.12	0.86	-0.47	-1.89	-0.30	-0.20	-0.26	-0.42	-0.24	-2.40	-0.38	-0.26
105	Lumbini Sugar Factory Ltd	2005	1	0	0.82	-0.08	0.36	0.25	-8.00	1.77	1.03	0.64	-3.54	1.77	0.75	-1.30	-3.31	-0.56	-0.24	-1.13	-0.72	-1.06	-1.54	-0.68	-0.30
106	Birgunj Sugar Factory Ltd	2000	5	0	4.72	0.48	0.61	0.15	3.19	2.51	5.24	1.53	-1.70	0.86	0.85	-0.16	-0.49	-0.17	-0.15	-0.18	-0.27	-0.16	-1.84	-0.24	-0.20
107	Birgunj Sugar Factory Ltd	2001	4	0	3.16	0.49	0.72	0.21	1.21	0.83	2.83	0.60	-2.25	1.09	0.79	-0.30	-0.52	-0.15	-0.12	-0.37	-0.22	-0.33	-0.86	-0.20	-0.15
108	Birgunj Sugar Factory Ltd	2002	3	0	1.01	0.01	0.69	0.51	184.26	1.61	4.77	1.10	-0.84	1.34	0.49	-0.59	-0.85	-0.10	-0.07	-0.21	-0.23	-0.21	-0.33	-0.23	-0.14
109	Birgunj Sugar Factory Ltd	2003	2	0	0.57	-0.43	0.57	0.47	-2.28	1.73	3.15	0.98	-2.81	2.11	0.53	-1.48	-1.88	-0.44	-0.18	-0.61	-0.59	-0.60	-0.59	-0.59	-0.24
110	Birgunj Sugar Factory Ltd	2004	1	0	0.07	-4.39	0.35	0.73	-0.03	0.40	0.31	0.14	-16.06	6.50	0.27	-6.08	-6.69	-3.50	-0.49	-26.2	-3.72	-26.1	-0.78	-3.71	-0.52
111	Nepal Herbs Products & Processing Ltd.	2005	5	0	0.69	-0.35	0.77	0.60	-2.05	0.93	3.11	0.72	0.82	1.87	0.40	-1.89	-1.31	0.04	0.01	-0.01	-0.01	0.02	0.01	0.02	0.01
112	Nepal Herbs Products & Processing Ltd.	2006	4	0	0.72	-0.32	0.80	0.62	-2.37	0.94	3.71	0.75	-0.04	1.81	0.38	-1.83	-1.25	0.00	0.00	-0.06	-0.04	-0.03	-0.02	-0.02	-0.01
113	Nepal Herbs Products & Processing Ltd.	2007	3	0	1.67	0.37	0.91	0.63	0.94	0.38	3.84	0.35	1.51	0.86	0.37	-0.37	-0.57	0.03	0.02	0.03	0.01	0.05	0.03	0.02	0.01
114	Nepal Herbs Products & Processing Ltd.	2008	2	0	1.59	0.34	0.92	0.66	0.91	0.34	3.95	0.31	-4.38	0.87	0.34	-0.42	-0.61	-0.08	-0.05	-0.30	-0.09	-0.28	-0.15	-0.09	-0.06
115	Nepal Herbs Products & Processing Ltd.	2009	1	0	0.35	-1.41	0.77	0.71	-0.78	1.43	4.71	1.10	0.84	3.09	0.29	-2.09	-2.32	0.05	0.01	-0.01	-0.01	0.01	0.01	0.01	0.00
116	Nepal Drugs Ltd	2004	5	0	0.85	-0.13	0.74	0.53	-3.90	0.66	1.99	0.49	-1.72	1.62	0.47	-0.62	-1.33	-0.17	-0.10	-0.55	-0.27	-0.52	-0.30	-0.26	-0.16
117	Nepal Drugs Ltd	2005	4	0	1.42	0.23	0.79	0.29	1.44	0.42	1.63	0.33	-5.59	1.93	0.71	-0.93	-1.54	-0.33	-0.17	-1.18	-0.39	-1.15	-0.69	-0.38	-0.20
118	Nepal Drugs Ltd	2006	3	0	0.99	-0.01	0.70	0.26	-62.67	0.67	1.66	0.47	-4.83	2.75	0.74	-1.75	-2.64	-0.32	-0.12	-0.83	-0.39	-0.69	-0.46	-0.32	-0.12
119	Nepal Drugs Ltd	2007	2	0	0.97	-0.02	0.69	0.22	-23.21	0.78	1.82	0.54	-0.92	3.18	0.78	-2.18	-3.14	-0.13	-0.04	-0.50	-0.27	-0.24	-0.18	-0.13	-0.04
120	Nepal Drugs Ltd	2008	1	0	0.97	-0.02	0.78	0.36	-11.31	0.35	1.26	0.27	4.41	2.22	0.64	-1.22	-1.81	0.66	0.30	1.87	0.51	2.42	0.82	0.66	0.30
121	Sri Ram Sugar Mills Ltd.	1999	10	0	0.47	-0.13	0.12	0.32	-3.30	3.70	0.50	0.43	0.53	0.77	0.68	0.32	-0.04	0.04	0.05	-0.08	-0.04	-0.04	-0.06	-0.02	-0.02
122	Sri Ram Sugar Mills Ltd.	2000	9	0	0.69	-0.10	0.23	0.42	-3.91	1.76	0.50	0.40	0.77	0.79	0.58	0.26	-0.05	0.04	0.06	-0.03	-0.01	0.02	0.02	0.01	0.01
123	Sri Ram Sugar Mills Ltd.	2001	8	0	0.60	-0.11	0.17	0.36	-5.67	3.75	0.70	0.62	1.40	0.76	0.64	0.33	-0.03	0.09	0.12	0.04	0.03	0.08	0.17	0.05	0.06
124	Sri Ram Sugar Mills Ltd.	2002	7	0	0.65	-0.10	0.18	0.39	-4.89	2.68	0.60	0.50	1.12	0.74	0.61	0.35	-0.02	0.06	0.08	0.01	0.01	0.06	0.10	0.03	0.04
125	Sri Ram Sugar Mills Ltd.	2003	6	0	0.68	-0.12	0.26	0.48	-4.00	1.85	0.60	0.47	0.43	0.79	0.52	0.27	-0.05	0.02	0.03	-0.06	-0.03	-0.01	-0.01	0.00	0.00
126	Sri Ram Sugar Mills Ltd.	2004	5	0	0.50	-0.18	0.19	0.48	-3.12	3.10	0.70	0.57	1.17	0.80	0.52	0.25	-0.04	0.06	0.07	0.01	0.01	0.05	0.08	0.03	0.04

127	Sri Ram Sugar Mills Ltd.	2005	4	0	0.34	-0.26	0.13	0.53	-1.67	3.27	0.49	0.43	1.32	0.75	0.47	0.28	-0.03	0.06	0.09	0.04	0.02	0.07	0.08	0.03	0.04
128	Sri Ram Sugar Mills Ltd.	2006	3	0	0.48	-0.21	0.19	0.56	-3.27	3.57	0.86	0.70	0.60	0.76	0.44	0.29	-0.05	0.02	0.03	-0.02	-0.02	0.16	0.27	0.11	0.15
129	Sri Ram Sugar Mills Ltd.	2007	2	0	0.54	-0.31	0.37	0.72	-1.74	1.47	0.85	0.54	-4.43	1.23	0.28	0.07	-0.23	-0.15	-0.16	-0.35	-0.25	-0.17	-0.14	-0.09	-0.10
130	Sri Ram Sugar Mills Ltd.	2008	1	0	0.40	-0.22	0.14	0.69	-2.12	3.24	1.21	0.47	-0.59	1.56	0.31	-0.01	-0.19	-0.01	-0.01	-0.07	-0.09	0.06	0.07	0.03	0.05
131	Himal Cement Co. Ltd.	1988	5	0	0.70	-0.12	0.29	0.51	-4.05	1.77	0.84	0.50	-0.08	0.91	0.49	0.20	0.03	0.00	0.00	-0.01	0.00	0.10	0.12	0.05	0.06
132	Himal Cement Co. Ltd.	1989	4	0	0.70	-0.12	0.27	0.45	-2.93	1.28	0.66	0.34	-0.30	1.08	0.55	0.15	0.01	-0.01	-0.01	-0.03	-0.01	0.01	0.01	0.00	0.01
133	Himal Cement Co. Ltd.	1990	3	0	0.79	-0.08	0.30	0.44	-0.83	0.22	0.13	0.07	-2.72	1.08	0.56	0.13	-0.01	-0.13	-0.15	-1.98	-0.13	-1.77	-0.31	-0.12	-0.14
134	Himal Cement Co. Ltd.	1991	2	0	0.91	-0.03	0.30	0.36	-13.75	1.44	0.98	0.43	-0.73	1.23	0.64	0.09	-0.03	-0.02	-0.02	-0.05	-0.02	-0.02	-0.02	-0.01	-0.01
135	Himal Cement Co. Ltd.	1992	1	0	0.66	-0.18	0.35	0.61	-4.63	2.42	1.73	0.84	1.13	1.04	0.39	0.14	0.02	0.05	0.05	0.05	0.05	0.11	0.17	0.09	0.11
136	Janakpur Cigeratte Factory Ltd	2003	6	0	1.80	0.32	0.71	0.78	6.14	2.73	22.44	1.95	79.84	0.51	0.22	0.49	0.42	1.97	3.86	0.99	1.94	1.00	4.91	1.95	3.82
137	Janakpur Cigeratte Factory Ltd	2004	5	0	1.72	0.28	0.67	0.68	8.48	3.54	24.34	2.36	84.61	0.57	0.32	0.35	0.47	2.40	3.69	1.00	2.37	1.01	6.13	2.38	3.67
138	Janakpur Cigeratte Factory Ltd	2005	4	0	2.80	0.44	0.69	0.66	5.15	3.31	24.89	2.28	1.39	0.38	0.34	0.51	0.43	0.03	0.06	0.00	0.01	0.01	0.09	0.02	0.04
139	Janakpur Cigeratte Factory Ltd	2006	3	0	1.18	0.10	0.67	1.00	23.19	3.51	22.11	2.34	1.28	0.56	0.00	0.37	0.29	0.03	0.05	0.00	0.01	0.01	0.04	0.02	0.04
140	Janakpur Cigeratte Factory Ltd	2007	2	0	1.42	0.21	0.71	0.84	9.06	2.68	19.39	1.89	-13.61	0.59	0.16	0.36	0.02	-0.29	-0.46	-0.17	-0.31	-0.16	-0.61	-0.31	-0.48
141	Janakpur Cigeratte Factory Ltd	2008	1	0	1.38	0.00	0.71	0.47	10.97	3.02	20.97	2.16	-6.93	1.10	0.53	-0.36	0.45	-0.30	-0.28	-0.16	-0.35	-0.16	-0.65	-0.34	-0.31
142	Necon Air Ltd.	1997	5	0	1.07	0.03	0.40	0.46	48.41	3.00	2.67	1.21	3.24	0.82	0.54	0.18	0.04	0.17	0.21	0.10	0.12	0.14	0.44	0.17	0.20
143	Necon Air Ltd.	1998	4	0	1.13	0.05	0.31	0.37	25.13	2.88	1.54	0.91	2.27	0.76	0.63	0.24	0.11	0.15	0.19	0.09	0.08	0.12	0.39	0.11	0.14
144	Necon Air Ltd.	1999	3	0	1.75	0.19	0.35	0.26	6.14	2.63	1.75	0.91	1.05	0.76	0.74	0.24	0.12	0.08	0.11	0.00	0.00	0.01	0.03	0.01	0.01
145	Necon Air Ltd.	2000	2	0	1.28	0.12	0.44	0.42	8.18	1.80	2.03	0.79	-0.15	0.81	0.58	0.19	0.03	-0.01	-0.01	-0.10	-0.08	-0.05	-0.12	-0.04	-0.05
146	Necon Air Ltd.	2001	1	0	1.08	0.03	0.48	0.38	17.08	1.27	1.98	0.60	-3.32	1.15	0.62	-0.15	-0.34	-0.26	-0.23	-0.57	-0.34	-0.54	-0.74	-0.32	-0.28
147	Butwal Power Ltd	2004	5	1	2.22	0.17	0.31	1.00	1.11	0.61	0.41	0.19	235.41	0.14	0.00	0.85	0.32	0.15	1.01	0.80	0.15	0.80	1.09	0.15	1.01
148	Butwal Power Ltd	2005	4	1	5.76	0.19	0.23	1.00	1.21	1.00	0.47	0.23	197.76	0.04	0.00	0.96	0.38	0.14	3.37	0.59	0.14	0.59	3.40	0.14	3.37
149	Butwal Power Ltd	2006	3	1	1.23	0.06	0.31	1.00	3.64	0.69	0.50	0.22	288.42	0.25	0.00	0.74	0.27	0.17	0.65	0.77	0.17	0.77	0.65	0.17	0.65
150	Butwal Power Ltd	2007	2	1	1.18	0.05	0.36	1.00	3.85	0.59	0.53	0.21	27.61	0.30	0.00	0.69	0.24	0.14	0.45	0.64	0.13	0.66	0.45	0.14	0.44
151	Butwal Power Ltd	2008	1	1	1.36	0.10	0.39	1.00	2.17	0.58	0.62	0.22	52.29	0.29	0.00	0.70	0.28	0.18	0.61	0.79	0.18	0.81	0.63	0.18	0.61
152	Raghupati Jute Mills Ltd	2000	8	1	1.79	0.09	0.21	0.29	10.12	4.48	1.20	0.94	1.06	0.41	0.71	1.52	-0.01	0.04	0.10	0.00	0.00	0.04	0.32	0.04	0.09
153	Raghupati Jute Mills Ltd	2001	7	1	1.58	0.07	0.21	0.31	13.46	4.92	1.30	1.01	1.10	0.41	0.69	1.50	0.00	0.03	0.08	0.00	0.00	0.04	0.31	0.04	0.10
154	Raghupati Jute Mills Ltd	2002	6	1	1.39	0.07	0.26	0.43	18.80	5.25	1.80	1.35	1.66	0.43	0.57	1.40	0.03	0.04	0.10	0.01	0.02	0.06	0.44	0.08	0.19
155	Raghupati Jute Mills Ltd	2003	5	1	1.39	0.07	0.26	0.43	18.80	5.25	1.83	1.35	1.66	0.43	0.57	0.57	0.03	0.04	0.10	0.01	0.02	0.06	0.44	0.08	0.19
156	Raghupati Jute Mills Ltd	2003	4	1	1.71	0.10	0.25	0.37	11.58	4.80	1.62	1.21	1.58	0.40	0.63	0.60	0.00	0.04	0.11	0.01	0.02	0.05	0.37	0.05	0.14
157	Raghupati Jute Mills Ltd	2004	3	1	1.36	0.07	0.26	0.50	18.17	4.77	1.68	1.25	2.05	0.39	0.50	0.61	0.03	0.05	0.12	0.02	0.02	0.05	0.34	0.07	0.17
158	Raghupati Jute Mills Ltd	2005	2	1	0.53	-0.27	0.30	0.92	-3.92	3.50	1.49	1.04	-1.83	0.62	0.08	0.38	-0.01	-0.03	-0.04	-0.04	-0.04	-0.01	-0.02	-0.01	-0.01
159	Raghupati Jute Mills Ltd	2006	1	1	0.50	-0.26	0.27	0.86	-5.25	5.18	1.88	1.38	1.53	0.62	0.14	0.38	0.00	0.04	0.07	0.01	0.01	0.04	0.10	0.05	0.09
160	Hetauda Cement Ltd	2003	6	1	0.58	-0.15	0.21	1.00	-1.43	1.04	0.27	0.21	-1.65	0.35	0.00	0.54	-0.03	-0.03	-0.06	-0.22	-0.05	-0.14	-0.08	-0.03	-0.06

161	Hetauda Cement Ltd	2004	5	1	0.66	-0.30	0.58	1.00	-2.72	1.41	2.11	0.82	1.66	0.88	0.00	-0.16	-0.07	0.07	0.06	0.04	0.03	0.08	0.07	0.06	0.05
162	Hetauda Cement Ltd	2005	4	1	0.57	-0.37	0.50	1.00	-2.15	1.59	2.31	0.80	19.80	0.88	0.00	-0.14	-1.15	0.76	0.67	0.90	0.72	0.94	0.86	0.75	0.66
163	Hetauda Cement Ltd	2006	3	1	0.76	-0.18	0.55	1.00	-3.87	1.24	2.49	0.68	22.30	0.72	0.00	0.00	-0.92	0.68	0.68	0.96	0.65	0.99	0.93	0.67	0.67
164	Hetauda Cement Ltd	2007	2	1	0.86	-0.09	0.52	1.00	-7.84	1.31	2.81	0.68	5.08	0.61	0.00	0.09	-0.78	0.13	0.14	0.15	0.10	0.18	0.20	0.12	0.13
165	Hetauda Cement Ltd	2008	1	1	0.61	-0.32	0.51	1.00	-2.55	1.59	3.91	0.82	7.83	0.84	0.00	0.17	-0.57	0.13	0.16	0.11	0.09	0.13	0.13	0.11	0.13
166	Unilever Nepal Ltd.	1995	15	1	0.91	-0.04	0.39	0.30	-9.72	0.91	0.60	0.35	-381.00	1.38	0.70	1.54	-0.09	-0.09	-0.07	-0.26	-0.09	-0.24	-0.20	-0.08	-0.06
167	Unilever Nepal Ltd.	1996	14	1	0.81	-0.07	0.30	0.45	-14.89	3.42	1.40	1.02	0.87	0.82	0.55	0.22	-0.08	0.08	0.10	-0.01	-0.01	0.02	0.05	0.02	0.02
168	Unilever Nepal Ltd.	1997	13	1	0.86	-0.07	0.44	0.65	-27.32	4.43	3.50	1.94	1.78	0.79	0.35	0.27	-0.01	0.13	0.17	0.03	0.06	0.06	0.21	0.11	0.14
169	Unilever Nepal Ltd.	1998	12	1	1.24	0.10	0.53	0.74	26.47	5.06	5.80	2.70	5.26	0.58	0.26	0.71	0.21	0.28	0.48	0.08	0.23	0.10	0.63	0.27	0.47
170	Unilever Nepal Ltd.	1999	11	1	1.32	0.16	0.65	1.00	17.69	4.26	7.80	2.76	13.47	0.49	0.00	1.04	0.34	0.25	0.51	0.08	0.22	0.09	0.53	0.26	0.53
171	Unilever Nepal Ltd.	2000	10	1	1.71	0.30	0.73	1.00	9.20	3.83	10.30	2.79	38.71	0.43	0.00	1.39	0.44	0.24	0.56	0.07	0.19	0.08	0.54	0.23	0.54
172	Unilever Nepal Ltd.	2001	9	1	1.60	0.28	0.75	0.97	7.23	2.72	8.00	2.03	7.58	0.48	0.03	1.09	0.40	0.14	0.30	0.04	0.09	0.06	0.26	0.12	0.25
173	Unilever Nepal Ltd.	2002	8	1	1.79	0.31	0.70	1.00	7.03	3.10	7.20	2.16	5.49	0.39	0.00	1.56	0.45	0.12	0.31	0.03	0.07	0.06	0.32	0.13	0.32
174	Unilever Nepal Ltd.	2003	7	1	1.38	0.22	0.80	1.00	7.62	2.11	8.50	1.69	48.71	0.58	0.00	0.84	0.36	0.17	0.30	0.07	0.13	0.09	0.27	0.16	0.27
175	Unilever Nepal Ltd.	2004	6	1	1.33	0.21	0.84	1.00	8.45	2.11	11.20	1.77	109.26	0.63	0.00	0.73	0.35	0.23	0.36	0.09	0.16	0.11	0.30	0.19	0.30
176	Unilever Nepal Ltd.	2005	5	1	2.41	0.47	0.81	1.00	2.84	1.66	11.59	1.35	108.50	0.34	0.00	0.20	0.11	0.17	0.22	0.13	0.17	0.14	0.56	0.19	0.23
177	Unilever Nepal Ltd.	2006	4	1	2.10	0.34	0.64	1.00	3.78	1.98	10.08	1.28	134.06	0.31	0.00	0.36	0.12	0.21	0.32	0.16	0.21	0.18	0.73	0.22	0.35
178	Unilever Nepal Ltd.	2007	3	1	1.66	0.25	0.64	1.00	7.15	2.84	12.21	1.81	249.41	0.38	0.00	0.23	0.14	0.26	0.34	0.14	0.26	0.16	0.73	0.28	0.37
179	Unilever Nepal Ltd.	2008	2	1	1.98	0.35	0.70	1.00	5.68	2.82	15.30	1.98	2,597.72	0.35	0.00	0.25	0.17	0.31	0.41	0.16	0.31	0.17	0.93	0.33	0.44
180	Unilever Nepal Ltd.	2009	1	1	1.56	0.24	0.67	1.00	9.27	3.31	18.22	2.22	444.04	0.43	0.00	0.57	0.50	0.37	0.87	0.17	0.37	0.18	0.90	0.39	0.90
181	National Trading Ltd	2002	7	1	1.26	0.19	0.89	1.00	7.72	1.61	43.95	1.43	42.17	0.71	0.00	0.27	0.10	1.46	2.07	1.00	1.43	1.00	2.03	1.43	2.03
182	National Trading Ltd	2003	6	1	1.31	0.21	0.88	1.00	6.20	1.47	41.96	1.29	34.30	0.67	0.00	0.29	0.11	1.33	1.98	1.00	1.29	1.00	1.92	1.29	1.92
183	National Trading Ltd	2004	5	1	1.16	0.12	0.86	1.00	13.14	1.84	46.91	1.58	43.31	0.74	0.00	0.21	0.00	1.75	2.37	1.08	1.71	1.08	2.32	1.71	2.32
184	National Trading Ltd	2005	4	1	1.02	0.02	0.89	1.00	56.12	1.06	37.15	0.95	-1.51	0.87	0.00	0.09	-0.07	-0.04	-0.05	-0.07	-0.07	-0.07	-0.07	-0.06	-0.07
185	National Trading Ltd	2006	3	1	1.01	0.01	0.91	1.00	85.60	0.72	17.62	0.66	-0.78	0.90	0.00	0.05	-0.17	-0.04	-0.04	-0.13	-0.09	-0.13	-0.09	-0.08	-0.09
186	National Trading Ltd	2007	2	1	0.97	-0.03	0.95	1.00	-33.11	0.91	41.14	0.87	-0.43	0.98	0.00	-0.01	-0.13	-0.01	-0.01	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
187	National Trading Ltd	2008	1	1	0.98	-0.02	0.96	1.00	-52.90	1.03	34.98	0.98	1.17	0.97	0.00	0.00	-0.14	0.03	0.03	0.00	0.00	0.01	0.01	0.01	0.01
188	Dairy Development Corporation	2003	6	1	0.99	0.00	0.52	0.71	-643.5	4.12	5.80	2.15	1.77	0.74	0.29	0.26	-0.30	0.03	0.04	0.01	0.01	0.02	0.10	0.05	0.07
189	Dairy Development Corporation	2004	5	1	3.54	0.36	0.50	0.56	5.52	3.96	5.04	1.99	4.27	0.25	0.44	0.44	-0.27	0.02	0.04	0.01	0.02	0.03	0.40	0.06	0.10
190	Dairy Development Corporation	2005	4	1	3.27	0.38	0.54	0.60	5.48	3.80	5.81	2.06	-7.38	0.28	0.40	0.43	-0.29	-0.04	-0.08	-0.02	-0.05	-0.01	-0.07	-0.01	-0.02
191	Dairy Development Corporation	2006	3	1	3.58	0.41	0.57	0.61	4.60	3.32	5.68	1.89	-4.48	0.26	0.39	0.37	-0.30	-0.03	-0.04	-0.02	-0.03	0.00	0.05	0.01	0.01
192	Dairy Development Corporation	2007	2	1	4.47	0.48	0.62	0.60	3.87	3.00	6.46	1.87	5.07	0.23	0.40	0.43	-0.27	0.02	0.04	0.01	0.02	0.03	0.39	0.05	0.10
193	Dairy Development Corporation	2008	1	1	3.52	0.47	0.66	0.62	5.43	3.89	7.39	2.55	-26.95	0.30	0.38	0.30	-0.48	-0.12	-0.18	-0.05	-0.13	-0.03	-0.41	-0.08	-0.11
194	Agriculture Inputs Co Ltd	2003	5	1	0.88	-0.07	0.52	1.00	-8.76	1.22	1.40	0.64	4,661	0.59	0.00	0.16	-0.06	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01

195	Agriculture Inputs Co Ltd	2004	4	1	0.79	-0.10	0.36	1.00	-2.68	0.71	0.44	0.26	1,015	0.46	0.00	0.22	-0.07	0.00	0.00	0.00	0.00	0.03	0.02	0.01	0.01
196	Agriculture Inputs Co Ltd	2005	3	1	0.78	-0.11	0.38	1.00	-3.95	1.13	0.78	0.43	-30,246	0.49	0.00	0.22	-0.05	-0.02	-0.03	-0.05	-0.02	-0.03	-0.03	-0.02	-0.02
197	Agriculture Inputs Co Ltd	2006	2	1	0.40	-0.35	0.23	1.00	-0.75	1.12	0.37	0.26	-49,192	0.58	0.00	0.06	-0.05	-0.04	-0.04	-0.16	-0.04	-0.12	-0.05	-0.03	-0.03
198	Agriculture Inputs Co Ltd	2007	1	1	0.76	-0.11	0.33	0.98	-3.52	1.11	0.61	0.37	20.00	0.44	0.02	0.25	-0.05	0.00	0.00	0.00	0.00	0.02	0.02	0.01	0.01
199	Nepal Telecom Ltd	2004	5	1	7.59	0.54	0.62	0.75	0.45	0.39	0.76	0.24	194.53	0.11	0.25	0.67	0.59	0.10	0.31	0.43	0.10	0.56	1.66	0.14	0.41
200	Nepal Telecom Ltd	2005	4	1	5.77	0.48	0.58	0.99	0.50	0.42	0.75	0.24	5,091	0.10	0.01	0.66	0.16	0.10	0.30	0.41	0.10	0.53	1.29	0.13	0.38
201	Nepal Telecom Ltd	2006	3	1	5.21	0.46	0.57	1.00	0.57	0.46	0.83	0.27	4,456	0.11	0.00	0.68	0.22	0.13	0.39	0.47	0.13	0.59	1.42	0.16	0.49
202	Nepal Telecom Ltd	2007	2	1	3.52	0.39	0.54	0.85	0.84	0.60	0.93	0.32	548.59	0.18	0.15	0.65	0.30	0.13	0.37	0.40	0.13	0.50	1.05	0.16	0.46
203	Nepal Telecom Ltd	2008	1	1	3.05	0.33	0.49	1.00	1.10	0.74	1.06	0.36	771.86	0.16	0.00	0.70	0.41	0.16	0.53	0.44	0.16	0.53	1.19	0.19	0.63
204	Nepal Lube Oil Ltd.	1993	16	1	1.54	0.27	0.77	0.81	3.43	1.20	3.90	0.92	5.64	0.61	0.19	0.63	0.17	0.10	0.16	0.09	0.08	0.10	0.19	0.09	0.15
205	Nepal Lube Oil Ltd.	1994	15	1	0.32	-0.90	0.42	0.99	-1.33	2.82	2.10	1.20	3.41	1.34	0.01	0.77	0.47	0.27	0.20	0.02	0.02	0.06	0.06	0.07	0.06
206	Nepal Lube Oil Ltd.	1995	14	1	0.79	-0.18	0.67	0.99	-6.72	1.81	3.60	1.21	988.00	0.86	0.01	0.79	0.35	0.19	0.22	0.06	0.07	0.08	0.12	0.10	0.11
207	Nepal Lube Oil Ltd.	1996	13	1	1.18	0.12	0.77	0.99	8.37	1.28	4.20	0.98	8.39	0.66	0.01	0.66	0.21	0.14	0.21	0.03	0.03	0.05	0.08	0.05	0.08
208	Nepal Lube Oil Ltd.	1997	12	1	1.63	0.32	0.82	0.81	2.40	0.93	4.20	0.76	2.71	0.62	0.19	0.61	0.15	0.09	0.14	0.05	0.04	0.06	0.09	0.04	0.07
209	Nepal Lube Oil Ltd.	1998	11	1	2.35	0.48	0.83	0.58	1.93	1.11	5.50	0.92	4.33	0.62	0.42	0.62	0.17	0.10	0.15	0.06	0.06	0.08	0.21	0.07	0.12
210	Nepal Lube Oil Ltd.	1999	10	1	2.09	0.45	0.85	0.68	2.37	1.24	7.30	1.06	5.59	0.60	0.32	0.67	0.20	0.15	0.24	0.09	0.10	0.10	0.27	0.11	0.18
211	Nepal Lube Oil Ltd.	2000	9	1	2.26	0.47	0.85	0.56	1.84	1.02	5.90	0.87	2.91	0.68	0.44	0.51	0.18	0.08	0.12	0.05	0.04	0.06	0.14	0.05	0.08
212	Nepal Lube Oil Ltd.	2001	8	1	2.56	0.52	0.85	0.50	1.22	0.74	4.40	0.63	0.42	0.67	0.50	0.53	0.18	0.01	0.02	-0.03	-0.02	-0.01	-0.01	0.00	-0.01
213	Nepal Lube Oil Ltd.	2002	7	1	1.25	0.17	0.86	1.00	7.26	1.47	8.90	1.26	3.09	0.68	0.00	0.52	0.17	0.11	0.15	0.05	0.06	0.06	0.11	0.07	0.11
214	Nepal Lube Oil Ltd.	2003	6	1	1.17	0.12	0.86	1.00	6.74	0.97	6.90	0.83	2.83	0.74	0.00	0.38	0.14	0.06	0.08	0.04	0.03	0.05	0.06	0.04	0.06
215	Nepal Lube Oil Ltd.	2004	5	1	1.43	0.25	0.84	1.00	2.92	0.88	4.55	0.74	1.09	0.59	0.00	0.34	0.18	0.03	0.05	0.00	0.00	0.03	0.04	0.02	0.04
216	Nepal Lube Oil Ltd.	2005	4	1	1.41	0.04	0.13	1.00	3.69	1.07	6.93	0.14	2.27	0.09	0.00	0.90	0.02	0.01	0.06	0.03	0.00	0.04	0.07	0.01	0.06
217	Nepal Lube Oil Ltd.	2006	3	1	1.35	0.04	0.17	1.00	4.40	1.14	9.71	0.19	1.05	0.12	0.00	0.86	0.03	0.00	0.03	0.00	0.00	0.01	0.02	0.00	0.02
218	Nepal Lube Oil Ltd.	2007	2	1	1.57	0.33	0.90	1.00	3.59	1.30	12.35	1.18	1.37	0.58	0.00	0.36	0.14	0.06	0.09	0.01	0.02	0.02	0.05	0.03	0.04
219	Nepal Lube Oil Ltd.	2008	1	1	1.59	0.34	0.92	1.00	3.00	1.11	12.39	1.02	1.59	0.58	0.00	0.35	0.15	0.04	0.06	0.01	0.01	0.02	0.04	0.02	0.04
220	Nepal Bitumen & Barrel Udhyog Ltd.	1999	10	1	2.17	0.45	0.84	0.48	2.19	1.18	6.10	0.99	1.25	0.81	0.52	0.24	-0.01	0.07	0.09	0.01	0.01	0.01	0.04	0.01	0.02
221	Nepal Bitumen & Barrel Udhyog Ltd.	2000	9	1	1.37	0.23	0.86	0.78	2.82	0.76	4.60	0.65	1.11	0.81	0.22	0.24	-0.01	0.06	0.08	0.01	0.00	0.01	0.01	0.01	0.01
222	Nepal Bitumen & Barrel Udhyog Ltd.	2001	8	1	1.10	0.08	0.86	0.99	11.35	1.03	6.20	0.88	1.14	0.79	0.01	0.27	0.00	0.07	0.09	0.01	0.01	0.01	0.01	0.01	0.01
223	Nepal Bitumen & Barrel Udhyog Ltd.	2002	7	1	1.10	0.08	0.88	1.00	11.88	1.05	7.90	0.93	1.23	0.80	0.00	0.24	0.00	0.07	0.08	0.01	0.01	0.02	0.02	0.01	0.02
224	Nepal Bitumen & Barrel Udhyog Ltd.	2003	6	1	1.03	0.02	0.88	1.00	32.95	0.87	6.50	0.77	-0.54	0.86	0.00	0.18	-0.07	-0.03	-0.03	-0.10	-0.07	-0.09	-0.08	-0.07	-0.08
225	Nepal Bitumen & Barrel Udhyog Ltd.	2004	5	1	1.13	0.10	0.89	1.00	16.19	1.86	15.59	1.66	1.57	0.79	0.00	0.16	-0.04	0.08	0.10	0.02	0.03	0.02	0.04	0.03	0.04
226	Nepal Bitumen & Barrel Udhyog Ltd.	2005	4	1	1.21	0.16	0.91	1.00	10.93	1.86	20.05	1.70	1.45	0.76	0.00	0.18	0.02	0.17	0.20	0.03	0.05	0.03	0.08	0.06	0.07
227	Nepal Bitumen & Barrel Udhyog Ltd.	2006	3	1	1.23	0.17	0.93	1.00	8.09	1.52	20.52	1.41	1.25	0.76	0.00	0.17	0.02	0.09	0.11	0.01	0.02	0.02	0.03	0.02	0.03
228	Nepal Bitumen & Barrel Udhyog Ltd.	2007	2	1	1.18	0.15	0.96	1.00	10.65	1.61	38.75	1.55	1.56	0.81	0.00	0.12	0.02	0.05	0.06	0.01	0.02	0.01	0.03	0.02	0.02

229	Nepal Bitumen & Barrel Udhyog Ltd.	2008	1	1	1.18	0.15	0.96	1.00	7.77	1.21	31.11	1.16	1.44	0.81	0.00	0.12	0.01	0.04	0.05	0.01	0.01	0.01	0.02	0.02	0.02
230	Nepal Transport and Warehouse Ltd	2004	5	1	1.93	0.46	0.96	1.00	0.26	0.12	2.99	0.12	-3,615	0.50	0.00	0.50	0.45	-0.02	-0.04	-0.16	-0.02	-0.11	-0.03	-0.01	-0.03
231	Nepal Transport and Warehouse Ltd	2005	4	1	1.54	0.32	0.92	1.00	0.56	0.20	3.15	0.18	-2,439	0.60	0.00	0.34	0.62	-0.02	-0.03	-0.10	-0.02	-0.05	-0.02	-0.01	-0.01
232	Nepal Transport and Warehouse Ltd	2006	3	1	2.05	0.43	0.84	1.00	0.32	0.16	1.59	0.14	-10,517	0.41	0.00	0.54	0.43	-0.06	-0.13	-0.44	-0.06	-0.38	-0.13	-0.05	-0.11
233	Nepal Transport and Warehouse Ltd	2007	2	1	2.32	0.47	0.82	1.00	0.38	0.22	2.37	0.18	5,530	0.35	0.00	0.21	0.04	0.03	0.04	0.17	0.03	0.21	0.11	0.04	0.05
234	Nepal Transport and Warehouse Ltd	2008	1	1	2.35	0.46	0.81	1.00	0.40	0.23	2.83	0.19	5,530	0.34	0.00	0.21	0.03	0.03	0.04	0.15	0.03	0.18	0.10	0.03	0.04
235	National Seeds Co Ltd	2004	5	1	2.38	0.22	0.38	1.00	1.86	1.08	0.69	0.41	3,133	0.16	0.00	0.84	0.00	0.02	0.14	0.05	0.02	0.05	0.14	0.02	0.14
236	National Seeds Co Ltd	2005	4	1	2.37	0.24	0.42	1.00	1.97	1.14	0.90	0.48	2,553	0.18	0.00	0.82	0.02	0.02	0.09	0.03	0.02	0.03	0.09	0.02	0.09
237	National Seeds Co Ltd	2006	3	1	1.92	0.20	0.42	1.00	2.91	1.39	1.14	0.58	5,534	0.22	0.00	0.78	0.05	0.03	0.15	0.06	0.03	0.06	0.15	0.03	0.15
238	National Seeds Co Ltd	2007	2	1	1.87	0.22	0.46	0.96	2.47	1.15	1.20	0.53	2,383	0.26	0.04	0.74	0.05	0.01	0.04	0.02	0.01	0.02	0.05	0.01	0.04
239	National Seeds Co Ltd	2008	1	1	4.83	0.56	0.71	0.75	0.61	0.48	1.46	0.34	9.08	0.20	0.25	0.80	0.03	0.01	0.03	0.02	0.01	0.02	0.05	0.01	0.03
240	Udaypur Cement Factory Ltd	2003	5	1	1.16	0.01	0.11	0.20	6.80	0.92	0.12	0.10	-0.40	0.47	0.80	0.53	-0.19	-0.01	-0.02	-0.26	-0.03	-0.05	-0.05	-0.01	-0.01
241	Udaypur Cement Factory Ltd	2004	4	1	1.08	0.01	0.13	0.24	10.34	0.74	0.11	0.09	-0.32	0.49	0.76	0.51	-0.20	-0.01	-0.01	-0.26	-0.02	-0.08	-0.06	-0.01	-0.02
242	Udaypur Cement Factory Ltd	2005	3	1	1.11	0.01	0.14	0.25	7.78	0.78	0.13	0.11	-0.01	0.49	0.75	0.51	-0.22	0.00	0.00	-0.17	-0.02	-0.01	-0.01	0.00	0.00
243	Udaypur Cement Factory Ltd	2006	2	1	1.05	0.01	0.15	0.28	13.76	0.70	0.12	0.10	0.43	0.50	0.72	0.50	-0.22	0.01	0.02	-0.10	-0.01	0.06	0.05	0.01	0.01
244	Udaypur Cement Factory Ltd	2007	1	1	1.01	0.00	0.16	0.32	106.73	0.85	0.17	0.13	2.75	0.49	0.68	0.51	-0.18	0.05	0.10	0.23	0.03	0.35	0.30	0.05	0.10
245	Nepal Food Corporation	2003	6	1	0.70	-0.33	0.78	0.69	-1.31	0.55	2.00	0.43	-5.47	1.60	0.31	-0.13	-1.28	-0.30	-0.18	-0.82	-0.35	-0.79	-0.31	-0.34	-0.21
246	Nepal Food Corporation	2004	5	1	0.71	-0.33	0.79	0.70	-1.41	0.58	2.32	0.46	-3.98	1.59	0.30	-0.15	-1.31	-0.18	-0.12	-0.50	-0.23	-0.47	-0.19	-0.22	-0.14
247	Nepal Food Corporation	2005	4	1	1.21	0.14	0.82	0.63	2.36	0.41	2.02	0.34	-3.31	1.07	0.37	0.95	-0.06	-0.12	-0.11	-0.46	-0.16	-0.43	-0.22	-0.15	-0.14
248	Nepal Food Corporation	2006	3	1	0.75	-0.28	0.84	1.00	-1.75	0.58	3.16	0.49	-0.79	1.11	0.00	-0.11	-1.10	-0.03	-0.02	-0.12	-0.06	-0.10	-0.04	-0.05	-0.04
249	Nepal Food Corporation	2007	2	1	0.82	-0.19	0.86	1.00	-2.86	0.64	4.08	0.55	2.69	1.05	0.00	-0.05	-0.94	0.05	0.05	0.06	0.03	0.07	0.03	0.04	0.03
250	Nepal Food Corporation	2008	1	1	0.70	-0.35	0.82	1.42	-1.91	0.81	3.87	0.66	0.09	0.82	0.00	-0.16	0.00	-0.57	0.11	0.09	0.06	0.07	0.08	0.06	0.08
251	Bottlers Nepal (Terai) Ltd.	2004	5	1	4.15	0.59	0.77	1.00	1.28	0.97	3.35	0.75	1,956	0.19	0.00	0.66	0.46	0.03	0.10	0.05	0.03	0.10	0.40	0.07	0.22
252	Bottlers Nepal (Terai) Ltd.	2005	4	1	1.80	0.21	0.48	1.00	3.03	1.34	1.25	0.65	1.07	0.27	0.00	0.62	0.45	0.38	0.99	0.04	0.03	0.08	0.20	0.05	0.14
253	Bottlers Nepal (Terai) Ltd.	2006	3	1	1.44	0.17	0.54	1.00	5.12	1.57	1.83	0.85	0.95	0.37	0.00	0.50	0.34	1.19	2.36	-0.07	-0.06	0.09	0.21	0.08	0.15
254	Bottlers Nepal (Terai) Ltd.	2007	2	1	1.35	0.17	0.67	1.00	5.33	1.37	2.84	0.93	2,585	0.50	0.00	0.40	0.17	0.09	0.16	0.10	0.09	0.19	0.36	0.18	0.30
255	Bottlers Nepal (Terai) Ltd.	2008	1	1	1.85	0.30	0.65	1.00	3.64	1.67	3.14	1.09	133.87	0.35	0.00	0.51	0.23	0.03	0.07	0.03	0.03	0.11	0.35	0.12	0.25
256	National Construction Co Ltd	2005	5	1	2.10	0.51	0.96	0.82	0.80	0.34	9.30	0.33	9.83	0.46	0.00	0.44	0.31	-0.02	-0.04	-0.07	-0.02	-0.06	-0.03	-0.02	-0.03
257	National Construction Co Ltd	2006	4	1	1.88	0.46	0.97	0.88	0.70	0.28	10.54	0.27	-26.52	0.52	0.00	0.41	0.26	-0.06	-0.11	-0.24	-0.06	-0.23	-0.11	-0.06	-0.11
258	National Construction Co Ltd	2007	3	1	2.10	0.51	0.97	0.84	0.48	0.21	6.70	0.20	-6.89	0.46	0.00	0.45	0.28	-0.02	-0.04	-0.09	-0.02	-0.08	-0.03	-0.02	-0.03
259	National Construction Co Ltd	2008	2	1	2.88	0.62	0.96	0.71	0.13	0.07	1.45	0.07	-23.83	0.33	0.00	0.54	0.31	-0.09	-0.19	-1.34	-0.09	-1.31	-0.18	-0.08	-0.18
260	National Construction Co Ltd	2009	1	1	3.27	0.68	0.98	0.60	0.14	0.07	2.91	0.07	-29.92	0.30	0.00	0.61	0.35	-0.12	-0.25	-1.84	-0.12	-1.81	-0.24	-0.12	-0.24
261	Nepal United Co. Ltd	1989	9	1	3.18	0.67	0.98	1.00	6.78	4.65	223.8	4.55	5.95	0.31	0.00	2.24	0.01	0.83	2.68	0.14	0.62	0.14	2.02	0.62	2.02
262	Nepal United Co. Ltd	1990	8	1	1.69	0.40	0.99	1.00	23.01	9.40	629.9	9.26	4.98	0.58	0.00	0.72	0.05	0.39	0.68	0.01	0.09	0.01	0.15	0.09	0.15

263	Nepal United Co. Ltd	1991	7	1	3.21	0.66	0.96	1.00	6.73	4.63	118.9	4.46	-1.13	0.30	0.00	2.33	0.10	-0.04	-0.14	-0.03	-0.14	-0.03	-0.45	-0.14	-0.45
264	Nepal United Co. Ltd	1992	6	1	1.30	0.23	0.99	1.00	6.85	1.59	111.4	1.57	2.43	0.76	0.00	0.32	0.02	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00
265	Nepal United Co. Ltd	1993	5	1	2.59	0.60	0.98	1.00	6.44	3.96	233.7	3.89	3.23	0.38	0.00	0.62	0.35	0.11	0.28	0.02	0.07	0.02	0.19	0.07	0.19
266	Nepal United Co. Ltd	1994	4	1	3.87	0.71	0.96	1.00	6.51	4.83	124.2	4.65	3.18	0.25	0.00	0.75	0.15	0.20	0.81	0.02	0.10	0.02	0.44	0.11	0.44
267	Nepal United Co. Ltd	1995	3	1	1.67	0.39	0.98	1.00	4.84	1.94	121.5	1.91	4.38	0.59	0.00	0.41	0.13	0.16	0.28	0.05	0.09	0.05	0.15	0.09	0.15
268	Nepal United Co. Ltd	1996	2	1	1.63	0.38	0.99	1.00	6.12	2.37	227.4	2.34	1.45	0.61	0.00	0.39	0.17	0.09	0.16	0.01	0.02	0.01	0.04	0.03	0.04
269	Nepal United Co. Ltd	1997	1	1	2.13	0.52	0.99	1.00	3.35	1.78	131.1	1.75	2.03	0.46	0.00	0.54	0.21	0.09	0.19	-0.01	-0.02	-0.01	-0.04	-0.02	-0.04
270	Bottlers Nepal Ltd.	1998	12	1	1.57	0.14	0.39	0.66	2.81	1.02	0.90	0.40	279.71	0.38	0.34	1.64	0.47	0.10	0.27	0.20	0.08	0.26	0.41	0.10	0.27
271	Bottlers Nepal Ltd	1999	11	1	1.78	0.19	0.44	0.67	2.38	1.04	1.10	0.45	76.87	0.36	0.33	1.86	0.54	0.09	0.25	0.17	0.08	0.26	0.48	0.12	0.32
272	Bottlers Nepal Ltd	2000	10	1	2.08	0.23	0.44	0.64	1.95	1.01	1.00	0.44	64.51	0.33	0.36	2.06	0.54	0.07	0.22	0.13	0.06	0.23	0.49	0.10	0.31
273	Bottlers Nepal Ltd	2001	9	1	1.47	0.15	0.46	0.95	3.30	1.05	1.20	0.48	556.12	0.33	0.05	2.37	0.55	0.05	0.16	0.09	0.04	0.19	0.30	0.09	0.28
274	Bottlers Nepal Ltd	2002	8	1	1.49	0.18	0.55	1.00	3.22	1.06	1.30	0.58	88.09	0.37	0.00	2.05	0.54	0.06	0.17	0.09	0.05	0.19	0.29	0.11	0.29
275	Bottlers Nepal Ltd	2003	7	1	3.06	0.39	0.59	1.00	1.70	1.14	1.60	0.67	105.82	0.19	0.00	4.05	0.56	0.03	0.17	0.04	0.03	0.13	0.47	0.09	0.47
276	Bottlers Nepal Ltd	2004	6	1	1.35	0.15	0.58	1.00	5.50	1.41	1.90	0.82	11,253.50	0.43	0.00	2.18	0.69	0.06	0.14	0.06	0.05	0.15	0.29	0.12	0.29
277	Bottlers Nepal Ltd	2005	5	1	2.95	0.35	0.53	1.00	2.05	1.36	1.50	0.71	132.09	0.18	0.00	0.73	0.66	0.04	0.15	0.06	0.04	0.14	0.55	0.10	0.37
278	Bottlers Nepal Ltd	2006	4	1	2.18	0.31	0.57	1.00	2.64	1.43	1.92	0.82	24.96	0.26	0.00	0.64	0.67	0.03	0.09	0.04	0.03	0.14	0.45	0.12	0.32
279	Bottlers Nepal Ltd	2007	3	1	1.04	0.02	0.40	1.00	36.20	1.52	1.00	0.60	4.42	0.38	0.00	0.45	0.46	0.04	0.07	0.05	0.03	0.14	0.23	0.09	0.16
280	Bottlers Nepal Ltd	2008	2	1	1.27	0.07	0.34	0.61	9.06	1.92	1.16	0.65	2.46	0.44	0.39	0.45	0.29	0.04	0.08	0.04	0.03	0.13	0.31	0.08	0.15
281	Bottlers Nepal Ltd	2009	1	1	1.12	0.04	0.40	0.77	18.96	1.99	1.57	0.80	2.16	0.47	0.23	0.41	0.27	0.05	0.08	0.03	0.02	0.10	0.22	0.08	0.13
282	Salt Trading Co Ltd	1989	18	1	0.99	-0.01	0.92	0.83	-667.12	5.99	73.00	5.54	3.64	1.13	0.17	0.24	0.18	0.12	0.10	0.01	0.06	0.01	0.06	0.06	0.05
283	Salt Trading Co Ltd	1990	17	1	0.95	-0.04	0.90	0.77	-126.14	6.20	57.30	5.60	2.11	1.24	0.23	0.23	0.18	0.07	0.05	0.00	0.03	0.01	0.03	0.03	0.03
284	Salt Trading Co Ltd	1991	16	1	1.17	0.14	0.95	0.68	23.32	3.40	61.20	3.22	2.73	1.18	0.32	0.14	0.11	0.08	0.06	0.01	0.03	0.01	0.04	0.03	0.03
285	Salt Trading Co Ltd	1992	15	1	1.51	0.32	0.94	0.52	11.54	3.91	56.50	3.65	1.92	1.19	0.48	0.12	0.10	0.07	0.06	0.01	0.02	0.01	0.04	0.02	0.02
286	Salt Trading Co Ltd	1993	14	1	2.03	0.47	0.93	0.39	8.15	4.13	52.50	3.83	1.52	1.16	0.61	0.12	0.10	0.08	0.07	0.00	0.02	0.01	0.05	0.02	0.02
287	Salt Trading Co Ltd	1994	13	1	1.73	0.40	0.94	0.49	7.39	3.11	48.90	2.92	1.20	1.12	0.51	0.10	0.08	0.08	0.07	0.00	0.01	0.00	0.02	0.01	0.01
288	Salt Trading Co Ltd	1995	12	1	1.77	0.41	0.94	0.48	6.12	2.67	43.70	2.51	1.19	1.11	0.52	0.09	0.07	0.08	0.07	0.00	0.01	0.01	0.02	0.01	0.01
289	Salt Trading Co Ltd	1996	11	1	2.51	0.57	0.95	0.34	4.72	2.84	51.30	2.69	1.29	1.10	0.66	0.08	0.05	0.07	0.06	0.00	0.01	0.00	0.03	0.01	0.01
290	Salt Trading Co Ltd	1997	10	1	2.51	0.57	0.95	0.34	4.72	2.84	51.30	2.69	1.29	1.10	0.66	0.08	0.05	0.07	0.06	0.00	0.01	0.00	0.03	0.01	0.01
291	Salt Trading Co Ltd	1998	9	1	3.19	0.65	0.95	0.27	3.48	2.39	43.60	2.26	1.14	1.11	0.73	0.08	0.05	0.11	0.10	0.00	0.01	0.01	0.04	0.01	0.01
292	Salt Trading Co Ltd	1999	8	1	3.13	0.65	0.95	0.28	3.24	2.20	43.80	2.10	1.10	1.09	0.72	0.07	0.04	0.09	0.09	0.00	0.01	0.00	0.03	0.01	0.01
293	Salt Trading Co Ltd	2000	7	1	3.30	0.67	0.96	0.28	2.22	1.54	37.60	1.48	0.81	1.03	0.72	0.08	0.06	0.06	0.06	-0.01	-0.01	-0.01	-0.04	-0.01	-0.01
294	Salt Trading Co Ltd	2001	6	1	3.92	0.72	0.96	0.24	2.20	1.64	40.90	1.57	1.15	1.03	0.76	0.08	0.06	0.10	0.09	0.01	0.01	0.01	0.05	0.01	0.01
295	Salt Trading Co Ltd	2002	5	1	3.74	0.00	0.96	0.25	2.31	1.69	42.31	1.62	1.25	1.04	0.75	0.43	0.41	0.11	0.11	0.01	0.02	0.02	0.10	0.02	0.02
296	Salt Trading Co Ltd	2003	4	1	4.42	0.00	0.97	0.22	1.90	1.47	53.35	1.43	1.45	1.01	0.78	0.31	0.30	0.09	0.09	0.02	0.03	0.02	0.14	0.03	0.03

297	Salt Trading Co Ltd	2004	3	1	3.78	0.00	0.97	0.26	3.32	2.45	83.85	2.38	1.63	0.98	0.74	0.37	0.36	0.11	0.12	0.02	0.04	0.02	0.18	0.05	0.05
298	Salt Trading Co Ltd	2005	2	1	1.06	0.00	0.93	0.82	22.21	1.25	15.75	1.16	1.42	1.07	0.18	0.83	0.82	0.09	0.08	0.02	0.03	0.02	0.03	0.03	0.03
299	Salt Trading Co Ltd	2006	1	1	1.01	0.00	0.57	0.86	95.98	0.98	1.33	0.56	1.02	0.66	0.14	0.47	0.47	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00
300	Bishal Bazar Co Ltd	1989	17	1	0.31	-0.21	0.10	0.44	-0.82	1.82	0.20	0.18	1.78	0.70	0.56	0.41	0.09	0.08	0.12	0.12	0.02	0.29	0.17	0.05	0.07
301	Bishal Bazar Co Ltd	1990	16	1	0.24	-0.27	0.08	0.52	-0.68	2.21	0.20	0.19	1.17	0.68	0.48	0.45	0.02	0.07	0.11	0.03	0.00	0.20	0.10	0.04	0.05
302	Bishal Bazar Co Ltd	1991	15	1	0.23	-0.32	0.10	0.61	-0.73	2.49	0.30	0.24	2.35	0.69	0.39	0.43	0.01	0.12	0.18	0.18	0.04	0.31	0.17	0.07	0.11
303	Bishal Bazar Co Ltd	1992	14	1	0.42	-0.33	0.24	0.80	-0.81	1.13	0.40	0.27	4.13	0.72	0.20	0.37	0.02	0.12	0.17	0.22	0.06	0.32	0.15	0.09	0.12
304	Bishal Bazar Co Ltd	1993	13	1	0.24	-0.44	0.14	0.86	-0.77	2.42	0.40	0.34	5.33	0.68	0.14	0.46	0.01	0.13	0.19	0.20	0.07	0.37	0.21	0.13	0.18
305	Bishal Bazar Co Ltd	1994	12	1	0.10	-0.56	0.06	1.00	-0.75	6.92	0.50	0.43	14.74	0.63	0.00	0.75	0.13	0.19	0.30	0.26	0.11	0.41	0.28	0.17	0.28
306	Bishal Bazar Co Ltd	1995	11	1	0.19	-0.48	0.12	1.00	-1.00	4.12	0.50	0.48	101.75	0.60	0.00	0.99	0.16	0.20	0.33	0.26	0.12	0.37	0.30	0.18	0.30
307	Bishal Bazar Co Ltd	1996	10	1	0.29	-0.37	0.15	1.00	-1.25	3.11	0.50	0.46	132.63	0.52	0.00	0.88	0.14	0.19	0.36	0.19	0.09	0.27	0.24	0.13	0.24
308	Bishal Bazar Co Ltd	1997	9	1	0.50	-0.23	0.23	1.00	-2.18	2.20	0.70	0.51	118.75	0.46	0.00	1.17	0.18	0.16	0.34	0.22	0.11	0.31	0.34	0.16	0.34
309	Bishal Bazar Co Ltd	1998	8	1	0.93	-0.03	0.33	1.00	-19.13	1.50	0.70	0.49	132.08	0.36	0.00	1.81	0.24	0.23	0.66	0.35	0.17	0.43	0.59	0.21	0.59
310	Bishal Bazar Co Ltd	1999	7	1	0.65	-0.14	0.25	1.00	-3.49	1.92	0.60	0.48	26.37	0.39	0.00	1.57	0.23	0.24	0.61	0.34	0.16	0.42	0.52	0.20	0.52
311	Bishal Bazar Co Ltd	2000	6	1	0.78	-0.07	0.24	1.00	-9.07	2.60	0.80	0.62	35.56	0.31	0.00	2.26	0.29	0.31	1.01	0.33	0.21	0.43	0.87	0.27	0.87
312	Bishal Bazar Co Ltd	2001	5	1	1.10	0.02	0.31	1.00	23.63	2.14	0.94	0.66	247.86	0.28	0.00	0.72	0.33	0.25	0.89	0.38	0.25	0.46	1.08	0.30	1.08
313	Bishal Bazar Co Ltd	2002	4	1	0.48	0.01	0.20	1.00	-4.01	4.41	1.12	0.89	19.51	0.43	0.00	1.00	0.52	0.34	0.81	0.39	0.34	0.46	0.97	0.41	0.97
314	Bishal Bazar Co Ltd	2003	3	1	0.29	0.01	0.25	0.76	-1.61	3.87	1.29	0.97	65.91	1.12	0.24	0.73	0.25	0.41	0.37	0.42	0.41	0.48	0.55	0.46	0.42
315	Bishal Bazar Co Ltd	2004	2	1	0.34	0.01	0.29	1.00	-1.73	3.39	1.40	0.99	40.82	0.86	0.00	0.68	0.19	0.37	0.43	0.37	0.36	0.42	0.48	0.42	0.48
316	Bishal Bazar Co Ltd	2005	1	1	0.46	0.01	0.40	1.00	-2.14	2.54	1.67	1.01	25.22	0.87	0.00	0.63	0.19	0.41	0.47	0.40	0.41	0.45	0.52	0.45	0.52

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Discriminant Results

Analysis Case Processing Summary

Unweighted Cases	N	Percent
Valid	316	100

Group Statistics

Group		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
Failed co.	CACL	1.4648	4.48583	146	146
	WCTA	-.3096	.68238	146	146
	CATA	.5469	.23835	146	146
	CLTD	.5184	.27921	146	146
	NSWC	-.2322	18.81809	146	146
	NSCA	1.6791	1.17920	146	146
	NSFA	3.1457	4.94395	146	146
	NSTA	.7512	.57699	146	146
	EBITINT	-1002.7586	6314.48088	146	146
	TDTA	1.7692	1.29570	146	146
	LDTD	.4818	.27924	146	146
	SETA	-.7905	1.42240	146	146
	RETA	-.8900	1.34204	146	146
	EBITTA	-.1314	.57691	146	146
	EBITTD	-.0094	.49504	146	146
	NINS	-2.8574	12.99672	146	146
	NITA	-.2323	.58899	146	146
	CFNS	-2.0126	9.68116	146	146
	CFCL	-.1606	1.32873	146	146
	CFTA	-.2019	.59265	146	146
	CFTD	-.0548	.49693	146	146
Non-failed co.	CACL	1.7132	1.19055	170	170
	WCTA	.1535	.28807	170	170
	CATA	.6227	.28787	170	170
	CLTD	.8210	.25554	170	170
	NSWC	-3.2007	73.82171	170	170
	NSCA	1.9897	1.54611	170	170

	NSFA	21.2764	60.27742	170	170
	NSTA	1.1873	1.21751	170	170
	EBITINT	-182.2392	4734.37260	170	170
	TDTA	.5951	.31653	170	170
	LDTD	.1746	.25268	170	170
	SETA	.5970	.57934	170	170
	RETA	.0979	.33374	170	170
	EBITTA	.1230	.25442	170	170
	EBITTD	.2538	.49356	170	170
	NINS	.0699	.31334	170	170
	NITA	.0808	.22938	170	170
	CFNS	.1077	.31817	170	170
	CFCL	.2858	.49793	170	170
	CFTA	.1030	.23049	170	170
	CFTD	.2205	.44761	170	170

Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
CACL	.998	.482	1	314	.488
WCTA	.829	64.858	1	314	.000
CATA	.980	6.377	1	314	.012
CLTD	.756	101.099	1	314	.000
NSWC	.999	.224	1	314	.637
NSCA	.988	3.929	1	314	.048
NSFA	.960	13.127	1	314	.000
NSTA	.952	15.695	1	314	.000
EBITINT	.995	1.735	1	314	.189
TDTA	.706	130.591	1	314	.000
LDTD	.749	105.274	1	314	.000
SETA	.698	135.632	1	314	.000
RETA	.785	85.976	1	314	.000
EBITTA	.921	26.966	1	314	.000
EBITTD	.934	22.262	1	314	.000
NINS	.973	8.623	1	314	.004
NITA	.885	40.827	1	314	.000
CFNS	.975	8.148	1	314	.005
CFCL	.950	16.496	1	314	.000
CFTA	.891	38.265	1	314	.000
CFTD	.921	26.823	1	314	.000

Pooled Within-Groups Matrices(a)

		CACL	WCTA	CATA	CLTD	NSWC	NSCA	NSFA	NSTA	EBITINT	TDTA	LDTD	SETA	RETA	EBITTA	EBITTD	NINS	NITA	CFNS	CFCL	CFTA	CFTD
Covariance	CACL	10.055	.526	.125	-.198	3.898	-.387	4.400	.051	354.852	-.422	.193	.359	.186	.070	.105	.535	.092	1.386	1.339	.086	.115
	WCTA	.526	.260	.021	-.056	1.181	.068	2.708	.087	-137.772	-.215	.054	.211	.219	.064	.026	1.806	.072	1.591	.039	.073	.026
	CATA	.125	.021	.071	.013	-.424	-.106	3.741	.092	-26.532	.062	-.014	-.075	-.033	-.004	-.006	-.181	-.005	-.142	-.010	-.008	-.011
	CLTD	-.198	-.056	.013	.071	.004	-.053	.585	.005	161.883	-.037	-.070	.032	.011	.007	.020	-.166	.006	-.193	.026	.005	.016
	NSWC	3.898	1.181	-.424	.004	3096.616	-13.464	-45.162	-11.577	-515.230	-2.394	-.022	1.916	1.690	.447	1.028	.555	.421	.689	1.145	.381	.882
	NSCA	-.387	.068	-.106	-.053	-13.464	1.929	23.484	.943	605.781	-.267	.059	.355	.262	.087	.081	2.010	.079	1.389	.034	.092	.067
	NSFA	4.400	2.708	3.741	.585	-45.162	23.484	1966.825	30.665	3134.052	.372	-.548	.637	.920	1.663	3.035	3.684	.909	2.090	.764	.698	1.098
	NSTA	.051	.087	.092	.005	-11.577	.943	30.665	.952	290.544	-.045	-.002	.073	.096	.056	.068	.889	.046	.596	.025	.044	.037
	EBITINT	354.9	-137.8	-26.53	161.9	-515.2	605.8	3134.1	290.5	30476277	-1062.	-162.1	1609.1	-82.823	79.653	102.290	-846.1	27.507	-460.7	251.946	41.702	84.691
	TDTA	-.422	-.215	.062	-.037	-2.394	-.267	.372	-.045	-1062.466	.829	.038	-.864	-.627	-.144	-.067	-2.599	-.152	-2.001	-.157	-.156	-.063
	LDTD	.193	.054	-.014	-.070	-.022	.059	-.548	-.002	-162.143	.038	.070	-.033	-.012	-.007	-.019	.170	-.005	.197	-.025	-.004	-.015
	SETA	.359	.211	-.075	.032	1.916	.355	.637	.073	1609.101	-.864	-.033	1.115	.730	.165	.082	2.644	.168	2.056	.173	.173	.078
	RETA	.186	.219	-.033	.011	1.690	.262	.920	.096	-82.823	-.627	-.012	.730	.892	.180	.076	2.905	.188	2.060	.169	.190	.073
	EBITTA	.070	.064	-.004	.007	.447	.087	1.663	.056	79.653	-.144	-.007	.165	.180	.189	.146	.538	.183	.618	.223	.184	.134
	EBITTD	.105	.026	-.006	.020	1.028	.081	3.035	.068	102.290	-.067	-.019	.082	.076	.146	.244	.198	.136	.210	.303	.137	.220
	NINS	.535	1.806	-.181	-.166	.555	2.010	3.684	.889	-846.068	-2.599	.170	2.644	2.905	.538	.198	78.055	.559	52.365	.354	.582	.179
	NITA	.092	.072	-.005	.006	.421	.079	.909	.046	27.507	-.152	-.005	.168	.188	.183	.136	.559	.189	.631	.230	.189	.137
	CFNS	1.386	1.591	-.142	-.193	.689	1.389	2.090	.596	-460.690	-2.001	.197	2.056	2.060	.618	.210	52.365	.631	43.335	.420	.648	.197
	CFCL	1.339	.039	-.010	.026	1.145	.034	.764	.025	251.946	-.157	-.025	.173	.169	.223	.303	.354	.230	.420	.949	.231	.308
	CFTA	.086	.073	-.008	.005	.381	.092	.698	.044	41.702	-.156	-.004	.173	.190	.184	.137	.582	.189	.648	.231	.191	.138
	CFTD	.115	.026	-.011	.016	.882	.067	1.098	.037	84.691	-.063	-.015	.078	.073	.134	.220	.179	.137	.197	.308	.138	.222
Correlation	CACL	1.000	.326	.148	-.234	.022	-.088	.031	.016	.020	-.146	.230	.107	.062	.051	.067	.019	.067	.066	.433	.062	.077
	WCTA	.326	1.000	.155	-.413	.042	.096	.120	.176	-.049	-.464	.399	.392	.455	.290	.103	.401	.325	.474	.079	.326	.109
	CATA	.148	.155	1.000	.177	-.029	-.286	.317	.356	-.018	.254	-.192	-.268	-.133	-.038	-.044	-.077	-.043	-.081	-.039	-.072	-.084
	CLTD	-.234	-.413	.177	1.000	.000	-.144	.049	.019	.110	-.152	-.989	.114	.044	.061	.152	-.070	.048	-.110	.101	.040	.128
	NSWC	.022	.042	-.029	.000	1.000	-.174	-.018	-.213	-.002	-.047	-.002	.033	.032	.019	.037	.001	.017	.002	.021	.016	.034
	NSCA	-.088	.096	-.286	-.144	-.174	1.000	.381	.696	.079	-.211	.159	.242	.200	.144	.118	.164	.132	.152	.025	.151	.102
	NSFA	.031	.120	.317	.049	-.018	.381	1.000	.709	.013	.009	-.047	.014	.022	.086	.138	.009	.047	.007	.018	.036	.053
	NSTA	.016	.176	.356	.019	-.213	.696	.709	1.000	.054	-.051	-.007	.071	.105	.133	.141	.103	.108	.093	.026	.102	.081
	EBITINT	.020	-.049	-.018	.110	-.002	.079	.013	.054	1.000	-.211	-.111	.276	-.016	.033	.037	-.017	.011	-.013	.047	.017	.033
	TDTA	-.146	-.464	.254	-.152	-.047	-.211	.009	-.051	-.211	1.000	.157	-.898	-.729	-.365	-.148	-.323	-.385	-.334	-.177	-.391	-.147
	LDTD	.230	.399	-.192	-.989	-.002	.159	-.047	-.007	-.111	.157	1.000	-.117	-.048	-.063	-.143	.073	-.044	.113	-.096	-.035	-.120
	SETA	.107	.392	-.268	.114	.033	.242	.014	.071	.276	-.898	-.117	1.000	.732	.360	.156	.283	.367	.296	.168	.376	.157
	RETA	.062	.455	-.133	.044	.032	.200	.022	.105	-.016	-.729	-.048	.732	1.000	.438	.163	.348	.458	.331	.184	.462	.165
	EBITTA	.051	.290	-.038	.061	.019	.144	.086	.133	.033	-.365	-.063	.360	.438	1.000	.682	.140	.969	.216	.527	.970	.653
	EBITTD	.067	.103	-.044	.152	.037	.118	.138	.141	.037	-.148	-.143	.156	.163	.682	1.000	.045	.634	.065	.630	.633	.946
	NINS	.019	.401	-.077	-.070	.001	.164	.009	.103	-.017	-.323	.073	.283	.348	.140	.045	1.000	.146	.900	.041	.151	.043
	NITA	.067	.325	-.043	.048	.017	.132	.047	.108	.011	-.385	-.044	.367	.458	.969	.634	.146	1.000	.221	.544	.998	.672
	CFNS	.066	.474	-.081	-.110	.002	.152	.007	.093	-.013	-.334	.113	.296	.331	.216	.065	.900	.221	1.000	.066	.225	.064
	CFCL	.433	.079	-.039	.101	.021	.025	.018	.026	.047	-.177	-.096	.168	.184	.527	.630	.041	.544	.066	1.000	.542	.672

	CFTA	.062	.326	-.072	.040	.016	.151	.036	.102	.017	-.391	-.035	.376	.462	.970	.633	.151	.998	.225	.542	1.000	.671
	CFTD	.077	.109	-.084	.128	.034	.102	.053	.081	.033	-.147	-.120	.157	.165	.653	.946	.043	.672	.064	.672	.671	1.000

a The covariance matrix has 314 degrees of freedom.

Covariance Matrices(a)

Group		CACL	WCTA	CATA	CLTD	NSWC	NSCA	NSFA	NSTA	EBITINT	TDTA	LDTD	SETA	RETA	EBITTA	EBITTD	NINS	NITA	CFNS	CFCL	CFTA	CFTD
Failed co.	CACL	20.123	.856	.145	-.353	1.988	-.597	.070	-.096	-162.894	-.752	.353	.691	.299	.181	.152	1.172	.224	3.021	2.691	.216	.165
	WCTA	.856	.466	-.009	-.108	.676	.184	.475	.069	-542.932	-.434	.108	.437	.439	.140	.052	3.927	.158	3.467	.073	.161	.055
	CATA	.145	-.009	.057	.020	.123	-.168	.449	.020	-193.797	.093	-.020	-.107	-.076	-.011	-5.47E-	-.368	-.011	-.273	.007	-.014	-.001
	CLTD	-.353	-.108	.020	.078	-.031	-.042	.451	.037	390.088	-.052	-.078	.055	.011	.001	.005	-.385	-.004	-.441	.024	-.006	-6.44E-
	NSWC	1.988	.676	.123	-.031	354.120	1.260	10.837	1.188	-2195.910	-1.407	.032	1.040	1.884	.477	.549	.700	.492	.680	.561	.407	.501
	NSCA	-.597	.184	-.168	-.042	1.260	1.391	1.665	.418	1039.929	-.630	.042	.651	.563	.114	.077	4.307	.131	2.971	.030	.147	.090
	NSFA	.070	.475	.449	.451	10.837	1.665	24.443	2.228	1602.706	-1.185	-.451	1.234	1.576	.679	.962	8.336	.746	5.733	1.428	.711	.971
	NSTA	-.096	.069	.020	.037	1.188	.418	2.228	.333	303.528	-.205	-.037	.180	.198	.061	.064	1.928	.069	1.319	.065	.069	.067
	EBITINT	-162.9	-542.9	-193.8	390.1	-2196	1040	1603	304	39872668	-2218	-390	3105	-276	88.4	51	-2021	-13.3	-1194	253.3	5.987	2.317
	TDTA	-.752	-.434	.093	-.052	-1.407	-.630	-1.185	-.205	-2218.491	1.679	.052	-1.775	-1.312	-.310	-.104	-5.609	-.324	-4.308	-.274	-.329	-.092
	LDTD	.353	.108	-.020	-.078	.032	.042	-.451	-.037	-389.902	.052	.078	-.055	-.011	-.001	-.005	.385	.004	.441	-.024	.006	5.81E-005
	SETA	.691	.437	-.107	.055	1.040	.651	1.234	.180	3105.162	-1.775	-.055	2.023	1.476	.350	.114	5.709	.360	4.427	.302	.366	.099
	RETA	.299	.439	-.076	.011	1.884	.563	1.576	.198	-276.002	-1.312	-.011	1.476	1.801	.382	.135	6.282	.402	4.449	.327	.407	.129
	EBITTA	.181	.140	-.011	.001	.477	.114	.679	.061	88.392	-.310	-.001	.350	.382	.333	.202	1.111	.335	1.283	.388	.337	.198
	EBITTD	.152	.052	-5.47E-006	.005	.549	.077	.962	.064	50.884	-.104	-.005	.114	.135	.202	.245	.328	.204	.355	.418	.204	.243
	NINS	1.172	3.927	-.368	-.385	.700	4.307	8.336	1.928	-2020.576	-5.609	.385	5.709	6.282	1.111	.328	168.915	1.155	113.283	.645	1.202	.285
	NITA	.224	.158	-.011	-.004	.492	.131	.746	.069	-13.334	-.324	.004	.360	.402	.335	.204	1.155	.347	1.311	.402	.349	.206
	CFNS	3.021	3.467	-.273	-.441	.680	2.971	5.733	1.319	-1194.334	-4.308	.441	4.427	4.449	1.283	.355	113.283	1.311	93.725	.787	1.345	.323
	CFCL	2.691	.073	.007	.024	.561	.030	1.428	.065	253.218	-.274	-.024	.302	.327	.388	.418	.645	.402	.787	1.766	.402	.423
	CFTA	.216	.161	-.014	-.006	.407	.147	.711	.069	5.987	-.329	.006	.366	.407	.337	.204	1.202	.349	1.345	.402	.351	.207
	CFTD	.165	.055	-.001	-6.44E-005	.501	.090	.971	.067	2.317	-.092	5.81E-005	.099	.129	.198	.243	.285	.206	.323	.423	.207	.247
Non-failed co.	CACL	1.417	.243	.108	-.065	5.536	-.207	8.116	.177	799.072	-.138	.055	.074	.089	-.025	.064	-.010	-.021	-.017	.178	-.025	.072
	WCTA	.243	.083	.047	-.012	1.614	-.032	4.624	.103	209.850	-.028	.007	.016	.030	-.001	.004	-.014	-.002	-.018	.010	-.003	.001
	CATA	.108	.047	.083	.006	-.893	-.052	6.566	.154	116.979	.034	-.008	-.048	.003	.001	-.011	-.021	.000	-.030	-.025	-.003	-.019
	CLTD	-.065	-.012	.006	.065	.035	-.063	.701	-.023	-33.914	-.024	-.063	.012	.011	.012	.033	.022	.014	.020	.029	.014	.030
	NSWC	5.536	1.614	-.893	.035	5449.645	-26.098	-93.209	-22.530	926.774	-3.241	-.069	2.669	1.523	.422	1.439	.430	.361	.696	1.647	.359	1.209
	NSCA	-.207	-.032	-.052	-.063	-26.098	2.390	42.203	1.393	233.287	.045	.073	.101	.003	.064	.084	.038	.035	.032	.037	.045	.047
	NSFA	8.116	4.624	6.566	.701	-93.209	42.203	3633.367	55.065	4447.929	1.708	-.632	.124	.357	2.508	4.813	-.307	1.050	-1.036	.194	.687	1.207
	NSTA	.177	.103	.154	-.023	-22.530	1.393	55.065	1.482	279.404	.092	.029	-.019	.010	.052	.071	-.002	.025	-.025	-.010	.021	.012
	EBITINT	799	210	117	-34	927	233	4448	279	22414284	-71	33	326	83	72	146	162	63	169	251	72	155
	TDTA	-.138	-.028	.034	-.024	-3.241	.045	1.708	.092	-70.611	.100	.026	-.082	-.040	-.003	-.034	-.017	-.005	-.021	-.056	-.007	-.038
	LDTD	.055	.007	-.008	-.063	-.069	.073	-.632	.029	33.271	.026	.064	-.014	-.013	-.013	-.031	-.014	-.013	-.012	-.026	-.013	-.028
	SETA	.074	.016	-.048	.012	2.669	.101	.124	-.019	325.499	-.082	-.014	.336	.089	.006	.054	.014	.003	.022	.062	.008	.060
	RETA	.089	.030	.003	.011	1.523	.003	.357	.010	82.922	-.040	-.013	.089	.111	.006	.026	.008	.003	.010	.034	.005	.026

	EBITTA	-.025	-.001	.001	.012	.422	.064	2.508	.052	72.155	-.003	-.013	.006	.006	.065	.098	.047	.052	.048	.081	.053	.078
	EBITTD	.064	.004	-.011	.033	1.439	.084	4.813	.071	146.396	-.034	-.031	.054	.026	.098	.244	.086	.078	.086	.205	.079	.201
	NINS	-.010	-.014	-.021	.022	.430	.038	-.307	-.002	161.647	-.017	-.014	.014	.008	.047	.086	.098	.049	.099	.104	.050	.089
	NITA	-.021	-.002	.000	.014	.361	.035	1.050	.025	62.548	-.005	-.013	.003	.003	.052	.078	.049	.053	.048	.082	.053	.078
	CFNS	-.017	-.018	-.030	.020	.696	.032	-1.036	-.025	168.769	-.021	-.012	.022	.010	.048	.086	.099	.048	.101	.106	.049	.089
	CFCL	.178	.010	-.025	.029	1.647	.037	.194	-.010	250.855	-.056	-.026	.062	.034	.081	.205	.104	.082	.106	.248	.084	.210
	CFTA	-.025	-.003	-.003	.014	.359	.045	.687	.021	72.345	-.007	-.013	.008	.005	.053	.079	.050	.053	.049	.084	.053	.079
	CFTD	.072	.001	-.019	.030	1.209	.047	1.207	.012	155.368	-.038	-.028	.060	.026	.078	.201	.089	.078	.089	.210	.079	.200
Total	CACL	10.039	.553	.129	-.179	3.701	-.367	5.509	.078	404.545	-.493	.173	.444	.247	.085	.121	.715	.111	1.513	1.362	.105	.132
	WCTA	.553	.312	.030	-.021	.834	.103	4.793	.138	-42.592	-.350	.018	.370	.332	.093	.056	2.138	.108	1.831	.091	.108	.058
	CATA	.129	.030	.072	.018	-.479	-.100	4.072	.100	-10.932	.039	-.019	-.049	-.015	.000	-.001	-.125	.001	-.101	-.002	-.003	-.005
	CLTD	-.179	-.021	.018	.094	-.220	-.030	1.952	.038	223.283	-.125	-.093	.137	.086	.026	.040	.055	.029	-.032	.060	.028	.037
	NSWC	3.701	.834	-.479	-.220	3089	-14	-58	-12	-1121	-2	.205	.883	.953	.258	.830	-1.614	.188	-.883	.811	.154	.676
	NSCA	-.367	.103	-.100	-.030	-13.652	1.947	24.813	.974	667.409	-.357	.035	.461	.337	.106	.101	2.230	.103	1.549	.068	.115	.088
	NSFA	5.51	4.793	4.072	1.952	-58.439	24.813	2042.548	32.539	6833.544	-4.9	-1.935	6.908	5.383	2.808	4.215	16.906	2.322	11.669	2.779	2.075	2.339
	NSTA	.078	.138	.100	.038	-11.863	.974	32.539	.996	378.836	-.173	-.035	.224	.204	.084	.096	1.205	.080	.824	.073	.077	.067
	EBITINT	405	-43	-11	223	-1121	667	6834	379	30547400	-1299	-224	1888	120	131	156	-244	91	-25	342	104	141
	TDTA	-.493	-.350	.039	-.125	-1.518	-.357	-4.938	-.173	-1299.317	1.170	.128	-1.27	-.914	-.218	-.143	-3.448	-.244	-2.615	-.287	-.244	-.143
	LDTD	.173	.018	-.019	-.093	.205	.035	-1.935	-.035	-224.462	.128	.094	-.139	-.088	-.027	-.039	-.054	-.029	.034	-.059	-.027	-.036
	SETA	.444	.370	-.049	.137	.883	.461	6.908	.224	1887.9	-1.27	-.139	1.591	1.069	.253	.172	3.648	.276	2.783	.326	.278	.173
	RETA	.247	.332	-.015	.086	.953	.337	5.383	.204	119.565	-.914	-.088	1.069	1.132	.242	.141	3.617	.264	2.575	.278	.265	.141
	EBITTA	.085	.093	.000	.026	.258	.106	2.808	.084	131.452	-.218	-.027	.253	.242	.204	.163	.722	.202	.750	.250	.203	.151
	EBITTD	.121	.056	-.001	.040	.830	.101	4.215	.096	155.800	-.143	-.039	.172	.141	.163	.261	.389	.156	.349	.331	.156	.238
	NINS	.715	2.138	-.125	.055	-1.614	2.230	16.906	1.205	-244.472	-3.5	-.054	3.648	3.617	.722	.389	79.944	.786	53.747	.678	.802	.380
	NITA	.111	.108	.001	.029	.188	.103	2.322	.080	91.464	-.244	-.029	.276	.264	.202	.156	.786	.212	.795	.264	.212	.158
	CFNS	1.513	1.831	-.101	-.032	-.883	1.549	11.669	.824	-25.433	-2.6	.034	2.783	2.575	.750	.349	53.747	.795	44.318	.655	.807	.342
	CFCL	1.362	.091	-.002	.060	.811	.068	2.779	.073	342.473	-.287	-.059	.326	.278	.250	.331	.678	.264	.655	.995	.264	.338
	CFTA	.105	.108	-.003	.028	.154	.115	2.075	.077	103.945	-.244	-.027	.278	.265	.203	.156	.802	.212	.807	.264	.213	.159
	CFTD	.132	.058	-.005	.037	.676	.088	2.339	.067	140.739	-.143	-.036	.173	.141	.151	.238	.380	.158	.342	.338	.159	.240

a The total covariance matrix has 315 degrees of freedom.

Analysis 1

Box's Test of Equality of Covariance Matrices

Log Determinants

Group	Rank	Log Determinant
Failed co.	3	-3.566
Non-failed co.	3	-6.363
Pooled within-groups	3	-4.344

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Test Results

Box's M		228.416
F	Approx.	37.672
	df1	6
	df2	671877.500
	Sig.	.000

Tests null hypothesis of equal population covariance matrices.

Stepwise Statistics

Variables Entered/Removed(a,b,c,d)

Step	Entered	Wilks' Lambda							
		Statistic	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	SETA	.698	1	1	314.000	135.632	1	314.000	.000
2	LDTD	.593	2	1	314.000	107.597	2	313.000	.000
3	WCTA	.509	3	1	314.000	100.328	3	312.000	.000

At each step, the variable that minimizes the overall Wilks' Lambda is entered.

a Maximum number of steps is 30.

b Minimum partial F to enter is 3.84.

c Maximum partial F to remove is 2.71.

d F level, tolerance, or VIN insufficient for further computation.

Variables in the Analysis

Step		**Tolerance**	**F to Remove**	**Wilks' Lambda**
1	SETA	1.000	135.632	
2	SETA	.986	82.571	.749
	LDTD	.986	55.863	.698
3	SETA	.758	11.729	.528
	LDTD	.753	102.796	.677
	WCTA	.646	51.245	.593

Wilks' Lambda

Step	Number of Variables	Lambda	df1	df2	df3	Exact F			
						Statistic	df1	df2	Sig.
1	1	.698	1	1	314	135.632	1	314.000	.000

2	2	.593	2	1	314	107.597	2	313.000	.000
3	3	.509	3	1	314	100.328	3	312.000	.000

Summary of Canonical Discriminant Functions

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.965(a)	100.0	100.0	.701

a First 1 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.509	211.042	3	.000

Standardized Canonical Discriminant Function Coefficients

	Function
	1
WCTA	.667
LDTD	-.819
SETA	.312

Canonical Discriminant Function Coefficients

	Function
	1
WCTA	1.308
LDTD	-3.086
SETA	.296
(Constant)	1.069

Unstandardized coefficients

Functions at Group Centroids

	Function
Group	1
Failed co.	-1.056
Non-failed co.	.907

Unstandardized canonical discriminant functions evaluated at group means

Classification Statistics

Classification Processing Summary

Processed		316
Excluded	Missing or out-of-range group codes	0
	At least one missing discriminating variable	0
Used in Output		316

Prior Probabilities for Groups

Group	Prior	Cases Used in Analysis	
		Unweighted	Weighted
Failed co.	.462	146	146.000

Non-failed co.	.538	170	170.000
Total	1.000	316	316.000

Classification Function Coefficients

	Group	
	Failed co.	Non-failed co.
WCTA	-3.319	-.750
LDTD	9.479	3.418
SETA	.197	.778
(Constant)	-3.491	-1.093

Fisher's linear discriminant functions

Classification Results(a)

				Predicted group membership		
			Group	Failed co.	Non-failed co.	Total
Cases Selected	Original	Count	Failed co.	124	22	146
			Non-failed co.	28	142	170
		%	Failed co.	84.9	15.1	100.0
			Non-failed co.	16.5	83.5	100.0

a 84.2% of selected original grouped cases correctly classified.

Casewise Statistics

Case number	Highest group						Second Highest Group			Discriminant scores
	Actual group	Predicted group	P (D > d / G = g)			Squared Mahalanobis Distance to Centroid	Group	P(G=g | D=d)	Squared Mahalanobis Distance to Centroid	Function 1
			p	df	P(G=g | D=d)					
1	0	0	.886	1	.817	.021	1	.183	3.315	-.913
2	0	0	.931	1	.833	.008	1	.167	3.523	-.970
3	0	0	.860	1	.807	.031	1	.193	3.196	-.880
4	0	0	.784	1	.775	.075	1	.225	2.853	-.782
5	0	0	.773	1	.770	.083	1	.230	2.805	-.768
6	0	0	.977	1	.848	.001	1	.152	3.745	-1.028
7	0	0	.991	1	.858	.000	1	.142	3.901	-1.068
8	0	0	.941	1	.872	.006	1	.128	4.155	-1.131
9	0	0	.941	1	.872	.005	1	.128	4.151	-1.130
10	0	0	.951	1	.869	.004	1	.131	4.101	-1.118
11	0	0	.861	1	.893	.030	1	.107	4.573	-1.231
12	0	0	.504	1	.956	.446	1	.044	6.925	-1.724
13	0	0	.487	1	.959	.483	1	.041	7.071	-1.752
14	0	0	.893	1	.885	.018	1	.115	4.401	-1.191
15	0	0	.796	1	.908	.067	1	.092	4.941	-1.316
16	0	0	.743	1	.918	.107	1	.082	5.251	-1.384
17	0	0	.704	1	.926	.144	1	.074	5.492	-1.436
18	0	0	.652	1	.935	.203	1	.065	5.830	-1.507
19	0	0	.516	1	.955	.423	1	.045	6.833	-1.707
20	0	0	.408	1	.537	.686	1	.463	1.290	-.228
21	0	0	.837	1	.898	.042	1	.102	4.706	-1.262
22	0	0	.754	1	.916	.098	1	.084	5.185	-1.370
23	0	1(**)	.668	1	.775	.185	0	.225	2.354	.478
24	0	1(**)	.428	1	.628	.629	0	.372	1.371	.114
25	0	1(**)	.307	1	.518	1.045	0	.482	.887	-.115
26	0	0	.611	1	.685	.258	1	.315	2.119	-.548
27	0	0	.771	1	.770	.084	1	.230	2.800	-.766
28	0	0	.888	1	.817	.020	1	.183	3.323	-.916
29	0	0	.631	1	.697	.231	1	.303	2.201	-.576
30	0	0	.824	1	.792	.050	1	.208	3.031	-.834
31	0	0	.963	1	.843	.002	1	.157	3.675	-1.010
32	0	0	.995	1	.857	.000	1	.143	3.879	-1.062

33	0	0	.949	1	.870	.004	1	.130	4.111	-1.120
34	0	0	.639	1	.702	.220	1	.298	2.234	-.587
35	0	0	.612	1	.685	.258	1	.315	2.120	-.549
36	0	0	.968	1	.845	.002	1	.155	3.699	-1.016
37	0	1(**)	.555	1	.716	.348	0	.284	1.888	.318
38	0	1(**)	.456	1	.649	.555	0	.351	1.485	.162
39	0	0	.491	1	.605	.474	1	.395	1.627	-.368
40	0	1(**)	.320	1	.532	.989	0	.468	.939	-.087
41	0	0	.725	1	.748	.123	1	.252	2.600	-.705
42	0	0	.258	1	.982	1.279	1	.018	9.577	-2.187
43	0	0	.033	1	.997	4.535	1	.003	16.756	-3.186
44	0	0	.027	1	.998	4.863	1	.002	17.381	-3.262
45	0	0	.744	1	.757	.107	1	.243	2.680	-.730
46	0	0	.892	1	.819	.018	1	.181	3.341	-.921
47	0	1(**)	.330	1	.542	.949	0	.458	.979	-.067
48	0	0	.562	1	.654	.337	1	.346	1.914	-.476
49	0	0	.606	1	.682	.265	1	.318	2.099	-.541
50	0	0	.906	1	.824	.014	1	.176	3.407	-.939
51	0	0	.972	1	.863	.001	1	.137	3.993	-1.091
52	0	0	.822	1	.902	.051	1	.098	4.790	-1.281
53	0	0	.958	1	.842	.003	1	.158	3.651	-1.003
54	0	0	.603	1	.680	.270	1	.320	2.086	-.537
55	0	0	.753	1	.761	.099	1	.239	2.719	-.742
56	0	0	.404	1	.535	.695	1	.465	1.277	-.223
57	0	1(**)	.335	1	.547	.928	0	.453	1.001	-.056
58	0	1(**)	.375	1	.584	.786	0	.416	1.160	.021
59	0	1(**)	.379	1	.587	.773	0	.413	1.176	.028
60	0	1(**)	.375	1	.584	.787	0	.416	1.160	.020
61	0	1(**)	.582	1	.731	.302	0	.269	2.000	.358
62	0	0	.599	1	.677	.277	1	.323	2.066	-.530
63	0	0	.779	1	.911	.079	1	.089	5.040	-1.338
64	0	0	.139	1	.991	2.188	1	.009	11.855	-2.536
65	0	0	.902	1	.823	.015	1	.177	3.387	-.933
66	0	0	.974	1	.847	.001	1	.153	3.728	-1.023
67	0	0	.810	1	.904	.058	1	.096	4.858	-1.297
68	0	0	.790	1	.909	.071	1	.091	4.974	-1.323
69	0	0	.832	1	.900	.045	1	.100	4.735	-1.269

70	0	0	.781	1	.911	.078	1	.089	5.028	-1.335
71	0	0	.816	1	.903	.054	1	.097	4.826	-1.289
72	0	0	.389	1	.970	.743	1	.030	7.985	-1.918
73	0	0	.321	1	.976	.984	1	.024	8.738	-2.049
74	0	0	.231	1	.984	1.433	1	.016	9.992	-2.254
75	0	0	.681	1	.725	.169	1	.275	2.413	-.646
76	0	0	.843	1	.800	.039	1	.200	3.117	-.858
77	0	0	.850	1	.803	.036	1	.197	3.151	-.868
78	0	0	.939	1	.835	.006	1	.165	3.560	-.980
79	0	0	.122	1	.992	2.397	1	.008	12.335	-2.605
80	0	0	.394	1	.969	.728	1	.031	7.935	-1.910
81	0	1(**)	.649	1	.766	.208	0	.234	2.275	.452
82	0	0	.598	1	.677	.279	1	.323	2.062	-.529
83	0	0	.599	1	.943	.277	1	.057	6.201	-1.583
84	0	0	.140	1	.991	2.183	1	.009	11.842	-2.534
85	0	0	.737	1	.919	.113	1	.081	5.288	-1.392
86	0	0	.227	1	.984	1.458	1	.016	10.056	-2.264
87	0	0	.100	1	.993	2.710	1	.007	13.033	-2.703
88	0	0	.156	1	.990	2.017	1	.010	11.451	-2.477
89	0	0	.115	1	.992	2.481	1	.008	12.523	-2.631
90	0	0	.211	1	.986	1.564	1	.014	10.333	-2.307
91	0	1(**)	.891	1	.860	.019	0	.140	3.338	.770
92	0	1(**)	.590	1	.735	.290	0	.265	2.031	.369
93	0	0	.499	1	.610	.457	1	.390	1.659	-.381
94	0	0	.669	1	.932	.183	1	.068	5.718	-1.484
95	0	0	.002	1	1.000	9.193	1	.000	24.959	-4.089
96	0	0	.402	1	.532	.703	1	.468	1.266	-.218
97	0	0	.950	1	.870	.004	1	.130	4.109	-1.120
98	0	0	.000	1	1.000	15.515	1	.000	34.842	-4.995
99	0	0	.000	1	1.000	17.545	1	.000	37.853	-5.245
100	0	0	.006	1	.999	7.460	1	.001	22.045	-3.788
101	0	0	.889	1	.886	.020	1	.114	4.425	-1.196
102	0	0	.768	1	.768	.087	1	.232	2.785	-.762
103	0	0	.860	1	.807	.031	1	.193	3.195	-.880
104	0	0	.834	1	.899	.044	1	.101	4.725	-1.266
105	0	0	.497	1	.957	.460	1	.043	6.982	-1.735
106	0	0	.934	1	.834	.007	1	.166	3.538	-.974

107	0	0	.809	1	.786	.058	1	.214	2.965	-.815
108	0	0	.658	1	.712	.196	1	.288	2.314	-.614
109	0	0	.612	1	.941	.257	1	.059	6.105	-1.564
110	0	0	.000	1	1.000	39.011	1	.000	67.399	-7.302
111	0	0	.901	1	.883	.016	1	.117	4.362	-1.181
112	0	0	.991	1	.858	.000	1	.142	3.901	-1.068
113	0	1(**)	.543	1	.708	.369	0	.292	1.839	.300
114	0	1(**)	.582	1	.731	.303	0	.269	1.998	.357
115	0	0	.211	1	.986	1.565	1	.014	10.334	-2.307
116	0	0	.734	1	.752	.116	1	.248	2.636	-.716
117	0	0	.963	1	.866	.002	1	.134	4.040	-1.103
118	0	0	.490	1	.958	.477	1	.042	7.047	-1.747
119	0	0	.346	1	.974	.887	1	.026	8.443	-1.998
120	0	0	.816	1	.903	.054	1	.097	4.827	-1.290
121	0	0	.967	1	.865	.002	1	.135	4.020	-1.098
122	0	0	.789	1	.777	.072	1	.223	2.875	-.788
123	0	0	.906	1	.824	.014	1	.176	3.409	-.939
124	0	0	.840	1	.799	.041	1	.201	3.103	-.854
125	0	0	.660	1	.714	.193	1	.286	2.324	-.617
126	0	0	.718	1	.744	.131	1	.256	2.567	-.695
127	0	0	.668	1	.718	.184	1	.282	2.356	-.628
128	0	0	.564	1	.656	.332	1	.344	1.924	-.480
129	0	0	.389	1	.521	.743	1	.479	1.214	-.194
130	0	0	.384	1	.517	.757	1	.483	1.196	-.186
131	0	0	.606	1	.682	.266	1	.318	2.098	-.541
132	0	0	.752	1	.761	.099	1	.239	2.717	-.741
133	0	0	.741	1	.755	.110	1	.245	2.666	-.726
134	0	0	.890	1	.818	.019	1	.182	3.335	-.919
135	0	0	.467	1	.586	.530	1	.414	1.528	-.329
136	0	1(**)	.963	1	.898	.002	0	.102	4.040	.954
137	0	1(**)	.720	1	.798	.129	0	.202	2.577	.549
138	0	1(**)	.864	1	.851	.029	0	.149	3.215	.736
139	0	1(**)	.686	1	.947	.163	0	.053	5.607	1.312
140	0	1(**)	.952	1	.900	.004	0	.100	4.098	.968
141	0	0	.698	1	.734	.150	1	.266	2.485	-.669
142	0	0	.581	1	.667	.304	1	.333	1.995	-.505
143	0	0	.751	1	.760	.101	1	.240	2.710	-.739

144	0	0	.872	1	.811	.026	1	.189	3.249	-.895
145	0	0	.583	1	.668	.301	1	.332	2.003	-.508
146	0	0	.836	1	.797	.043	1	.203	3.086	-.850
147	1	1	.526	1	.965	.402	0	.035	6.750	1.542
148	1	1	.485	1	.969	.488	0	.031	7.089	1.606
149	1	1	.646	1	.952	.211	0	.048	5.872	1.367
150	1	1	.663	1	.950	.190	0	.050	5.759	1.343
151	1	1	.614	1	.956	.254	0	.044	6.091	1.411
152	1	0(**)	.618	1	.689	.249	1	.311	2.145	-.557
153	1	0(**)	.580	1	.666	.307	1	.334	1.988	-.503
154	1	0(**)	.382	1	.515	.764	1	.485	1.188	-.182
155	1	0(**)	.530	1	.632	.395	1	.368	1.784	-.428
156	1	0(**)	.623	1	.693	.241	1	.307	2.169	-.566
157	1	0(**)	.394	1	.526	.726	1	.474	1.236	-.204
158	1	1	.743	1	.808	.108	0	.192	2.675	.579
159	1	1	.613	1	.748	.256	0	.252	2.125	.401
160	1	1	.900	1	.911	.016	0	.089	4.368	1.034
161	1	1	.778	1	.822	.079	0	.178	2.829	.625
162	1	1	.713	1	.796	.135	0	.204	2.548	.540
163	1	1	.945	1	.875	.005	0	.125	3.591	.839
164	1	1	.941	1	.902	.005	0	.098	4.151	.981
165	1	1	.836	1	.842	.043	0	.158	3.087	.701
166	1	0(**)	.699	1	.734	.150	1	.266	2.487	-.670
167	1	0(**)	.697	1	.733	.152	1	.267	2.478	-.667
168	1	1	.349	1	.560	.878	0	.440	1.054	-.030
169	1	1	.763	1	.816	.091	0	.184	2.764	.606
170	1	1	.502	1	.968	.451	0	.032	6.946	1.579
171	1	1	.333	1	.982	.937	0	.018	8.595	1.875
172	1	1	.439	1	.973	.599	0	.027	7.494	1.681
173	1	1	.305	1	.984	1.052	0	.016	8.936	1.933
174	1	1	.484	1	.969	.491	0	.031	7.099	1.608
175	1	1	.515	1	.966	.425	0	.034	6.841	1.559
176	1	1	.401	1	.977	.707	0	.023	7.865	1.748
177	1	1	.479	1	.970	.502	0	.030	7.140	1.616
178	1	1	.574	1	.960	.317	0	.040	6.384	1.470
179	1	1	.490	1	.969	.477	0	.031	7.044	1.598
180	1	1	.520	1	.966	.414	0	.034	6.797	1.551

181	1	1	.624	1	.954	.240	0	.046	6.022	1.397
182	1	1	.602	1	.957	.273	0	.043	6.180	1.430
183	1	1	.703	1	.944	.145	0	.056	5.497	1.288
184	1	1	.830	1	.924	.046	0	.076	4.745	1.122
185	1	1	.850	1	.921	.036	0	.079	4.637	1.097
186	1	1	.905	1	.910	.014	0	.090	4.340	1.027
187	1	1	.892	1	.913	.018	0	.087	4.407	1.043
188	1	1	.512	1	.688	.431	0	.312	1.709	.251
189	1	1	.558	1	.717	.344	0	.283	1.898	.321
190	1	1	.656	1	.770	.198	0	.230	2.307	.462
191	1	1	.690	1	.785	.159	0	.215	2.449	.508
192	1	1	.762	1	.815	.092	0	.185	2.757	.604
193	1	1	.770	1	.819	.085	0	.181	2.795	.615
194	1	1	.910	1	.909	.013	0	.091	4.312	1.020
195	1	1	.919	1	.907	.010	0	.093	4.266	1.009
196	1	1	.934	1	.904	.007	0	.096	4.190	.991
197	1	1	.784	1	.824	.075	0	.176	2.855	.633
198	1	1	.960	1	.898	.002	0	.102	4.054	.957
199	1	1	.766	1	.935	.088	0	.065	5.112	1.204
200	1	1	.335	1	.982	.931	0	.018	8.578	1.872
201	1	1	.332	1	.982	.941	0	.018	8.606	1.877
202	1	1	.693	1	.946	.156	0	.054	5.564	1.302
203	1	1	.425	1	.975	.638	0	.025	7.630	1.706
204	1	1	.909	1	.909	.013	0	.091	4.317	1.021
205	1	1	.408	1	.612	.684	0	.388	1.292	.080
206	1	1	.905	1	.910	.014	0	.090	4.338	1.026
207	1	1	.640	1	.953	.219	0	.047	5.914	1.375
208	1	1	.873	1	.916	.026	0	.084	4.511	1.067
209	1	1	.735	1	.805	.115	0	.195	2.642	.569
210	1	1	.975	1	.883	.001	0	.117	3.733	.876
211	1	1	.667	1	.775	.185	0	.225	2.353	.477
212	1	1	.579	1	.729	.308	0	.271	1.986	.353
213	1	1	.587	1	.959	.296	0	.041	6.288	1.451
214	1	1	.664	1	.949	.189	0	.051	5.751	1.342
215	1	1	.554	1	.962	.350	0	.038	6.530	1.499
216	1	1	.634	1	.953	.227	0	.047	5.953	1.383
217	1	1	.635	1	.953	.225	0	.047	5.943	1.381

218	1	1	.485	1	.969	.487	0	.031	7.084	1.605
219	1	1	.478	1	.970	.504	0	.030	7.148	1.617
220	1	1	.432	1	.631	.618	0	.369	1.386	.121
221	1	1	.880	1	.856	.023	0	.144	3.287	.756
222	1	1	.755	1	.937	.097	0	.063	5.179	1.219
223	1	1	.738	1	.939	.112	0	.061	5.283	1.242
224	1	1	.807	1	.928	.060	0	.072	4.878	1.152
225	1	1	.730	1	.940	.119	0	.060	5.330	1.252
226	1	1	.674	1	.948	.176	0	.052	5.683	1.327
227	1	1	.660	1	.950	.193	0	.050	5.777	1.347
228	1	1	.699	1	.945	.150	0	.055	5.526	1.294
229	1	1	.695	1	.945	.154	0	.055	5.549	1.299
230	1	1	.361	1	.980	.836	0	.020	8.283	1.821
231	1	1	.493	1	.969	.471	0	.031	7.022	1.593
232	1	1	.377	1	.978	.781	0	.022	8.108	1.791
233	1	1	.403	1	.976	.700	0	.024	7.841	1.744
234	1	1	.406	1	.976	.690	0	.024	7.810	1.738
235	1	1	.484	1	.969	.491	0	.031	7.098	1.608
236	1	1	.470	1	.971	.522	0	.029	7.217	1.630
237	1	1	.513	1	.967	.428	0	.033	6.854	1.562
238	1	1	.583	1	.959	.301	0	.041	6.313	1.456
239	1	1	.716	1	.942	.132	0	.058	5.415	1.271
240	1	0(**)	.871	1	.890	.026	1	.110	4.522	-1.219
241	1	0(**)	.953	1	.869	.004	1	.131	4.094	-1.116
242	1	0(**)	.995	1	.857	.000	1	.143	3.883	-1.063
243	1	0(**)	.944	1	.837	.005	1	.163	3.586	-.986
244	1	0(**)	.852	1	.804	.035	1	.196	3.157	-.869
245	1	0(**)	.485	1	.600	.488	1	.400	1.601	-.358
246	1	0(**)	.469	1	.588	.524	1	.412	1.538	-.333
247	1	1	.606	1	.744	.267	0	.256	2.095	.391
248	1	1	.813	1	.834	.056	0	.166	2.982	.670
249	1	1	.919	1	.868	.010	0	.132	3.468	.806
250	1	1	.731	1	.803	.118	0	.197	2.625	.564
251	1	1	.261	1	.986	1.265	0	.014	9.539	2.032
252	1	1	.532	1	.965	.390	0	.035	6.698	1.532
253	1	1	.600	1	.957	.275	0	.043	6.192	1.432
254	1	1	.612	1	.956	.257	0	.044	6.103	1.414

255	1	1	.481	1	.970	.497	0	.030	7.122	1.612
256	1	1	.338	1	.981	.920	0	.019	8.543	1.866
257	1	1	.376	1	.979	.783	0	.021	8.115	1.792
258	1	1	.336	1	.981	.926	0	.019	8.561	1.869
259	1	1	.257	1	.987	1.283	0	.013	9.588	2.040
260	1	1	.218	1	.989	1.517	0	.011	10.212	2.139
261	1	1	.838	1	.843	.042	0	.157	3.094	.703
262	1	1	.966	1	.881	.002	0	.119	3.692	.865
263	1	1	.979	1	.884	.001	0	.116	3.752	.880
264	1	1	.369	1	.979	.807	0	.021	8.191	1.806
265	1	1	.316	1	.983	1.004	0	.017	8.797	1.909
266	1	1	.061	1	.997	3.517	0	.003	14.739	2.783
267	1	1	.316	1	.983	1.004	0	.017	8.795	1.909
268	1	1	.405	1	.976	.694	0	.024	7.823	1.741
269	1	1	.449	1	.973	.572	0	.027	7.400	1.664
270	1	1	.751	1	.937	.100	0	.063	5.202	1.224
271	1	1	.407	1	.611	.687	0	.389	1.289	.079
272	1	1	.716	1	.797	.132	0	.203	2.561	.544
273	1	1	.089	1	.996	2.898	0	.004	13.442	2.610
274	1	1	.368	1	.979	.812	0	.021	8.207	1.808
275	1	1	.086	1	.996	2.944	0	.004	13.539	2.623
276	1	1	.578	1	.960	.309	0	.040	6.350	1.463
277	1	1	.257	1	.987	1.287	0	.013	9.599	2.042
278	1	1	.187	1	.991	1.738	0	.009	10.772	2.226
279	1	1	.424	1	.975	.638	0	.025	7.631	1.706
280	1	1	.436	1	.974	.606	0	.026	7.521	1.686
281	1	1	.315	1	.983	1.009	0	.017	8.811	1.912
282	1	1	.758	1	.814	.095	0	.186	2.739	.599
283	1	1	.583	1	.732	.301	0	.268	2.003	.359
284	1	1	.553	1	.714	.352	0	.286	1.878	.314
285	1	1	.388	1	.595	.745	0	.405	1.212	.044
286	1	0(**)	.368	1	.502	.811	1	.498	1.131	-.156
287	1	1	.380	1	.588	.772	0	.412	1.178	.029
288	1	1	.380	1	.588	.771	0	.412	1.179	.029
289	1	0(**)	.384	1	.517	.756	1	.483	1.197	-.187
290	1	0(**)	.384	1	.517	.756	1	.483	1.197	-.187
291	1	0(**)	.459	1	.579	.550	1	.421	1.495	-.315

292	1	0(**)	.444	1	.567	.587	1	.433	1.434	-.290
293	1	0(**)	.419	1	.547	.653	1	.453	1.336	-.249
294	1	0(**)	.463	1	.583	.538	1	.417	1.514	-.323
295	1	0(**)	.954	1	.869	.003	1	.131	4.087	-1.114
296	1	0(**)	.852	1	.895	.035	1	.105	4.625	-1.243
297	1	0(**)	.963	1	.866	.002	1	.134	4.039	-1.102
298	1	1	.883	1	.857	.022	0	.143	3.298	.760
299	1	1	.896	1	.861	.017	0	.139	3.359	.776
300	1	0(**)	.804	1	.784	.062	1	.216	2.943	-.808
301	1	0(**)	.670	1	.719	.182	1	.281	2.363	-.630
302	1	0(**)	.533	1	.635	.389	1	.365	1.797	-.433
303	1	1	.435	1	.634	.609	0	.366	1.401	.127
304	1	1	.479	1	.666	.501	0	.334	1.577	.199
305	1	1	.722	1	.799	.127	0	.201	2.585	.551
306	1	1	.859	1	.850	.031	0	.150	3.193	.730
307	1	1	.950	1	.876	.004	0	.124	3.616	.845
308	1	1	.837	1	.923	.042	0	.077	4.705	1.113
309	1	1	.507	1	.967	.440	0	.033	6.903	1.571
310	1	1	.656	1	.951	.199	0	.049	5.806	1.353
311	1	1	.460	1	.972	.547	0	.028	7.307	1.647
312	1	1	.693	1	.946	.156	0	.054	5.564	1.302
313	1	1	.640	1	.953	.219	0	.047	5.915	1.376
314	1	1	.722	1	.799	.127	0	.201	2.584	.551
315	1	1	.711	1	.943	.137	0	.057	5.450	1.278
316	1	1	.721	1	.942	.128	0	.058	5.389	1.265

❑ ❑

Appendix-VII

Logistic Regression Results

Case Processing Summary			
Unweighted Cases[a]		**N**	**Percent**
Selected Cases	Included in Analysis	316	100
	Missing Cases	0	.0
	Total	316	100
Dependent Variable Encoding			
Original Value			Internal Value
Failed co.			0
Non-failed co.			1

Block 1: Method = Forward Stepwise (Conditional)
Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	226.305	1	.000
	Block	226.305	1	.000
	Model	226.305	1	.000
Step 2	Step	42.516	1	.000
	Block	268.822	2	.000
	Model	268.822	2	.000
Step 3	Step	22.132	1	.000

	Block	290.954	3	.000
	Model	290.954	3	.000
Step 4	Step	13.072	1	.000
	Block	304.027	4	.000
	Model	304.027	4	.000
Step 5	Step	17.768	1	.000
	Block	321.795	5	.000
	Model	321.795	5	.000
Step 6	Step	5.541	1	.019
	Block	327.336	6	.000
	Model	327.336	6	.000
Step 7	Step	6.746	1	.009
	Block	334.082	7	.000
	Model	334.082	7	.000
Step 8	Step	3.613	1	.057
	Block	337.695	8	.000
	Model	337.695	8	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	209.939[a]	.511	.683
2	167.423[a]	.573	.765
3	145.290[a]	.602	.804
4	132.218[a]	.618	.825

5	114.450[b]	.639	.853
6	108.909[b]	.645	.862
7	102.163[b]	.653	.872
8	98.549[b]	.657	.877

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 9 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2.418	8	.965
2	6.071	8	.639
3	13.360	8	.100
4	17.033	8	.030
5	32.727	8	.000
6	23.963	8	.002
7	3.643	8	.888
8	5.586	8	.693

Contingency Table for Hosmer and Lemeshow Test

		Group = Failed co.		Group = Non-failed co.		Total
		Observed	Expected	Observed	Expected	

Step 1	1	32	31.998	0	.002	32
	2	32	31.529	0	.471	32
	3	26	27.246	6	4.754	32
	4	23	22.232	10	10.768	33
	5	12	14.386	20	17.614	32
	6	10	9.588	22	22.412	32
	7	7	5.374	25	26.626	32
	8	3	2.602	29	29.398	32
	9	1	.973	31	31.027	32
	10	0	.072	27	26.928	27
Step 2	1	32	31.999	0	.001	32
	2	32	31.681	0	.319	32
	3	30	29.571	2	2.429	32
	4	22	24.591	10	7.409	32
	5	19	15.734	13	16.266	32
	6	4	7.229	28	24.771	32
	7	5	3.543	27	28.457	32
	8	2	1.357	30	30.643	32
	9	0	.272	32	31.728	32
	10	0	.024	28	27.976	28
Step 3	1	32	32.000	0	.000	32
	2	32	31.806	0	.194	32
	3	32	30.251	0	1.749	32

	4	27	24.880	5	7.120	32
	5	12	17.403	20	14.597	32
	6	5	7.109	27	24.891	32
	7	5	1.921	27	30.079	32
	8	1	.469	31	31.531	32
	9	0	.144	32	31.856	32
	10	0	.018	28	27.982	28
Step 4	1	32	32.000	0	.000	32
	2	32	31.877	0	.123	32
	3	32	30.802	0	1.198	32
	4	29	26.453	3	5.547	32
	5	12	16.703	20	15.297	32
	6	4	5.709	28	26.291	32
	7	2	1.719	30	30.281	32
	8	3	.567	29	31.433	32
	9	0	.162	32	31.838	32
	10	0	.010	28	27.990	28
Step 5	1	32	32.000	0	.000	32
	2	32	31.939	0	.061	32
	3	32	31.331	0	.669	32
	4	30	28.353	2	3.647	32
	5	12	15.553	20	16.447	32
	6	4	4.790	28	27.210	32
	7	0	1.506	32	30.494	32

	8	4	.458	28	31.542	32
	9	0	.069	32	31.931	32
	10	0	.000	28	28.000	28
Step 6	1	32	32.000	0	.000	32
	2	32	31.958	0	.042	32
	3	32	31.472	0	.528	32
	4	30	28.540	2	3.460	32
	5	12	15.705	20	16.295	32
	6	5	4.579	27	27.421	32
	7	0	1.312	32	30.688	32
	8	3	.361	29	31.639	32
	9	0	.073	32	31.927	32
	10	0	.000	28	28.000	28
Step 7	1	32	32.000	0	.000	32
	2	32	31.966	0	.034	32
	3	32	31.574	0	.426	32
	4	29	29.223	3	2.777	32
	5	14	15.034	18	16.966	32
	6	4	4.540	28	27.460	32
	7	2	1.398	30	30.602	32
	8	1	.228	31	31.772	32
	9	0	.038	32	31.962	32
	10	0	.000	28	28.000	28

Step 8	1	32	32.000	0	.000	32
	2	32	31.973	0	.027	32
	3	32	31.645	0	.355	32
	4	30	29.230	2	2.770	32
	5	14	15.590	18	16.410	32
	6	3	4.207	29	27.793	32
	7	2	1.137	30	30.863	32
	8	1	.188	31	31.812	32
	9	0	.030	32	31.970	32
	10	0	.000	28	28.000	28

Model if Term Removed[a]

Variable		**Model Log Likelihood**	**Change in -2 Log Likelihood**	**df**	**Sig. of the Change**
Step 1	SETA	-218.976	228.014	1	.000
Step 2	CLTD	-106.655	45.888	1	.000
	SETA	-181.186	194.950	1	.000
Step 3	WCTA	-84.716	24.142	1	.000
	CLTD	-107.070	68.851	1	.000
	SETA	-118.631	91.971	1	.000
Step 4	WCTA	-69.190	6.162	1	.013
	CLTD	-95.707	59.196	1	.000
	NSFA	-72.830	13.442	1	.000

	SETA	-114.983	97.747	1	.000
Step 5	WCTA	-60.138	5.826	1	.016
	CLTD	-92.253	70.057	1	.000
	NSFA	-71.045	27.641	1	.000
	SETA	-109.491	104.531	1	.000
	RETA	-66.628	18.806	1	.000
Step 6	WCTA	-57.464	6.019	1	.014
	CLTD	-92.569	76.228	1	.000
	NSFA	-69.470	30.032	1	.000
	SETA	-110.865	112.822	1	.000
	RETA	-63.605	18.301	1	.000
	EBITTD	-57.316	5.723	1	.017
Step 7	WCTA	-54.624	7.086	1	.008
	CLTD	-90.981	79.800	1	.000
	NSFA	-68.057	33.951	1	.000
	NSTA	-54.779	7.396	1	.007
	SETA	-109.585	117.008	1	.000
	RETA	-60.080	17.998	1	.000
	EBITTD	-53.338	4.514	1	.034
Step 8	WCTA	-53.017	7.486	1	.006
	CLTD	-90.495	82.441	1	.000
	NSFA	-65.847	33.145	1	.000
	NSTA	-53.261	7.973	1	.005
	SETA	-105.139	111.729	1	.000

	RETA	-57.770	16.990	1	.000
	EBITTD	-53.369	8.189	1	.004
	CFTA	-51.139	3.729	1	.053
a. Based on conditional parameter estimates					

Variables not in the Equation

Steps			**Score**	**df**	**Sig.**
Step 1	Variables	WCTA	5.898	1	.015
		CLTD	41.577	1	.000
		NSFA	9.455	1	.002
		NSTA	5.819	1	.016
		TDTA	14.710	1	.000
		LDTD	40.652	1	.000
		RETA	.777	1	.378
		EBITTA	.040	1	.842
		EBITTD	.099	1	.753
		NINS	5.714	1	.017
		NITA	1.138	1	.286
		CFNS	4.160	1	.041
		CFCL	1.117	1	.291
		CFTA	.624	1	.429
		CFTD	.048	1	.827

	Overall Statistics		**86.380**	**15**	**.000**
Step 2	Variables	WCTA	23.115	1	.000
		NSFA	15.868	1	.000
		NSTA	7.136	1	.008
		TDTA	5.608	1	.018
		LDTD	.004	1	.947
		RETA	1.489	1	.222
		EBITTA	.242	1	.622
		EBITTD	2.277	1	.131
		NINS	2.109	1	.146
		NITA	.005	1	.946
		CFNS	1.727	1	.189
		CFCL	1.648	1	.199
		CFTA	.018	1	.893
		CFTD	1.965	1	.161
	Overall Statistics		**61.647**	**14**	**.000**
Step 3	Variables	NSFA	10.289	1	.001
		NSTA	.811	1	.368
		TDTA	.348	1	.555
		LDTD	.040	1	.841
		RETA	4.589	1	.032
		EBITTA	1.187	1	.276

		EBITTD	6.877	1	.009
		NINS	.745	1	.388
		NITA	.446	1	.504
		CFNS	.910	1	.340
		CFCL	3.639	1	.056
		CFTA	.638	1	.425
		CFTD	6.214	1	.013
	Overall Statistics		**58.156**	**13**	**.000**
Step 4	Variables	NSTA	7.388	1	.007
		TDTA	6.787	1	.009
		LDTD	.021	1	.886
		RETA	17.789	1	.000
		EBITTA	2.766	1	.096
		EBITTD	11.517	1	.001
		NINS	.263	1	.608
		NITA	1.174	1	.279
		CFNS	.602	1	.438
		CFCL	2.951	1	.086
		CFTA	1.222	1	.269
		CFTD	9.679	1	.002
	Overall Statistics		**64.156**	**12**	**.000**
Step 5	Variables	NSTA	7.928	1	.005

		TDTA	3.393	1	.065
		LDTD	.397	1	.529
		EBITTA	3.054	1	.081
		EBITTD	9.225	1	.002
		NINS	.056	1	.813
		NITA	1.475	1	.225
		CFNS	.205	1	.651
		CFCL	5.981	1	.014
		CFTA	1.518	1	.218
		CFTD	8.455	1	.004
	Overall Statistics		**39.843**	**11**	**.000**
Step 6	Variables	NSTA	6.787	1	.009
		TDTA	4.819	1	.028
		LDTD	.537	1	.464
		EBITTA	2.799	1	.094
		NINS	2.194	1	.139
		NITA	3.745	1	.053
		CFNS	3.073	1	.080
		CFCL	1.261	1	.261
		CFTA	3.855	1	.050
		CFTD	.003	1	.954
	Overall Statistics		**19.704**	**10**	**.032**

Step 7	Variables	TDTA	4.299	1	.038
		LDTD	.464	1	.496
		EBITTA	3.186	1	.074
		NINS	3.066	1	.080
		NITA	3.982	1	.046
		CFNS	3.655	1	.056
		CFCL	1.791	1	.181
		CFTA	4.406	1	.036
		CFTD	.024	1	.877
	Overall Statistics		**13.886**	**9**	**.126**
Step 8	Variables	TDTA	3.176	1	.075
		LDTD	.295	1	.587
		EBITTA	.339	1	.560
		NINS	.853	1	.356
		NITA	.521	1	.471
		CFNS	1.264	1	.261
		CFCL	3.337	1	.068
		CFTD	2.514	1	.113
	Overall Statistics		**10.020**	**8**	**.264**

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	SETA	5.632	.708	63.298	1	.000	279.104
	Constant	-.634	.208	9.272	1	.002	.530
Step 2[b]	CLTD	4.181	.724	33.333	1	.000	65.450
	SETA	5.825	.798	53.262	1	.000	338.827
	Constant	-3.386	.546	38.424	1	.000	.034
Step 3[c]	WCTA	3.222	.730	19.452	1	.000	25.068
	CLTD	5.633	.907	38.555	1	.000	279.559
	SETA	5.041	.870	33.572	1	.000	154.684
	Constant	-4.122	.625	43.520	1	.000	.016
Step 4[d]	WCTA	1.991	.819	5.914	1	.015	7.326
	CLTD	5.508	.937	34.542	1	.000	246.575
	NSFA	.053	.018	9.121	1	.003	1.055
	SETA	5.533	.959	33.263	1	.000	252.834
	Constant	-4.692	.704	44.429	1	.000	.009
Step 5[e]	WCTA	1.974	.850	5.393	1	.020	7.202
	CLTD	6.253	1.024	37.312	1	.000	519.709
	NSFA	.090	.022	16.494	1	.000	1.094
	SETA	9.544	1.603	35.454	1	.000	1.396E4
	RETA	-3.425	.884	15.002	1	.000	.033
	Constant	-6.758	1.024	43.591	1	.000	.001
Step 6[f]	WCTA	2.100	.894	5.520	1	.019	8.166

	CLTD	6.690	1.094	37.394	1	.000	803.955
	NSFA	.098	.024	16.804	1	.000	1.102
	SETA	10.171	1.700	35.783	1	.000	2.613E4
	RETA	-3.408	.889	14.695	1	.000	.033
	EBITTD	-1.022	.418	5.981	1	.014	.360
	Constant	-7.109	1.081	43.253	1	.000	.001
Step 7[g]	WCTA	2.385	.953	6.266	1	.012	10.862
	CLTD	7.361	1.246	34.923	1	.000	1.573E3
	NSFA	.154	.036	18.223	1	.000	1.167
	NSTA	-1.309	.508	6.652	1	.010	.270
	SETA	10.456	1.774	34.753	1	.000	3.474E4
	RETA	-3.573	.953	14.050	1	.000	.028
	EBITTD	-.941	.443	4.513	1	.034	.390
	Constant	-6.825	1.119	37.208	1	.000	.001
Step 8[h]	WCTA	2.525	.995	6.441	1	.011	12.488
	CLTD	7.736	1.350	32.864	1	.000	2.290E3
	NSFA	.156	.036	18.223	1	.000	1.168
	NSTA	-1.384	.519	7.120	1	.008	.250
	SETA	10.354	1.765	34.396	1	.000	3.137E4
	RETA	-3.593	.990	13.179	1	.000	.028
	EBITTD	-2.183	.735	8.816	1	.003	.113
	CFTA	2.335	1.193	3.828	1	.050	10.328

	Constant	-6.831	1.139	35.947	1	.000	.001

a. Variable(s) entered on step 1: SETA.
b. Variable(s) entered on step 2: CLTD.
c. Variable(s) entered on step 3: WCTA.
d. Variable(s) entered on step 4: NSFA.
e. Variable(s) entered on step 5: RETA.
f. Variable(s) entered on step 6: EBITTD.
g. Variable(s) entered on step 7: NSTA.
h. Variable(s) entered on step 8: CFTA.

Casewise List[b]

Case	Selected Status[a]	Observed Group	Predicted	Predicted Group	Temporary Variable Resid	Temporary Variable ZResid
20	S	F**	.845	N	-.845	-2.338
23	S	F**	.928	N	-.928	-3.590
102	S	F**	.878	N	-.878	-2.683
138	S	F**	.976	N	-.976	-6.405
139	S	F**	.984	N	-.984	-7.955
140	S	F**	.990	N	-.990	-9.734
161	S	N**	.110	F	.890	2.841
167	S	N**	.093	F	.907	3.128
253	S	N**	.350	F	.650	1.364

a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2.000 are listed.

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