PREDICTING BUSINESS FAILURE IN THE HOSPITALITY INDUSTRY: AN APPLICATION OF LOGIT MODEL

by

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Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
In partial fulfillment of Requirements for the degree of
Doctor of Philosophy
in
Hospitality and Tourism Management

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1994

Blacksburg, Virginia.

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(ABSTRACT)

The phenomenon of business failure has attracted research interest in finance literature partly because of its impact on the U.S economy. Whereas an impressive body of knowledge has been accumulated on this subject thus far, the hospitality literature has lacked empirical studies that seek to explain the nature of this phenomenon in the hospitality industry.

The restaurant industry has consistently had the most business failures of any single segment within the retail trade sector in the eighties. Therefore, there were three purposes in this study: 1) to develop a model for predicting business failure which can be a useful tool in helping researchers and industry practitioners to identify warning signs of business failure in the restaurant industry, 2) to determine whether the financial variables of a predictive model for business failure in the restaurant industry are the same as in the hotel industry, and 3) to determine whether the financial variables that are associated with reorganization are different from those that are associated with liquidation

in the restaurant industry.

The sample consisted of 23 failed and 23 non-failed restaurant firms, and 15 failed and 15 non-failed hotel firms within the period of 1982-1993. The predictive business failure models were developed through logistic regression analysis employing 8 financial variables based on one year prior to business failure.

The models were tested at two and three years prior to business failure. The empirical evidence illustrated that the business failure model developed for the restaurant industry is capable of predicting business failure, and even bankruptcy with high classification accuracy.

The relationship between reorganization and liquidation was investigated through logistic regression analysis employing two sets of indicators for capital structure and profitability. The sample consisted of 14 reorganizers and 10 liquidators from the restaurant industry.

The empirical evidence showed that reorganization and liquidation are not dependent on each other, that is, reorganization and liquidation cannot be determined by both capital structure and profitability in the restaurant a failed

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to a number of people who both provided valuable help during the long and arduous process of preparing this dissertation and made significant contributions towards completion of this dissertation.

I would like to thank my Co-chairs, Dr. Francis A. Kwansa and Michael D. Olsen who have provided me with much needed inspiration, advice, and encouragement during my graduate study and especially with this dissertation. I am indebted to Dr. Olsen for introducing me to the subject of finance. Most importantly, I am especially grateful to Dr. Francis Kwansa for nurturing my interest in the subject along the way and for allowing me to benefit from his deep knowledge of finance. His kindness and endless support made this odyssey much more enjoyable.

Appreciation is also extended to Drs. Eliza C. Tse, Thomas L. VanDyke, and Young-Seock Shin. Their guidance and assistance have been invaluable. I am sincerely thankful to them for their comments, questions and suggestions for improving this dissertation.

Finally, I would like to dedicate this dissertation to my parents whose support, encouragement, and sacrifice have been the driving force through all my scholarly efforts, and I hope this dissertation makes them proud.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Between the 1930s and the early 1980s, the business failure rate for the U.S. was always below one percent (or 100 per 10,000 firms) per year and usually below one half of a percentage point per year. However, from 1983 to 1987, the failure rate was above one percent. The failure rate rose dramatically during the recession of the early eighties and has remained high in recent years even as the economy has recovered (Dun & Bradstreet, 1991). Reasons often cited for business failure include neglect, disaster, fraud, economic, inexperience, financial and strategic (Platt, 1985).

Business failure is an important economic phenomenon, because it is not costless. Indeed, the consequences due to such failure include hardships such as investors' loss of equity and dividends, creditors' loss of principal and interest, and employees' loss of jobs (Altman, Avery, Elsenbeis & Sinkey, 1981). Since business failure is of vital concern to corporate managers, security analysts, investors, and lenders, there has been a substantial amount of research conducted on the topic.

In the hospitality industry, especially the restaurant industry, business failure has become an important issue for survival since the industry is considered to be saturated.

Many restaurant firms have liquidated due to the high level of competition in the industry. What is needed are tools or techniques that will help the restaurant industry identify early warning signs of impending business failure, so as to save businesses from eventual liquidation.

Business failure is a term which is used in a variety of contexts. Keown, Scott, Martin & Petty (1985) offer three terms that are used to represent business failure. Economic failure, which is indicative of business expenses exceeding revenues, can be viewed as a mild form of failure which may be temporary for many firms. Technical insolvency describes a situation where the firm has positive net worth but has insufficient liquidity to meet current liabilities. Lastly, at the other extreme, is bankruptcy. In this state, the firm shows negative net worth as well as illiquidity.

Bankruptcy is the most critical type of business failure, and the most well known types of bankruptcy are liquidation and reorganization (these are also referred to as chapter 7 and chapter 11, respectively, of the Bankruptcy Code). Liquidation can be voluntary or involuntary. Both voluntary and involuntary liquidation involve selling off all of the firm's assets for cash, paying all outstanding debts from the proceeds, and distributing the remaining funds to stockholders as liquidating dividends. The corporate entity of the liquidating firm ceases to exist after liquidation (Kudla,

1988). Reorganization also can be voluntary or involuntary. The purpose of having voluntary and involuntary reorganization as an alternative to liquidation is to emphasize the fact that it is often better to encourage and facilitate the rehabilitation of a business in financial distress than to liquidate it.

There have been two distinct arguments presented regarding the relationship between liquidation and reorganization. One group of authors believes that reorganization and liquidation are independent of each other, that is, reorganization and liquidation can be determined respectively by capital structure and profitability (Haugen & Senbet, 1978; 1988; Senbet & Seward, 1993). Another group believes that reorganization and liquidation are dependent on each other, that is reorganization and liquidation can be determined by both capital structure and profitability (Bulow, 1978; Shapiro & Peitzman, 1984; Titman, 1984; White, 1984; Morris, 1986; Casey, McGee & Stickney, 1986).

No empirical study has focused on the relationship between reorganization and liquidation from the point of view of the financial factors which determine them. Thus, there is a need to investigate the relationship between reorganization and liquidation to help restauranteurs make the appropriate business decision when faced with the prospect of choosing one or the other.

1.2 CONTEXT OF THE STUDY

Although business failure is not a recent phenomenon, it is mostly identified with the 1980s because of the existence of chronically sick industries (e.g., agriculture), high real interest rates, international competition, increased leveraging of corporate America, deregulating of key industries (e.g., financial services) and relatively high new business formation rates (Altman, 1993) present during this period. Table 1 provides a summary of business failures, liabilities and failure rates in the U.S. from 1971 to 1991, and it shows, for example, that business failure rate (100 per 10,000) was over one percent during 1984 to 1987. The number of failures surged dramatically in 1991 with the rate reaching 1.6 percent and failure liabilities topping one hundred billion for the first time. Increasing failure rates have generated significant research interest in prediction models that attempt to predict the likelihood of failure.

Business failure in the restaurant industry is also mostly identified with 1980s because it is commonly accepted that the industry entered maturity in its life cycle during this period. Some of the indicators which generally confirm the industry's overall maturity are: 1) lower profit margins resulting from stagnation of industry sales, 2) price competition, 3) competitor shakeout, 4) over capacity, 5) market segmentation, 6) broadening of product line, and 7)

increased emphasis on service (West, 1988).

Table 2 provides a summary of business failures by industry sectors. Compared to all other sectors most business failures between 1984 and 1992 occurred in the retail trade and services sector. Table 3 provides a summary of business failures in the retail trade sector, and within this sector, the number of business failures in the restaurant industry (eating and drinking places) peaked in 1984 and has since remained highest in the retail trade sector.

Bankruptcy is the mechanism through which failed firms frequently leave the market. The number of firms filing for bankruptcy along with their total liabilities rose rapidly throughout the eighties (Logue, 1990). Table 4 provides a summary of total bankruptcy case filings from 1980 to 1991. As indicated by White (1983), there were more liquidations and fewer reorganizations during this period. He argued that the Reform Act of 1978 made the bankruptcy process more efficient by making reorganization more difficult.

As business failure rates and bankruptcies are expected to increase, a reflection and evaluation of the consequences of these events will provide pertinent information for future planning by managers, security analysts, investors, and lenders in the restaurant industry.

Table 1. Business Failures, Liabilities, and Failure Rates (1971-1991)

Calendar Year	Number of Failures	Failure Liabilities	Failure Rate per 10,000	Average Liability
1971	10,326	$ 1,916,929,000	42	$ 185,641
1972	9,566	2,002,244,000	38	209,099
1973	9,345	2,298,606,000	36	245,972
1974	9,915	3,053,137,000	38	307,931
1975	11,432	4,380,170,000	43	383,150
1976	9,628	3,011,271,000	35	312,762
1977	7,911	3,095,317,000	28	390,872
1978	6,619	2,656,006,000	24	401,270
1979	7,564	2,667,362,000	28	352,639
1980	11,742	4,635,080,000	42	394,744
1981	16,794	6,955,180,000	61	414,147
1982	24,908	15,610,792,000	88	626,738
1983	31,334	16,072,860,000	110	512,953
1984	52,078	29,268,646,871	107	562,016
1985	57,253	36,937,369,478	115	645,160
1986	61,616	44,723,991,601	120	725,850
1987	61,111	34,723,831,429	102	568,209
1988	57,097	39,573,030,341	98	693,084
1989	50,361	42,328,790,375	65	840,507
1990	60,746	64,044,056,369	75	1,059,771
1991	87,266	105,362,200,325	106	1,207,366

Definition of Business Failure:
Businesses that ceased operations following assignment or bankruptcy; ceased operations with losses to creditors after such actions as foreclosure or attachment; voluntarily withdrew leaving unpaid debts; were involved in court actions such as receivership, reorganization or arrangement; or voluntarily compromised with creditors.

Definition of liabilities:
They include all accounts and notes payable and all obligations, whether in secured form or not, known to be held by banks, officers, affiliated companies, supplying companies or the government. Long-term, publicly held obligations are not included and offsetting assets are not taken into account.

Source: Business Failure Record, Dun & Bradstreet, New York, 1991.

Table 2. Business Failure by Industry Sectors (1984-1992)

Calendar Year	Agri.	Mining	Con.	Manu.	Trans.	Whole.	Retail.	Fin.	Services	Public
1984	1,998	744	6,936	5,015	2,285	4,882	13,787 (25.9%)	2,392	12,787 (1.9%)	16
1985	2,699	796	7,005	4,869	2,536	4,836	13,494 (24.7%)	2,676	16,649 (1.8%)	12
1986	2,649	921	7,109	4,772	2,565	4,869	13,620 (23.8%)	2,797	20,967 (1.5%)	20
1987	3,767	622	6,735	4,313	2,249	4,321	12,242 (23%)	2,547	23,864 (1.4%)	13
1988	2,029	500	7,140	4,264	2,234	4,510	11,862 (23.4%)	2,884	17,930 (1.9%)	13
1989	1,540	351	7,120	3,933	2,115	3,687	11,120 (23.9%)	2,932	13,679 (1.9%)	9
1990	1,733	388	8,162	4,740	2,630	4,423	12,972 (24.6%)	3,819	16,119 (2.5%)	10
1991	2,232	409	11,815	6,534	3,839	6,100	17,008 (22.8%)	5,877	22,663 (2.2%)	19
1992	2,871	430	12,452	7,120	3,922	6,744	33,360 (13.7%)	6,260	26,871 (1.8%)	30

Agri.: Agriculture, Forestry and Fishing
Con. : Construction
Manu.: Manufacturing
Trans.: Transportation and Public Utilities
Whole: Wholesale
Fin.: Finance, Insurance, and Real Estate

Parenthesis represents the percentage of business failures for eating and drinking places in retail trade sector and hotel & other lodging places in services sector.

Source: Business Failure Record, Dun & Bradstreet, New York, 1984-1992.

Table 3. Business Failure in the Retail Sector (1984-1992)

Industry	1984	1985	1986	1987	1988	1989	1990	1991	1992
Bldg. Materials & Garden Supplies	772	789	762	656	648	608	703	920	967
General Merchandise Stores	214	210	217	177	179	147	199	243	296
Food Stores	1,281	1,298	1,164	1,027	1,018	962	1,107	1,357	1,438
Auto Dealers & Service Stations	1,321	1,390	1,321	1,197	1,086	1,136	1,453	1,990	1,907
Apparel & Accessory Stores	2,027	1,836	1,940	1,844	1,762	1,549	1,816	2,184	2,419
Furniture Stores	1,531	1,415	1,560	1,456	1,588	1,395	1,673	2,197	2,671
Eating and Drinking Places	3,579	3,340	3,252	2,826	2,784	2,668	2,965	4,194	4,578
Miscellaneous	3,062	3,216	3,404	3,059	2,797	2,665	3,036	4,013	4,808

Source: Business Failure Record, Dun & Bradstreet, New York, 1984-1992.

Table 4. Total Bankruptcy Case Filings (1980-1991)

Calendar Year	Total Filings	Chapt. 7	Chapt. 11	Chapt. 12	Chapt. 13	Other
1980	331,098	249,136	6,348		75,584	30
1981	363,847	260,664	10,041	-	93,139	3
1982	380,212	257,644	18,821	-	103,738	9
1983	348,872	234,594	20,252	-	94,021	5
1984	348,488	234,997	20,252	-	93,221	18
1985	412,431	280,986	23,374	-	108,059	12
1986	530,008	374,452	24,740	601	130,200	15
1987	574,849	406,761	19,901	6,078	142,065	44
1988	613,606	437,882	17,690	2,034	155,969	31
1989	679,980	476,993	18,281	1,440	183,228	38
1990	782,960	543,334	20,783	1,346	217,468	29
1991	943,987	656,460	23,989	1,495	262,006	37
TOTAL	6,310,338	4,413,903	224,472	12,994	1,658,698	271

Source: Administrative Office of the United States Courts-Bankruptcy Division.

1.3 JUSTIFICATION FOR RESEARCH

A number of studies focusing on business failure have validated the use of prediction models to identify the warning signs of business failure. For example, when GTI (a manufacturer) was hovering on the edge of bankruptcy, the firm was able to accomplish a turnaround with the help of a corporate strategy designed by a predictive business failure model (Altman, 1981). There is enough evidence (Platt, 1989; Wight, 1985; White, 1984; Rutledge, 1985), however, to suggest that prediction models for business failure are not homogeneous across all industries, and the different prediction models are the result of different characteristics that are unique to specific industries. For example, industries have different levels of business risk arising from differences in demand variability, sales price variability, input cost variability, ability to adjust output price for changes in input costs, and operating leverage (Brigham & Gapenski, 1990).

In addition, although it has been suggested (Platt, 1989; Wight, 1985; White, 1984; Rutledge, 1985) that each industry needs its own business failure prediction model due to the different characteristics that are unique to the industry, it has not been shown empirically that the business failure prediction model for one industry is significantly different from a model for another. This means then that applying an

aggregate business failure model, such as Altman's, to a single industry may result in wrongly categorizing a failed firm as non-failed or vice-versa.

Further, this study will serve another need, that is, it will attempt to resolve the controversy in the literature regarding the relationship, or lack thereof, between reorganization and liquidation. One school of thought believes that different circumstances direct a firm's decision to select reorganization or liquidation when facing financial distress, and as a result, the two events are considered to be independent (Haugen & Senbet, 1978;1988; Senbet & Seward, 1993). This means a firm experiencing a capital structure problem may opt to reorganize without critically assessing its ability to continue operating profitably. Similarly a firm experiencing profitability problems may opt to liquidate without regard to the opportunities that a change in capital structure may offer.

The independent relationship also suggests that, in estimating bankruptcy costs for reorganized firms, these estimates cannot be based on lost profits (that is, how much profits will decline as a result of reorganization). Rather the estimates will have to be based on costs related to capital structure such as the increased cost of capital resulting from reorganization. Therefore, proponents of this school of thought consider the use of lost profits in

estimating indirect costs of reorganization to be inappropriate [see Altman's (1984) study].

The opposing perspective regarding the relationship between reorganization and liquidation believes that there are similar factors which direct a firm's decision to reorganize or liquidate. Indeed, some point to the fact that bankruptcy data shows that more than two-thirds of firms filing for reorganization eventually liquidate which suggests that many of the reorganizing firms may not have been worth saving in the first place (Altman, 1983; LoPucki, 1983). Therefore, when a firm is facing the choice of reorganization versus liquidation a common set of factors must be considered in that decision. In this regard, Titman (1984) and Altman (1984) suggest that the indirect bankruptcy costs for the reorganized firms may be based on profitability (that is, how much the firm would lose if reorganized) since reorganization and liquidation are dependent on each other.

This study will provide a more comprehensive, and empirical look at business failure compared to an earlier study by Ventrice (1982), and further offer the first empirical look at the relationship between reorganization and liquidation in the restaurant industry.

1.4 PURPOSE OF THE STUDY

1.4.1 The Prediction Model for the Restaurant Industry

According to Dun and Bradstreet's business failure reports, most business failures between 1984 and 1992, compared to all other sectors, occurred in the retail and services sector. Within the retail trade sector, the segment consisting of eating and drinking establishments has consistently had the most business failures of any single segment between 1984 and 1992 (Dun & Bradstreet, 1984-1992).

In spite of the number of research studies (Beaver, 1967; Altman, 1968; Deakin, 1972; Ohlson, 1980; Lincoln, 1984) conducted to explain and predict business failure, research focusing on the restaurant industry is very limited. One of the reasons for this lack of research may be that some researchers believe that inter-industry differences in business failure are negligible. Another reason has been that the criteria for sample selection for most of the studies tend to be biased towards large firms. For example, the average asset size of Altman, Haldeman & Narayanan's study (1977) was approximately $100 million. Within that study, no firm had less than $20 million in assets. Many of the restaurant firms that have failed, however, do not have asset sizes that large. Developing a business failure model that utilizes firms with relatively smaller asset sizes is necessary because small firms, as opposed to the large ones, tend to be more

vulnerable to financial distress due to their size.

Bettinger (1981) and others suggested that it is necessary to consider that a business failure predictive model should reflect the unique nature of a given industry (Platt, 1989; Wight, 1985; White, 1984; Rutledge, 1985). Therefore Altman's model (1977), which is the earliest and best known of the prediction models for business failure in manufacturing and/or retail sectors, is hardly universal for all industries. This study will develop an appropriate and reliable business failure model useful in predicting the occurrence of business failure in the restaurant industry.

1.4.2 The Comparison of the Restaurant Model with the Hotel Model

Since general business failure predictive studies may not be universal for all industries, Altman (1973), Cleverly & Nilsen (1980), and Olsen, Bellas & Kish (1983), respectively, conducted business failure predictive studies for railroads, hospital firms, and restaurant firms while simultaneously taking into consideration characteristics of the types of firms being analyzed. In Altman's study, the profitability and leverage ratios were found to be important predictors. However, liquidity ratios were not important in distinguishing between financially distressed and healthy firms in the railroad industry. In Cleverly & Nilsen's study, the

financially distressed firms had unfavorable liquidity and profitability ratios, little long-term debt, and favorable and improving activity ratios in the hospital industry. Olsen et al.'s study showed that liquidity ratios provided a 5 to 10 months advance warning and profitability ratios provided a 7 to 10 months advance warning of business failure in the restaurant industry. Therefore, this study will compare the hotel industry's business failure prediction model to the restaurant industry's model in order to determine whether the predictive model for the restaurant industry is unique.

The hotel industry is a major part of the hospitality industry and has similar characteristics to the restaurant industry. Andrew (1984) indicated that several financial characteristics set the hospitality industry apart from other industries. These characteristics are lack of working capital, high reliance on fixed assets, variability of operating cash flow, and seasonality of revenue. Given that the hotel and restaurant industries have similar financial characteristics, if the predictors of business failure for the two industries are different, then this will provide further evidence to support the need for industry-specific failure models.

1.4.3 The Relationship between Reorganization and Liquidation

According to the Administrative Office of the United States Courts-Bankruptcy Division, there were 6,310,338 bankruptcy filings from 1980 to 1991. Liquidation and reorganization, respectively, represented 70% and 4% of the total bankruptcy filings for these years (Administrative Office of the United States Courts-Bankruptcy Division, 1991).

When it is deemed that there is no hope for rehabilitation or if prospects are so poor as to make it unreasonable to invest further efforts, costs, and time, the only remaining alternative is liquidation. Economically, liquidation is justified when the value of the assets sold individually exceeds the capitalization value of the assets in the market place.

The reorganization procedure in bankruptcy is designed to enable firms in temporary financial difficulty which are still worth saving to continue operating while the claims of creditors are settled using a collective procedure. A drawback of this procedure is that sometimes firms that are not worth saving from an economic efficiency standpoint may be reorganized (Logue, 1990).

This study will provide empirical evidence regarding reorganization and liquidation with respect to their independence from or dependence on each other. The empirical evidence of the relationship can facilitate a firm's decision

to reorganize or liquidate. That is, if the results of the study show that there is no differences in the determinants of liquidation versus reorganization, then firms can be indifferent in their choice of bankruptcy type. Further, the evidence can be used with respect to the controversial issue of relevant indirect bankruptcy costs for the reorganized firms.

In summary, the purposes of this study are three-fold:

1. To develop a predictive model for business failure which can be a useful tool in helping researchers and industry practitioners to identify warning signs of business failure in the restaurant industry.
2. To determine whether the financial variables of a prediction model for business failure in the restaurant industry are unique when compared to the hotel industry.
3. To determine whether the financial variables that are associated with reorganization are different from those that are associated with liquidation in the restaurant industry.

1.5 RESEARCH QUESTIONS

Given that 1) the restaurant industry has consistently had the most business failures within the retail sector from 1984 to 1992, 2) each industry needs its own prediction model for business failure, and 3) there have been arguments with respect to the relationship between reorganization and liquidation, the following questions are of empirical interest:

1. Can business failure be predicted and which financial variables can predict business failure in the restaurant industry?
2. Are there differences in the financial variables which predict business failure for the restaurant industry on one hand and the hotel industry on the other?
3. Are the financial variables that determine reorganization different from those that determine liquidation in the restaurant industry?

1.6 SIGNIFICANCE OF THE STUDY

Previous studies provide empirical evidence that characteristics of business failure can be determined and examined. Furthermore these characteristics are unique to failed firms when compared to non-failed firms (Altman, 1968; Giroux & Wiggins, 1983; Flagg, Giroux & Wiggins, 1991). Platt (1989) stated that each industry has different business

failure rate elasticities and these differences were shown to be attributable to industry financial conditions. However, many of the previous studies did not consider industry differences, for firms from different industries were simply aggregated for purposes of business failure prediction. Although a few studies (Altman, 1973; Cleverly & Nilsen, 1980; Ventrice, 1982; Olsen, Bellas & Kish, 1983) considered industry differences, they did not show whether or not their prediction models were applicable to the specific industry only.

Also, some prior studies have provided the factors that distinguish bankrupt firms that successfully reorganize from those that liquidate (LoPucki, 1983; Casey, McGee & Stickney, 1986; Badden-Fuller, 1989; Schary, 1991). These factors were: financial characteristics, strategy, age and type of the business, geographic location, size and the existence of creditor opposition to reorganization plan. However, there has not been further investigation into whether, on the basis of the financial factors determining them, reorganization and liquidation can be explained by the same (dependence) or different (independence) factors.

This study can provide additional information complementary to the body of knowledge with respect to business failure by investigating 1) what financial variables determine business failure, 2) whether these financial

variables are different for the restaurant and hotel industries, and 3) how capital structure and profitability variables can play an important role in the decision to reorganize or liquidate in the restaurant industry.

1.7 OUTLINE OF DISSERTATION

The following chapter will focus on a review of the literature on business failure and the relationship between reorganization and liquidation.

Chapter 3 will be devoted to the methodology to be used for this study. Chapter 4 will cover the presentation and discussion of the results of this study. Finally, Chapter 5 will highlight the conclusions of the study as well as any attendant limitations.

CHAPTER 2

LITERATURE REVIEW

2.1 REVIEW OF EMPIRICAL STUDIES ON BUSINESS FAILURE

Business failure studies have taken one of two approaches with regard to types of variables. One approach has been to use accounting and financial ratios as predictors of business failure. The other approach, which focuses more on the process of failure, attempts to identify events in the firm's pre-failure life which significantly explain the failure phenomenon. This section will describe the two approaches.

2.1.1 Ratio Approach

Many of the studies employing accounting and financial ratios (hereafter referred to as ratios) are designed to explain and predict business failure by developing models which classify firms as failed or non-failed. Beaver (1967), who is considered to have pioneered the stream of research in business failure, defined failure in a broad context. Failure was defined in his study as a business defaulting on interest payments on its debt, overdrawing its bank account, missing preferred dividend payments, or declaring bankruptcy by filing chapter 11 during the period of 1954-1964./

Of the 30 ratios examined in his study, he found six to be best in predicting business failure. They are net income/total assets, net income/total debt, current plus long

term liabilities/total assets, working capital to total assets, no-credit interval (the period which no credit is offered from lenders) and current ratio. He was able to accurately classify 78% of the sample of firms from 38 industries five years before business failure. The analysis conducted in his study was a univariate analysis, that is, it examined the predictive ability of ratios, one at a time.

It is possible that a multivariate ratio analysis would predict business failure even better than the single ratio analysis because business failure is viewed as a complex process which requires more than one variable to capture all the facts of the firm. Consequently, several techniques have been developed to study the phenomenon.

Altman (1968) is credited with the initial work in establishing a multivariate firm bankruptcy model which helps in determining and identifying manufacturing firms that may be on the brink of failure. His study was based on a sample of 66 firms of which 33 were bankrupt and 33 were non-bankrupt for the period of 1946-1965. The term failure was defined to include only those firms which filed for chapter 11, and 22 ratios were tested in his study. His model is based on a multiple discriminant analysis (hereafter referred to as MDA) incorporating the following five ratios: working capital/total assets, retained earnings/total assets, earnings before interest and taxes/total assets, market value of equity/book

value of total assets, and sales/total assets. A score is subsequently derived that indicates whether a firm is bankrupt, non-bankrupt or in a neutral category referred to as the zone of ignorance. His model's predictive accuracy was 95% during the first year prior to failure and 36% in the fifth year.

To develop an alternative to the Beaver (1967) and Altman (1968) models, Deakin (1972) analyzed 32 firms that failed between 1964 and 1970. The term failure was defined to include only those firms which experienced financial reorganization, insolvency, or were otherwise liquidated for the benefit of creditors.

A paired sample of non-failed firms was matched by industry classification. The MDA model consisting of Beaver's 14 ratios (1967) could accurately classify 85% of the sample of firms five years before failure. Compared to Beaver's study (1967), this study consistently showed better results.

Mergers of competitors often violate antitrust laws. One of the few possible defenses to a merger prosecution is the Failing Company Doctrine. This defense can be invoked when one of two merging firms is failing and the failing firm receives no offer to merge from a firm with which a merger would have been legal.

Blum (1974) constructed a failing firm model using MDA to aid in assessing the probability of business failure. He

defined failure in his study in accordance with the meaning the courts have given to it in the context of antitrust defense. This analysis was applied to a paired sample of 115 failed and 115 non-failed firms in accordance to industry classification for the period of 1954-1968. A 12 ratio model with emphasis upon liquidity, profitability, and variability (standard deviation) was developed. The firm model predicted failed firms to fail and non-failed firms not to fail with an accuracy of 93 to 95% at the first year before failure. Predictive accuracy was 80% at the second year and was 70% at the third, fourth and fifth years before failure.

In order to jointly evaluate 1) the predictive power of ratio information and 2) the ability of loan officers to evaluate ratio information in a failure predictive framework, Libby (1975) employed Deakin's sample and ratios.

Using Principal components analysis, he identified 5 independent sources of variation with the 14 ratios from Deakin's (1972) sample. The 5 dimensions were labeled 1) profitability, 2) activity, 3) liquidity, 4) asset balance, and 5) cash position. Through analysis of the rotated factor matrix, net income/total assets, current assets/sales, current assets/current liabilities, current assets/total assets, and cash/total assets were chosen respectively to represent the five dimensions. The 5 dimensions set was only slightly less accurate than the 14 ratio set for predicting failure. The 5

dimensions set predicted 51 and 43 correct out of 60 observations based upon sample and double cross-validation respectively.

He used the five dimensions set for his experiment. The usefulness of the information was judged on the basis of the accuracy of the loan officers' predictions. Each firm required the loan officers to classify the firm as a failure or non-failure within three years of the statement date and rate his/her confidence in his/her prediction on a three point scale. As measured by the number of agreements on the fail-not fail scale, interrater reliability ranged from 31 to 57 agreements out of 60 predictions and averaged 48 of 60.

This study illustrated the usefulness of principal components analysis regarding the dimensionality of a data set and showed that ratios enabled bankers to make highly accurate and reliable predictions of business failure.

Altman, Haldeman & Narayanan (1977) employed both linear and quadratic MDA to construct, analyze and test a new bankruptcy classification model by incorporating 28 ratios. Two samples of firms consisted of 53 bankrupt firms and 58 non-bankrupt firms for the period of 1969-1975. The latter was matched to the failed group by industry classification. This sample was divided almost equally into manufacturers and retail groups.

The model consisted of seven ratios: return of assets,

stability of earnings, debt service, cumulative profitability, liquidity, capitalization and size. This model outperformed Altman's model (1968). The new model appeared to be quite accurate for up to five years prior to failure with successful classification of well over 90% of the sample one year and 70 % accuracy up to five years prior bankruptcy. The linear MDA slightly outperformed the quadratic MDA.

Ohlson (1980) presented some empirical results of a study and in turn predicted failure as evidenced by the event of bankruptcy. The sample consisted of 105 bankrupt firms and 2,058 non-bankrupt industrial firms, excluding utilities, transportation, and financial services, for the period of 1970-1976.

The logistic regression analysis was chosen to avoid a fairly well known problem associated with multiple discriminant analysis, that is, the variance-covariance matrices of the predictors should be the same for both groups (failed and non-failed firms). Models 1-3 composed of an intercept and nine independent ratios; model 1 predicted bankruptcy within one year with classification accuracy of 96%, model 2 predicted bankruptcy within two years with classification accuracy of 92%, given that the firm did not fail within the subsequent years, and model 3 predicted bankruptcy within one or two years with classification of 95%.

Dambolena & Khoury (1980) suggested that the standard

deviations of ratios over time appeared to be the strongest measure of ratio stability, and the inclusion of the stability of ratios improved the ability of the discriminant function to predict failure.

They selected 19 ratios and computed each ratio's stability by standard deviation for both the bankrupt and the non-bankrupt firms. The sample consisted of 68 firms which were almost equally divided between retail and manufacturing sectors for the period of 1969-1975.

The MDA model of best ratios correctly predicted 91% of the sample in the first year, 84% in the second year, 83% in the third year and 89% in the fourth year before bankruptcy. This model included the ratios of net profit/sales, net profits/total assets, fixed assets/net worth, funded debt/net working capital, total debt/total assets, the standard deviation of inventory/net working capital, and standard deviation of fixed assets/net worth.

Casey & Bartczak (1985) provide evidence as to whether operating cash flow data can increase the accuracy of accrual based MDA and logistic regression analysis models to distinguish between bankrupt and non-bankrupt firms. Sixty firms were selected that had petitioned for bankruptcy and a sample of 230 non-failed firms was chosen during the period of 1971-1982. The non-failed firms were selected to match the industrial classification of the failed firms.

The 6 accrual based ratios were cash/total assets, current assets/total assets, current assets/current liabilities, sales/current assets, net income/total assets, and total liabilities/owners' equity in this study. The 3 cash flow ratios examined in this study were CFO (cash flow from operation), CFO divided by current liabilities, and CFO divided by total liabilities.

Since there were no differences between model 1 (6 accrual based ratios alone) and model 2 (6 accrual based ratios and 3 cash flow ratios) for both MDA and logistic regression analysis in terms of the accuracy of classification, they concluded that operating cash flow data did not provide incremental power over accrual based ratios.

The average of five year's classification accuracy through MDA was 77% and 76% for model 1 and model 2, respectively. The average of five year's classification accuracy through logistic regression analysis was 83% and 84% for model 1 and model 2, respectively.

In their study, Frydman, Altman & Kao (1985) employed recursive partitioning analysis which is a nonparametric technique. One of the primary differences from MDA and logistic regression analysis is the manner in which they partition the dependent variable space into classification regions. The recursive partitioning analysis classification rule partitions dependent variable space, in general, into a

number of rectangular regions. The two group MDA or logistic regression analysis, on the other hand, partitions dependent variable space into only two half-plane regions (fail or non-fail).

The sample of their study consisted of 58 bankrupt and 142 non-bankrupt manufacturing and retailing firms for the period of 1971-1981. Of 20 ratios, there were six ratio terminal nodes where firms were classified as either bankrupt or non-bankrupt from the analysis of univariate splits. They were cash flow/total debt, cash/total sales, total debt/total assets, market value of equity/total capitalization, interest coverage, and quick assets/total assets.

Coasts & Fant (1993) employed the neutral network tool. This tool consisted of input layer, hidden node, and output layer. The input layer was composed of pieces of ratios. The output layer was composed of a single response or combination node which reflects the situation's known outcome, health or distressed firms.

Depending on the complexity of the pattern in the input data there can be any number of hidden nodes. Each hidden node is fully connected from all input nodes to all output nodes. Training is the process of creating and installing new hidden nodes until the residual forecast errors are eliminated or made tolerable.

The sample of their study consisted of 94 distressed

firms which were defined by auditors' reports during the period of 1970-1989. To serve as counter examples to the distressed firms, a group of 188 viable firms (two viable firms for every one by industry classification) was chosen for the same period. They used the same ratios found from Altman's study (1968). Their model consistently correctly predicted auditors' findings of distress at least 80% of the time over an effective lead time of up to five years.

In summary, the previous studies provide empirical evidence that characteristics of business failure can be determined and examined through the use of accounting and financial ratios. Furthermore, the studies show that these characteristics are unique to failed firms when compared to non-failed firms. Another summarizing observation, however, is that these studies did not consider industry differences. The samples of these studies consisted of aggregate industries. Therefore it is not known whether the models from these studies may be directly applicable to a single industry, and whether the same ratios would be found useful in predicting business failure in specific industries.

Two studies have attempted to depart from the aggregate industries sample and subsequently focused on a few selected industry groups. Edmister (1972) hypothesized that the relative level of a borrower's ratio to the average ratio of other small businesses in the same industry can be a predictor

of small business failure. To test this hypothesis empirically, ratios denoted as RMA (Robert Morris Associates) relative were calculated by dividing the original ratios from Robert Morris Associates' annual statement studies by average ratios for firms in similar industries. SBA relative ratios were likewise computed using Standard Industrial Classification averages compiled from 45,000 statements submitted by Small Business Administration borrowers.

MDA was employed to select a set of ratios. The sample consisted of 48 borrowers who had three consecutive annual statements available prior to the date when the loan was granted, and contained an equal number of loss and non-loss cases from the period of 1954-1969.

He found seven out of nineteen ratios denoted as RMA or SBA to be good predictors of small business failure. The seven ratio model consisting of RMA and SBA relative ratios correctly discriminated firms in 39 out of 42 cases. While this study concentrated on small business failure, the previous studies focused on predicting business failure of medium and large asset size firms while ignoring small businesses.

Lincoln's (1984) objective was to develop models from 39 ratios to measure the levels of insolvency risk for firms in selected industry sectors. The ninety non-bankrupt firms selected included 39 manufacturing, 19 retail, 20 property

and 12 finance firms, and they were compared to 41 bankrupt firms for the period of 1969-1978.

Since the significance of ratios can vary from industry to industry, each MDA model for each industry sector showed a different accuracy of classification and each model consisted of different ratios. The average of 5 years of classification accuracy was 85, 93, 71, 73% for manufacturing, retail, property, and finance, respectively.

Although both studies recognized the importance of industry differences, very few studies have fully isolated an industry from an SIC sector for analysis and prediction.

2.1.2 Events Approach

The events approach to business failure is indeed an ex post facto research design which seeks not to predict bankruptcy but to determine the characteristics of the failure process. In this regard, this approach represents a departure from the methodology adopted in prior research. The underlying rationale for this approach is that prior to bankruptcy (the most critical event of business failure), when a firm is in financial distress, several actions are usually taken by management to stave off this phenomenon.

These actions may not be captured by accounting and financial ratios as indicated by Johnson (1970). He argued that accounting and financial ratios do not contain

information about underlying economic factors and decision processes such as management reorganization, mergers, and deferral of payments.

Giroux & Wiggins (1983) suggested that there may be specific events that occur before bankruptcy, not captured by accounting and financial ratios, that may help explain why many apparent bankruptcy candidates are able to avoid bankruptcy court.

They described the failure process and demonstrated it using two well known bankruptcies: W.T. Grant and Interstate Stores. The first signal of financial problems for W.T. Grant was negative cash flows from beginning in 1966. W.T. Grant first reported a net loss in 1972. The next failure event for W.T. Grant occurred in 1973 when Standard and Poors acknowledged W.T. Grant's financial problems by down-grading its rating of W.T. Grant's debt instruments. Afterward, W.T. Grant faced several events, such as reduction and elimination of dividend, debt accommodation, and management reorganization. W.T. Grant filed for chapter 11 in 1975 and eventually liquidated in 1976.

Interstate Stores faced similar events before filing for chapter 11 in 1974 and eventually successfully reorganized in 1978. In each case, the entire process lasted about a decade and each firm exhibited the same basic events before bankruptcy.

Giroux & Wiggins (1984) extended their 1983 study. They developed a failure process model that established an analytical framework for evaluating the financial deterioration of failing firms. The primary objective of this study was to determine the usefulness of the events approach in discriminating between bankrupt and non-bankrupt firms by showing that certain economic events are unique to bankrupt firms but not to non-bankrupt ones. A sample of firms that declared bankruptcy during the period of 1970-1980 was selected. A matching sample of comparable non-bankrupt industrial firms was selected for the same period.

Seven events-net losses, dividend reduction/elimination, bond rating downgrading, discontinued operations, management reorganization, debt accommodation, and loan default-were identified as potential significant failure events from their previous study.

The timing sequence revealed that: 1) debt accommodation, discontinued operation and downgrading of bonds typically occurred in the year of bankruptcy; 2) loan defaults and management reorganizations tended to occur either in the year of bankruptcy or in the year preceding bankruptcy; and 3) net losses most often began one or two years before the year of bankruptcy. Nonetheless, the authors indicated there was so much variation in the timing pattern of events for all the bankrupt firms that a recurring pattern was difficult to

discern.

Four of the events were tested to determine if there were statistical differences between the number of surviving firms and the number of bankrupt firms reporting net losses, debt accommodations, loan defaults, and discontinued operations. No tests were run on other events because they were rarely reported events. Chi-Square tests indicated statistically significant differences (at the 0.001 level) for the first three events such as net losses, debt accommodations and loan default.

In summary, the events approach is a viable alternative approach for business failure. However, it has not been used widely due to lack of predictive power. The preceding studies did not consider industry differences therefore did not capture the events which may be unique to an industry.

2.1.3 Combination of ratio and events approach

Argenti (1976) argued that non-financial symptoms may be needed to achieve a reasonable level of prediction accuracy. The major objective of Keasey & Watson (1987) was to determine whether a model utilizing a number of non-financial variables, either alone or in conjunction with accounting and financial ratios, is able to predict business failure more accurately than models based solely upon accounting and financial ratios.

The unit of analysis of this study was based on firms

that were independently owned with a single plant and located in the Northeast of England. A sample of 73 failed firms and 73 non- failed firms was constructed by industry classification for the period of 1970 to 1983. They used 28 accounting and financial ratios and 18 non-financial variables. Logistic regression analysis was employed for the models.

Models 1, 2, and 3 were constructed using accounting and financial ratios only, non-financial variables only, and both accounting and financial ratios and non-financial variables, respectively. Model 1 (consisting of 5 accounting and financial ratios), model 2 (consisting of 5 non-financial variables), and model 3 (consisting of 4 accounting and financial ratios and 3 non-financial variables), respectively, had 55, 65, and 65% classification accuracy 3 years prior to business failure.

Flagg, Giroux & Wiggins (1991) combined the postulated events with accounting and financial ratios in a single model so as to predict which failing firms would ultimately go into bankruptcy. A firm is considered to have entered the failure process if it had an initial net operating loss following at least three consecutive years of profitability (net income greater than zero) for the period of 1975-1981. The sample in their study consisted of 202 failing firms in total, excluding utility, transportation, and financial service industries. Of

these 26 (13%) went bankrupt and 176 (87%) survived over the five year examination period.

Four events and six accounting and financial ratios were investigated through logistic regression analysis. This model, which consisted of 2 events and 4 accounting and financial ratios, correctly classified 94% of the sample as bankrupt or non-bankrupt. In summary, although the previous studies proposed a model based on both failure events and accounting and financial ratios, these studies did not consider industry differences.

The following section will focus on industry differences and explore the notion that contemporary business failure studies should focus more on firms in a specific industry in order to provide additional information complementary to the body of knowledge accumulated through cross-sectional and aggregate industries studies.

2.2 INDUSTRY FINANCIAL CHARACTERISTICS AND THEIR INFLUENCES ON BUSINESS FAILURE

Platt (1989) suggested that industry failure rates were related to differences in industry financial conditions and that each industry has different failure rate elasticities with respect to financial conditions. Financial conditions such as working capital, capital structure, profitability, asset structure, systematic risk and leveraged buyout will be

reviewed with respect to industry differences and their influences on business failure.

2.2.1 Working Capital

Working capital is funds invested in a firm's cash, accounts receivable, inventory, and other current assets. Working capital management is concerned with the problems that arise in attempting to manage current assets, current liabilities, as well as the inter-relationships between them. Working capital investment and policies tend to vary with the type of industry. After examining a sample of 1,881 firms from 36 industries over a period of 19 years (1960-1979), Hawawini, et.al. (1986) concluded that 1) there was indeed a significant and persistent industry effect on a firm's investment in working capital which was measured by the working capital/sales ratio and 2) firms adhered to definite industry benchmarks when setting their working capital investment policies.

Clifton-Steele (1985) argued that one of the major causes of business failure is insufficient attention to the requirements of working capital management. Excessive investment in non-productive working capital sacrifices the potential for maximizing return from productive investments (Wight, 1985). Furthermore, too little working capital leads to an inability to pay current liabilities (Sprague and

Bellows, 1975; Clark & Newman, 1986).

2.2.2 Capital Structure

Capital structure has been widely debated in finance literature. In their pathbreaking paper, Modigliani & Miller (1958) suggested that in a world without taxes, both the value of a firm and its overall cost of capital are unaffected by its capital structure. They argued, however, in a world with corporate taxes, financial leverage does determine firm value and cost of capital (Modigliani & Miller, 1963). Kane, Marcus & McDonald (1985) showed that a meaningful measure of the advantage of debt use is the extra rate of return, net of a market premium for bankruptcy risk, earned by a leveraged firm relative to an otherwise-identical unleveraged firm.

Miller and Modigliani also recognized the need for the firm to maintain a substantial reserve on untapped borrowing power in order to provide it with some flexibility since over-leveraging tended to reduce the firm's options in capital structure decisions. One of the effects of over-leveraging is that larger fixed interest charges from the greater use of debt financing leads to a high probability that a decline in the firm's earnings will cause financial distress. Thus capital structure decisions can contribute to the risk of bankruptcy.

Having recognized the benefits and pitfalls of leverage

to a firm in the preceding discussion, it is important to note that the pattern of capital structure tends to be more identical within industries and less identical across industries. Earlier on Donaldson (1957) had assumed the existence of relatively standard industry debt ratios. The reasoning behind this assumption was based on the idea that an important determinant of the ability of a firm to carry debt is the stability of its operating earnings. Firms in the same industry presumably face similar supply and demand conditions and similar technology. It seems reasonable to suppose that equally competent managers facing similar circumstances would arrive at roughly similar judgements as to the prudent amount of debt appropriate to that set of conditions (Cherry & Spradley, 1990). Therefore, it would appear unwise to disregard industry classification in capital structure analysis or in the analysis of incidence and prediction of business failure.

Previous empirical studies supported the finding that the pattern of capital structure of a firm within a given industry classification differs significantly from the pattern of capital structure of a firm belonging to another industry classification. These studies also suggested that firms within a given industry classification develop the pattern of capital structure that are optimal for their operational risk and asset structure (Schwartz & Arsonson, 1967; Scott, 1972;

Scott & Martin, 1975; Bowen, Daley & Huber, 1982; Martin & Henderson, 1984).

The pattern of capital structure was measured in these studies by such ratios as equity/total capitalization, long term debt/equity, times-interest earned and equity ratios through parametric and/or nonparametric techniques for the various periods.

2.2.3 Profitability

Profitability is one of the most important factors that can cause business failure. Such terms as economic failure, technical insolvency, and bankruptcy can be explained by profitability.

With regard to bankruptcy, past or future profitability can impact such exit modes as reorganization and liquidation. White (1984) suggested that firms expected to operate in the near future should be able to generate funds internally in order to successfully emerge from bankruptcy.

On the other hand, Casey, McGee & Stickney (1986) indicated past profitability (the retained earnings/total assets ratio) as well as the change in total assets and the free assets (assets not secured) as discriminators between successful reorganization and liquidation. Whether it concerns past or future profitability, these studies showed that profitability is an important factor for the exit modes

of bankruptcy.

Profitability patterns are not identical across industries. Kessides (1990) indicated that industry effect was statistically significant and quantitatively important, and it accounted for a significant portion of the variance in business unit profit margins of 1,775 business units operated by 456 firms in 242 industries listed in the 1975 Federal Trade Commission Line of Business Data. A similar result was found by Amato & Wider (1990). They showed that the industry effect emerged as the dominant effect in explaining variation in profitability, measured by return on assets, through 256 consistent observations in 40 industries from the Internal Revenue Service Sourcebook of Corporate Statistics of Income for the years 1966 and 1975.

2.2.4 Asset Structure: Fixed Asset

Fixed assets consist of 1) land and buildings, 2) plant and machinery, 3) fixtures, fittings and equipment, and 4) payments on account and assets in the course of construction. These assets are associated with production and marketing methods used by firms.

Production process and marketing methods are not identical across industries. Therefore the pattern of fixed assets is different from industry to industry. For example, on average, production processes in primary goods industries

tend to be more capital intensive than those found in secondary goods industries. Therefore primary goods industries probably have a higher concentration in fixed assets than do secondary goods industries (Rudolph, 1979).

Rudolph (1979) investigated asset structures for 311 firms during the period of 1964-1974. These firms were divided into primary and secondary goods industries. The results showed that primary goods industries were in the upper extreme in the ownership of fixed assets while the secondary goods industries were in the lower extreme, as measured by fixed assets/total assets ratio.

The probability of business failure is higher if firms which used internal and/or external financing, either go on capital spending binges in managing their fixed assets or allow their fixed assets to become obsolete (McKinlay, 1979). Debts taken on to acquire these assets must be repaid. Eventually, these debts can come into line with these asset values. This likely will be accomplished through write-offs, bankruptcies, and rescheduling (Rutledge, 1985).

2.2.5 Systematic Risk

Systematic risk, also known as market risk, is common to all securities and cannot be eliminated by diversification. The measure of systematic risk for stocks is the beta coefficient (hereafter referred to as beta).

It can be suggested that consideration be given to industry differences in a effort to explain differences in a firm's systematic risk. Fabozzi & Francis (1979) showed that significant industry effect could either increase or decrease the systematic risk of stocks in any particular industry.

They also showed that holding the industry effect constant enabled more exact and meaningful measurements to be made for the determinants of systematic risk such as leverage and earnings variance through the sample of 1,218 firms in 24 different industries.

Several studies have been conducted with respect to beta. Beaver, Kettler & Scholes et.al. (1970) showed that betas for a given period could be predicted by using a few financial ratios, such as dividend payout ratio, a financial leverage ratio, and an earnings variance measure, more accurately than they could by simply using the preceding period's beta as a predictor.

Hamada (1972) analyzed corporate financial structures and showed evidence that leverage should exert a positive influence on betas. Therefore beta captures some information such as financial leverage and earning variance which can be causes of business failure.

Market data such as systematic risk can provide a satisfying theoretical basis for analyzing corporate bankruptcy in that investors' expectation should be reflected

in market risk-return measures (Aharony, 1980).

Castagna & Matolcsy (1981) suggested that failed firms have a higher systematic risk than the apriori value of one, and that the market on average adjusts the prices of failed firms upwards prior to failure occurring. Ro, Zavgren & Hsieh (1992) also suggested that the systematic risk of failing firms is much higher than that of healthy firms and continues to increase prior to bankruptcy. These studies indicated a positive relationship between systematic risk and business failure.

2.2.6 Leveraged Buyout

Leveraged buyout (hereafter referred to as LBO) is a financial mechanism to take over a firm using borrowed funds. Most often, the target firm's assets serve as security for the loan taken out by the acquiring firm which repays the loans out of the cash flow of the acquired company. Management may use this technique to retain control by converting a firm from public to private. A limited number of investors own the stock of a privately held firm, and public shareholders receive a premium over the current market value for their shares (Cooke, 1988).

LBO, also called management buyout, can be motivated by the presence of divisions that no longer fit the corporate strategies and have lower productivity. Therefore parent

companies may decide to divest resources by spinning off these unwanted divisions (Moncarz, 1985).

Some industries may be more likely to have LBOs than others due to the differences in growth rates, free cash flow, debt capacity, and returns, and firms with management or operating inefficiency are more likely to have LBOs than others in the same industry. Consequently, some industries and some firms with inefficiencies may tend to employ LBOs to prevent business failure. Theoretical factors for explaining the motivations for taking a firm private can be grouped under two competing hypothesis. The first, the firm specific effects hypothesis, states that firm-specific characteristics, such as management or operating inefficiency, are the primary motivation for taking a firm private. The second, called the industry effect hypothesis, states that factors in common to the firm's industry are the primary motivation for taking a firm private (Ambrose & Winters, 1992).

They found weak evidence to support the industry effect hypothesis, for only statistically weak nonparametric tests supported this hypothesis. They concluded that firm specific factors were the primary motivating forces for most LBOs. The industry in which a firm operates is the secondary factor contributing to whether a firm becomes the target of a LBO. The sample used in this study consisted of 263 successful going-private LBO transactions in 62 industries from 1980

through 1987.

The industry effect hypothesis suggests that certain industries are more likely to have LBO activity. For there to be a concentration of LBOs in an industry, most firms in the industry must generate enough cash flow above their needs to service the debt used in the LBOs. Jensen (1989) pointed out that some of the best examples of this occurred in the oil, tire, and tobacco industries. Lehn, Netter & Poulsen (1990) supported the industry effect hypothesis and reported that LBOs occurred for firms in industries that are faced with slower growth prospects and lower research and development expenses.

Shrieves & Stevens (1979) suggested a bankruptcy avoidance rationale for mergers and acquisitions, that is, target firms tend to be near bankruptcy at the time they were acquired.

The whole emphasis of LBO, or management buyout, is on management involvement and motivation since owner-managers stand to benefit the most. As a result, they become more committed and generate increased productivity for the firm. Therefore firms may prevent possible business failure with an increase in productivity. There has been much study of corporate control activity, and, although the results of such studies have not been uniform, the evidence indicates control transactions generate value for shareholders. The evidence

also suggests that this value comes from real increases in productivity. LBOs are an interesting example of control transfers that highlight the effect of changes in organization form and incentives on productivity (Jensen, 1989).

In summary, many previous studies not only suggested that the industry effect is an important determinant of some financial characteristics such as working capital, capital structure, profitability, asset structure, systematic risk, and leveraged buyout but also indicated that these financial characteristics are related to business failure phenomena. In the next section, studies on business failure in the restaurant and hotel industries is reviewed.

2.3 REVIEW OF BUSINESS FAILURE IN THE RESTAURANT AND HOTEL INDUSTRIES

The restaurant and hotel industries entered the 1990s with a series of challenges that threaten the survival of a significant number of firms. Although in some cases, occurrences beyond human control have made some business failures inevitable, the pursuit of knowledge about business failure has been worthwhile. In this section studies about business failure in the restaurant and hotel industries will be reviewed. These studies would be classified as ratio and events approach studies.

2.3.1 Ratio Approach

The purpose of Olsen, Bellas & Kish's study (1983) was to describe some of the approaches to developing an early warning system for business failure and present evidence to support the use of several key warning signals developed for the restaurant industry. This study was the first attempt to test the applicability of business failure prediction studies through ratio approach in the restaurant industry.

A failure was defined as a restaurant which for six consecutive months had a cumulative negative cash flow. This study concentrated on three multi-unit food service organizations: a franchised steak house concept; a multi-unit, multi-concept full service restaurant chain; and a franchised, limited menu, medium priced regional chain. A total of 19 restaurant units from the three organizations provided data for the analysis. Of the 19, 12 were considered non-failed while 7 were considered failed.

12 ratios were obtained for both the failed and non-failed firms within each restaurant organization and the differences were compared over the time periods prior to failure. From this comparison the ratios which demonstrated large differences between the pairings of failed and non-failed firms were considered the most useful indicators. The time period of their effective usefulness was demonstrated in this study.

Ratios such as current asset/current liabilities, working capital/total assets, earnings before interest and taxes/total assets, earnings before interest and taxes/revenues, total assets/revenue, and working capital/revenue appeared to be the most useful indicators for predicting failure. The liquidity ratios provided 5 and 10 months advance warning, but the profitability ratios provided a longer lead time (7-18 months advance warning). Only one asset utilization ratio, working capital to revenue, appeared to have predictive capabilities (6-9 months advance warning) as good as liquidity ratios.

Liquidity is an overriding concern for hotel firms. The firms that prosper in the present environment will likely be those that have made the most of their financial resources (Swanson, 1991). Swanson investigated the liquidity measure, Emery's Lambda, in order to provide financial managers and other stakeholders a way of analyzing their firm's financial performance. Emery's Lambda is defined as the sum of the initial liquid reserve plus the total anticipated cash flow divided by the uncertainty about net cash flow. Initial liquid reserve is all sources of liquidity, such as cash, marketable securities, and lines of credit. The uncertainty factor is measured by the standard deviation of net cash flows. Emery's Lambda can be considered a measure of a firm's ability to bring all resources to bear on unexpected demands for cash. The higher the value of Lambda, the more able a

firm is to meet such demands for liquidity and the less likely the firm is to experience temporary insolvency.

Six firms, Divi, Hilton, Holiday, Marriott, Motel 6, and Prime Motor Inns were selected for Swanson's study. Each firm was analyzed using Emery's Lambda in order to show how effective this measure was in determining each firm's health. Among six firms, Divi and Prime Motor Inns showed lower Emery's Lambda than others. He suggested that the traditional measure of liquidity cannot assign probability to the likelihood of insolvency, but indeed Emery's Lambda can be employed to investigate liquidity positions of firms with a high degree of confidence for the likelihood of business failure.

2.3.2 Events Approach

Tavlin, Moncarz & Dumont (1989) examined several firms in the restaurant industry that had experienced varying degrees of financial success in order to investigate the reasons for business failure. Some events from the business failure process that were common within all the firms examined can be deduced from this study as the selected firms approached business failure. Some of these events are operating losses, realignment charge for the disposition of unprofitable company owned units, couponing or discounting, costly lease-purchase arrangements, exchange of both common and preferred stock for

reduction in long term debt and interest expenses, and leveraged buyout.

Kwansa & Parsa (1990) used the events approach to identify and present a series of events which characterize the business failure process in the restaurant industry. Publicly-traded firms were selected for this study. An initial sample of 12 bankrupt firms was obtained from the Wall Street Journal Index, New York Times Index and Trade Journals. Further, a control sample of non-bankrupt firms was also selected from the same sources between the period 1970-1988. All bankrupt firms were analyzed for the occurrence of failure events with a focus on the two years preceding the actual bankruptcy filing. The sample of bankrupt firms was compared to the non-bankrupt sample to determine if the failure events identified were unique to the bankrupt firms. Seven failure events which were identified as significant in Giroux & Wiggins's study (1984) were used in this study. In addition to these events, 6 other events which had been previously identified in a study by Tavlin, Moncarz & Dumont (1989) were included.

Seven events from the above study appeared to be unique in the bankrupt process of the restaurant firms examined. These were net losses, management turnover, loan default, royalty default, credit accommodation, decline in unit sales, and renegotiation of franchise contract. All these events

observed in the bankrupt firms occurred within two years of their filing for bankruptcy. They suggested that some of the events observed, such as royalty default, renegotiation of franchise contract, and decline in unit sales, are characteristic of industries in which franchising exists.

Business failure events in the hotel industry was examined by Moncarz (1992). She focused on Prime Motor Inns' (hereafter referred to as Prime) initial success and the principal causes of its failure which resulted in the filing of protection from creditors in Federal Bankruptcy Court. The first event occurring two years prior to bankruptcy was the decline in quality of earnings. Prime's unusual gains resulted from transactions involving the sale of hotels, and interest income. However, per share income from its basic business of lodging, food and beverage, and hotel franchise was declining. The next event was divestiture of unprofitable units. Prime signed an agreement to sell 65% of Howard Johnson and Ramada to Blackstone Capital Partners. Prime also extended FCD Hospitality Company's loan repayment dates. Finally Prime attempted to restructure its debt while preparing to file for bankruptcy.

In summary, the challenge of the last two decades was managing and financing rapid, unsustainable growth in restaurant and hotel industries. The 1990s will likely be a decade of effective survival management requiring careful

monitoring of businesses to identify and recognize the warning signals of business failure.

The previous researchers in the restaurant and hotel industries believed that the warning signals of possible business failure could be detected much earlier through ratio analysis or events approach. Although these techniques exist many restaurant and hotel firms continue to be threatened by bankruptcy. Therefore the investigation of factors which determine the decision to reorganize or liquidate is as critical as the identification of early warning signals for business failure. The next section will review reorganization and liquidation.

2.4 REORGANIZATION AND LIQUIDATION

Only 30 percent of publicly-traded bankrupt firms successfully reorganize (Altman, 1983; LoPucki, 1983). LoPucki (1983) presented empirical evidence showing that the success rate of firms entering reorganization since the new Bankruptcy Code became effective in October 1979 was lower than it was ten years before.

Several studies have been conducted to explain the diminishing success rate by identifying the factors that distinguish bankrupt firms that successfully reorganize from those that liquidate. The purpose of these studies (LoPucki, 1983; Casey, McGee & Stickney, 1986; Badden-Fuller, 1989;

Schary, 1991) has been to identify factors which contribute to a firm's selection of bankruptcy type. The factors employed in these studies can be categorized as financial characteristics, strategy, age and type of the business, geographic location, size, and the existence of creditor opposition to reorganization plan.

However, these studies did not investigate whether the relationship between reorganization and liquidation is dependent on each other or independent of each other. Bankruptcy attorneys estimate that perhaps 8 out of 10 firms that file for reorganization wind up being liquidated (Chatterjee & Scott, 1989). Therefore, it can be suggested that there is a progressional relationship between the process of reorganization and liquidation. This is an important issue because the existence of such a relationship would not only contribute to the decision concerning reorganization or liquidation from the point of view of financial factors but also to the controversial issue of relevant bankruptcy costs. This section will review the relationship between reorganization and liquidation followed by bankruptcy costs.

2.4.1 Independence of reorganization and liquidation

Reorganization occurs when fixed obligations cannot be met. In this case there is a formal reorganization of the capital structure of the firm through court action in order to avoid transfer of ownership. Liquidation occurs when the market value of the dismantled assets exceeds their value as a reorganized, on-going firm (Haugen & Senbet, 1978; 1988).

Haugen and Senbet suggest that liquidation, unlike reorganization, should be viewed as a capital budgeting decision and as such should be independent of the manner in which the firm is financed. Therefore liquidation and reorganization are separate, independent events. An unprofitable firm may be liquidated even if it has no debt in its capital structure.

There is no necessary linkage between reorganization (financial distress due to capital structure) and a firm's operating profitability (economic distress). It is tempting to point to new stories of distressed firms as evidence of a causal relationship between impending reorganization and a deterioration in profitability or decrease in product demand (Senbet & Seward, 1993). The crucial consideration is whether an identical but otherwise non-distressed firm (due to lower financial leverage) would face a similar deterioration in its performance. It can be suggested that there is a distinction between reorganization and liquidation (economic distress due

to profitability) (Senbet & Seward, 1993).

In summary, reorganization can be determined by capital structure (how the firm is financed), whereas liquidation can be determined by profitability (how well the firm is operated). Therefore reorganization and liquidation are independent of each other.

2.4.2 Dependence of Reorganization and Liquidation

White (1984) and Casey, McGee & Stickney (1986) indicated that there were differences between successful reorganizers and liquidators. Their models incorporated capital structure variables, indicated by free assets (these are non-collaterized tangible assets and tend to decrease as a firm increases its debt level), and profitability variables, which are indicated by net income and retained earnings divided by total assets. These two studies suggested that capital structure and profitability variables were important discriminators between successful reorganizers and liquidators.

Titman (1984) suggested 1) that a firm's capital structure determines the future liquidation decision and 2) that this, in turn, affects the manner in which the firm conducts business with its customers, workers, and suppliers. An increase in a firm's debt level, which increases its possibility of reorganization, may thus worsen the terms of

trade with the external environment resulting in an increased probability of liquidation.

From these studies it may be concluded that liquidation can be determined by capital structure and profitability together. Several studies (Bulow, 1978; Shapiro & Peitzman, 1984; Morris, 1986) have suggested many variables to be considered in a firm's decision to reorganize. The common variables suggested in these studies were capital structure and profitability.

In summary, the decision to reorganize or liquidate is inter-related with respect to capital structure and profitability, and, therefore, reorganization and liquidation decisions are dependent on each other.

2.4.3 Bankruptcy Costs

Bankruptcy costs are both direct and indirect. Direct costs encompass legal and administrative fees which include the cost of lawyers, accountants, and other professionals involved in the bankruptcy filing. There is little controversy with respect to the measurement of direct bankruptcy costs because those costs tend not to be significant.

A study of railroad bankruptcies between 1933 and 1935 by Warner (1977) provided evidence of the magnitude of direct costs. He found that these costs averaged about four percent

of the firm's aggregate market value measured just prior to declaring reorganization. He noted that direct costs of this magnitude were unlikely to affect the pricing of debt claims and optimality of capital structure at the time of debt issuance.

Weiss (1990) also indicated that direct costs had virtually no impact on the pricing of claims and capital structure prior to bankruptcy. He found that direct costs averaged 3.1 percent of the book value of debt plus the market value of equity within a sample of 35 reorganized and 2 liquidated firms from various industries between 1979 and 1986. Ang, Chua & McConnell (1982) showed similar results in their study which found that direct costs averaged 7.5 percent of the liquidated value of the firm. Thus, they concluded that the direct costs appeared to be insufficient relative to the alleged tax advantage of debt within the Modglinai and Miller tax model used to explain observed capital structure. The sample consisted of 55 liquidated firms from various industries for the period of 1963-1978.

These studies suggest that direct costs are unlikely to represent a significant determinant of capital structure decisions within reorganized and/or liquidated samples.

Both direct and indirect costs should be considered in order to measure the significance of the magnitude of bankruptcy costs (Stone, 1977). Potentially more significant

and substantial are the indirect costs (Chatterjee & Scott, 1989).

The indirect costs are opportunity costs which include lost sales, increased operating costs, and a reduction in the firm's competitiveness (Davis, 1992).

Altman (1984) measured the indirect costs as the differences between the earnings realized in each of the three years prior to the firm's reorganization and the earnings that could have been expected at the beginning of each of those years.

He found that, on average, indirect costs ranged from 11 percent to 17 percent of the firm value up to three years before reorganization within the sample consisting of 19 industrial firms over the period of 1970-1978. He concluded that the present value of expected bankruptcy costs for many of the reorganized firms were found to exceed the present value of tax benefits derived from leverage. These conclusions implied that 1) the firms were over-leveraged and 2) a potentially important ingredient in the discussion of optimal capital structure was indeed the bankruptcy cost factor.

Haugen & Senbet (1988) criticized Altman's procedure (1984) because his study had confused the indirect costs of liquidation with the indirect costs associated with reorganization. As an example, they illustrated that when a

firm is confronted with the introduction of a dominant product by a competing firm, the event has an adverse impact on the realized earnings through reductions in sales and increase in costs. This, in turn, suggests that Altman's procedure (1984) measured such negative deviations as part of indirect bankruptcy-reorganization costs. When they were, in fact, unrelated to the way the firm is financed.

Titman (1984) suggested that liquidation costs have important implications, which are related to the theory of capital structure. An increase in a firm debt level, which increases its probability of reorganization, will thus worsen the terms of trade to reflect the increased probability of liquidation as the firm does business with its customers, workers, and suppliers. The less favorable terms of trade are a cost of debt financing which is relevant to the firm's capital structure.

In summary, the controversy surrounding relevant indirect bankruptcy costs results from the relationship of reorganization and liquidation. If reorganization and liquidation are dependent on each other, the indirect bankruptcy costs for the reorganized firms may not be confounded with liquidation costs. In other words, the indirect costs for the reorganized firms cannot be based on profitability (how much the firm would lose if reorganized) which is the determinant of liquidation. If reorganization

and liquidation are dependent on each other, the indirect bankruptcy costs for the reorganized firms may be based on profitability (how much the firm would lose if reorganized).

2.5 SUMMARY

The previous studies provide empirical evidence illustrating that characteristics of business failure can be determined and examined through ratio, events and the combination of ratio and events approach (Altman, 1968; Giroux & Wiggins, 1984; Flagg, Giroux & wiggins, 1991). Table 5 provides the summary of business failure studies using ratio approach. However, most of these studies did not consider industry differences. Therefore it is not known whether the models from these studies may be directly applicable to a single industry.

Many previous studies not only suggested that the industry effect is an important determinant of some financial characteristics such as working capital, capital structure, profitability, asset structure, systematic risk, and leveraged buyout but also indicated that these financial characteristics are related to business failure phenomena (Platt, 1989; Wight, 1985; White, 1984, Casey, McGee & Stickney, 1986). Therefore it can be suggested that contemporary business failure studies focus more on firms in a single industry in order to provide additional information complementary to the body of knowledge

accumulated through cross-sectional and aggregate industries studies.

Although business failure can be predicted by the early warning signs, some firms still eventually file for bankruptcy. Bankruptcy is the most critical type of business failure, and the most well known types of bankruptcy are liquidation (chapter 7) and reorganization (chapter 11). However, there have been arguments regarding the relationship between liquidation and reorganization.

One group of authors believes that reorganization and liquidation are independent of each other, that is, reorganization and liquidation can be determined respectively by capital structure and profitability (Haugen & Senbet, 1978;1988; Senbet & Seward, 1993). Another group believes that reorganization and liquidation are dependent on each other, that is, reorganization and liquidation can be determined by both capital structure and profitability (Bulow, 1978, Shapiro & Peitzman, 1984; Titman, 1984; White, 1984; Morris, 1986; Casey, McGee & Stickney, 1986).

If reorganization and liquidation are independent of each other, the indirect bankruptcy costs for the reorganized firms may not be confounded with liquidation costs (Haugen & Senbet, 1978; Senbet & Seward, 1993). However, if reorganization and liquidation are dependent on each other, the indirect bankruptcy costs for the reorganized firms may be based on

profitability (Titman, 1984).

The investigation of these relationships would not only contribute to the decision concerning reorganization or liquidation from the point of view based on financial factors but also to the controversial issue of relevant indirect bankruptcy costs.

Table 5. The Summary of Business Failure Studies through Ratio Approach

Author	Year	Sample	Statistical Method	Important Predictors
Beaver	1967	79 failed firms and a paired sample of non-failed firms	Empirical tests focus on comparison of means and dichotomous classification tests	net income/total assets net income/total debt total debt/total assets working capital/ total assets no-credit interval current ratio
Altman	1968	33 failed firms and a paired sample of non-failed firms	Multiple discriminant analysis	working capital/ total assets retained earnings/ total assets earnings before interest and taxes/total assets market value of equity/ book value of total debt sales/total assets
Deakin	1972	32 failed firms and a paired sample of non-failed firms	Multiple discriminant analysis	cashflow/total debt total debt/total assets net income/total assets current ratio current assets/sales quick assets/sales working capital/sales cash/sales current assets/ total assets cash/total assets quick assets/ current liabilities

(table continued)

Blum	1974	115 failed firms and a paired sample of non-failed firms	Multiple discriminant analysis	cashflow/total debt
Libby	1975	32 failed firms and a paired sample of non-failed firms	Principle-component analysis	net income/total assets current asset/sales current asset/ current liabilities current asset/ total assets cash/total assets
Altman	1977	53 failed firms and a paired sample of non-failed firms	Multiple discriminant analysis	return on assets standard error of estimate of earnings before interest and taxes/total assets earning before interest and taxes/interest retained earnings/ total assets current assets/ current liabilities market value of equity/total capital total assets
Ohlson	1980	105 failed firms and 2,058 non-failed firms	Logistic regression analysis	total liabilities/ total assets working capital/ total assets current ratio net income/ total assets

(table continued)

Khoury	1980	68 failed firms and a paired sample of non-failed firms	Multiple discriminant analysis	net profit/sales net profit/total assets fixed assets/net worth totaldebt/workingcapital total debt/total assets standard deviation of inventory/workingcapital standard deviation of fixed assets/net worth
Lincoln	1984	39 non-failed firms and 41 failed firms	Multiple discriminant analysis	Cashflow/ current liabilities currentasset/totalassets quickasset/currentassets current liabilities/ total liabilities quick liabilities/ current liabilities retained profit/ total assets total liabilities/ total assets
Casey	1985	230 non-failed firms and 60 failed firms	Multiple discriminant & logistic regression analysis	cash/total assets current assets/ total assets current ratio sales/current assets net income/total assets total liabilities/ equity CFO(cashflow from operation) CFO/current liabilities CFO/total liabilities

(table continued)

Frydman 1985	58 failed firms and 142 non-failed firms	Recursive partitioning analysis	cashflow/total debt cash/total sales total debt/total assets market value of equity/ total capitalization interest coverage quick assets/total assets
Coats 1993	94 failed firms and 188 non-failed firms	Neutral network tool	working capital/ total assets earnings before interest and taxes/total assets market value of equity/ book value of total debt sales/total assets
Olsen 1983	12 failed restaurant firms and 7 failed restaurant firms	Empirical tests focus on comparison of means over time periods prior to failure	current ratio working capital/ total assets earning before interest and taxes/total assets earning before interest and taxes/revenue total assets/revenue working capital/ revenue
Swanson 1991	7 hotel firms	Emery's Lambda	the sum of initial liquid reserve plus anticipated cashflow divided by standard deviation of cashflow

The failed and non-failed firms in the samples were manufacturing or industrial firms unless they were otherwise specified.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH QUESTIONS

According to Dun and Bradstreet's business failure reports, in comparison to all other industries most business failures between 1984 and 1992 occurred in the retail and service sector. Within the retail trade sector, the eating and drinking places segment has consistently had the most business failures of any single segment between 1984 and 1992 (Dun & Bradstreet, 1984-1992).

Financial conditions such as working capital, capital structure, profitability, asset structure (fixed assets), systematic risk and leveraged buyouts are related to business failure. Each industry has different business failure rate elasticities with respect to these financial conditions. Therefore empirical work in the area of business failure cannot assume that industries are homogeneous.

Bankruptcy is the most critical type of business failure, and the most well known types of bankruptcy are reorganization and liquidation. Although there have been conflicting arguments with respect to the relationship between reorganization and liquidation, no empirical research has been conducted.

Given that 1) the restaurant industry has consistently had the most business failures within the retail sector from

1984 to 1992, 2) each industry needs its own prediction model for business failure which reflects the industry's unique nature, and 3) there have been arguments with respect to the relationship between reorganization and liquidation, the following questions are of empirical interest:

1. Can business failure be predicted and which financial variables can predict business failure in the restaurant industry?
2. Are there differences in the financial variables which predict business failure for the restaurant industry on one hand and the hotel industry on the other?
3. Are the financial variables that determine reorganization different from those that determine liquidation in the restaurant industry?

3.2 HYPOTHESES

Three null hypotheses can be developed from the research questions and the theoretical underpinnings. Table 6 summarizes research questions, hypotheses, and theoretical underpinnings.

First null hypothesis:

Business failure cannot be predicted in the restaurant industry at the 0.05 level.

There are 8 sub-hypotheses (at the 0.05 level) under the first null hypothesis as follows:

1. Business failure is not determined by current ratio.
2. Business failure is not determined by cashflow per share.
3. Business failure is not determined by total assets turnover.
4. Business failure is not determined by operating cycle days.
5. Business failure is not determined by sales/net property, plant and equipment.
6. Business failure is not determined by long-term debt/common equity.
7. Business failure is not determined by total debt/invested capital.
8. Business failure is not determined by total assets/common equity.

The second null hypothesis:

There are no differences in the predictors for business failure between the restaurant industry and the hotel industry.

The third null hypothesis:

Capital structure and profitability do not determine reorganization and liquidation.

Table 6. Research Question, Hypothesis and Theoretical Underpinning

Research question	Null hypothesis	Theoretical underpinning
Can business failure be predicted? Which financial variables can predict business failure in the restaurant industry?	Business failure cannot be predicted.	Usefulness of ratio analysis has provided that business failure can be predicted by developing models which classify firms as failed or non-failed. (Beaver, 1967; Altman;1968; Olsen, et.al., 1983)
Are there differences in the financial variables which predict business failure for the restaurant industry on one hand and the hotel industry on the other?	There are no differences in the predictors for business failure between restaurant and hotel industry.	Industry failure rates are shown to be related to differences in industry financial conditions and each industry has different failure rate elasticities with respect to financial conditions. (Platt, 1989; Wight, 1985; White, 1984; Casey, et.al, 1986; Rutledge, 1985)
Are the financial variables that determine reorganization different from those that determine liquidation in the restaurant industry?	Capital structure and profitability together do not determine reorganization and liquidation.	Reorganization and liquidation are dependent on each other. (Bulow, 1978; Titman, 1984; White, 1984; Morris, 1986)

3.3 METHODOLOGICAL REVIEW

3.3.1 Justification of Research Methodology

Leedy (1993) asserts that the nature of the data dictates the research methodology. If the data is verbal, the method is qualitative; if it is numerical, the method is quantitative. However, as an alternative to this strict dichotomy, there is triangulation consisting of a hybrid variation. Leedy, therefore, classifies, all research methodologies under one of these categories.

Qualitative research can be primarily an inductive approach to data analysis and results in theory development (Parse, Coyne & Smith, 1985; Kirk & Miller, 1986; Cobb & Hagemaster, 1987). Conversely, quantitative research can be primarily a deductive approach to data analysis. Researchers construct and test null hypotheses so as to either support or reject these hypotheses at some level of statistical probability (Ramer, 1989). Goodwin & Goodwin (1984) suggested that many studies could be enhanced if they combined both qualitative and quantitative approaches. Triangulation research is the use of two or more methods of data collection procedures within a single study (Duffy, 1987).

In this study, the type of methodology was determined by the nature of the data (ratios) derived from the research questions. Therefore the quantitative methodology was employed.

3.3.2 Justification of Research Method

A method is a way of accomplishing an end result, and it indeed depends on the methodology. Descriptive, survey, historical and case studies are examples often used in qualitative research while experimental, quasi-experimental and statistical-analytical studies are examples usually employed in quantitative research. A combination of methods from both the qualitative and quantitative methodologies describes triangulation research (Leedy, 1993).

In this study, the statistical-analytical method was employed due to the nature of the research questions. The experimental method and quasi-experimental methods deal with the phenomenon of cause and effect within a closed system of controlled conditions. However, the research questions in this study do not determine cause and effect relationships within the context of business failure but instead classify and predict business failure.

The research questions can be investigated by using an analysis of financial ratios, an events approach, and the combination of the two. Since the purpose of the events approach is not to classify and predict but to determine the characteristics of the failure process, the events approach is not appropriate to the research questions.

Although the combination approach may increase understanding of the failure process and improve business

failure prediction, there can be collinearity between ratios and events. For example, lower profitability and higher capital structure may be highly correlated with some events such as reduction in dividends, violation of debt covenants, troubled debt restructuring or going concern qualified audit opinions. Therefore the ratio approach was employed in this study. In the next section, the various statistical-analytical methods employing the ratio approach will be briefly reviewed.

3.3.3 Choice of Classification and Prediction Method

Many of the studies employing accounting and financial ratios as independent variables predict business failure using methods which classify firms as failed or non-failed. In order to assess how well the method works, it is common to compare predictions of business failure to the observed outcomes by estimating classification accuracy percentages which are generally reported in matrix form.

There are several methods such as the univariate analysis, multiple discriminant analysis, logistic regression analysis, recursive partitioning analysis, and neural network artificial intelligence. In reviewing the nature of the data in the context of the research questions, it was determined that logistic regression analysis would be the best analytical tool in this case.

Efficient computer programs for fitting the logistic regression model have now removed computational cost as a barrier to an appropriate analysis of data not meeting the basic assumptions of multiple discriminant analysis (Fienberg, 1981). Press & Wilson (1978) describe the superiority of logistic regression analysis over multiple discriminant analysis through two empirical illustrations. Their study showed that logistic regression analysis was more superior to multiple discriminant analysis in terms of classification and prediction procedure.

In this study, logistic regression analysis was employed as a classification and prediction method since it is robust and superior to multiple discriminant analysis. In the next section, more detailed aspects of logistic regression analysis will be reviewed.

3.3.4 Logistic Regression Analysis

Logistic regression analysis can be applied when observations can be classified into two groups where the presence or absence of a phenomenon or event is considered a dependent variable. The objectives of logistic regression analysis are to 1) develop a model which summarizes the relationship between a dichotomous dependent variable and a set of independent variables, 2) determine which independent variables are useful for prediction, and 3) predict the value

for the dependent variable from the values of the independent variables (Hosmer & Lemeshow, 1989).

Logistic regression analysis is a parametric procedure similar to discriminant analysis that poses less rigorous constraints on the estimator variables. This method assumes the applicability of a logistic curve. If the logistic regression model is written in terms of the log of the odds, it is called a logit model and is represented as follows:

$$\log\left(\frac{Prob(event)}{Prob(no\ event)}\right) = B_0 + B_1X_1 + \ldots + B_pX_p \quad (3.3.4a)$$

where,

B_0, B_1 : coefficients estimated from the data

X : independent variable

Since it is easier to think of odds, rather than log odds, the above equation can be written in terms of odds as follows:

$$\frac{Prob(event)}{Prob(no\ event)} = e^{B_0 + B_1X_1 + \ldots + B_pX_p} = e^{B_0}e^{B_1X_1} \ldots e^{B_pX_p} \quad (3.3.4b)$$

where, e is the base of the natural logarithms.

The way of assessing the goodness of fit of the model is to examine how likely the sample results are given the parameter estimates. It is customary to use -2 times the log of the likelihood (-2LL) as a measure of how well the estimated model fits the data. This is to test the null hypothesis that the observed likelihood does not differ from

1 (the value of the likelihood for a model fits perfectly). If the observed significance level is large, the null hypothesis that the model fits cannot be rejected. Another way to assess how well the model fits is to compare the predictions to the observed outcomes. The classification table shows how many observations are correctly or incorrectly predicted by the selected independent variables.

The test that a coefficient is zero can be based on the Wald statistic, which has a chi-square distribution. The Wald statistic is the square of the ratio of the coefficient to its standard error. If the coefficient is positive, the odds are increased; if the coefficient is negative the odds are decreased; and if the coefficient is zero, the odds are unchanged.

Stepwise logistic selection is the procedure to enter important variables which can classify and predict the groups into a model. A crucial aspect of using stepwise logistic selection is the choice of an alpha level (probability of enter) to judge the importance of variables. Several researchers have studied the choice of probability of entry. They concluded that choosing a value for probability of entry in the range of 0.10 to 0.20 was more highly recommended since the choice of 0.05 is too stringent and often excludes important variables from the model (Bendel & Afifi, 1977; Costanza & Afifi, 1979).

In logistic regression analysis, there are comparable diagnostics that can be used to examine the adequacy of the resulting model. The diagnostics are known as Pearson and deviance residuals. The Pearson residual is the residual divided by an estimate of its standard deviation as follows:

$$Z_i = \frac{Residual_i}{\sqrt{(Pred.Prob._i)(1-Pred.Prob._i)}} \qquad (3.3.4c)$$

where the residual is the difference between the observed probability of the event and the predicted probability of the event based on the model. The deviance residual compares the predicted probability of being in the correct group which is based on the model to the perfect prediction of 1 as follows:

$$-2 \times \log(L0/L1) \qquad (3.3.4d)$$

where L1 is always 1, since the likelihood of the correct prediction in a perfect model is 1, and L0 is the predicted probability of membership in the correct group.
It is calculated by taking the square root of the above statistic and attaching a negative sign if the event did not occur for that case.

3.4 METHODOLOGICAL ISSUES

Some methodological issues can be considered in order to increase the reliability of classification and prediction of business failure. This section will describe the methodological issues.

3.4.1.Definition of Business Failure

Business failure is a term which is used in a variety of contexts. Keown, Scott, Martin & Petty (1985) offer three terminologies that are used to represent business failure. Economic failure, which is indicative of business expenses exceeding revenues, can be viewed as a mild form of failure. Technical insolvency describes a situation where the firms have positive net worth but have insufficient liquidity to meet current liabilities. The term bankruptcy represents the opposite extreme in which the firm shows negative net worth as well as negative liquidity.

In determining business failure with respect to classification and prediction, researchers have defined failure based on the legal context (i.e., reorganization and liquidation). It has also been defined based on the characteristics of the business failure process (i.e., defaulting on interest payments concerning current obligations, overdrawing bank accounts, missing preferred dividend payments, negative cash flow and net loss). These

characteristics of the business failure process are indicators (direct or indirect) of economic failure or technical insolvency.

The studies employing the legal context investigate these warning signals by matching actual bankrupt firms with non-bankrupt firms while the studies employing the characteristics of the business failure process investigate the warning signals by matching failed firms with non-failed firms. One advantage for using the legal definition is that all uncertainties about the status of a firm are resolved. In other words, a firm is either bankrupt or non-bankrupt. The failure process model has the advantage of providing more comprehensive information regarding business failure than the traditional models. This is possible because, in addition to classifying firms into failed versus non-failed, the model is also capable of determining which failed and non-failed firms will ultimately go bankrupt. Consequently, this model offers early warning signals to firms to help them avoid bankruptcy.

Among the characteristics of the business failure process, net income has been widely used in order to define business failure. Schwartz & Menon (1985) used the reporting of net loss or negative net income as an indication that a firm was having financial difficulty. A firm was considered to have entered the failure process if it had an initial net operating loss following at least three consecutive years of

profitability which is defined as net income greater than zero (Flagg, Giroux & Wiggins, 1991). In this study, negative net income for three or more consecutive years was employed as the definition of business failure.

The three business failure terminologies suggest that a continuum exists in business failure. Most firms may not suddenly face technical insolvency or bankruptcy. Usually they tend to move from economic failure to technical insolvency, and lastly to bankruptcy. The negative net income is a direct indicator of economic failure. Therefore business failure studies defined by negative net income can provide early warning signs to firms to help them avoid other business failures in the continuum. The three or more consecutive years restriction was applied in order to assure that non-failed firms were reasonably healthy at the outset and not already in some stage of the failure process.

3.4.2 Definition of Reorganization and Liquidation

Once a firm files for bankruptcy, there are two alternative procedures. The first, liquidation (chapter 7), occurs when the firm ceases operation, its assets are sold, and the proceeds distributed to creditors. The corporate entity of the liquidating firm ceases to exist after liquidation. The second, reorganization (chapter 11), occurs when the firm continues to operate after the bankruptcy

filing, and it agrees to compensate creditors partially for their claims (Logue, 1990).

In this study, reorganization was defined by the event of filing for reorganization (chapter 11), while liquidation was defined from the view-point of asset liquidation, cessation of operations and/or acquisitions by an operating firm(s) or financial investor(s). Although the definition of liquidation in this study was not based on the event of filing for liquidation (chapter 7), the final effect of this definition would be the same as the event of filing for liquidation because the firms filing for liquidation eventually cease to exist by the various liquidation methods.

Faced with a bankruptcy decision, rarely would a firm file for chapter 7 bankruptcy liquidation unless the firm has already exhausted all other possibilities. Even after exhausting all other possibilities, the firm tends to cease to exist by the various liquidation methods and not by legally filing for liquidation.

3.4.3 Sample Construction

Researchers typically estimate the classification and prediction of business failure on nonrandom samples. Estimating the classification and prediction of business failure on such samples may result in biased parameter and probability estimates due to unequal probability and

incomplete data (Zmijewski, 1985). Similar issues are also relevant to other research settings that involve binary state classification and prediction models (Palepu, 1986).

First, the observed result of unequal probability bias is that since there are more non-bankrupt firms than bankrupt firms, the probability for a non-bankrupt firm to be in the sample is higher than that of a bankrupt firm. Therefore the bankrupt group (non-bankrupt group) may underestimate (overestimate) the classification and prediction error rates. Second, bias results from including in the sample only firms with complete financial data. Bankrupt firms have, on average, low probabilities of being selected for the sample because bankrupt firms are more likely to have incomplete data.

The definition of business failure, was three or more years of consecutive negative net income in this study. There are many more failed firms (i.e., negative net income for three or more consecutive years) than bankrupt firms, and these failed firms may have better and more complete data than bankrupt firms. Therefore by using failed firms rather than bankrupt firms the biases could be reduced in this study.

3.5 RESEARCH METHODS

3.5.1 Classifying and Predicting Business Failure in the Restaurant and Hotel Industries

A. Sample

A preliminary search identified 122 publicly-traded restaurant firms and 36 hotel firms from COMPUSTAT by the four digit SIC codes. The four digit SIC codes for the restaurant and hotel industry are respectively 5812 and 7011. The period of 1982-1993 was selected because of the significant business failures that characterized this period in the restaurant industry. The same period was also selected for the hotel industry for comparative purposes. Among 122 restaurant firms 23 firms were identified as failed based on the definition of business failure in this study. Twenty-three firms out of 99 firms were randomly paired with the failed firms. These 23 non-failed firms were selected based on the following rules: 1) these firms did not have negative net income for three or more consecutive years and 2) if the firm had more positive consecutive net income years, it had priority to be selected as one of the non-failed firms. For example, if firm A had 7 years of consecutive positive net income, firm B had 2 years of consecutive positive net income, and both firms did not have negative income for three or more consecutive years, firm A was selected as one of the non-failed firms. This manner of sample selection was used in order to provide a sharp contrast

between failed and non-failed firms.

Table 7 shows the list of failed and non-failed firms in the restaurant industry. Among 23 failed firms, 7 firms were defined as failed from 1986 to 1989, and 16 firms were defined as failed from 1990 to 1993. Five actual bankrupt firms were in the failed group. The average years of negative net income were 4.5 years.

The same procedures were followed for the hotel industry sample. Among 36 hotel firms listed on COMPUSTAT in the hotel industry, 15 firms were identified as failed based on the definition of business failure in this study, and another 15 firms were selected as non-failed.

Table 8 shows the list of failed and non-failed firms in the hotel industry. Among 15 failed firms, 4 firms were defined as failed from 1988 to 1989, and 11 firms were defined as failed from 1990 to 1993. Two actual bankrupt firms were in the failed group. The failed and non-failed event was employed as the dependent variable.

Table 7. The List of Failed and Non-Failed Firms in the Restaurant Industry During the Period of 1982-1993

Names of Failed Firms	Year of Business Failure	Years of Negative Net Incomes	Names of Non-Failed Firms	Years of Positive Net Incomes
Ambassador	1992	C3	Brinker International	C9
Atlantic Restaurant	1992	C4	Bob Evans Farms	C10
Carrols Corp.	1992	C7	Buffets Inc.	C9
Discus Corp.	1990	C7	Consolidated Products	C10
*Consul Restaurant	1988	C4	Cracker Barrel Old Store	C10
Chefs International	1990	C7	Food Maker Inc.	S5
LDB Corp.	1992	C4	Elmers Restaurant	C9
*Jamco Ltd.	1989	C6	Frisch's Restaurant	C11
Jerry's Inc.	1991	C3	Golden Corral Restaurant	C11
Elxsi Corp.	1986	C5	WSMP Inc.	C7
Le Peep Restaurant	1991	C7	Family Steak House	C7
Maverick Restaurant	1993	C4	National Pizza	C10
Miami Subs Corp.	1990	C5	McDonald's Corp.	C11
Noble Romans Inc.	1990	C3	Morrison Restaurant	C11
*Po Folks Inc.	1988	C3	Ryan's Family Steak House	C11
Sea Galley Stores	1992	C4	Shoney's Inc.	C10
*Rax Restaurant Inc.	1991	C3	Marriott Corp.	C11
Eateries Inc.	1989	C3	Panchos Mexican Buffet	C9
Fast Food Operators	1991	C3	Piccadilly Cafeterias	C10
Volunteer Cap Corp.	1989	C5	TCBY Enterprises	C10
Vie De France Corp.	1992	C4	Sizzler International	C10
TPI Enterprises Inc.	1989	C5	Sybra Inc.	C6
*SIS Corp.	1990	C4	Uno Restaurant	C7

C means consecutive.
S means sporadic.
* indicates bankrupt firm.

Table 8. The List of Failed and Non-Failed Firms in the Hotel Industry During the period of 1982-1993

Names of Failed Firms	Year of Business Failure	Years of Negative Net Incomes	Names of Non-Failed Firms	Years of Positive Net Incomes
Aircoa Hotel	1988	C3	Swiss Chalet Inc.	C9
Amerihost properties	1988	C4	Sun Resorts Ltd.	S6
Celebrity Resorts Inc.	1992	C4	Red Lion Inns	C4
Extech Corp.	1988	C4	Utah Resources Inc.	S7
General Builders Corp.	1992	C3	Thomas Edison Inns	S5
*Integra Hotel & Resort	1991	C4	Pocono Hotels Corp.	S9
Journeys End Resorts	1992	C5	La Quinta Inns Inc.	C10
Krisch American Inns	1992	C6	Marcus Corp.	C11
La Quinta Motor Inns	1992	C6	Int'l. Leisure Hosts	C8
Lees Inns of America	1991	C4	Club Med Inc.	C10
Microtel Franchise	1993	C4	Sholodge Inc.	C3
PSH Master	1992	C6	Kahler Corp.	S7
*Servico Inc.	1990	C3	Hilton Hotels Corp.	C11
Uptower Inns Inc.	1992	C4	Golf Hosts Resorts Inc.	C11
Southern Services Inc.	1989	C5	Sonesta Int'l. Hotels	S6

C means consecutive.
S means sporadic.
* indicates bankrupt firm.

B. Independent Variables

Although no two researchers have used exactly the same independent variables with respect to business failure, the variables used represent the common financial ratios categories of liquidity, activity, performance, profitability, and leverage (Mensah, 1984).

There were 26 accounting and financial ratios from COMPUSTAT. Current ratio, quick ratio, working capital per share, cash flow per share are the indicators for liquidity. Inventory turnover, receivables turnover, total asset turnover, average collection period, days to sell inventory, and operating cycle are the indicators for activity. Sales/net property, plant & equipment and sales/stockholder equity are the indicators for performance. Operating margin before depreciation, operating margin after depreciation, pretax profit margin, net profit margin, return on assets, return on equity, return on investment are the indicators for profitability. Interest coverage before tax, interest coverage after tax, long-term debt/common equity, long-term debt/shareholder equity, total debt/invested capital, total debt/total assets, and total assets/common equity are the indicators for leverage.

All ratios from COMPUSTAT were not used as independent variables due to the following reasons:

1. The redundant variables, which are inventory turnover,

receivables turnover, average collection period, and days to sell inventory were deleted, because operating cycle does capture the information contained in these variables.

2. Quick ratio, working capital per share, sales/stockholder equity, interest coverage before tax, interest coverage after tax, long-term debt/shareholder equity, and total debt/total assets were deleted because these ratios could not converge. If variables cannot converge, logistic regression analysis cannot be accomplished.

3. Since the definition for dependent variable is based on profitability in this study, the indicators for profitability were not selected as independent variables. In addition, these indicators also caused a convergence problem as previously explained.

Table 9 shows 8 accounting and financial ratios along with their definitions, used as independent variables for both the restaurant and hotel industry.

1. Current ratio

Owners and stockholders normally prefer a low current ratio to a high one because stockholders view investments in most current assets as less productive than investments in noncurrent assets. Conversely, creditors normally prefer a relatively high current ratio, as this provides assurance that they will receive timely payments. This ratio was found to be significant predictor with respect to business failure studies

(Beaver, 1967; Libby, 1975; Altman, 1977; Ohlson, 1980; Casey & Bartczack, 1985). Further, this ratio was also found to be a significant predictor in the restaurant industry (Olsen, Bellas & Kish, 1983).

2. Cashflow per share

Users of financial statements have been showing an increased interest in cashflow information (Gombola, Haskins, Ketz & Williams, 1987). Cashflow divided by total liabilities was found to be a significant predictor with respect to business failure (Deakin, 1972; Blum, 1974; Frydman, Altman, Kao, 1985; Casey & Bartczak, 1985). Further, Casey & Bartczak (1985) and Lincoln (1984) found cashflow divided by current liabilities to be a significant predictor of business failure as well.

These studies examined whether operations provided sufficient cash to pay a firm's liabilities from the creditor's perspective. However, investors tend to focus on cashflow per share because of their concern with a firm's ability to pay dividends. Although cashflow per share is a fairly new ratio, it can capture the information with respect to business failure from the investors' standpoint-information which previously has not been obtained through earlier studies.

3. Total asset turnover

Total asset turnover measures management's effective

utilization of the firm's assets. This ratio was found to be a significant predictor with respect to business failure (Altman, 1968; Coats & Fant, 1993). For most hospitality establishments, especially lodging businesses, fixed assets constitute the majority of the operation's total assets. The total asset turnover ratio is relatively low for most hospitality segments, especially for the lodging segment. The relative low ratio is due to the hospitality industry's high dependence on fixed assets and its inability to quickly increase output to meet maximum demand.

4. Operating cycle

The average collection period can be calculated by dividing 365 by receivables turnover which is calculated by sales divided by the average of the current year's receivables and the prior year's receivables. In hospitality operations that extend credit to guests, receivables are generally the largest current assets. Therefore, an examination of the quality of its receivables must be considered.

Days to sell inventory can be calculated by dividing 365 by inventory turnover which is the cost of goods sold divided by the average of the current year's total inventory and the prior year's total inventory. The inventory turnover shows how quickly the inventory is being used. All things being the same, generally, the quicker the inventory turnover the better because inventory can be expensive to maintain. Further it

should be noted that inventory held by hospitality operations is highly susceptible to theft and must be carefully controlled to meet seasonal sales fluctuations.

Finally, the operating cycle, which measures a firm's speed to convert inventory and receivable accounts to cash, can be calculated by the average collection period plus days to sell inventory.

5. Sales divided by net property, plant & equipment

High fixed costs are generally associated with more capital intensive industries such as the hospitality industry. Business risk depends in part on the extent to which a firm incorporates fixed costs into its operation. If fixed costs are high, even a small decline in sales can lead to a large decline in profitability. Therefore, when all else is held constant, the higher a firm's fixed costs, the greater its business risk. Ultimately, this ratio can capture in part the information of business risk.

6. Leverage ratios

The leverage predictor most often found to be significant in business failure research was total debt divided by total assets (Beaver, 1967; Deakin, 1972; Dambolena & Khoury, 1980; Ohlson, 1980; Lincoln, 1984; Frydman, Altman & Kao, 1985). One of limitations of this ratio is that it cannot capture more comprehensive leverage information from the perspective of investors and creditors.

Since it is known that the hospitality industry may not be attractive to both investors and creditors, long-term debt divided by common equity, total debt divided by invested capital, and total assets divided by common equity were used in order to capture more comprehensive leverage information from the perspective of both investors and creditors.

Table 9. The Independent Variables and their Definitions

Variable	Definition
Current ratio (X_1)	Current asset divided by current liabilities.
Cashflow per share (X_2)	Income which is defined as income or loss after all expenses, including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends, plus depreciation, amortization, and other noncash charges. This is divided by shares.
Total assets turnover (X_3)	Sales, divided by the average of the current year's total assets and prior year's total assets.
Operating cycle days (X_4)	Average collection period plus days to sell inventory.
Sales/Net property, plant equipment (X_5)	Sales, divided by net property, plant and equipment.
Long-term debt/Common equity in percentage (X_6)	Total long-term debt, divided by common equity
Total debt/Invested capital in percentage (X_7) total	The sum of long-term debt and debt in current liabilities, divided by the sum of following items: long-term debt, preferred stock, minority interest and total common equity. This is then multiplied by 100.
Total assets/Common equity in percentage (X_8)	The sum of current assets, net plant, and other non-current assets, divided by common equity. This is then multiplied by 100.

C. Statistical-Analytical Method

In pairing the failed versus non-failed firms for both restaurant and hotel samples, it was determined that if a firm failed in 1990 (this failed firm would have had negative net income for three or more consecutive years prior to 1990), then its 8 independent variables one year prior to 1990 (t-1), namely 1989, were compared to a non-failed firm.

The prediction model was created for each industry through logistic regression analysis based on the data of one year prior to business failure.

D. Validation:Testing of the Models

In order to test whether the model based on the data of one year prior to business failure (t-1) is valid, the following technique was employed:

The model was tested for the two and three years prior to business failure (t-2 and t-3) by determining the classification percentage.

3.5.2 Comparing the Restaurant Industry with the Hotel Industry

A. Sample

The same groups (failed and non-failed) as described in the previous section were employed for each industry as the dependent variable. As previously mentioned, the same period of 1982 to 1993 was selected for both restaurant and hotel

samples. A reason for this is that the characteristics of external economic environments which are expected to affect the financial conditions of firms change over time (Mensah, 1984). Therefore if different periods were employed for each industry the comparison would be the biased.

B. Independent Variables

In order to compare the restaurant industry with the hotel industry, the independent variables that emerged as significant in the model for each industry were utilized as independent variables.

C. Statistical-Analytical Method

In order to compare the restaurant industry with the hotel industry, the independent variable(s) that were not present in the restaurant industry model but were in the hotel industry model were investigated.

Two possible scenarios can be expected in this investigation: 1) the independent variables that emerge as significant will not be the same for each industry, or 2) the same independent variables will be present in both industry models. In the case of the first scenario, the conclusion would be that the restaurant industry model is different from the hotel industry model. In the case of the second scenario, the conclusion would be that the two models are possibly identical. In other words, if the coefficient of the independent variable(s) is not significantly different from

zero, the restaurant industry model would be considered the same as the hotel industry model. Conversely, if the coefficient of the independent variable(s) is significantly different from zero, the restaurant industry model would be considered different from the hotel industry model.

3.5.3 Applying the Prediction Model for Business Failure to bankrupt firms in the Restaurant Industry

A. Sample

In order to determine whether the prediction model for business failure can be useful in predicting bankruptcy in the restaurant industry, the model was applied to bankrupt firms. The bankrupt firms were selected based on the definitions of reorganization and liquidation in this study. A sample of restaurant firms which filed for reorganization (chapter 11) between 1980 and 1993 was obtained from the following three sources: 1) Predicasts Overview of Market and Technology, 2) Funk and Scott (F&S) Index, and 3) the Wall Street Journal, Nations Restaurant News, and other trade journals. The financial data for the bankrupt firms was obtained from COMPUSTAT, Compact-disclosure, and/or 10k-reports.

Restaurant firms which did not file for bankruptcy but liquidated their assets, ceased operation, or were acquired between 1980 and 1993 were also included in the sample. The period of 1980-1993 was selected because the restaurant

industry has consistently had the most business failures of any single segment within the retail trade sector between 1984 and 1992. Thus, it would be expected that the most reorganizations and liquidations in the restaurant industry would occur during this period (1980-1993). Table 10 provides the list of bankrupt firms in the restaurant industry. Five bankrupt firms defined as failed were included in this sample.

Table 10. The List of Reorganizers and Liquidators in the Restaurant Industry During the Period of 1980-1994

Reorganizer	Year	Liquidator	Year	Form of Liquidation
All American Burger	1981/May	Al Copeland Enterprises	1993	Acquisition by America's Favorite chicken and lenders
Bombay Palace Rest.	1989/Sept.			
		*Consul Restaurant	1992	Acquisition by chi-chi.
Cattleguard	1990/Nov.			Selling its assets and ceasing its operation
Del Taco	1993/March			
El Pollo Asado	1989/Nov.			
		Famous	1993	Acquisition by Carlos Murphy's.
Flanigan's	1985/Nov.			
Gilbert/Robinson	1991/Nov.			
Horn & Hardart	1981/Sept.			
		*Jamco	1992	Acquisition by Omnivest International.
		Kelly-Johnston	1986	Acquisition by Aschling.
		Pantera's	1991	Selling its asset and ceasing its operation as result of Pizza Inn's reorganization plan.
Pizza Inn	1989/Sept.			
*Po Folks	1987/Dec.			

(table continued)

		Pizza Time Theater	1984	Selling its assets and ceasing its operation.
Primo	1987/Feb.			
*Rax restaurant	1992/Dec.			
Southern Hospitality	1988/July			
Victoria Stations	1986/May			
		Restaurant Enterprises Group	1994	Acquisition by Foodmaker and two investment partners.
		Sambo's restaurant	1984	Acquisition by Vicorp restaurant. Selling its assets and ceasing its operation.
		*SIS Corp.	1990	Selling its assets and ceasing its operation.

* indicates a firm defined failed

B. Independent Variables

The same variables utilized in the model for business failure in the restaurant industry were employed as the independent variables in order to investigate whether the predictors from the business failure model can be applicable to bankrupt firms.

C. Statistical-Analytical Method

The prediction model for business failure was tested at intervals of one, two, and three years prior to bankruptcy (t-1, t-2, and t-3) by examining the classification percentages, based on data for bankrupt firms in the sample.

3.5.4. Determining the Relationship between Reorganization and Liquidation in the Restaurant Industry

A. Sample

As indicated in table 10, there were 14 reorganizers and 10 liquidators in the restaurant industry. The events of reorganization and liquidation represented the dependent variable.

B. Independent Variables

In order to investigate whether reorganization (how the firm is financed) and liquidation (how well the firm is operated) are dependent on each other, two sets of variables representing capital structure and profitability were selected as indicators of reorganization and liquidation. Long-term

debt to equity, total debt to total assets, total debt to invested capital, and interest coverage were selected as proxies for capital structure. Also return on assets, return on equity, return on invested capital, net profit margin, and cashflow per share were selected as proxies for profitability. Table 11 shows the list of the indicators as well as their definitions.

Twenty interaction terms consisting of pairs of ratios representing capital structure and profitability were investigated through logistic regression analysis in order to determine whether reorganization and liquidation are dependent on each other. That is, each regression model consisted of three independent variables: a capital structure ratio, a profitability ratio and an interaction term representing capital structure and profitability. The non-significance or significance of the interaction term will allow for the rejection or acceptance of the null hypothesis. For the first research objective, there is one independent variable serving as an indicator for profitability (cashflow per share) and three independent variables serving as indicators for capital structure (long-term debt divided by common equity, total debt divided by invested capital, and total assets divided by common equity).

C. Statistical-Analytical Method

There were 20 models with profitability and capital structure variables and interaction terms. If the coefficient of the interaction term is significantly different from zero, then it implies that both capital structure and profitability can determine reorganization and liquidation. Therefore reorganization and liquidation are dependent on each other.

This investigation was extended up to three years prior to reorganization or liquidation (t-3). If reorganization and liquidation are dependent on each other this extension of examination can provide further information, that is, which year (t-1, t-2 and/or t-3) the relationship was indeed significant.

Table 11. The Capital Structure and Profitability Indicators and Their Definitions

Indicator	Definition
Leverage	
Long-term debt/common equity (D_1)	Total long-term debt, divided by common equity.
Total debt/Total assets (D_2)	The sum of long-term debt and debt in current liabilities (long-term debt due in one year), divided by total assets.
Total debt/Invested capital (D_3)	The sum of long-term debt and debt in current liabilities (long-term debt due in one year), divided by the sum of following items: total long-term debt, preferred stock, minority interest and total common equity.
Interest coverage (D_4)	Income which is defined as income or loss after all expenses including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends plus interest expense, divided by interest expense.
Profitability	
Return on assets (P_1)	Income which is defined as income or loss after all expenses, including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends, divided by total assets.

(table continued)

Return on equity (P_2)	Income which is defined as income or loss after all expenses, including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends, divided by common equity.
Return on investment (P_3)	Income which is defined as income or loss after all expenses, including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends, divided by total investment capital. Total investment capital is the sum of following items: total long-term debt, preferred stock, minority interest, and total common equity.
Net profit margin (P_4)	Income which is defined as income or loss after all expenses, including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends, divided by sales.
Cashflow per share (P_5)	Income which is defined as income or loss after all expenses, including extraordinary items, discontinued operations, income taxes and minority interest, but before provisions for common and/or preferred dividends, plus depreciation, amortization, and other noncash charges. This is divided by shares.

3.6 SUMMARY

In order to develop a predictive model for business failure in the restaurant industry and simultaneously determine whether the financial variables of a predictive model for business failure in the restaurant industry are the same as in the hotel industry, the samples consisting of 23 failed and 23 non-failed restaurant firms along with 15 failed and 15 non-failed hotel firms, all within the period of 1982-1993, were constructed. The predictive business models were developed through logistic regression analysis employing 8 financial variables based on one year prior to business failure.

The model for each industry was tested at two and three years prior to business failure. Also the model for the restaurant industry was applied to actual bankrupt firms in order to investigate whether the prediction model for business failure can be applied to actual bankrupt firms in the restaurant industry. The above tasks were pursued as as a means of validating the models.

Finally, in order to determine whether the financial variables that are associated with reorganization in the restaurant industry are different from those that are associated with liquidation, the sample consisting of 14 reorganizers and 10 liquidators in the restaurant industry was constructed. The relationship between reorganization and

liquidation was investigated through logistic regression analysis employing two sets of indicators for capital structure and profitability.

There were 4 indicators for capital structure and 5 indicators for profitability. This method was used to capture the information which may be difficult to obtain if one indicator for capital structure and one for profitability were employed.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 RESULTS

4.1.1 The Restaurant Industry

In order to investigate whether business failure can be predicted and which financial variables can predict business failure in the restaurant industry, logistic regression analysis was conducted employing the dependent variable (failed and non-failed group) and 8 independent variables.

Table 12 provides the results of the full model consisting of all independent variables as well as the model consisting of variables selected through stepwise logistic regression. Since there was no indication which variables were important from the full model, stepwise logistic regression was employed.

Although two models were significant at 0.05 level as indicated by -2LL (-2 times log of likelihood), the model consisting of two variables (cashflow per share and total debt divided by invested capital) was selected as the prediction model for business failure in the restaurant industry. It was chosen because it offered a higher classification accuracy (exceeding 90%), compared to the full model which had a classification accuracy of 81%.

Table 12. Logistic Regression Analysis in the Restaurant Industry

Full Model:
-2LL = 56.247 (Probability, 0.0001)
Classification accuracy: 81.80%

Variable	Parameter Estimate	Standard Error	Wald Chi-Square	Probability
X_1	-19.1586	31.5904	0.3678	0.5442
X_2	-12.9585	16.4282	0.6222	0.4302
X_3	-10.9077	19.7527	0.3049	0.5808
X_4	0.4703	0.6928	0.4608	0.4973
X_5	12.5555	21.7272	0.3339	0.5634
X_6	0.0208	0.0443	0.2213	0.6381
X_7	0.1158	0.1779	0.4241	0.5149
X_8	-1.4961	2.9518	0.2569	0.6123

Model through stepwise logistic selection (Probability, 0.1)
: -2LL = 39.881 (Probability, 0.0001)
Classification accuracy: 90.90%

Variable	Parameter Estimate	Standard Error	Wald Chi-Square	Probability
X_2	-2.9902	0.97	9.40	0.0022
X_7	0.0405	0.02	6.62	0.0101

X_1: Current ratio
X_2: Cashflow per share
X_3: Total asset turnover
X_4: Operating cycle
X_5: Sales divided by net property, plant, & equipment
X_6: Long-term debt divided by common equity
X_7: Total debt divided by invested capital
X_8: Total assets divided by common equity

1. Intercepts were not included in the models because logistic regression analyses could not converge with intercepts

The model is presented as follows:

$$Y = -2.9902X_2 + 0.0405X_7 \qquad (4.1.1a)$$

Where,

Y: business failed or non-failed group
X_2: cashflow per share
X_7: total debt divided by invested capital

Coefficient of cashflow per share was -2.9902, and coefficient of total debt divided by invested capital was 0.0405. As indicated in table 13 these two variables are not highly correlated. Figures 1-2 provide Pearson and deviance residuals for the restaurant sample. These diagnostics illustrate the adequacy of the model and which firms cannot fit the model. The cases which had Pearson and deviance residuals extremely distant from zero can be considered the firms which cannot fit the model well.

Probability of business failure of the sample and summary of classification accuracy at one, two, and three years prior to business failure are shown in tables 14-16. Classification accuracy was 90%, 88%, and 75%, respectively, at one, two, and three years prior to business failure. As indicated in tables 14-16, 5 bankrupt firms were included in the failed group.

In summary, two financial variables, cashflow per share along with total debt divided by invested capital, can predict business failure with 90%, 88%, and 75% accuracy at one, two, and three years, respectively, prior to business failure in the restaurant industry.

Table 13. The Correlation Matrices for the Restaurant and Hotel Samples

The Restaurant Sample

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
X_1	1.00000	-0.01825	-0.21788	0.62012	-0.04170	-0.15324	-0.36848	-0.21880
X_2	-0.01825	1.00000	0.27927	-0.46348	-0.02461	0.16998	-0.22826	0.00768
X_3	-0.21788	0.27927	1.00000	-0.41516	0.66228	-0.17707	-0.17393	-0.22451
X_4	0.62012	-0.46348	-0.41516	1.00000	0.02531	-0.02694	-0.04740	-0.05076
X_5	-0.04170	-0.02461	0.66228	0.02531	1.00000	-0.12528	0.03997	-0.06768
X_6	-0.15324	0.16998	-0.17707	-0.02694	-0.12528	1.00000	0.20244	0.77606
X_7	-0.36848	-0.22826	-0.17393	-0.04740	0.03997	0.20244	1.00000	0.45769
X_8	-0.21880	0.00768	-0.22451	-0.05076	-0.06768	0.77606	0.45769	1.00000

The Hotel Sample

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
X_1	1.00000	-0.07210	-0.04251	0.72613	0.35504	-0.28301	-0.38271	-0.08842
X_2	-0.07210	1.00000	0.27469	-0.01146	-0.04551	0.21998	0.05424	0.44702
X_3	-0.04251	0.27469	1.00000	-0.28745	0.42870	-0.24865	-0.04567	-0.17605
X_4	0.72613	-0.01146	-0.28745	1.00000	0.24960	-0.18510	-0.23344	0.10360
X_5	0.35054	-0.04551	0.42870	0.24960	1.00000	-0.26453	-0.31331	-0.31783
X_6	-0.28301	0.21998	-0.24865	-0.18510	-0.26453	1.00000	0.17930	0.49657
X_7	-0.38271	0.05424	-0.04567	-0.23344	-0.31331	0.17930	1.00000	0.37097
X_8	-0.08842	0.44702	-0.17605	0.10360	-0.31783	0.49657	0.37097	1.00000

X_1: Current ratio
X_2: Cashflow per share
X_3: Total asset turnover
X_4: Operating cycle
X_5: Sales divided by net property, plant, & equipment
X_6: Long-term debt divided by common equity
X_7: Total debt divided by invested capital
X_8: Total assets divided by common equity

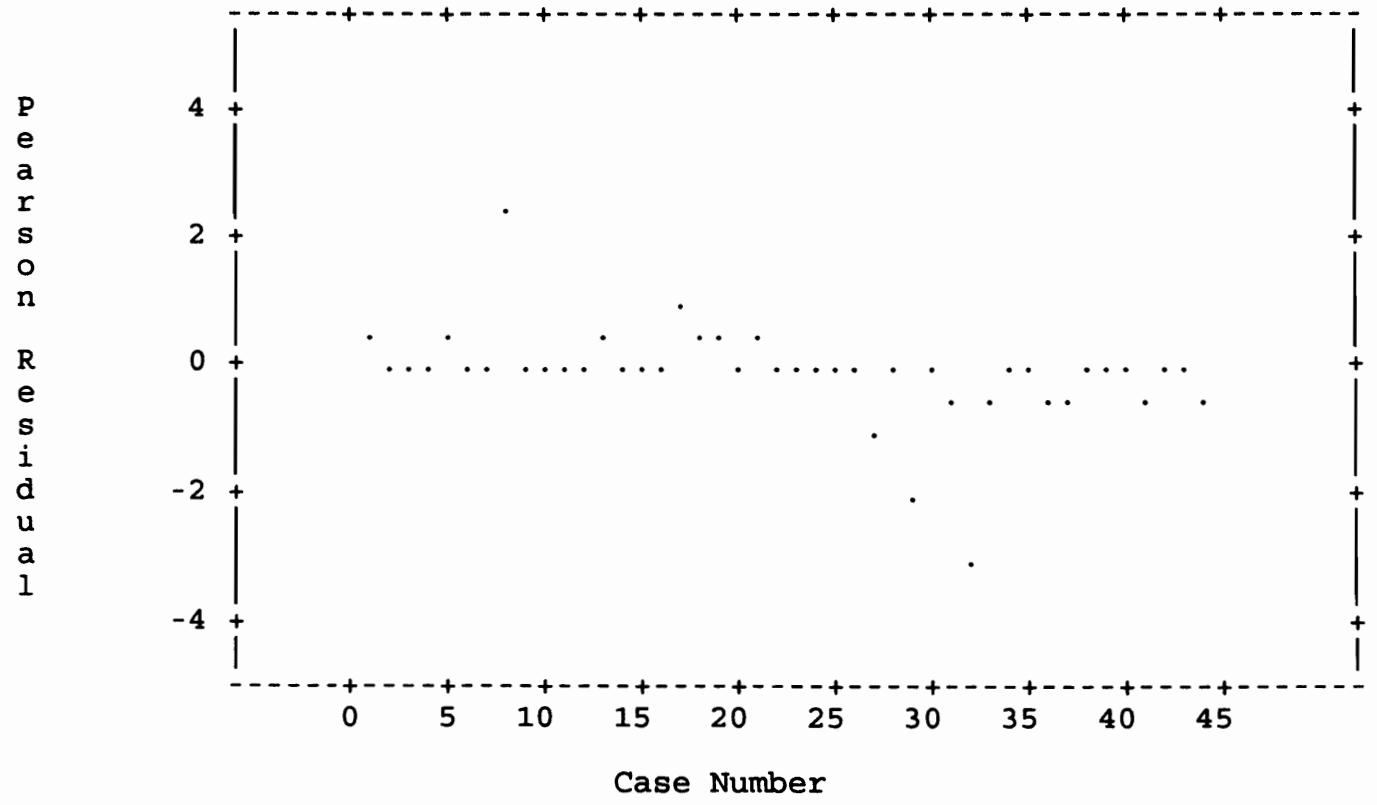

Figure 1. The Plot of Pearson Residual in the Restaurant Sample

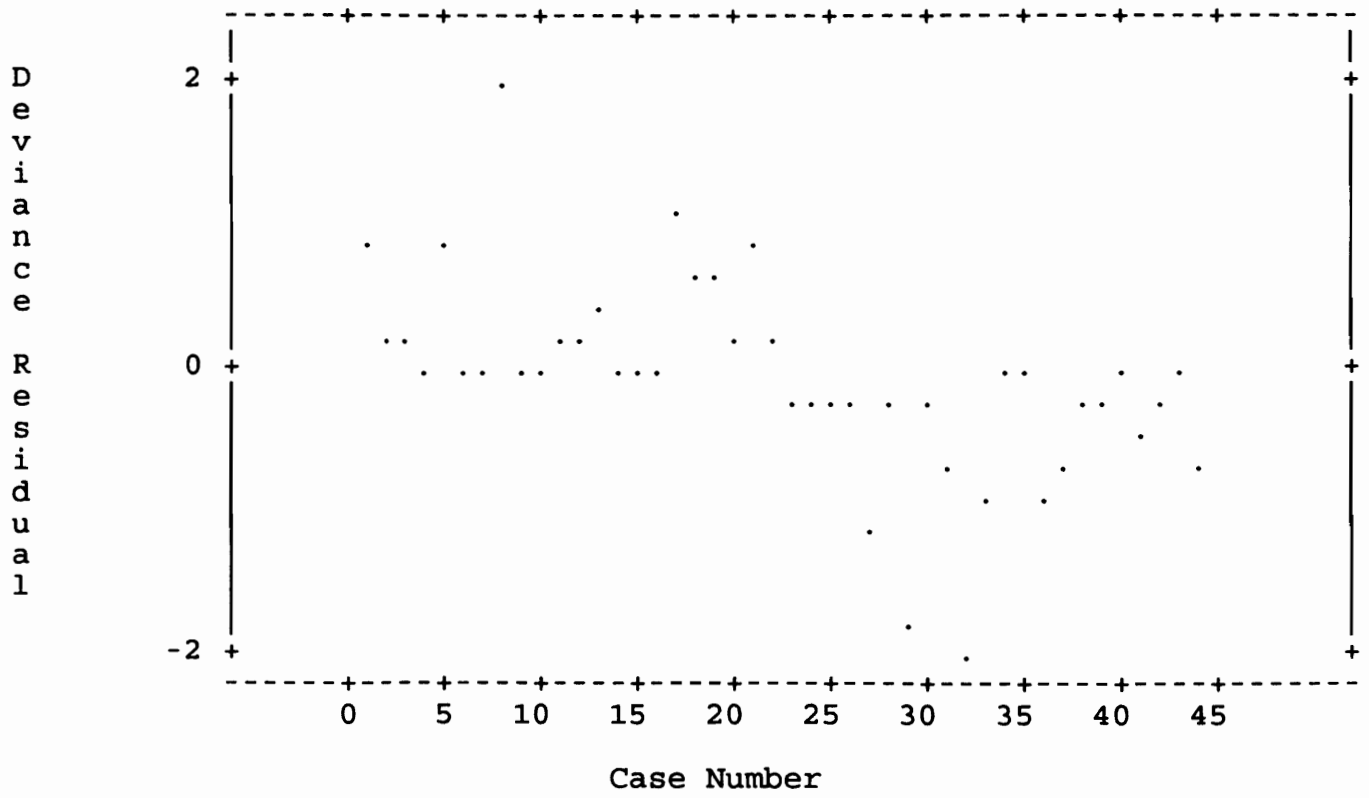

Figure 2. The Plot of Deviance Residual in the Restaurant Sample

Table 14. Probability and Prediction of Business Failure in the Restaurant Industry (t-1)

Name	Probability	Status	Prediction
Ambassador	0.69731	Failed	Failed
Atlantic Rest.	0.97170	Failed	Failed
Discus Corp.	0.98548	Failed	Failed
*Consul Rest.	0.99657	Failed	Failed
Chefs Int'l	0.70186	Failed	Failed
LDB Corp.	1.00000	Failed	Failed
*Jamco Ltd.	0.99641	Failed	Failed
Jerry's Inc.	0.12931	Failed	Non-failed
Elxsi Corp.	1.00000	Failed	Failed
Le Peep Rest.	0.99998	Failed	Failed
Maverick Rest.	0.95936	Failed	Failed
Miami Subs Corp.	0.95669	Failed	Failed
Noble Romans Inc.	0.93741	Failed	Failed
*Po Folk Inc.	1.00000	Failed	Failed
Sea Galley Store	0.99918	Failed	Failed
*Rax Rest.	0.99907	Failed	Failed
Bateries Inc.	0.56894	Failed	Failed
Fast Food Operators	0.75539	Failed	Failed
Volunteer Cap Corp.	0.75380	Failed	Failed
VIE De France Corp.	0.97742	Failed	Failed
TPI Enterprises	0.71798	Failed	Failed
*SIS Corp	0.98542	Failed	Failed
Brinker Int'l	0.04938	Non-failed	Non-failed
Bob Evans Farms	0.02622	Non-failed	Non-failed
Buffets Inc.	0.00959	Non-failed	Non-failed
Consolidated	0.03929	Non-failed	Non-failed
Cracker Barrel Old	0.52382	Non-failed	Failed
Food Maker Inc.	0.01328	Non-failed	Non-failed
Elmers Rest.	0.79621	Non-failed	Failed
Frisch's Rest.	0.01565	Non-failed	Non-failed
WSMP Inc.	0.18044	Non-failed	Non-failed
Family Steak House	0.88714	Non-failed	Failed
National Pizza	0.26515	Non-failed	Non-failed
McDonald's Corp.	0.00087	Non-failed	Non-failed
Morrison Rest.	0.00214	Non-failed	Non-failed
Ryan's Family Steak	0.27300	Non-failed	Non-failed
Shoney's Inc.	0.20605	Non-failed	Non-failed
Marriott Corp.	0.01662	Non-failed	Non-failed
Panchos Mexican	0.02266	Non-failed	Non-failed
Piccadilly	0.00140	Non-failed	Non-failed
TCBY Enterprises	0.13703	Non-failed	Non-failed
Sizzler Int'l	0.01856	Non-failed	Non-failed
Sybra Inc.	0.00016	Non-failed	Non-failed
Uno Restaurant	0.14945	Non-failed	Non-failed

1. * indicates actual bankrupt firm
2. Classification accuracy: 90.90%

Table 15. Probability and Prediction of Business Failure in the Restaurant Industry (t-2)

Name	Probability	Status	Prediction
Ambassador	0.58292	Failed	Failed
Discus Corp.	0.98275	Failed	Failed
*Consul Rest.	0.99932	Failed	Failed
Chefs Int'l	0.96266	Failed	Failed
LDB Corp.	0.99974	Failed	Failed
*Jamco Ltd.	0.81684	Failed	Failed
Jerry's Inc.	0.31504	Failed	Non-failed
Elxsi Corp.	1.00000	Failed	Failed
Le Peep Rest.	1.00000	Failed	Failed
Maverick Rest.	0.95907	Failed	Failed
Miami Subs Corp.	0.94585	Failed	Failed
Noble Romans Inc.	0.96927	Failed	Failed
*Po Folk Inc.	0.99155	Failed	Failed
Sea Galley Store	0.99784	Failed	Failed
*Rax Rest.	0.98995	Failed	Failed
Eateries Inc.	0.68294	Failed	Failed
Fast Food Operators	0.86748	Failed	Failed
Volunteer Cap Corp.	0.97996	Failed	Failed
VIE De France Corp.	0.88168	Failed	Failed
TPI Enterprises	0.41850	Failed	Non-failed
*SIS Corp	0.99917	Failed	Failed
Brinker Int'l	0.12804	Non-failed	Non-failed
Bob Evans Farms	0.04205	Non-failed	Non-failed
Buffets Inc.	0.01581	Non-failed	Non-failed
Consolidated	0.07163	Non-failed	Non-failed
Cracker Barrel Old	0.57069	Non-failed	Failed
Food Maker Inc.	0.00197	Non-failed	Non-failed
Elmers Rest.	0.84598	Non-failed	Failed
Prisch's Rest.	0.02386	Non-failed	Non-failed
WSMP Inc.	0.10221	Non-failed	Non-failed
Family Steak House	0.85700	Non-failed	Failed
National Pizza	0.22608	Non-failed	Non-failed
McDonald's Corp.	0.00309	Non-failed	Non-failed
Morrison Rest.	0.00811	Non-failed	Non-failed
Ryan's Family Steak	0.30845	Non-failed	Non-failed
Shoney's Inc.	0.29998	Non-failed	Non-failed
Marriott Corp.	0.00115	Non-failed	Non-failed
Panchos Mexican	0.05247	Non-failed	Non-failed
Piccadilly	0.00407	Non-failed	Non-failed
TCBY Enterprises	0.21403	Non-failed	Non-failed
Sizzler Int'l	0.00062	Non-failed	Non-failed
Sybra Inc.	0.00090	Non-failed	Non-failed
Uno Restaurant	0.33172	Non-failed	Non-failed

1. * indicates actual bankrupt firm
2. Classification accuracy: 88.37%

Table 16. Probability and Prediction of Business Failure in the Restaurant Industry (t-3)

Name	Probability	Status	Prediction
Ambassador	0.31461	Failed	Non-failed
Atlantic Rest.	0.93857	Failed	Failed
Discus Corp.	0.98930	Failed	Failed
*Consul Rest.	0.99999	Failed	Failed
Chefs Int'l	0.75451	Failed	Failed
LDB Corp.	0.48245	Failed	Non-failed
*Jamco Ltd.	0.98158	Failed	Failed
Jerry's Inc.	0.01257	Failed	Non-failed
Elxsi Corp.	1.00000	Failed	Failed
Le Peep Rest.	0.99898	Failed	Failed
Maverick Rest.	0.96973	Failed	Failed
Miami Subs Corp.	0.82440	Failed	Failed
Noble Romans Inc.	0.39403	Failed	Non-failed
*Po Folk Inc.	0.06666	Failed	Non-failed
Sea Galley Store	0.99966	Failed	Failed
*Rax Rest.	0.25466	Failed	Non-failed
Bateries Inc.	0.42613	Failed	Non-failed
Fast Food Operators	0.68551	Failed	Failed
Volunteer Cap Corp.	0.48296	Failed	Non-failed
VIE De France Inc.	0.81051	Failed	Failed
TPI Enterprises	0.67924	Failed	Failed
*SIS Corp	0.96118	Failed	Failed
Brinker Int'l	0.30955	Non-failed	Non-failed
Bob Evans Farms	0.03681	Non-failed	Non-failed
Buffets Inc.	0.35089	Non-failed	Non-failed
Consolidated	0.03919	Non-failed	Non-failed
Cracker Barrel Old	0.63169	Non-failed	Failed
Food Maker Inc.	0.01396	Non-failed	Non-failed
Elmers Rest.	0.88008	Non-failed	Failed
Frisch's Rest.	0.02715	Non-failed	Non-failed
WSMP Inc.	0.15764	Non-failed	Non-failed
Family Steak House	0.86309	Non-failed	Failed
National Pizza	0.33382	Non-failed	Non-failed
McDonald's Corp.	0.00943	Non-failed	Non-failed
Morrison Rest.	0.02321	Non-failed	Non-failed
Ryan's Family Steak	0.41688	Non-failed	Non-failed
Shoney's Inc.	0.48998	Non-failed	Non-failed
Marriott Corp.	0.00027	Non-failed	Non-failed
Panchos Mexican	0.04596	Non-failed	Non-failed
Piccadilly	0.00284	Non-failed	Non-failed
TCBY Enterprises	0.40645	Non-failed	Non-failed
Sizzler Int'l	0.00109	Non-failed	Non-failed
Sybra Inc.	0.00637	Non-failed	Non-failed
Uno Restaurant	0.27155	Non-failed	Non-failed

1. * indicates actual bankrupt firm
2. Classification accuracy: 75.00%

4.1.2 The Hotel Industry

In order to identify which financial variables can predict business failure in the hotel industry, the dependent variable (failed and non-failed group) and 8 independent variables were analyzed through logistic regression analysis. Table 17 provides the results of the full model consisting of all independent variables and the model consisting of cashflow per share (its p-value was 0.07 from the full model).

Although two models were significant at 0.05 level as indicated by -2LL (-2 times log of likelihood), the model consisting of cashflow per share was selected as the prediction model for business failure in the hotel industry. That model was selected because it showed a classification accuracy (92%) superior to the full model's classification accuracy of 68%.

The model is presented as follows:

$$Y = -2.0319X_2 \qquad (4.1.2a)$$

where,

Y: business failed or non-failed group
X_2: cashflow per share

Table 17. Logistic Regression Analysis in the Hotel Industry

Full Model:
-2LL = 23.768 (Probability, 0.0025)
Classification accuracy: 68.00%

Variable	Parameter Estimate	Standard Error	Wald Chi-Square	Probability
X_1	0.0207	0.2528	0.0067	0.9346
X_2	-3.8453	2.1382	3.2340	0.0721
X_3	-0.8691	3.6268	0.0574	0.8106
X_4	0.0006	0.0129	0.0022	0.9628
X_5	0.1694	0.4187	0.1637	0.6857
X_6	0.0183	0.0297	0.3818	0.5366
X_7	0.0155	0.0389	0.1581	0.6909
X_8	-0.3621	2.5939	0.0195	0.8890

Model through stepwise logistic selection (alpha, 0.1) : -2LL = 18.251 (Probability, 0.0001)
Classification accuracy: 92.00%

Variable	Parameter Estimate	Standard Error	Wald Chi-Square	Probability
X_2	-2.0319	0.9990	4.1670	0.0420

X_1: Current ratio
X_2: Cashflow per share
X_3: Total asset turnover
X_4: Operating cycle
X_5: Sales divided by net property, plant, & equipment
X_6: Long-term debt divided by common equity
X_7: Total debt divided by invested capital
X_8: Total assets divided by common equity

1. Intercepts were not included in the models because logistic regression analysis could not converge with intercepts

The coefficient of cashflow per share was -2.0319. Figures 3-4 provide Pearson and deviance residuals for the hotel sample. These diagnostics illustrate the model's adequacy and which firms cannot fit the model. The cases which had Pearson and deviance residuals extremely distant from zero can be considered the firms which cannot fit the model well.

Probability of business failure of the sample and summary of classification accuracy at one, two, and three years prior to business failure are shown in tables 18-20. Classification accuracy was 92%, 86%, and 75%, respectively, at one, two, and three years prior to business failure. As indicated in tables 18-20 two bankrupt firms were included in the failed group.

In summary, the financial variable, cashflow per share (coefficient: -2.0319), can predict business failure with 92%, 86%, and 75% accuracy at one, two, and three years, respectively, prior to business failure in the hotel industry.

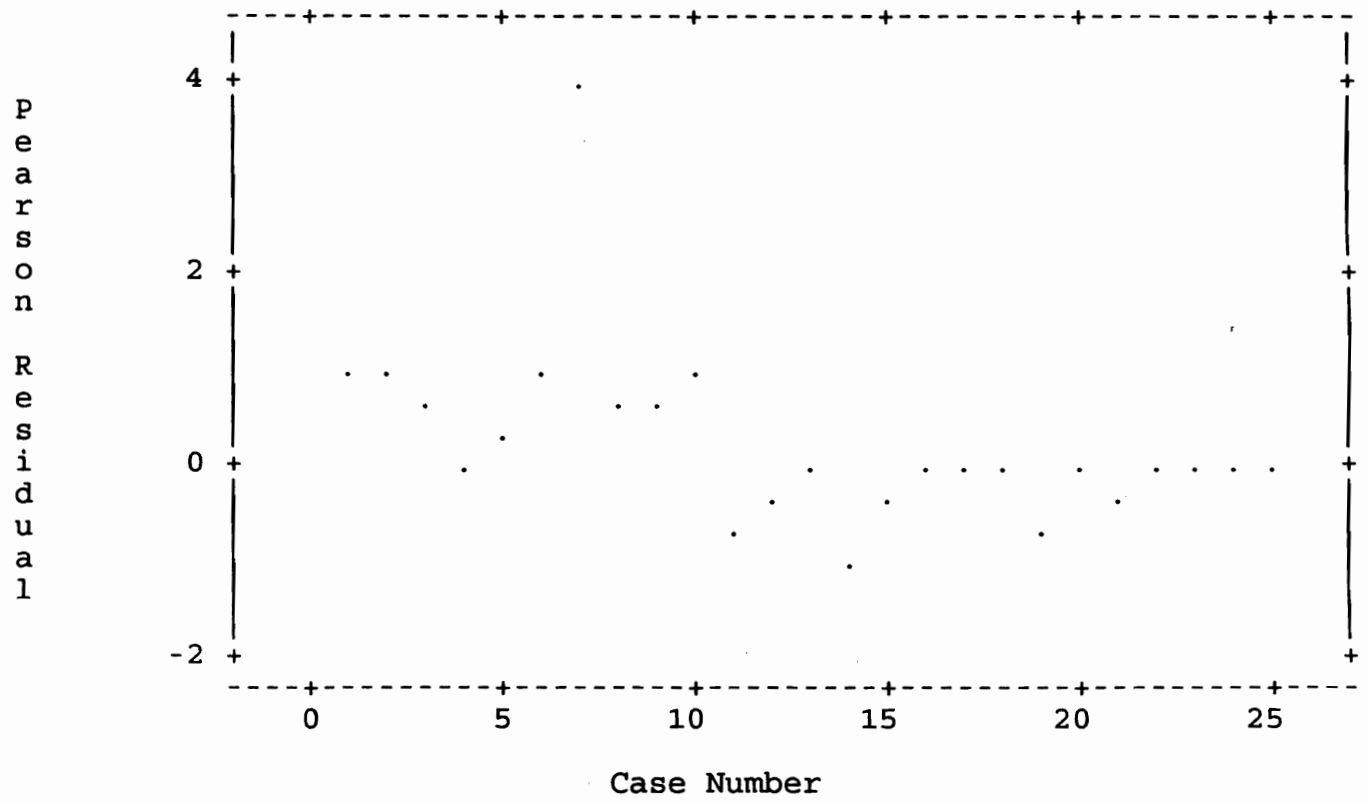

Figure 3. The Plot of Pearson Residual in the Hotel Sample

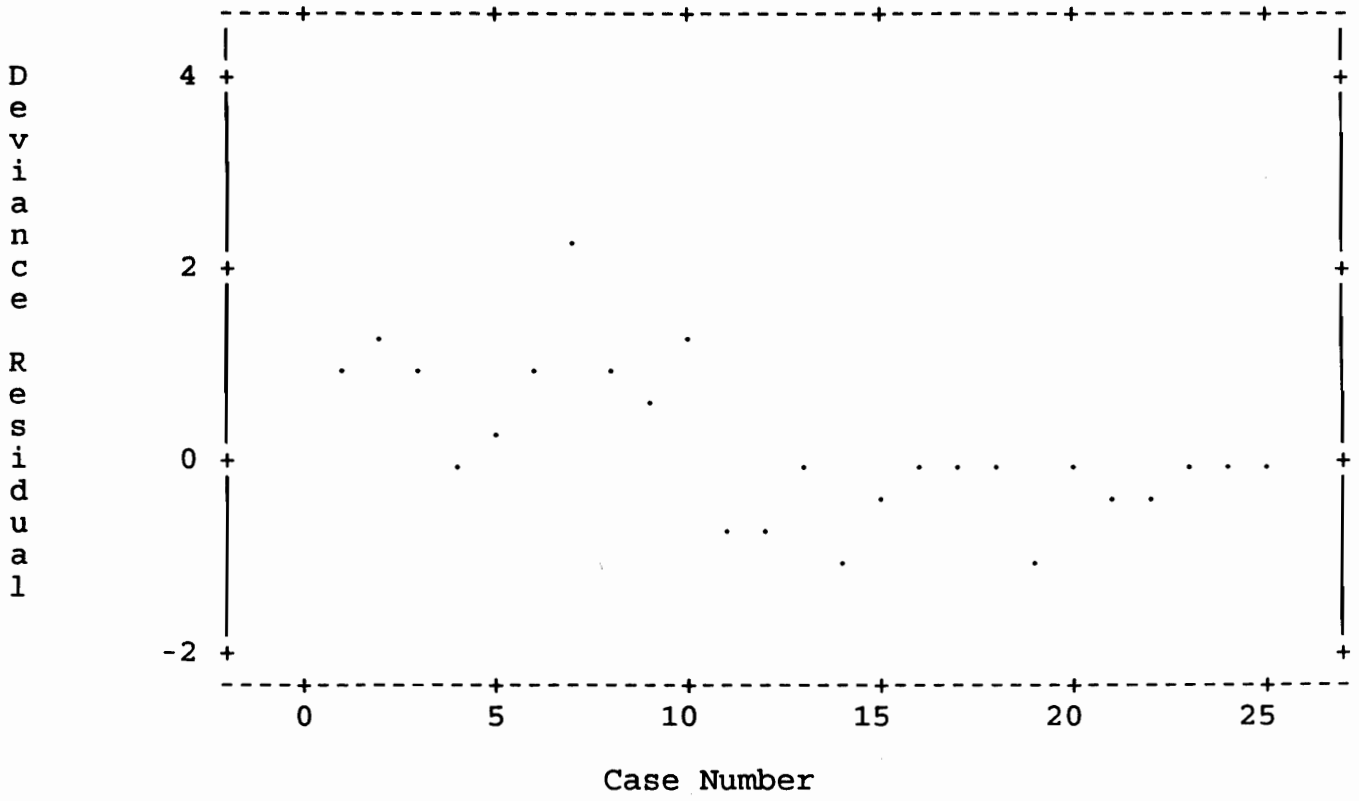

Figure 4. The Plot of Deviance Residual in the Hotel Sample

Table 18. Probability and Prediction of Business Failure in the Hotel Industry (t-1)

Name	Probability	Status	Prediction
Amerihost	0.56566	Failed	Failed
Celebrity	0.50508	Failed	Failed
Extech Crop.	0.63852	Failed	Failed
*Integra	0.98846	Failed	Failed
Journeys End	0.95198	Failed	Failed
Krisch American	0.57561	Failed	Failed
La Quinta Motor	0.06164	Failed	Non-failed
Microtel	0.64784	Failed	Failed
PSH Master	0.74204	Failed	Failed
Uptower Inns Inc.	0.46450	Failed	Non-failed
Swiss Chalet Inc.	0.20074	Non-failed	Non-failed
Sun Resort Ltd.	0.18493	Non-failed	Non-failed
Red Lion Inns	0.00264	Non-failed	Non-failed
Utah Resources	0.45441	Non-failed	Non-failed
Thomas Edison	0.10025	Non-failed	Non-failed
Pocono Hotels	0.00000	Non-failed	Non-failed
La Quinta Inns	0.00548	Non-failed	Non-failed
Marcus Corp.	0.00727	Non-failed	Non-failed
Int'l Leisure	0.29872	Non-failed	Non-failed
Club Med Inc.	0.00032	Non-failed	Non-failed
Sholodge Inc.	0.05602	Non-failed	Non-failed
Kahler Corp.	0.02370	Non-failed	Non-failed
Hilton Hotels.	0.00042	Non-failed	Non-failed
Golf Hosts Resorts	0.00000	Non-failed	Non-failed
Sonesta Int'l	0.01044	Non-failed	Non-failed

1. * indicates actual bankrupt firm
2. Classification accuracy: 92.00%

Table 19. Probability and Prediction of Business Failure in the Hotel Industry (t-2)

Name	Probability	Status	Prediction
Amerihost	0.61475	Failed	Failed
Celebrity	0.50508	Failed	Failed
Extech Crop.	0.62909	Failed	Failed
General Builders	0.52538	Failed	Failed
*Integra	0.77547	Failed	Failed
Journeys End	0.56066	Failed	Failed
Krisch American	0.57561	Failed	Failed
La Quinta Motor	0.11383	Failed	Non-failed
Lees Inns	0.42936	Failed	Non-failed
Microtel	0.60022	Failed	Failed
PSH Master	0.60509	Failed	Failed
*Servico	0.00413	Failed	Non-failed
Uptower Inns Inc.	0.45945	Failed	Non-failed
Southern services	0.99969	Failed	Failed
Swiss Chalet Inc.	0.30730	Non-failed	Non-failed
Sun Resort Ltd.	0.19430	Non-failed	Non-failed
Red Lion Inns	0.00281	Non-failed	Non-failed
Utah Resources	0.42936	Non-failed	Non-failed
Thomas Edison	0.12672	Non-failed	Non-failed
Pocono Hotels	0.00000	Non-failed	Non-failed
La Quinta Inns	0.00526	Non-failed	Non-failed
Marcus Corp.	0.01087	Non-failed	Non-failed
Int'l Leisure	0.30730	Non-failed	Non-failed
Club Med Inc.	0.00396	Non-failed	Non-failed
Sholodge Inc.	0.03954	Non-failed	Non-failed
Kahler Corp.	0.02722	Non-failed	Non-failed
Hilton Hotels.	0.00028	Non-failed	Non-failed
Golf Hosts Resorts	0.00000	Non-failed	Non-failed
Sonesta Int'l	0.04710	Non-failed	Non-failed

1. * indicates actual bankrupt firm
2. Classification accuracy: 86.20%

Table 20. Probability and Prediction of Business Failure in the Hotel Industry (t-3)

Name	Probability	Status	Prediction
Amerihost	0.54055	Failed	Failed
Celebrity	0.50508	Failed	Failed
Extech Crop.	0.53044	Failed	Failed
General Builders	0.39007	Failed	Non-failed
*Integra	0.40467	Failed	Non-failed
Journeys End	0.68398	Failed	Failed
Krisch American	0.50000	Failed	Non-failed
La Quinta Motor	0.11799	Failed	Non-failed
Lees Inns	0.55062	Failed	Failed
Microtel	0.65246	Failed	Failed
PSH Master	0.53550	Failed	Failed
*Servico	0.00006	Failed	Non-failed
United Inns	0.48984	Failed	Non-failed
Southern services	0.96343	Failed	Failed
Swiss Chalet Inc.	0.37091	Non-failed	Non-failed
Sun Resort Ltd.	0.13839	Non-failed	Non-failed
Red Lion Inns	0.00337	Non-failed	Non-failed
Utah Resources	0.53550	Non-failed	Failed
Thomas Edison	0.14837	Non-failed	Non-failed
Pocono Hotels	0.00000	Non-failed	Non-failed
La Quinta Inns	0.00324	Non-failed	Non-failed
Marcus Corp.	0.01383	Non-failed	Non-failed
Int'l Leisure	0.40467	Non-failed	Non-failed
Club Med Inc.	0.02617	Non-failed	Non-failed
Sholodge Inc.	0.08651	Non-failed	Non-failed
Kahler Corp.	0.14837	Non-failed	Non-failed
Hilton Hotels.	0.00030	Non-failed	Non-failed
Golf Hosts Resorts	0.00000	Non-failed	Non-failed
Sonesta Int'l	0.00000	Non-failed	Non-failed

1. * indicates actual bankrupt firm
2. Classification accuracy: 75.86%

4.1.3 Application of the Model to bankrupt firms in the Restaurant Industry

In order to investigate whether the predictive business failure model can be applied to bankrupt firms in the restaurant industry, the dependent variable (one group of bankrupt firms) and two independent variables (cashflow per share and total debt divided by invested capital) were analyzed through logistic regression analysis. Of the 24 bankrupt firms not all of them had complete financial data for each of the time periods under investigation. Thus the number of bankrupt firms analyzed at t-1, t-2 and t-3 were not the same.

The probability of bankruptcy for the sample of bankrupt firms and summary of classification accuracy at one, two, and three years prior to bankruptcy are shown in tables 21-23. Classification accuracy was 100%, 46%, and 35%, respectively, at one, two, and three years prior to bankruptcy.

Table 24 illustrates the probability of bankruptcy for the bankrupt firms which had complete financial data at intervals of one, two, and three years prior to bankruptcy. Since some firms were deleted due to missing data for the independent variables at different time periods, inferences cannot be made about the probability of bankruptcy for these firms.

In summary, the predictive business failure model

consisting of cashflow per share and total debt divided by invested capital can predict bankruptcy with 100%, 46%, and 35% accuracy at one, two, and three years, respectively, prior to bankruptcy for bankrupt firms in the restaurant industry.

Table 21. Probability and Prediction of Bankruptcy in the Restaurant Industry (t-1)

Name	Probability	Status	Prediction
All American Burger	0.73505	Bankrupt	Bankrupt
Cattleguard	0.67864	Bankrupt	Bankrupt
*Consul Restaurant	0.79815	Bankrupt	Bankrupt
El Pollo Asado	0.99557	Bankrupt	Bankrupt
Flanigan's	0.78807	Bankrupt	Bankrupt
Pizza Time Theater	1.00000	Bankrupt	Bankrupt
*Po Folks	0.73212	Bankrupt	Bankrupt
*Rax Restaurant	0.64124	Bankrupt	Bankrupt
Southern Hospitality	0.97418	Bankrupt	Bankrupt
Victoria Stations	0.96955	Bankrupt	Bankrupt

1. * indicates firms included in the failed group
2. Fourteen firms were excluded due to missing values for independent variables
3. Classification accuracy: 100%

Table 22. Probability and Prediction of Bankruptcy in the Restaurant Industry (t-2)

Name	Probability	Status	Prediction
All American Burger	0.69456	Bankrupt	Bankrupt
Bombay Palace Rest.	0.23719	Bankrupt	Non-bankrupt
*Consul Restaurant	0.29409	Bankrupt	Non-bankrupt
El Pollo Asado	0.45889	Bankrupt	Non-bankrupt
Famous	0.91568	Bankrupt	Bankrupt
Flanigan's	0.56540	Bankrupt	Bankrupt
Gilbert/Robinson	0.00000	Bankrupt	Non-bankrupt
Horn & Hardart	0.98422	Bankrupt	Bankrupt
Kelly-Johnston	0.21898	Bankrupt	Non-bankrupt
Pizza Time Theater	0.02108	Bankrupt	Non-bankrupt
*Po Folks	0.00451	Bankrupt	Non-bankrupt
Primo	0.45617	Bankrupt	Non-bankrupt
*Rax Restaurant	0.91979	Bankrupt	Bankrupt
*SIS Corp.	0.63660	Bankrupt	Bankrupt
Victoria Stations	0.99257	Bankrupt	Bankrupt

1. * indicates firms included in the failed group
2. Nine firms were excluded due to missing values for independent variables
3. Classification accuracy: 46.67%

Table 23. Probability and Prediction of Bankruptcy in the Restaurant Industry (t-3)

Name	Probability	Status	Prediction
All American Burger	0.86557	Bankrupt	Bankrupt
Bombay Palace Rest.	0.26782	Bankrupt	Non-bankrupt
*Consul Restaurant	0.29409	Bankrupt	Non-bankrupt
Del Taco	0.07798	Bankrupt	Non-bankrupt
El Pollo Asado	0.46370	Bankrupt	Non-bankrupt
Famous	0.99986	Bankrupt	Bankrupt
Flanigan's	0.49830	Bankrupt	Non-bankrupt
Gilbert/Robinson	0.00000	Bankrupt	Non-bankrupt
Horn & Hardart	0.00148	Bankrupt	Non-bankrupt
Kelly-Johnston	0.16004	Bankrupt	Non-bankrupt
Pizza Time Theater	0.20245	Bankrupt	Non-bankrupt
*Po Folks	0.01313	Bankrupt	Non-bankrupt
Primo	0.51586	Bankrupt	Bankrupt
*Rax Restaurant	0.80292	Bankrupt	Bankrupt
Sambo's restaurant	0.57442	Bankrupt	Bankrupt
*SIS Corp.	0.34983	Bankrupt	Non-bankrupt
Victoria Stations	0.99927	Bankrupt	Bankrupt

1. * indicates firms included in the failed group
2. Seven firm were excluded due to missing values for independent variables
3. Classification accuracy: 33.33%

Table 24. The Analysis of Bankruptcy Probability
for the Common Firms in the Restaurant Industry

	T-1		T-2		T-3	
Name	Pro.	Pre.	Pro.	Pre.	Pro.	Pre.
All American Burger	0.73505	Bankrupt	0.69456	Bankrupt	0.86557	Bankrupt
Consul Restaurant	0.79815	Bankrupt	0.29409	Non-bankrupt	0.29409	Non-bankrupt
El Pollo Asado	0.99557	Bankrupt	0.45889	Non-bankrupt	0.46370	Non-bankrupt
Flanigan's	0.78807	Bankrupt	0.56540	Bankrupt	0.49830	Non-bankrupt
Pizza Time Theater	1.00000	Bankrupt	0.02108	Non-bankrupt	0.20245	Non-bankrupt
Po Folks	0.73212	Bankrupt	0.00451	Non-bankrupt	0.01313	Non-bankrupt
Rax Restaurant	0.64124	Bankrupt	0.91979	Bankrupt	0.80292	Bankrupt
Victoria Stations	0.96955	Bankrupt	0.99257	Bankrupt	0.99927	Bankrupt

Prob: Probability
Pre: Prediction
T-1: One year prior to bankruptcy
T-2: Two years prior to bankruptcy
T-3: Three years prior to bankruptcy

4.1.4 The relationship of Reorganization and Liquidation in the Restaurant Industry

In order to investigate whether reorganization and liquidation are dependent on each other, the dependent variable (reorganizers and liquidators) and independent variables (indicators of capital structure, profitability ,and their interaction term) were analyzed through logistic regression analysis. The significance of the coefficients of interaction terms at one, two, and three years prior to bankruptcy (reorganization or liquidation) are shown in tables 25-27.

In summary, the 20 interaction terms of a set of 4 indicators of capital structure and a set of 5 indicators of profitability were not consistently significant at intervals of one, two, and three years prior to bankruptcy at 0.05 level.

Table 25. The Analysis of Relationship between Reorganization and Liquidation in the Restaurant Industry (t-1)

P_1	P_2	P_3	P_4	P_5	D_1	D_2	D_3	D_4	Interaction	Observations
0.6822					0.2657				0.6943	11
0.9263						0.1734			0.8592	11
0.3163							0.1036		0.2421	11
0.5464								0.7422	0.7422	14
	0.4792				0.3446				0.4607	11
	0.4367					0.1965			0.4825	11
	0.4593						0.7155		0.7107	11
	0.5083							0.6870	0.7702	14
		0.6501			0.2903				0.9834	11
		0.6838				0.1701			0.9945	11
		0.5446					0.1518		0.5660	11
		0.6301						0.1934	0.6085	11
			0.7607		0.1844				0.8965	11
			0.9632			0.0709			0.8334	11
			0.2584				0.0981		0.2024	11
			0.7073					0.6266	0.7361	14
				0.5497	0.8861				0.5305	10
				0.6108		0.5377			0.6236	10
				0.3575			0.1986		0.3194	10
				0.6249				0.1516	0.2428	13

P_1: Return on assets
P_2: Return on equity
P_3: Return on investment
P_4: Net profit margin
P_5: Cashflow per share

D_1: Long-term divided by equity
D_2: Total debt divided by total assets
D_3: Total debt divided by invested capital
D_4: Interest coverage

1. Figures indicate the significance of coefficients
2. None of the coefficient were significant with intercepts at the 0.05 level

Table 26. The Analysis of Relationship between Reorganization and Liquidation in the Restaurant Industry (t-2)

P_1	P_2	P_3	P_4	P_5	D_1	D_2	D_3	D_4	Interaction	Observations
0.3567					0.4517				0.4458	17
0.1273						0.8200			0.1886	16
0.1776							0.6705		0.2898	16
0.8910								0.1895	0.7320	18
	0.2639				0.4285				0.3621	17
	0.2373					0.9035			0.2140	16
	0.1409						0.6347		0.1735	16
	0.7416							0.2743	0.4591	18
		0.7727			0.4668				0.4294	17
		0.3395				0.6974			0.4565	16
		0.1283					0.4144		0.1638	16
		0.4521						0.3228	0.8161	16
			0.3598		0.7288				0.7748	14
			0.2242			0.9603			0.2830	16
			0.2695				0.8812		0.5633	16
			0.8906					0.2558	0.7690	18
				0.1981	0.5421				0.2316	14
				0.9269		0.7349			0.7246	13
				0.5522			0.9209		0.8087	13
				0.6252				0.2717	0.2000	14

P_1: Return on assets
P_2: Return on equity
P_3: Return on investment
P_4: Net profit margin
P_5: Cashflow per share

D_1: Long-term divided by equity
D_2: Total debt divided by total assets
D_3: Total debt divided by invested capital
D_4: Interest coverage

1. Figures indicate the significance of coefficients
2. None of the coefficient were significant with intercepts at the 0.05 level

Table 27. The Analysis of Relationship between Reorganization and Liquidation in the Restaurant Industry (t-3)

P_1	P_2	P_3	P_4	P_5	D_1	D_2	D_3	D_4	Interaction	Observations
0.4922					0.1687				0.3134	21
0.7658						0.2809			0.4784	20
0.5997							0.4374		0.6597	20
0.5978								0.1436	0.4625	21
	0.2500				0.3130				0.9416	21
	0.3677					0.6878			0.3521	20
	0.2799						0.5944		0.2696	20
	0.6918							0.8068	0.2007	21
		0.4008			0.2475				0.4322	21
		0.2769				0.6803			0.2953	20
		0.3766					0.5415		0.7121	20
		0.7126						0.3348	0.7777	20
			0.6376		0.1947				0.3169	21
			0.7687			0.1816			0.8029	20
			0.5211				0.4391		0.6688	20
			0.7443					0.1655	0.4443	21
				0.2403	0.7456				0.1456	17
				0.6842		0.6581			0.9782	16
				0.9121			0.7184		0.6271	16
				0.9886				0.5484	0.6563	17

P_1: Return on assets
P_2: Return on equity
P_3: Return on investment
P_4: Net profit margin
P_5: Cashflow per share

D_1: Long-term divided by equity
D_2: Total debt divided by total assets
D_3: Total debt divided by invested capital
D_4: Interest coverage

1. Figures indicate the significance of coefficients
2. None of the coefficient were significant with intercepts at the 0.05 level

4.2 HYPOTHESES TESTING

The first null hypothesis is that business failure cannot be predicted in the restaurant industry at the 0.05 level. To test the null hypothesis the value of -2LL was investigated . Since the value of -2LL (39.881) from the predictive business failure model for the restaurant industry is significant at the 0.05 level, it can be concluded that the observed likelihood does not differ from 1 (the value of the likelihood for a model that fits perfectly). Consequently it can be concluded that business failure can be predicted which leads to the rejection of the null hypothesis.

There are 8 sub-hypotheses under the first null hypothesis. Since cashflow per share and total debt divided by invested capital were significant at the 0.05 level, the second and the seventh sub-hypotheses are rejected while the other sub-hypotheses fail to be rejected.

The second null hypothesis is that there are no differences in the predictors for business failure between restaurant and hotel industry at the 0.05 level. The predictive business failure model for the restaurant industry consisting of cashflow per share and total debt divided by invested capital was significant at the 0.05 level, and the predictors were significant at the 0.05 level. The predictive business failure model for the hotel industry consisting of cashflow per share was significant at 0.05 level, and the

predictor was significant at the 0.05 level. Therefore it can be concluded that there are differences in the financial variables which predict business failure for the restaurant industry on one hand and the hotel industry on the other, which in turn leads to the rejection of the null hypothesis.

The third null hypothesis is that capital structure (indicated by total debt divided by invested capital) and profitability (indicated by cashflow per share) together do not determine reorganization and liquidation at the 0.05 level. Since the interaction terms of these indicators were not significant at the 0.05 level at intervals of one, two, and three years prior to bankruptcy, the null hypothesis fails to be rejected.

4.3 DISCUSSION

4.3.1 The First Research Question

The first research question addressed the predictability of business failure and which financial variables can predict such failure in the restaurant industry. Out of the 26 ratios obtained from COMPUSTAT, only 8 ratios were investigated due to the issues of redundancy and convergence as mentioned in the section of 3.5.1.B.

The significant variables predicting business failure were cashflow per share and total debt divided by invested

capital, and the magnitude (coefficient) of cashflow per share and total debt divided by invested capital was -2.9902 and 0.0405, respectively. The other 6 ratios were found not to be significant in predicting business failure in the restaurant industry.

The negative sign of cashflow per share indicates that the more cashflow per share the firms have, the lower the probability that they will fail. The positive sign of total debt divided by invested capital indicates that the more debt divided by invested capital the firms have, the higher probability of failure. As expected, the classification accuracy percentage declined the farther away the firm was from the incidence of business failure. The same pattern was also found in previous studies (Altman, 1968; Blum, 1974; Altman, Haldeman & Narayaman, 1977). It can be suggested that the two variables can be used as early warning signals for business failure in the restaurant industry because of the high classification accuracy of the prediction model.

Five bankrupt firms were in the failed group. Both Consul Restaurant and Jamco Ltd., which were predicted as failed respectively in 1987 and 1988, actually liquidated in 1992. Also SIS Corp., which was predicted as failed in 1989, actually liquidated in 1990. Rax Restaurant and Po Folks Inc., which were predicted as failed respectively in 1990 and 1986, filed for reorganization in 1992 and 1987, respectively.

Flagg, Giroux & Wiggins (1991) also had similar results. They found that bankrupt and non-bankrupt firms could be correctly classified when the sample consisted of only business firms which had failed. It can be concluded that the model is capable of determining which failed firms will ultimately go bankrupt, and, consequently, this model offers early warning signals to firms to help them avoid bankruptcy.

Some firms having a higher probability of failure at intervals of one, two, and three years prior to business failure have continued to survive in the industry, while others with similar probability of failure at intervals of one, two, and three years prior to business failure went bankrupt. It can be predicted that these firms with a higher probability of failure and which have managed to survive in the industry will eventually go bankrupt. This prediction can be supported by the actual cases of Consul Restaurant, Jamco Ltd, Po Folks Inc, Rax Restaurant, and SIS corp. They had a higher probability of potential failure and indeed eventually went bankrupt.

Further research was conducted in order to investigate whether the model can be applied to actual bankrupt firms by adding bankrupt firms which were not included in the failed group. As expected the classification accuracy of the bankrupt firms was higher the closer the firms were to bankruptcy. This indicates that these variables of the

prediction model for business failure can be used as warning signs in order to prevent bankruptcy.

With respect to the 7 bankrupt firms which had complete data at the different time periods, there were two general patterns which emerged. Some firms had a lower probability of bankruptcy at two and/or three years prior to bankruptcy, and eventually had a higher probability of going bankrupt at one year prior to bankruptcy. Other firms consistently had a higher probability of becoming bankrupt at intervals of one, two, and three years prior to bankruptcy. In both patterns, it can be suggested that the firms should have recognized the imminence of bankruptcy sooner than they did, and with the help of these early warning signs combined with good corporate (or business) strategy they may have been able to avoid bankruptcy.

In summary, the predictive business failure model consisting of cashflow per share and total debt divided by invested capital can predict business failure with high classification accuracy, and this classification accuracy increases as firms move closer toward business failure. Also when this predictive business failure model was applied to bankrupt firms (bankruptcy is the most critical type of business failure), the same pattern appeared. The empirical evidence suggests that the model for business failure can provide more comprehensive information as well as greater lead

time.

4.3.2 The Second Research Question

The second research question was whether there are differences in the financial variables which predict business failure for the restaurant industry on one hand and the hotel industry on the other.

The significant variable predicting business failure was cashflow per share, and the magnitude (coefficient) of cashflow per share was -2.0319 in the hotel industry. The negative sign of cashflow per share indicates that the more cashflow per share the firms have, the lower the probability of business failure.

As expected, the correct classification percentage was lower as the firms were farther from business failure, while higher the closer they were to business failure. This indicates that the ability of the variable in the hotel model to predict business failure increases with proximity to business failure event suggesting that the variable can be used as an early warning signal of business failure in the hotel industry. This finding is similar to that found with respect to the restaurant industry.

Two bankrupt firms were in the failed group. Integra Hotel & Resort, which was predicted failed in 1990, was actually bankrupt in 1992. Also Servico, which was predicted

failed in 1990, was actually bankrupt in 1990.

It can be concluded that the predictive business failure model can offer early warning signal to firms to help them avoid bankruptcy. Consequently, it can be predicted that some firms having a higher probability of failure will have a great likelihood of becoming bankrupt. Similar conclusions were mentioned with respect to the restaurant industry.

It is known that the hospitality industry (the restaurant and hotel industries) may not be attractive to both equity and debt investors. Andrew (1984) indicated that the hospitality industry has a risky image due to variability of operating cashflow and capital intensive fixed assets. Elwood & Kwansa (1990) also have determined that venture capitalists consider the hospitality industry unattractive.

The two financial variables, cashflow per share and total debt divided by invested capital, were important predictors of business failure in the restaurant industry. These two financial variables also emerged as important in the previous studies using the events approach (Tavlin, Moncarz & Dumont, 1989; Kwansa & Parsa, 1990). The studies indicated that net loss and debt restructuring which were observed in the bankrupt firms occurred within one or two years of their filing for bankruptcy.

Equity investors may consider the financial variable, cashflow per share an important predictor because of a concern

with a firm's ability to pay dividends. On the other hand, creditors may consider the financial variable, the total debt divided by invested capital, an important predictor because of a concern with a firm's ability to pay principal and interest in the restaurant industry.

Cashflow per share was an important predictor for business failure in the hotel industry. It was also found to be an important predictor in Moncarz's study (1992). In the case of Prime Motor Inns, she indicated that the first event was the decline in cashflow per share. The important determinant of the ability of a firm to carry debt is the stability of its operating earnings (Cherry and Spradley, 1990). This suggests that profitability and capital structure may be complementary to each other. Indeed, when they are not complementary to each other, firms tend to be in financial distress. This suggestion, though valid for the restaurant industry, may not hold true for the hotel industry because none of the capital structure variables were found to be significant with respect to the hotel industry.

Although the indicators of capital structure may be important predictors for business failure none of indicators were found to be significant in the hotel industry. The reason for their insignificance may be that the profitability variable alone (cashflow per share) was significant enough to explain and predict business failure in the hotel industry.

In summary, it was found that the combination of these two variables can predict business failure with high classification accuracy for the restaurant industry while cashflow per share can predict business failure with high classification accuracy for the hotel industry.

4.3.3. The Third Research Question

The third research question was whether the financial variables that determine reorganization are different from those that determine liquidation in the restaurant industry. Previous researchers in the restaurant industry believed that the warning signals of possible business failure can be detected much earlier using empirically supported techniques (Olsen, Bellas & Kish, 1983; Tavlin, Moncarz & Dumont, 1989; Kwansa & Parsa, 1990).

Two financial variables, cashflow per share and total debt divided by invested capital, were found in this study to be important predictors of business failure in the restaurant industry. Although business failure can be predicted by these early warning signals, some firms still eventually face bankruptcy. In this case, the investigation of the relationship between reorganization and liquidation can help firms in deciding whether to reorganize or liquidate. Although the profitability indicator (cashflow per share) and capital structure indicator (total debt divided by invested

capital) were important predictors for business failure, the interaction terms of these variables were not significant for reorganized and liquidated samples at intervals of one, two, and three years prior to bankruptcy. This suggests that these two variables are not dependent with respect to the decision to file bankruptcy (reorganization or liquidation).

Furthermore, the interaction terms of other indicators were not consistently significant at intervals of one, two, and three years prior to bankruptcy. This evidence suggests strongly that reorganization and liquidation are not dependent on each other, that is, reorganization and liquidation cannot be determined by the combination of capital structure and profitability.

In this context, it can be suggested that reorganization and liquidation may be independent of each other, that is, reorganization and liquidation may be determined respectively by capital structure and profitability. It is recommended that liquidation be the first choice. Indeed, if the going-concern value of the firm exceeds its liquidation value, reorganization, rather than liquidation, can be considered. However, only a few firms are able to successfully reorganize (Altman, 1983; LoPucki, 1983). Furthermore, the success rate at turnarounds for firms entering into reorganizations since the new Bankruptcy Code became effective in October of 1979 was lower than it was ten years prior (LoPucki, 1983). In

addition, a non-trivial number of firms emerging from reorganization file for reorganization again (Altman, 1993). For example, in the restaurant industry, All American Burger, which had filed for reorganization in 1977, filed for reorganization again in 1981.

Further, indirect bankruptcy costs for the reorganized firms may not be confounded with liquidation costs. The indirect costs for the reorganized firms may not be based on the profitability variable (how much the firm would lose if reorganized) which is the hypothesized determinant of liquidation. Therefore, the only relevant indirect bankruptcy costs may be considered liquidation costs because indirect costs are opportunity costs from profits which cannot be captured as Haugen & Senbet (1978; 1988) and Senbet & Seward (1993) indicated.

In summary, when there is lack of lead time to prevent business failure, firms eventually face bankruptcy. The empirical evidence provides that reorganization and liquidation are not dependent on each other, that is, reorganization and liquidation cannot be determined by both capital structure and profitability. It is recommended that liquidation be considered the first choice, and that the relevant indirect bankruptcy costs be liquidation costs.

CHAPTER 5

CONCLUSIONS

5.1 SUMMARY OF THE STUDY

Questions regarding business failure have occupied the attention of researchers consistently over the past two decades. In response to these questions, many empirical studies have been conducted using firms across industries.

Industry failure rates are shown to be related to differences in industry financial conditions, and each industry has different failure rate elasticities with respect to financial conditions. This has left unanswered the question as to whether the predictive business failure models based on the aggregated sample of all firms across industries can be useful for specific industries.

The restaurant industry has consistently had the most business failures of any single segment within the retail sector in the eighties. Therefore a predictive model for business failure which can be a useful tool in helping researchers and industry practitioners to identify warning signs of business failure in this industry was developed. The sample consisted of 23 failed and 23 non-failed restaurant firms between 1982-1983. The predictive business failure model was developed through logistic regression analysis, which employed 8 financial variables, one year prior to business failure. The predictive business failure model

consisting of cashflow per share and total debt divided by invested capital can predict business failure 90%, 88%, and 75% at one, two , and three years, respectively, prior to business failure in the restaurant industry.

Some bankrupt firms which were in the failed group were predicted to fail and eventually went bankrupt. Consequently, it may be predicted that some firms, which have a higher probability of failure at intervals of one, two, and three years prior to business failure but are not bankrupt, will eventually go bankrupt. In addition, the predictive business failure model was applied to actual bankrupt firms by adding more bankrupt firms which were not included in the failed group for the restaurant industry. The model can predict bankruptcy 100%, 46%, and 35% at one, two, and three years, respectively, prior to bankruptcy. With respect to the 7 bankrupt restaurant firms which had complete data at the different time periods, it can be suggested that the firms should have recognized earlier than they did that they were near bankruptcy, and by recognizing the early warning signs combined with a good strategic plan they may have been able to avoid bankruptcy.

The second research question was to determine whether the financial variables in a predictive model for business failure in the restaurant industry are the same as in the hotel industry. Andrew (1984) indicated that several financial

characteristics set the hospitality industry apart from other industries. Elwood & Kwansa also (1990) have determined that venture capitalists consider the hospitality unattractive. Therefore, considering the similarity of the hotel and restaurant industries, if the business failure predictive model for the restaurant industry is not applicable to the hotel industry, then it can be suggested that the model for the restaurant industry is unique. Consequently, the predictive business failure model for the hotel industry was developed through logistic regression analysis, which employed the same 8 financial variables as were used in the restaurant model, one year prior to business failure. The sample consisted of 15 failed and 15 non-failed firms between 1982-1993. The predictive business failure model consisting of cashflow per share can predict business failure 92%, 86%, and 75% at one, two, and three years, respectively, prior to business failure in the hotel industry. Some bankrupt firms were in the failed group. All of them were predicted failed and eventually went bankrupt. Consequently, it may be predicted that some firms, which have a higher probability of failure at intervals of one, two, and three years prior to business failure but are not bankrupt, will eventually go bankrupt.

The important determinant of the ability of a firm to carry debt is the stability of its operating earnings. This

suggests that profitability and capital structure are complementary to each other. Indeed, when they are not complementary to each other, firms tend to experience financial distress. This suggestion, though valid for the restaurant industry, may not hold true for the hotel industry because none of the capital structure variables were found to be significant with respect to the hotel industry.

The third research question was to determine whether the financial variables that are associated with reorganization are different from those that are associated with liquidation in the restaurant industry. Although business failure can be predicted by the early warning signs, some firms still eventually file for bankruptcy. In this case, the investigation of the relationship between reorganization and liquidation can help in deciding whether to reorganize or liquidate.

There have been arguments regarding the relationship between liquidation and reorganization. One group of authors believes that reorganization and liquidation can be determined respectively by capital structure and profitability (Haugen & Senbet, 1978; 1988; Senbet & Seward, 1993). The other group believes that reorganization and liquidation can be determined by both capital structure and profitability (Bulow, 1978; Shapiro & Peitzman, 1984; Titman, 1984; White, 1984; Morris, 1986; Casey, McGee & Stickney, 1986). The relationship

between reorganization and liquidation was investigated through logistic regression analysis employing two sets of indicators for capital structure and profitability. The sample consisted of 14 reorganizers and 10 liquidators in the restaurant industry.

The empirical evidence indicates that reorganization and liquidation are not dependent on each other, that is, reorganization and liquidation cannot be determined by both capital structure and profitability in the restaurant industry. It is recommended that liquidation be the first choice because the constraints related to the development of new Bankruptcy Code in October of 1979 and the fact that continuing refiling has negative long term effects on the industry.

In addition, the indirect bankruptcy costs for reorganized firms should not be based on profitability which is the determinant of liquidation. Since indirect costs are opportunity costs, the relevant indirect bankruptcy costs should be liquidation costs.

Consequences of the study are related to business valuation. Determining the value of a firm is important to buyers, sellers, potential merger & acquisition partners, lending institutions, and tax authorities.

There are three approaches with respect to business valuation: costs, sales, and net income-capitalization. Of

the three valuation approaches available to the appraiser, the net income-capitalization approach generally provides the most persuasive and supportable conclusions (Rushmore, 1984; Fisher, 1991).

There are two basic components with respect to net income-capitalization business valuation. They are maintainable net income and cost of capital (Rushmore, 1984; Fisher, 1991). These two components can be measured in the past or future context. The appraisers can estimate maintainable net income and cost of capital in order to appreciate the business value for a specific property. In addition, they can estimate the probability of business failure employing the developed predictive business failure model.

If the probability of business failure is higher it is suggested that the maintainable net income and cost of capital be adjusted to reflect high business failure risk. On the other hand, if the probability of business failure is lower, it is suggested that the maintainable net income and cost of capital be adjusted to reflect low business failure risk. This adjustment is based on the idea that cost of capital along with maintainable net income should not be universal for all properties even within the same industry.

Therefore the predictive business failure model can be used to provide more additional information to buyers,

sellers, potential merger & acquisition partners, lending institutions, and tax authorities with respect to business valuation.

5.2 IMPLICATIONS OF THE STUDY

The predictive business failure model developed in this study has relevance to many research questions such as business failure and valuation.

The industry researchers and practitioners can estimate the probability of business failure through the predictive business failure model. This estimation can be employed as a tool to diagnose the financial distress and can be used to prevent it with lead time if indeed they are in financial distress. Also this tool can be employed to provide more additional information with respect to business valuation.

Since reorganization and liquidation are not dependent on each other, reorganization may be determined by capital structure and liquidation may be determined by profitability. With respect to the decision to file bankruptcy, liquidation can be the first choice because the restaurant industry is mature and competitive. Furthermore the success rate of turnarounds for firms entering into reorganization since the new Bankruptcy Code became effective in October 1979 was lower than it was ten years prior.

With respect to indirect bankruptcy costs, the industry

researchers and practitioners can estimate these costs based on the loss of profitability if firms are liquidated. These estimated indirect costs can be compared with the market value of the dismantled asset. If the market value of the dismantled assets exceeds the indirect costs, liquidation can be the choice.

5.3 LIMITATIONS OF THE STUDY

It may not be possible to consider the samples of restaurant and hotel firms as representative of their industries. The sample sizes were 46 firms and 30 firms respectively for the restaurant and hotel industries. In addition, only publicly traded firms were included, and most of them were chains in both samples obtained from COMPUSTAT. The corollary to this observation is whether or not the predictive business failure models from this study can be generalized to the hospitality industry.

There is a need to investigate whether the predictive model can be useful for private firms, independent operators, firms from different regions, or different types of properties for future research.

The relationship between reorganization and liquidation was not investigated for the hotel industry, in part, because there were fewer bankrupt firms in the hotel industry. The small number of hotel firms would have prevented the use of

parametric techniques of statistical analysis. However, although nonparametric techniques are statistically weaker, the relationship between reorganization and liquidations could be investigated for the hotel sample employing nonparametric techniques which apply to logistic regression analysis. Future research can provide additional information complementary to the results of this study with respect to business failure in the hospitality industry.

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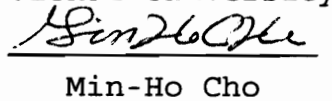

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