BANKRUPTCY OUTCOME AFTER THE POINT OF FILING

by

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(ABSTRACT)

The subject of corporate bankruptcy has been of interest to financial academicians and practitioners alike. Researchers have directed most of their attention to accounting based models for predicting bankruptcy filings. Although some research has attempted to estimate the probability and costs of bankruptcy, a very limited amount is centered around the outcome of bankruptcy proceedings. Specifically, little is known about the circumstances that determine whether the firm will liquidate, successfully reorganize, or become an acquisition of another firm after filing for court protection. Given the potentially large losses to both creditors and stockholders, the determinants of bankruptcy outcome should be of considerable interest. The focus of this research is threefold. First, the factors that should have an effect on the disposition of the firm after the bankruptcy filing are examined for their influence on the disposition. Second, since there is some dispute as to the appropriate classification of acquired firms, the correct classification of acquired (or merged) firms is determined. Third, the effect of a major change in the bankruptcy law is examined.

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Finally, I wish to thank my wife, ., for her support, encouragement, tolerance, and love as I completed the study. No one knows more than she how much time and effort has gone into this work. It is to her that I dedicate this dissertation.

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Chapter One: Introduction

The subject of corporate bankruptcy has been of interest to financial academicians and practitioners alike. Researchers have directed most of their attention to accounting based models for predicting bankruptcy filings. Although some research has attempted to estimate the probability and costs of bankruptcy, a very limited amount is centered around the outcome of bankruptcy proceedings. Specifically, little is known about the circumstances that determine whether the firm will liquidate, successfully reorganize, or become an acquisition of another firm after filing for court protection. Given the potentially large losses to both creditors and stockholders, the determinants of bankruptcy outcome should be of considerable interest. The focus of this research is threefold. First, the factors that should have an effect on the disposition of the firm after the bankruptcy filing are examined for their influence on the disposition. Second, since there is some dispute as to the appropriate classification of acquired firms, the correct classification of acquired (or merged) firms is determined. Third, the effect of a major change in the bankruptcy law is examined.

Contribution

Financial theory dictates that liquidation should occur if the market value of the firm is less than the liquidation value. In practice, however, numerous aspects affect the actual outcome of a bankruptcy firm. First, the market value of the firm is used in financial theories, but courts often use book value to settle priority claims. Second, management may be acting in their own self-interest since their own value in the labor market may be affected. Third, there may be agency costs of renegotiating debt contracts. As an example, unsecured debt may be renegotiated for secured debt. This restructuring of debt may affect the preference of some claimants on the firm as to the outcome of a bankruptcy filing. Fourth, the interpretation and application of bankruptcy laws often favor a certain class of creditor and allow for the possible breakdown of the priorities of claims. The fates of stockholders and creditors of firms in financial distress are often not under their own control and, further, differ with respect to the disposition of the firms.

As stated above, the purpose of this study is threefold. First, the factors relating to the disposition of firms from the point of filing for legal bankruptcy are examined. Then using variables hypothesized by prior theories, a model is developed to estimate the likelihood of bankruptcy outcomes in terms of liquidation versus continuation given the announcement of filing. Next, the empirical question of whether the acquired firms should be grouped with the liquidated firms or with the reorganized (continued) firms is investigated. White (1983) groups acquired firms with liquidated firms. Casey, et. al. (1986) remove acquired firms from their sample. Since the effect on the various claimants of the liquidated firm is generally different from that of the acquired firm, the

grouping of the two outcomes is questionable. The model will be tested to determine the appropriate grouping. Finally, the 1978 Reform Act is examined to test for structural changes in several variables as well as the overall model.

Organization of Study

Since the bankruptcy law plays a major role regarding the disposition of the firm after filing, it is discussed at length in the next chapter. This discussion is in two parts: the law that existed prior to 1979 (hereafter the pre-1979 law) and the Reform Act of 1978 (hereafter the Reform Act) which was implemented on October 1, 1979 and remains in effect today. The second chapter also presents a review of the literature.

The third chapter presents details of the research methodology including a description of the logit model and the selection of variables. The results of the study are presented in chapter four, including the grouping of the acquired firms and the effect of the law change. The fifth and final chapter presents a summary of the results and recommendations for further research.

Chapter Two: Law and Literature Review

Introduction

The purpose of this chapter is to review the bankruptcy laws as they existed before the 1978 Reform Act as well as after the Act was passed. Also, this chapter will review the literature dealing with bankruptcy. The law is discussed with emphasis on pertinent changes that occurred with the Reform Act. The bankruptcy literature is reviewed looking first at background studies, then reviewing the prediction models. Next, literature on the costs of bankruptcy is discussed. Finally, literature on the disposition of the firm is reviewed.

The Law

The purpose of this section is to discuss the pre-1979 law and the changes made to it by the 1978 Reform Act (as stated above, the law went into effect in 1979). The approach used for this comparison is to discuss each of the following in turn: a brief history of bankruptcy law; the order of priority of claimholder settlement; and the actual bankruptcy filing process and the legal aspects of deciding the disposition of the firm after filing.

The Bankruptcy Reform Act of 1978 replaced the Bankruptcy Act of 1898. Although there was a flurry of emergency legislation passed during the early 1930's, in response to the depression of 1929, the 1898 law remained basically unchanged until the Chandler Act of 1938. The Chandler Act amended the 1898 law to deal with the financial crises of the depression era but did not completely modernize the Act of 1898. Two chapters of the Chandler Act were closely related to corporate bankruptcy and reorganization attempts. Chapter XI proceedings were voluntary and applied only to unsecured creditors. Chapter X proceedings could be voluntary or involuntary and were more restrictive than Chapter XI proceedings. Chapter XI was generally preferred by the debtor since Chapter X automatically placed an outside trustee in control of the firm during the bankruptcy proceeding.

In 1970 Congress formed the Commission on the Bankruptcy Laws of the United States to study and recommend changes to bring the entire bankruptcy system up to date. The end product of the Commission's work was the Bankruptcy Reform Act of

1978. The change in bankruptcy laws is important to the present study since it could have a significant impact on the disposition of a troubled firm.

H. R. Miller and M. L. Cook in their "A Practical Guide to the Bankruptcy Reform Act," found the following to be among the most significant changes brought about by the Reform Act of 1978 affecting corporate bankruptcies:

a. The Bankruptcy Court's increased independence and full jurisdiction.
b. Appointment of the bankruptcy judges by the President for 14-year terms.
c. The United States trustee pilot program.
d. The consolidation of Chapters X, XI and XII into a single reorganization Chapter 11. (The Reform Act dropped the pre-1979 law's Roman numeral designation).
e. The simplification of the test for involuntary petitions.
f. A simplification of the bankruptcy trustee's statutory avoiding powers.
g. Expedited hearings on relief from stay and provisions to safeguard collateral.

Claimholder Settlements

Since claimants on the firm have specific rights under law which might affect the outcome of a bankruptcy filing, it is important to review how claimholder setelements are made. First, the secured creditors may reclaim their principal and interest from the specific assets against which they have a lien. If their claims exceed the value of their security, they become unsecured creditors for the balance. The balance of the assets are disposed of by the trustee and the proceeds from this disposition are paid out according to the absolute priority rule. Highest in priority is the cost of administering the bankruptcy, including lawyers' fees and other expenses incurred after the filing for bankruptcy. Second in priority are creditors' claims arising, in an involuntary case, in the ordinary course of business after the petition is filed. Wage claims up to a limit of $2000 ($600 under the old Act) are granted third priority. Certain fringe benefits are given fourth priority. The fifth priority in the new law is for consumer creditors who have paid money in connection with the purchase or rental of property or the purchase of services which have not been delivered. Any taxes owed occupy the next priority provided by both acts. Seventh on the priority list are the unsecured creditors such as trade creditors, bondholders and banks. Preferred stockholders are eighth and, finally, the common equity holders receive the balance of the proceeds.

Disposition of the Bankrupt Firm and the Filing Process

The three potential outcomes a financially distressed corporate entity faces are liquidation, reorganization under court protection, and acquisition by another firm. When

a firm files for liquidation, a trustee is appointed by the court to oversee the liquidation of the assets.

Reorganization under the old Bankruptcy Act allowed failing firms to file for protection through the court while continuing to operate without substantial change in form or management. Management would propose a settlement with creditors which specified a cutback in unsecured debt claims and secured creditors were prevented from foreclosing on their lien assets. The plan had to be approved by majority vote of all unsecured creditor classes. Since only the managers had a right to propose a plan, the creditors' had little alternative to accepting the plan. If the plan was not accepted, then liquidation followed.

The new Bankruptcy Reform Act stiffened the voting requirements by stating that a two-thirds majority in each class must vote in favor of a plan. The new law also requires that secured as well as unsecured creditor classes approve the plan if their claims are adversely affected. However, the managers no longer have the exclusive right to propose a plan. Creditors now have other alternatives to either liquidation or the managers' plan. If no plan is accepted, the firm can continue to operate while a buyer is sought. Finally, the new Reform Act removed the restriction that firms reorganizing must continue in the same form, meaning that parts of the firm may be sold or eliminated.

The old Act generally required that a trustee be appointed if the filing was under Chapter X, and did not permit the appointment of a trustee in a Chapter XI case. This situation caused debtors to favor filing under Chapter XI since they did not want to be restrained in the management of the business. In consolidating the chapters, the Reform Act adopted the flexible approach of leaving the debtor in control of the business unless

a request is made for the appointment of a trustee. Should this occur, a court hearing is held to determine the need for a trustee.

There are now three basic ways of commencing a bankruptcy case where a corporation is concerned. A voluntary case begins with the filing of a petition by the management of the firm. Involuntary cases may be filed under the liquidation provisions of Chapter 7 or the reorganization provisions of Chapter 11 of the Reform Act, but an involuntary petition may be filed only if the debtor is generally not paying its debts or a custodian has been appointed for the debtors property. An involuntary petition may be filed by three or more creditors having claims aggregating at least $5,000 more than the value of any lien securing such claims, unless there are fewer than twelve creditors. In that case, one or more creditors holding claims of at least $5,000 may file. The Reform Act specifically provides that an indenture trustee may be a petitioning creditor. A case ancillary to a foreign proceeding is commenced by the filing of a petition with the bankruptcy court by a foreign representative.

The new bankruptcy laws contained in the Reform Act were generally effective on October 1, 1979. However, the new bankruptcy court system did not take effect until April 1, 1984. The full effect of the changes in the law may not be evident in empirical research prior to the new court system being in place.

Background Literature Review

A number of issues have been dealt with in the literature concerning bankruptcy, its costs and its probability of occurrence. These issues are of importance due to their hypothesized effect on the question of cost of debt and equity financing and the existence of an optimal capital structure. The capital structure literature generally centers on the trade-off between the tax advantages of debt financing and the expected costs of bankruptcy. The existence of an optimal capital structure has been modeled in numerous studies, including those by Kraus and Litzenberger (1973), Kim (1976), Scott (1976), and DeAngelo and Masulis (1980).

Given the important role of capital structure in the development of financial theory, a considerable amount of research has been undertaken in the bankruptcy area. It has traditionally focused on measuring the costs of bankruptcy or estimating the probability of bankruptcy, often through a group of models classified as bankruptcy prediction models. Until recently, little attention had been directed at the importance of the definition of bankruptcy. More specifically, recent studies have recognized that while the law permits a bankruptcy filing, this action does not mean that the firm will liquidate or cease to exist. After filing, the bankruptcy law permits the firm to follow one of the three avenues; liquidation, reorganization, or acquisition by another firm. Each of these outcomes has its own implications for the debtholders and stockholders of the firm.

In this section, the literature pertaining to the aforementioned areas of prior research - bankruptcy prediction, cost measurement, and disposition of the firm after filing - are examined.

Bankruptcy Prediction Models

Early work examining the probability of bankruptcy centers on the use of financial ratios and various regression techniques. Beaver (1967) is among the earliest works to study failure prediction. He analyzes 79 firms that failed between 1954 and 1964 along with a paired sample of non-failed firms and, using a univariate approach, he tests the usefulness of ratio analysis for predicting bankruptcy. Beaver concludes that it is possible for accounting data to predict failure five years in advance. His tests of 30 ratios (using dichotomous classification tests and analysis of likelihood ratios) finds cash flow to total debt to be the key variable.

Altman (1968) uses multiple discriminant analysis of 66 firms to arrive at a five variable linear model for bankruptcy prediction consisting of (1) working capital/total assets, (2) retained earnings to total assets, (3) EBIT/total assets, (4) market value of equity/book value of total debt, and (5) sales/total assets. This model, however, does not have predictive ability beyond two years prior to failure. Deakin (1972) develops an alternative to the Beaver and Altman models. He utilizes linear multiple discriminant analysis to modify Altman's model to include Beaver's fourteen best predictors and obtains a combination of ratios which yields predictive accuracy three years in advance of failure. The sample size is 32 firms that failed between 1964 and 1970 and a paired sample of non- failed firms.

Altman, et.al. (1977) employ both linear and quadratic classification equations to arrive at a seven variable "ZETA" model consisting of (1) return of assets, (2) stability of earnings, (3) debt service, (4) cumulative profitability, (5) liquidity, (6) capitalization, and (7) size. Their sample consists of 53 bankrupt firms and a matched sample of non-bankrupt firms. The ZETA model outperforms Altman's earlier model. Dambolena and Khoury (1980) also use financial ratios and discriminant analysis in their stability model. They employ a sample of 46 firms to introduce various measures of ratio stability to improve the predictions, relative to those of Altman's.

Wilcox (1976) analyzes 52 failed and 52 non-failed firms to demonstrate that techniques based on ratios are poor predictors for periods longer than one year. This is because ratios vary across industries and across time and that they are easily "window dressed" by managers. He presents a technique based on the gambler's ruin approach and provides evidence of its superiority for periods longer than one year to failure. Vinso (1979) criticizes the ratio based models as being static in nature. He also criticizes models based on first passage of time techniques since they rely on the assumption that ruin is eventually a certainty. Building on Wilcox, he presents his dynamic "risk of ruin" technique as being "consistent with or superior to other risk measures currently available."

Citing the limited information in ratio and earnings data, Ahrony, Jones and Swary (1980) suggest an approach to estimate the probability of failure based on a company's market rates of return. With a sample of 45 failed industrials and a group of 65 control firms, they develop a model which compares favorably with ratio based models.

The studies reviewed above demonstrate an academic interest in the bankruptcy question and the outcome of firms in financial distress. The next section reviews the literature pertaining to the costs associated financially distressed firms.

Bankruptcy Costs

The second area of concern is the identification and measurement of the costs of bankruptcy. The literature refers to both direct and indirect costs of bankruptcy. Generally, direct costs are the legal and administrative costs associated with the process of filing and executing a bankruptcy. Indirect costs include implicit costs such as loss of profits caused by the loss of sales.

Some have argued that bankruptcy costs are insignificant to the theory of optimal capital structure. The first major attempt to measure bankruptcy costs was undertaken by Warner (1977). Whether his study could be generalized to include other industries is questionable since he investigates only 11 rail carriers over the 1933 to 1955 time period. He demonstrates with his sample of railroad bankruptcies that direct bankruptcy costs are on average only one percent of a firm's market value prior to bankruptcy.

Others also suggest that bankruptcy costs are not of importance to capital structure. Miller (1977) refers to Warner's study and argues that, in a world of differential personal taxes, the marginal personal tax disadvantage of debt combined with the supply side adjustments by firms will override the corporate tax advantage of debt, driving market prices to equilibrium implying capital structure irrelevance to any given firm. Haugen and Senbet (1978) conclude that, if capital market prices are determined by ra-

tional investors, informal reorganization would occur making bankruptcy costs trivial or nonexistent.

White (1983) distinguishes between ex-ante and ex-post bankruptcy costs. She defines ex-ante bankruptcy costs as an agency cost, where managers do not act in the interest of the stockholders but in their own self-interest, trying to keep a firm operating when it should be liquidated. The ex-ante cost is the difference between the net liquidation value of the firm and the present value of the future income stream given continuation or reorganization. This definition of ex-ante costs is similar to the indirect costs referred to in other studies. White considers the direct bankruptcy transaction costs as ex-post costs. Titman (1983) also discusses the capital structure problem from the standpoint of bankruptcy costs arriving from the agency relationship. He investigates the relationship between the firm (as the agent) and its customers (as principals) who suffer costs if the firm liquidates.

Altman (1984) considers indirect costs as well as direct costs and presents two proxies for measuring these costs for 12 retailers and 7 industrial firms. The first proxy he uses is a regression of firm sales on the appropriate industry sales figure for a ten year period prior to the forecasted year. Next he uses the estimates of security analysts to determine lost profits. He finds that total bankruptcy costs (direct plus indirect), on average, range from 12.4% three years prior to bankruptcy to 16.4% just prior to bankruptcy.

Noting the measurement problems of previous studies, Kalaba, Langetieg, Rasakhoo, and Weinstein (1984) demonstrate with a simulation that quasilinear estimation is a potentially reliable and efficient technique for the estimation of implicit bankruptcy costs. An empirical study remains to be done for validating their contention.

The above research demonstrates that much concern exists over the outcome of the financially distressed firm due to the potentially large costs of bankruptcy. With the exception of Michelle White's work, most of these models have treated bankruptcy as a generic concept, ignoring the different outcomes and the different costs. The next section reviews literature dealing directly with the disposition of firms in financial distress.

Disposition of the Firm in Bankruptcy

A central concern of this study is the disposition of a firm after it files for bankruptcy. The concept of bankruptcy and the financially distressed firm is currently gaining the interest of many academicians, however the definition of bankruptcy is an unclear issue. Is a firm considered bankrupt when it cannot meet the current payment on its debt obligations, when it violates indenture provisions or is it bankrupt when it actually files for protection under the court system? Is a firm bankrupt only when it liquidates or is it considered bankrupt while it is undergoing reorganization? Jensen and Meckling (1976) argue that bankruptcy and liquidation are different events and that liquidation will occur only if the market value of future cash flows generated by the firm is less than the market value of the assets if they were sold piecemeal.

Warner (1977) uses the term, bankruptcy, to refer "to proceedings which are undertaken under bankruptcy laws when a corporation is unable to pay or reach agreement with its creditors outside of court". Once a firm files for protection under the courts, the claimants on the firm are subject to outcomes different from those they bar-

gained for when purchasing their respective securities. Warner further points out that courts typically do not follow the priorities of securities' claims in bankruptcy proceedings making the determination of the outcome of a court proceeding of great interest to the claimants.

Recent studies have become concerned with the alternatives available under actual bankruptcy proceedings. White (1983) considers the three options of liquidation, continuation, and reorganization and discusses the tendency of management to continue the firm even when liquidation may be more appropriate. She argues that since managers not wanting to be displaced have an incentive to resist liquidation as long as possible, the bankruptcy reorganization process prolongs the continuation of inefficient firms. This offsets the beneficial effects of competition, and efficiency can be improved by reducing the likelihood of reorganization. She maintains that the new Bankruptcy Code does just that. She also discusses the shift from unsecured to secured debt by failing firms delaying bankruptcy. This action permits the proportion of debt financing to increase and leads to a breakdown in the "me-first" priority rules associated with Fama and Miller and in the order of claims covered by the Bankruptcy Code. White uses a sample of 186 firms in the Southern District of New York which liquidated or reorganized in 1978-1979 and a sample of 121 firms from 1980.

Baldwin and Mason (1983) use an options pricing framework to formulate recontracting of debt and equity such that absolute priority rules do not hold. They found that, in the case of the Massey Ferguson Ltd. reorganization, absolute priority rules did not hold and that the market expects debt and equity claims to be recontracted before equity is eradicated.

Lewellen (1971) brings mergers into the bankruptcy argument by arguing that for mergers to be beneficial, a merger must reduce the probability of one of the firms involved defaulting on its debt. Should this occur, the debt should increase in value making the merger beneficial. Further consideration of the merger outcome is supported by Kim (1978) when he states "...in order for the bankrupt firm to receive even a fraction of tax credits for its losses, either the firm must merge with a profitable firm or it must carry-forward its tax losses after the bankruptcy." Scott (1977) notes a similar tax benefit in the acquisition of the financially distressed firm, but also notes that the relative size of the acquirer and the target are important. Shrieves and Stevens (1979) present empirical evidence of mergers occurring for the purpose of avoiding bankruptcy. They use a sample of 112 acquired and 112 nonacquired firms and Altman's Z score model to argue a bankruptcy avoidance rationale for mergers.

Clark and Weinstein (1983) recognize that investors do not expect the firm to liquidate as a result of filing for bankruptcy. They use daily and monthly price and return data on 138 firms petitioning for reorganization during the period between 1938 and 1979 in order to investigate the "Bankruptcy Announcement Effect" around the filing date. They conclude that bankruptcy filings convey important unanticipated information to the market. They also check for different behavior under Chapter X and Chapter XI of the old Act. Their findings offer limited support for the proposition that a Chapter X filing, which generally took control away from existing management, was worse news for shareholders than a Chapter XI filing. However, they drew no conclusion due to small samples.

Bulow and Shoven (1978) describe a model with three classes of claimants on the income and assets of the firm, specifically:

a. bondholders - a non-cohesive group with a fixed time pattern of claims.
b. bank lenders - with loans due each period; they have ability to negotiate with equity holders.
c. equity holders - residual claimants who always wish to avoid bankruptcy.

Bulow and Shoven treat bank lenders and equity holders as a coalition with the bank lender holding the decision making power as to whether the firm will continue or liquidate. They develop a two-period model where bankruptcy occurs when the two negotiating claimants, the bank and the equity holders, have a more valuable joint claim under liquidation than with continuance. Also, bankruptcy will occur if bankruptcy cost, defined as the difference between the value as an ongoing concern and the liquidation value, is less than the value of bondholders' claims under continuance minus the value of bondholders' claims under liquidation. Initial financial crisis can be represented by a negative net worth condition, or when there is insufficient cash to pay all current claims.

If continuation is to occur then the additional funds needed are optimally obtained from the bank if the difference between the value of the firm under continuance minus the liquidation value is less than the value to debtholders under continuance minus the value to debtholders under liquidation.

Bulow and Shoven present numerical examples to demonstrate the following results:

A. A firm may stay in business despite having both negative net worth and a cash shortage.
B. A firm may liquidate even when the going concern value exceeds the liquidation value.
C. A firm may stay in business even when its liquidation value exceeds its going concern value.
D. If two firms have identical bankruptcy costs, variance of returns, liabilities, and asset value, it is possible that the firm with more cash will stay in business while the other will not.
E. It is possible that a lower liquidation value will improve the position of bondholders by encouraging the bank to keep the firm operating.
F. Given liquidation value, higher present value of future earnings may mean a less valuable bondholder claim.
G. Bond debt may receive a higher or lower payoff than bank debt.

These results indicate that the outcome of a bankruptcy filing is not necessarily intuitive and that more research is needed in the area.

Finally, they point out that the addition of tax considerations may change the outcome of the firm's bankruptcy decision and opens the possibility that a merger will

occur. Since the tax system allows losses to be accumulated and applied to future earnings, the firm with losses has something of value which is lost in liquidation. Therefore, the tax system may support the continuance of a firm or merger with another firm and discourage liquidation.

White (1980) extends the work of Bulow and Shoven. In her article she analyzes the bankruptcy liquidation rules from a public policy standpoint. She defines the social condition for continuance to be $P > L$ or that the firm's expected present value of future earnings is greater than the liquidation value of its assets. She concludes that neither absolute priority, proportionate priority nor the "me-first" rules leads to private investment incentives which are socially efficient except under a very restrictive set of assumptions: bondholders must be paid the same amount regardless of whether the firm liquidates or continues and all interest rates on bonds, both old and new, must be the same as the current discount rate. The latter assumption is not likely to occur and the first assumption is describing riskless debt which negates the concern of the bankruptcy question entirely.

Golbe (1981) also uses the model of Bulow and Shoven to demonstrate that, although equity holders may be risk neutral or risk averse with respect to their own returns, they may be risk preferring with regard to firm returns, especially if the firm is in financial crisis. He shows that increased variance does not increase the risk to equity holders since their downside return is limited to loss of their investment if bankruptcy occurs but their upside is not limited. Thus, increased variance increases the equity holders' expected returns but not their risk. Debt holders, on the other hand, do not share in the upside gain but do participate with the equity holders and the bank in the downside risk. Therefore, a mean-preserving increase in the variance of the firm's re-

turns increases the expectations of the equity holders at the expense of the bond holders. Assuming the Bulow and Shoven coalition theory, this renders bankruptcy less likely.

While some work is being done in the area of bankruptcy dealing with aspects of the issue of continuation versus liquidation, little empirical research has been undertaken in examining the factors which distinguish among outcomes of bankruptcies after filing has occurred. Casey, McGee, and Stickney (1986) develop a multivariate model to distinguish between reorganized and liquidated firms with the variables motivated by White's work. They use probit analysis to empirically test their model and find that two factors posited by White have discriminating power. They are the free assets percentage and the earnings prospects of the firm. Their model is able to classify accurately in only 69% of the cases in their estimation sample and this drops to 59% for their holdout sample.

There are major weaknesses in their study, however. First, they distinguish between reorganized and liquidated firms but ignore firms that are acquired. Many firms that file for protection in the courts have intangible or conditional assets that may be lost should liquidation occur. For example, tax loss carryovers are valuable to a reorganized firm once it turns profitable or may be valuable to a profitable acquiring firm immediately. The value of the tax loss carryovers are lost if the firm is liquidated. Casey, McGee, and Stickney's model might have been more significant had they included acquired firms along with reorganized firms in a single group called continued firms.

Second, they limit "predictor" variables only to those motivated by White. White's model is built using Bulow and Shoven as is Golbe's, but variables with strong theoretical and intuitive significance are not present in the Casey, McGee, and Stickney model.

For example, the liquidity of the firm has theoretical support in Bulow and Shoven's work and is intuitively appealing but was not considered in the Casey, McGee, and Stickney model. The same holds true for tax loss carryovers. Bulow and Shoven propose that the amount of funds supplied by banklenders should have an effect on the outcome. They are not clear as to whether the term "banklender" refers strictly to banks or, more broadly, to private debt. In either case, the variable is not considered by Casey, McGee and, Stickney. The variance of the firm's returns is suggested by Golbe as affecting the outcome of a financially distressed firm. Including these variables should add explanatory value to a multivariate model.

Third, when a firm's plan is confirmed, it is out of bankruptcy. Should it fail again, this constitutes another failure. Casey, McGee, and Stickney require three years of continued "success" and this unnecessarily limits their sample. Finally, their holdout group spans the change in the law. Based on White's findings, the new Code should have an effect on their variables. This study uses variables motivated by these recent studies to investigate their influence on the outcome of the financially distressed firm after they file for protection under the existing bankruptcy laws.

This chapter provides a review of the law and the literature pertinent to this study. The next chapter provides a description of the statistical details and the research design.

Chapter Three: Data, Model and Methodology

Introduction

This chapter provides a description of the model and the statistical methods used in this study. The first section introduces the variables selected for the study and their proxies. Next, the sample is described. The third section describes the logit outcome estimation model. Finally, the model to determine the effect of the law change is presented.

Variable Selection

The theoretical determinants of the outcome of a bankruptcy filing which are operationalized in the present study are (1) Ownership Concentration, (2) Liquidity, (3)

Bank Debt, (4) Tax Loss Carryovers, (5) Free Assets, (6) Earnings Prospects, (7) Size, (8) Return Variance, (9) Return Skewness, (10) Coupon Rate, and (11) Bankruptcy Law. Each of these are discussed next.

Ownership Concentration (OWN)

The ability of the firm's owners to affect management's commitment to maintaining the firm as an ongoing concern should have a direct effect on the outcome of the firm's bankruptcy proceeding. White (1983) introduces management commitment by discussing the desire of the existing management to continue the firm in order to protect their jobs. Management often has a substantial portion of their personal wealth in the firm. If the firm does poorly and may go bankrupt, the manager's immediate market value will be adversely effected. They may lose their jobs as well as any wealth invested in the firm. Jensen and Meckling (1976) argue that the manager is a utility maximizer with both pecuniary returns and non-pecuniary returns (perquisites) of his employment determining utility. As the manager's share of equity declines, his propensity for perquisite consumption increases. This characterizes the agency conflict between the owner-manager and outside stockholders.

If the stock of a firm is closely held, i.e. if a few stockholders hold a substantial number of shares, these stockholders may exert pressure on the management for the firm to continue. If existing management has a substantial percentage ownership in the firm, or is influenced by a concentration of ownership, continuation is expected as this

owner-management entity tries to keep secure its position and to prevent losses incurred in liquidation.

The effect of ownership concentration would be affected by the fact that the ability to control the reorganization process is changed by the new Code. Management no longer has the exclusive right to present a plan of reorganization. Creditors and/or other interested parties may now present to the court alternative plans and the court chooses the one which it determines to best provide for the various claimants on the firm. Thus, one would expect the change in the bankruptcy laws to reduce the significance of the ownership concentration variable.

The average number of shares held per stockholder serves as proxy for the concentration of ownership. This variable was the most difficult to obtain for the sample firms. Of the 101 firms in the sample, this variable is missing in 18 of the observations.

Liquidity (LIQ)

The higher the liquidity of the firm, the more likely it will not be liquidated. Referring to Bulow and Shoven (1980), the higher the liquidity, the lower the amount the banklender must put up to continue the firm. The likelihood of continuance should increase with increased liquidity. The current ratio of the firm is used as proxy for liquidity.

Bank Debt (BANK)

Bulow and Shoven's coalition theory provides a strong argument for the inclusion of the level of bank debt in any model predicting bankruptcy outcome. If banklenders are willing to lend money to a firm in financial distress, they anticipate that the firm is to fare better in the future. This would indicate that the firm is expected to continue. Since banklenders often have security for their loans and thus have had limited voting rights under the old Act, the change in the voting requirements requiring two-thirds majority in each class should affect their ability to control the firm as predicted by Bulow and Shoven. The proxy for bank debt will be the ratio of short- term borrowings of the firm to the total debt.

Tax Loss Carryovers (TAX)

Bulow and Shoven further point out that the addition of tax considerations may change the outcome of the firm's bankruptcy decision. Since the tax system allows losses to be accumulated and applied to future earnings, the firm with accumulated losses has something of value that will be lost in liquidation. Therefore, "the tax system may encourage continuance or merger and discourage bankruptcy." White (1983) considers acquired firms in the same class as liquidated firms. Casey, McGee, and Stickney (1986) ignore these firms altogether. It is the contention of the present study that acquired firms are part of the continued class. This concept is supported by the new bankruptcy code which states that a firm does not have to continue in the same form. The greater the amount of tax loss benefits available to an acquiring firm, the more

attractive an acquisition becomes. The accumulated tax losses, in effect, become a contingent asset of the financially distressed firm. One would expect to see a positive relationship between this variable and the continuance outcome. If no tax loss carryovers are given on Compustat or listed in the Moody's Industrial Manual, it is assumed that none exist.

Free Assets (FA)

The more free assets a firm has, the greater the assets available for collateral for further borrowing. White (1983) demonstrates analytically that assets not secured by previous borrowing give the firm additional borrowing capacity to obtain funds to emerge from financial distress. Casey, McGee, and Stickney (1986) find free assets to be a significant discriminatory factor. Thus, firms with a high level of free assets should show a tendency for continuation. However, the more secured debt the firm has, the fewer the assets available for distribution to unsecured creditors. This should result in a tendency for continuation since the unsecured creditors may fare better, and they, by law, have the voting power to accept a plan for continuance. The theoretical arguments represented by these two variables are in conflict and the effects may be offsetting. The Casey, et.al. study used non-collateralized tangible assets divided by total tangible assets as the proxy for the free asset variable. However, since senior debt may be secured by general claims on assets, this study uses the ratio of total assets less total borrowings to total assets as proxy for free assets. Total borrowings is available for all but one of the observations.

Earnings Prospects (ROA)

White (1983) also introduces the idea that the more attractive the firm's earnings prospects in the near future, the more likely they will be able to generate funds internally or obtain funds from external borrowing, thus the more likely it will be continued. The law change allowing the firm to continue to operate while searching for an acquirer or allowing the firm to reorganize in an altered form should make the continuance of the firm more likely. However, this argument is contrary to White's argument that the Reform Act makes reorganization more difficult. White argues that the change should have made the process more economically efficient. Firms with present value of future earnings lower than their liquidation value should be liquidated and others should be continued. For the reasons stated above, this is not so obvious. In arriving at this conclusion, White considers acquired firms as liquidated. To check for the effect the change in the law might have on the variables, this study separates the data by the law under which the filings were made and runs the model on each group as well as on the combined group. The firm's return on assets serves as a proxy for earnings prospects.

Size (SIZE)

White further demonstrates that the greater the size of a firm the more likely it has raised capital in the past by issuing long-term, unsecured bonds. The assets generated by this borrowing are available to serve as collateral for additional borrowing. Thus the greater the total assets of the firm, the more likely it will be continued. Also, larger firms in bankruptcy usually represent larger potential losses to creditors, who will be more

likely to accept reorganization proposals to limit these losses. Again, the larger a firm, the more likely it will be continued.

Return Variance (VAR)

Golbe (1981) shows that increased variance of returns does not increase the risk to equity holders. This is because their downside return is limited to the loss of their investment if bankruptcy occurs while their upside is unlimited. Thus, increased variance increases the equity holders' expected returns but not their risk. Debt holders, on the other hand, do not share in the upside gain but do participate with the equity holders and the bank in the downside risk. Therefore, a mean- preserving increase in the variance of the firm's returns increases the expectations of the equity holders at the expense of the bond holders. If Bulow and Shoven are correct in assuming that a coalition exists between the equity holders and the bank lenders, and that they have the decision making power, then liquidation is less likely to occur as the variance of returns is increased.

Return Skewness (SKEW)

The condition described by Golbe actually describes a tendency toward positive skewness of returns for firms in financial distress. Recognizing this, for the same reasons as above, the liquidation outcome should be negatively related to the skewness of returns. The average variance and skewness of returns are obtained from CRSP Master

Daily File by going back 252 days before the date of filing.[1] There are 21 missing observations of these variables.

Coupon Rate (COUP)

White (1980) introduces the idea that bond interest rate as it relates to the current discount rate may have an effect on the outcome of a financially distressed firm. She argues that one condition for the absolute priority rule to give efficient results is that bond interest rate equals the current discount rate. If the current interest rates are greater than the average coupon rate for the firm, the bonds will be selling at a discount. Under these conditions the bondholders may fair better under liquidation rather than continuation since, under liquidation, their settlement is usually based on book value rather than market value. The higher the average coupon rate of the firm, the more likely the firm's debt will not be selling at a discount. The average coupon rate of the firm is further motivated by Bulow and Shoven (1978) when they argue that the additional funds required from the banklenders is directly related to the bond interest rate. They contend that if the firm is to be continued, the banklenders must provide enough funding to keep the firm's obligation to the bondholders current. The greater the coupon rate on the existing bonds, the greater will be the required funding by the banklenders and thus, the less likely the firm will be continued. The average coupon rate for the firm serves as proxy for these interest rate effects.

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[1] The average return for the past 252 days is used to approximate one year.

Bankruptcy Law (LAW)

White (1983) argues that the Reform Act of 1978 makes the bankruptcy process more efficient by making reorganization more difficult. If this is the case, there should be a tendency for fewer reorganizations and more liquidations after the implementation of the Reform Act.

The proxies for the variables discussed above are summarized in Table 1, along with the hypothesized relationships between liquidation and continuation.

Sample

The sample consists of 42 liquidated firms, 47 reorganized firms and 12 acquired firms for a total of 101 bankrupt public companies traded on the New York Stock Exchange or the American Stock Exchange. These firms are also listed on the Compustat Research File and the CRSP daily return file. Of these firms, 70 filed under the pre-1979 law and 31 filed under the Reform Act of 1978. The companies are selected by going through the Wall Street Journal Index and finding companies that had filed during the study period of 1970 through 1984 and subsequently culminated the bankruptcy process. Data on the outcomes are obtained from follow-up Wall Street Journal articles, Moody's Industrial Manuals, and the National Quotation Bureau "Pink Sheets". Financial statement data are obtained from Compustat Annual and Research tapes. Due the sketchy filing of financial information of firms under the bankruptcy process, there are missing data for some of the variables. Missing Compustat data on debt securities,

Table 1. VARIABLE SUMMARY

VARIABLE	PROXY	SYMBOL	HYPOTHESIZED RELATIONSHIP
Ownership Concentration	Shares/ Shareholders	OWN	+ Continuance - Liquidation
Liquidity	Current Ratio	LIQ	+ Continuance - Liquidation
Bank Debt	Short Term Borrowings/ Total Debt	BANK	+ Continuance - Liquidation
TaxLoss Carryovers	Tax Loss Carryovers	TAX	+ Continuance - Liquidation
Free Assets	(Total Assets less Total Borrowings)/ Total Assets	FA	?
Earnings Prospects	Return on Assets	ROA	+ Continuance - Liquidation
Size	Total Assets	SIZE	+ Continuance - Liquidation
Variability of Returns	Return Variance	VAR	+ Continuance - Liquidation
Skewness of Returns	Return Skewness	SKEW	+ Continuance - Liquidation
Coupon Interest Rate	Average Coupon Rate	COUP	- Continuance + Liquidation

capital stock holdings and tax loss benefits of the firms are obtained from the Moody's Industrial Manual and the corporate 10-K reports of the firms. Data on the variance and skewness of returns are obtained from the CRSP daily return files.

While the size of the sample presents some statistical problems, it compares favorably with the sample sizes of other studies in the area of bankruptcy (see Table 2). The present sample is greater in size than all studies with the exception of White (1983) and Clark and Weinstein (1983). White's sample consisted of firms in the Southern District of New York during her three year study period. Clark and Weinstein's study used market data for a period between 1938 and 1979.

Missing Data

Due to the nature of the firms under study and their state of financial distress, it is not unexpected that observations for some of the variables are missing. The Compustat and CRSP tapes have missing information for a number of the variables. After searching other sources, missing data still remained. One method for dealing with missing information for variables is to drop the observations for which there are missing data. However, dropping the observations with partial data causes a loss of efficiency and weakens the statistical statements that can be made about the estimated parameters of the model. Further, the size of this sample requires that an alternative method for dealing with the problem be found. An accepted method is the imputation of missing

Table 2. SAMPLE SIZE COMPARISONS

STUDY	SAMPLE SIZE
Beaver (1967)	79 firms that failed from 1954 to 1964 and a paired sample of non-failed firms
Altman (1968)	33 manufacturing firms that failed between 1946 and 1965 and a paired sample of non-failed firms.
Deakin (1972)	32 firms that failed between 1964 and 1970 and a paired sample of non-failed firms.
Wilcox (1976)	Matched samples of 52 bankrupt and 52 non-bankrupt firms
Warner (1977)	11 rail carriers failed from 1933-1955
Altman, et.al. (1977)	53 bankrupt firms and a matched sample of non-bankrupt firms.
Dambolena and Khoury (1980)	46 firms
Ahrony, Jones and Swary (1980)	45 failed industrials and a group of 65 control firms.
White (1983)	186 firms which liquidated or reorganized in 1978-1979 and a sample of 121 firms from 1980.
Clark and Weinstein (1983)	138 firms petitioning for reorganization between 1938 and 1979.
Altman (1984)	12 retailers and 7 industrials.
Casey, McGee and Stickney (1986)	57 successes and 61 liquidators from 1970-81

data by the sample means.[2] The missing data in this study are imputed by the sample means by grouped outcome. The models were also run using data imputed by the overall means for each variable with no significant difference in the results. The interested reader may refer to appendix B for the results of these runs. The univariate statistics for the variables by various groupings are given in Table 3.

Outcome Estimation Model

The decision of whether to use discriminant analysis or a conditional probability model depends largely on the intended use of the results. If dichotomous classification is the only requirement, then discriminant analysis may be adequate, even though the violation of statistical assumptions such as multivariate normality of the independent variables may make evaluation sample specific. Discriminant analysis may also be used to generate a probability, but most procedures to do so involve subjective assessment of the probability associated with a particular discriminant score such as is done by Altman in his Z-score analysis.

Conditional probability models such as logit and probit use the coefficients of the independent variables to predict the probability of occurrence of a dichotomous dependent variable. A cumulative probability distribution assumption is needed in order to constrain the predicted values to comply with the acceptable (0,1) limiting values of probability distributions. The coefficient of each variable can be interpreted as the effect

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[2] Robert S.Pindyck and Daniel L. Rubinfeld, *Econometric Models & Economic Forcasts*, (New York: McGraw-Hill, 1981),p.245-249.

Table 3. UNIVARIATE STATISTICS

ALL OUTCOMES - BOTH LAW (N = 101)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.2943	0.2267	0.0514	0.5951	0.2600	0.8292
TAX	16.5876	57.1197	3262.6601	7.4376	3.3890	520.0000
LIQ	1.9228	3.0838	9.5098	5.0979	1.2332	21.2076
ROA	-0.1481	0.3237	0.1048	-6.4956	-0.0914	3.0141
SIZE	203.8070	964.7450	930732.9150	8.9030	31.2600	9379.9200
COUP	0.1142	0.0679	0.0046	2.5489	0.0996	0.4877
VAR	-0.0072	0.0045	0.00002	2.6702	0.0015	0.0342
SKEW	-0.5957	4.5660	20.8484	0.3351	-0.1310	31.8120
OWN	1121.7200	735.6100	541122.0721	2.3583	1138.0000	4928.0000
FA	0.2969	0.6317	0.3990	-6.0880	0.3712	5.9855

ALL OUTCOMES - PRE LAW (70)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.2872	0.2205	0.0486	0.5578	0.2600	0.7332
TAX	11.0721	28.4678	810.4156	5.5740	3.4750	208.0000
LIQ	2.0495	3.5351	12.4969	4.7496	1.2312	20.9390
ROA	-0.1381	0.3584	0.1285	-6.9299	-0.0772	2.9685
SIZE	82.9446	190.1740	36166.1503	4.6070	28.8715	1106.6600
COUP	0.0925	0.0384	0.0015	1.2566	0.0879	0.2182
VAR	-0.0009	0.0050	0.00002	2.8552	-0.0016	0.0342
SKEW	-0.7880	5.0199	25.1994	0.4533	-0.1554	31.8120
OWN	972.6140	500.5950	250595.3540	0.7572	1118.5000	2255.0000
FA	0.2230	0.7294	0.5320	-5.4952	0.2648	5.9855

ALL OUTCOMES - POST LAW (31)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.3103	0.2430	0.0590	0.6571	0.2974	0.8159
TAX	29.0420	93.7034	8780.3272	5.1226	2.5000	520.0000
LIQ	1.6369	1.6840	2.8359	2.5127	1.2606	7.7556
ROA	-0.1707	0.2306	0.0532	-1.1003	-0.1055	0.9093
SIZE	476.721	1705.35	2908218.6	5.1042	46.361	9376.87
COUP	0.1632	0.0915	0.0084	1.8602	0.1436	0.4877
VAR	-0.0004	0.0034	0.00001	1.0929	-0.0011	0.0145
SKEW	-0.1615	3.3547	11.2540	-0.1472	-0.0467	19.9479
OWN	1458.42	1028.76	1058347.1	1.9754	1323.00	4848.00
FA	0.4639	0.2549	0.0650	-0.9710	0.5588	1.2732

TABLE 3 (CONT) - UNIVARIATE STATISTICS

REORGANIZATION OUTCOME - BOTH LAW (47)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.3131	0.2296	0.0527	0.2953	0.3090	0.7315
TAX	8.1219	11.7012	136.9181	2.1371	3.5500	55.0000
LIQ	1.7771	3.0526	9.3184	5.9253	1.2292	20.9390
ROA	-0.1178	0.4339	0.1883	-5.6790	-0.0939	3.0141
SIZE	140.0240	367.2200	134850.5284	5.0125	36.9560	2297.8100
COUP	0.1285	0.0803	0.0064	2.4902	0.1026	0.4811
VAR	0.0005	0.0055	0.00003	2.8597	0.0001	0.0309
SKEW	-0.9858	4.4216	19.5505	-0.0290	-0.6244	30.7378
OWN	1121.1500	751.7560	565137.0835	3.4345	1138.0000	4895.0000
FA	0.2676	0.3795	0.1440	-1.2817	0.2503	2.0804

REORGANIZATION OUTCOME - PRE LAW (32)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.3327	0.2417	0.0584	0.2885	0.3035	0.7315
TAX	8.6102	12.0256	144.6151	2.3708	3.7895	55.0000
LIQ	1.8228	3.5764	12.7906	5.4612	1.1861	20.9390
ROA	-0.1860	0.5091	0.2592	-5.2715	-0.0907	2.9451
SIZE	103.2790	208.1780	43338.0797	4.0026	31.3270	1106.1200
COUP	0.1010	0.0456	0.0021	1.2629	0.0898	0.2182
VAR	0.0009	0.0062	0.00004	2.7215	0.0003	0.0309
SKEW	-0.8379	4.8854	23.8671	0.1040	-0.7811	30.7378
OWN	942.9060	436.8570	190844.0384	0.3967	1138.0000	1760.0000
FA	0.1997	0.4183	0.1750	-1.0793	0.2342	2.0804

REORGANIZATION OUTCOME - POST LAW (15)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.2714	0.2028	0.0411	0.0559	0.3090	0.5551
TAX	7.0801	11.3114	127.9478	1.7093	3.3501	36.5000
LIQ	1.6798	1.5100	2.2801	2.8197	1.2606	6.3098
ROA	-0.1602	0.2104	0.0443	-0.4699	-0.1219	0.6729
SIZE	218.4130	580.9020	337447.1336	3.7479	44.2670	2292.0000
COUP	0.1871	0.1057	0.0112	2.0084	0.1633	0.4302
VAR	-0.0004	0.0033	0.00001	0.8934	-0.0001	0.0136
SKEW	-1.3013	3.3514	11.2319	-1.4055	-0.4552	14.6964
OWN	1501.4000	1098.5300	1206768.1609	2.8941	1432.0000	4710.0000
FA	0.4124	0.2299	0.0529	-0.2897	0.4414	0.6045

TABLE 3 (CONT) - UNIVARIATE STATISTICS

ACQUIRED OUTCOME - BOTH LAW (12)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.2081	0.2049	0.0420	2.3351	0.1649	0.7803
TAX	47.6755	148.8570	22158.4064	3.4547	2.6326	520.0000
LIQ	1.8102	1.8909	3.5755	2.6368	1.1450	7.1769
ROA	-0.1215	0.2136	0.0456	-1.7957	-0.0308	0.6873
SIZE	119.9230	189.5570	35931.8562	1.9968	40.6120	551.4350
COUP	0.1314	0.0753	0.0057	1.8658	0.1109	0.2798
VAR	-0.0014	0.0029	0.00001	0.4946	-0.0015	0.0079
SKEW	-1.1579	4.7682	22.7357	0.3649	-1.1319	18.9712
OWN	855.3330	321.5780	103412.4101	1.1304	860.0000	1206.0000
FA	0.4321	0.3155	0.0995	0.3970	0.4515	1.0402

ACQUIRED OUTCOME - PRE LAW (8)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.1509	0.1162	0.0135	0.9075	0.1293	0.3650
TAX	3.2406	4.5069	20.3121	1.1645	0.8125	10.9000
LIQ	20.7020	2.2384	5.0104	2.3825	1.0612	6.6870
ROA	-0.0253	0.0668	0.0045	-0.7446	-0.0110	0.1988
SIZE	37.0380	30.2249	913.5446	0.9132	29.4575	89.8640
COUP	0.0962	0.0296	0.0009	-0.6499	0.1030	0.0877
VAR	-0.0018	0.0023	0.00001	0.4437	-0.0015	0.0073
SKEW	-2.0948	4.1672	17.3656	-1.2251	-0.8003	11.0226
OWN	862.6250	367.3640	134956.3085	1.2614	860.0000	1206.0000
FA	0.3417	0.3233	0.1045	0.9625	0.2741	1.0402

ACQUIRED OUTCOME - POST LAW (4)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.3227	0.3100	0.0961	1.9952	0.1717	0.6277
TAX	136.5450	255.7440	65404.9935	1.9950	13.0905	520.0000
LIQ	1.2902	0.9370	0.8780	0.2451	1.2518	2.2920
ROA	0.3138	0.2881	0.0830	0.0937	0.3057	0.6218
SIZE	285.6940	273.2370	74658.4582	0.0353	278.5960	523.8870
COUP	0.2019	0.0938	0.0088	1.1334	0.1752	0.2028
VAR	0.0004	0.0039	0.00002	0.0368	0.0002	0.0072
SKEW	0.7158	5.9852	35.8226	1.6972	-1.2924	13.4886
OWN	840.7500	252.6970	63855.7738	0.1655	833.0000	603.0000
FA	0.6130	0.2362	0.0558	1.6984	0.5215	0.5061

TABLE 3 (CONT) - UNIVARIATE STATISTICS

LIQUIDATED OUTCOME - BOTH LAW (42)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.2978	0.2287	0.0523	0.6523	0.2600	0.8271
TAX	17.1789	38.6490	1493.7452	3.6579	3.2945	208.0000
LIQ	2.1180	3.4226	11.7142	4.4633	1.3306	20.7721
ROA	0.1226	0.1739	0.0302	-1.8082	0.0867	0.9010
SIZE	299.1490	1446.7600	2093114.4976	6.3365	28.8320	9379.7200
COUP	0.0932	0.0413	0.0017	0.9570	0.0900	0.2193
VAR	0.0019	0.0034	0.00001	0.3362	0.0019	0.0186
SKEW	0.0015	4.7099	22.1832	0.6656	0.0467	28.7485
OWN	1198.4800	794.4830	631203.2373	1.1546	1175.0000	3233.0000
FA	0.2911	0.8824	0.7786	-5.4717	0.4538	5.9576

LIQUIDATED OUTCOME - PRE LAW (30)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.2751	0.2059	0.0424	0.5441	0.2600	0.7311
TAX	15.7865	41.4986	1722.1338	4.0481	3.2945	208.0000
LIQ	2.2857	3.8388	14.7364	4.3285	1.3306	20.2659
ROA	0.1171	0.1448	0.0210	0.8102	0.0893	0.5433
SIZE	73.4967	195.8890	38372.5003	5.0392	25.9900	1079.3100
COUP	0.0823	0.0296	0.0009	0.5959	0.0782	0.1210
VAR	0.0025	0.0032	0.00001	0.4759	0.0019	0.0124
SKEW	0.3863	5.4418	29.6132	0.8082	0.0467	28.7485
OWN	1033.6300	592.8750	351500.7656	0.7188	1175.0000	2255.0000
FA	0.2161	1.0243	1.0492	-4.8166	0.4064	5.9576

LIQUIDATED OUTCOME - POST LAW (12)

VARIABLE	MEAN	STD.DEV.	VAR	SKEW	MEDIAN	RANGE
BANK	0.3547	0.2798	0.0783	0.5543	0.2959	0.7652
TAX	20.6600	31.7634	1008.9136	1.7286	5.0000	99.0000
LIQ	1.6987	2.1312	4.5420	2.3460	1.2204	7.7556
ROA	0.1361	0.2391	0.0572	-2.3067	0.0741	0.9010
SIZE	863.2810	2685.9600	7214381.1216	3.4503	40.9895	9363.9000
COUP	0.1204	0.0540	0.0029	0.1534	0.1131	0.2193
VAR	0.0004	0.0035	0.00001	1.8898	0.0017	0.0127
SKEW	0.9708	1.7823	3.1766	1.5097	0.2942	5.6822
OWN	1610.5800	1080.0900	1166594.4081	0.6081	1415.0000	3153.0000
FA	0.4785	0.2878	0.0828	-2.0871	0.5642	1.1663

of a unit change in an independent variable on the probability of the dichotomous dependent variable. Pindyck and Rubinfeld (1981) point out "... the logistic and probit formulations are quite similar; the only difference is that the logistic has slightly fatter tails..." Thus, logit is more appealing for this study.

The logit model is based on the cumulative logistic probability function specified as:

$$P_i = F(Z_i) = F(a + BX_i) = 1 / (1 + e_i^{-Z}) \qquad (1)$$

from which it can be shown that

$$\log(P_i / (1 - P_i)) = Z_i = a + BX_i \qquad (2)$$

or that the dependent variable can be stated as simply the logarithm of the odds that a particular outcome will occur.

The logit model can be extended to the three-choice case as follows:

$$\log P_2 / P_1 = a_{21} + B_{21}X_i \qquad (3)$$

$$\log P_3 / P_1 = a_{31} + B_{31}X_i \quad (4)$$

$$\log P_3 / P_2 = a_{32} + B_{32}X_i \quad (5)$$

The SAS logist procedure uses the maximum likelihood estimation method to find parameter estimators which make it most likely that the outcomes of the firms in the sample would occur. The likelihood function is evaluated when all parameters are equal to zero except for the constant (L_0). Next the likelihood function is evaluated at its maximum (L_{max}). The likelihood ratio λ is defined as L_0/L_{max}. SAS tests the significance of the entire logit model using the fact that -2 log λ follows a chi-square distribution with k degrees of freedom, where k is the number of parameters (other than the constant) in the equation.[3]

Using the SAS logist procedure, this study will determine whether the acquired firms should be considered a separate group, grouped with the continued firms or grouped with the liquidated firms. Once the appropriate grouping is found, the relative probability that the outcome of a bankruptcy filing will be liquidation, reorganization, acquisition, or some appropriate grouping of these outcomes will be modeled. Specifically, assuming acquisitions are treated as a separate group:

$$\log P_2 / P_1 = a_{21} + B_{21}\,\mathrm{OWN} + C_{21}\,\mathrm{LIQ} + D_{21}\,\mathrm{BANK} + E_{21}\,\mathrm{TAX} + F_{21}\,\mathrm{FA} \quad (6)$$

$$+ G_{21}\,\mathrm{ROA} + H_{21}\,\mathrm{SIZE} + I_{21}\,\mathrm{VAR} + J_{21}\,\mathrm{INT} + K_{21}\,\mathrm{SKEW} + L_{21}\,\mathrm{LAW} + e_{21}$$

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[3] Robert S.Pindyck and Daniel L. Rubinfeld, *Econometric Models & Economic Forcasts*, (New York: McGraw-Hill, 1981),p.311-312.

$$\log P_3 / P_1 = a_{31} + B_{31} OWN + C_{31} LIQ + D_{31} BANK + E_{31} TAX + F_{31} FA \quad (7)$$

$$+ G_{31} ROA + H_{31} SIZE + I_{31} VAR + J_{31} INT + K_{31} SKEW + L_{31} LAW + e_{31}$$

$$\log P_3 / P_2 = a_{32} + B_{32} OWN + C_{32} LIQ + D_{32} BANK + E_{32} TAX + F_{32} FA \quad (8)$$

$$+ G_{32} ROA + H_{32} SIZE + I_{32} VAR + J_{32} INT + K_{32} SKEW + L_{32} LAW + e_{32}$$

where:

Subscript 1 = Liquidated;

Subscript 2 = Reorganized;

Subscript 3 = Acquired;

OWN = Ownership Concentration;

LIQ = Liquidity;

BANK = Bank Debt;

TAX = Tax loss carryovers;

FA = Free Assets;

ROA = Earnings Prospects;

SIZE = Size;

VAR = Variability of Returns;

INT = Average Coupon Rate;

SKEW = Skewness of Returns; and

LAW = 0, if event is before 1978 Reform Act was effective and

1, otherwise.

Effect of the Law Change

White (1983) argues that the Reform Act of 1978 makes the bankruptcy process more efficient by making reorganization more difficult. If this is the case, there should be a tendency for fewer reorganizations and more liquidations after the implementation of the Reform Act. The model will be tested for the effect of the law change by using a dummy variable and by the use of t-tests. First, the use of a dummy variable to test for a shifts in the data:

Let D_L = 1 if filed under Old Act; and 0 if filed under the Reform Act.

The following model will be tested:

$$\log P_2 / P_1 = a_{21} + B_{21}\,OWN + C_{21}\,LIQ + D_{21}\,BANK + E_{21}\,TAX \qquad (9)$$

$$+ F_{21}\,FA + G_{21}\,ROA + H_{21}\,SIZE + I_{21}\,VAR + J_{21}\,INT + K_{21}\,SKEW$$

$$+ L_{21}\,LAW + M_{21}\,D_L \times OWN + N_{21}\,D_L \times LIQ + O_{21}\,D_L \times BANK + P_{21}\,D_L \times TAX$$

$$+ Q_{21}\,D_L \times FA + R_{21}\,D_L \times ROA + S_{21}\,D_L \times SIZE + T_{21}\,D_L \times VAR + U_{21}\,D_L \times INT$$

$$+ W_{21}\,SKEW + e_{21}$$

where:

Subscript 1 = Liquidated

Subscript 2 = Continued

Should any of the interactive coefficients be significant, there is an indication that the law change has an effect. The model is run for the continued versus liquidated groups only, due to the limited size of the acquired group. This grouping is intuitively appealing because of the similarity of the consequences to the claimants.

Next, an additional set of tests are run to see if there are differences in the variables of the model across the law change. T-tests are run on the data to determine if there are significant differences in the means of the variables when grouped according to the set of laws the firms filed under. These t-tests are conducted for all possible groupings of the data. The SAS t-test procedure first tests for equal variances and then presents the t-tests for equal means for both the equal variance and the unequal variance cases.

This chapter has presented the motivation of the variables, the development of the model, the sample selection and the statistical methodology. Next, the results of the study are presented.

Chapter Four: Results

Introduction

The results of the statistical analyses are presented in this chapter. First, the results of the analyses to determine the proper grouping of the acquired firms are presented. Next, the results of the analysis comparing liquidated firms to reorganized firms are given along with the effects that the significant variables have on the disposition of the bankrupt firm. Then, the acquired firms are grouped with the reorganized firms and results for the liquidated versus "continued" firms are given. Finally, the results of the tests for the effect of the law change are presented.

Categorization of Acquired Firms

Acquired Versus Liquidated

A central question in this study concerns the categorization of acquired firms. That is, whether they can be classified as liquidated, reorganized, or whether they are a statistically different sub-group. To answer this question, pairwise logit models are estimated for both acquired versus liquidated groups and acquired versus reorganized groups. The results of the logit analysis of the 12 acquired and 42 liquidated firms are presented in Table 4. According to the chi- square statistic of 15.55 (11 df) the model is significant at only the $\alpha = 0.1585$ level. While the model as a whole does not statistically distinguish between the acquired and liquidated firms at a level that is statistically acceptable, the average coupon rate variable (COUP) is significant at the $\alpha = 0.0658$ level and is positively signed. This indicates that the higher the coupon rate, the greater the likelihood of acquisition. Further, the ownership concentration variable (OWN) is significant at the $\alpha = 0.0271$ level with a negative BETA, indicating that the lower the ownership concentration, the greater the likelihood of acquisition.

The coupon rate effect is in direct opposition to Bulow and Shoven's argument that the greater the need for funds from banklenders, the less likely they will provide these funds, making liquidation more likely. One explanation for this anomaly is that the average coupon rate is proxying for interest rates. To test this possibility, the average coupon rate is divided by the market rate of interest at the time of filing. Both the

Corporate Baa rate and the prime rate are used.[4] The results presented in Table 5 reveal that regardless which rate is used to adjust the coupon rate, the interest rate variable (INT) drops in significance. For the Baa adjustment, the interest rate variable (INT), is significant at only the $\alpha = 0.1176$ level and the variance of returns variable (VAR) enters the model at a significance level of $\alpha = 0.0751$. When adjusted with the prime rate, the INT variable is significant only at the $\alpha = 0.0968$ level but the variance of returns variable (VAR) is only significant at a level of $\alpha = 0.1054$. In both cases, the coefficient of the variance of returns has the hypothesized sign.

The ownership concentration effect is also opposite to that expected. However, to the extent that low ownership concentration implies less management control, the relationship is as hypothesized from an agency perspective.

The t-tests for differences in the means of the variables grouped by liquidated outcome versus acquired outcome presented in Table 6 support the logit findings. The coupon interest variable (COUP) is found to have statistically different means at the $\alpha = 0.0245$ level with coupon interest rate being higher for the acquired firms. The ownership concentration variable (OWN) has means that are significantly different at the $\alpha = 0.1519$ level with higher concentration for the liquidated firms.

The above results indicate that there are significant differences in the coupon interest rate, ownership concentration and variance of returns variables for acquired firms versus liquidated firms. Thus, White should not have combined the two groups in her 1983 study.

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[4] The interest rates used are those in effect at the time of filing and were found in "The Economic Report of the President", United States Government Printing Office, Jan. 1987

Table 4. LOGIT ANALYSIS OF ACQUIRED VERSUS LIQUIDATED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF ACQUIRED (N = 12)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 57.21

MODEL CHI-SQUARE = 15.55 WITH 11 D.F. (-2 LOG L.R.) P = 0.1585

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.10688435	1.58337638	0.00	0.9462
LAW	-0.45520935	1.11377996	0.17	0.6828
OWN	-0.00170228	0.00077024	4.88	0.0271 **
LIQ	0.03386816	0.14218843	0.06	0.8117
BANK	-3.05992457	2.47794510	1.52	0.2169
TAX	0.00187417	0.00773536	0.06	0.8086
FA	0.10790108	0.66494900	0.03	0.8711
ROA	3.95767499	3.53083283	1.26	0.2623
SIZE	-0.00032437	0.00133064	0.06	0.8074
VAR	313.08841758	201.94603338	2.40	0.1211
SKEW	-0.10805710	0.11068379	0.95	0.3289
COUP	20.60249146	11.20013054	3.38	0.0658 *

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

Table 5. ACQUIRED VERSUS LIQUIDATED GROUPS - INTEREST ADJUSTED

DEPENDENT VARIABLE: OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF ACQUIRED (N = 12)

Baa ADJUSTMENT

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 57.21
MODEL CHI-SQUARE = 14.29 WITH 11 D.F. (-2 LOG L.R.) P = 0.2175.

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.19305170	1.75145673	0.01	0.9122
LAW	0.47871985	0.94011295	0.26	0.6106
OWN	-0.00161801	0.00075347	4.61	0.0318 **
BANK	-2.70436231	2.32981783	1.35	0.2457
TAX	0.00518228	0.00637872	0.66	0.4165
LIQ	0.01823704	0.16027369	0.01	0.9094
ROA	4.15671347	3.41889990	1.48	0.2241
SIZE	-0.00028184	0.00101149	0.08	0.7805
INT	1.94551240	1.24332715	2.45	0.1176
VAR	354.61601775	199.24181625	3.17	0.0751 *
SKEW	-0.11808439	0.11123527	1.13	0.2884
FA	0.06996441	0.63963904	0.01	0.9129

PRIME RATE ADJUSTMENT

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY = 57.21
MODEL CHI-SQUARE = 14.68 WITH 11 D.F. (-2 LOG L.R.) P = 0.1975.

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.31124781	1.76503103	0.03	0.8600
LAW	0.78390166	0.97932820	0.64	0.4235
OWN	-0.00154335	0.00072848	0.49	0.0341 **
BANK	-2.17776332	2.30754300	0.89	0.3453
TAX	0.00637036	0.00639539	0.99	0.3192
LIQ	0.01988179	0.16622258	0.01	0.9048
ROA	4.09537451	3.26655098	1.57	0.2099
SIZE	-0.00042673	0.00131875	0.10	0.7463
INT	1.51541341	0.91257449	2.76	0.0968 *
VAR	338.16717513	208.84604132	2.62	0.1054
SKEW	-0.14396995	0.11482192	1.57	0.2099
FA	0.01104872	0.65871440	0.00	0.9866

Table 6. TTEST PROCEDURE - LIQUIDATED VS ACQUIRED

VARIABLE : LAW

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.28571429	0.45722996	0.07055211	0	1.00000000
1	12	0.33333333	0.49236596	0.14213381	0	1.00000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.3001	16.8	0.7678
EQUAL	-0.3129	52.0	0.7556

FOR H0: VARIANCES ARE EQUAL, F' = 1.16 WITH
11 AND 41 DF PROB > F' = 0.6876

VARIABLE : BANK

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.29779524	0.22871072	0.03529083	0.00471000	0.83177000
1	12	0.20814250	0.20485995	0.05913797	0.00722000	0.78756000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	1.3018	19.6	0.2081
EQUAL	1.2234	52.0	0.2267

FOR H0: VARIANCES ARE EQUAL, F' = 1.25
WITH 41 AND 11 DF PROB > F' = 0.7258

VARIABLE : TAX

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	17.17892857	38.6489983	5.96366992	0	208.0000000
1	12	47.67550000	148.8573673	42.97142054	0	520.0000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.7030	11.4	0.4962
EQUAL	-1.2166	52.0	0.2293

FOR H0: VARIANCES ARE EQUAL, F' = 14.83
WITH 11 AND 41 DF PROB > F' = 0.0001

VARIABLE: LIQ

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	2.11801619	3.42257437	0.52811469	0.00000000	20.77210000
1	12	1.81016083	1.89085549	0.54584296	0.18260000	7.35946000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.4053	33.4	0.6878
EQUAL	0.2975	52.0	0.7672

FOR H0: VARIANCES ARE EQUAL, F' = 3.28
WITH 41 AND 11 DF PROB > F' = 0.0383

TABLE 6 (CONT)

VARIABLE : SIZE

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	299.1493333	1446.758640	223.2397048	2.95800000	9382.680000
1	12	119.92325	189.556834	54.7203446	3.30000000	554.735000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.7798	45.5	0.4396
EQUAL	0.4252	52.0	0.6724

FOR H0: VARIANCES ARE EQUAL, F' = 58.25
WITH 41 AND 11 DF PROB > F' = 0.0001

VARIABLE : COUP

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.09318262	0.04130011	0.00637275	0.01228000	0.23160000
0	12	0.13142750	0.07530820	0.02173960	0.05016000	0.33000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-1.6882	12.9	0.1153
EQUAL	-2.3162	52.0	0.0245

FOR H0: VARIANCES ARE EQUAL, F' = 3.32
WITH 11 AND 41 DF PROB > F' = 0.0049

VARIABLE : VAR

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	-0.00187145	0.00335946	0.00051838	-0.00971000	0.00892800
1	12	-0.00134725	0.00285026	0.00082280	-0.00488000	0.00304700

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.5390	20.6	0.5956
EQUAL	-0.4915	52.0	0.6251

FOR H0: VARIANCES ARE EQUAL, F' = 1.39
WITH 41 AND 11 DF PROB > F' = 0.5740

VARIABLE : SKEW

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.00144945	4.70989341	0.72675233	-12.84250000	15.90600000
1	12	-1.15792000	4.76817483	1.37645351	-9.50299000	9.46822000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.7448	17.6	0.4662
EQUAL	0.7500	52.0	0.4566

FOR H0: VARIANCES ARE EQUAL, F' = 1.02
WITH 11 AND 41 DF PROB > F' = 0.8857

TABLE 6 (CONT)

VARIABLE : OWN

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	1198.476190	794.4828119	122.5913594	232.0000000	3465.000000
1	12	855.333333	321.5783047	92.8316604	433.0000000	1639.000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	2.2315	45.6	0.0306
EQUAL	1.4544	52.0	0.1519

FOR H0: VARIANCES ARE EQUAL, F' = 6.10
WITH 41 AND 11 DF PROB > F' = 0.0027

VARIABLE : FA

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.29111507	0.88241670	0.13615985	-4.99569000	0.96189500
1	12	0.43211133	0.31553320	0.09108659	-0.05973000	0.98049300

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.8607	49.2	0.3936
EQUAL	-0.5406	52.0	0.5911

FOR H0: VARIANCES ARE EQUAL, F' = 7.82
WITH 41 AND 11 DF PROB > F' = 0.0008

Acquired Versus Reorganized

The results of the logit analysis for the 47 reorganized and 12 acquired firms are presented in Table 7. The chi-square statistic of 11.05 (11 df) shows that the model is significant at only the $\alpha = 0.4391$ level. Further, none of the variables in the model significantly differentiate between reorganized and acquired firms.[5] The t-tests in Table 8 find that no variable has means significantly different at the $\alpha = .05$ level when grouped by acquired versus reorganized outcomes. The tax loss carryover variable (TAX) has significantly different means between the acquired versus reorganized groups only at the $\alpha = 0.070$ level.

Overall, the results indicate that there is no statistical difference between the reorganized firms and the acquired firms. This is in direct opposition to White's grouping and further supports the findings of the previous section that the acquired firms should not be grouped with the liquidated firms. The results of the analyses of the acquired versus liquidated firms and acquired versus reorganized firms show that, by not including the acquired firms, Casey, McGee, and Stickney unnecessarily reduced the size of their sample.

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[5] The model was estimated using the coupon rate adjusted for the level of interest rates at the time of filing. Since the insignificance of the variables remains the same, the results are not reported here.

Table 7. LOGIT ANALYSIS OF REORGANIZED VERSUS ACQUIRED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF REORGANIZED (N=47)
1 IF ACQUIRED (N=12)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 59.60

MODEL CHI-SQUARE= 11.05 WITH 11 D.F. (-2 LOG L.R.) P = 0.4391

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	0.80272860	1.54069727	0.27	0.6024
LAW	0.50319821	0.95764846	0.28	0.5993
OWN	-0.00118208	0.00101031	1.37	0.2420
LIQ	-0.04075287	0.15133907	0.07	0.7877
BANK	-2.50369285	2.09677798	1.43	0.2325
TAX	0.00894194	0.01156052	0.60	0.4392
FA	0.47888024	1.32702549	0.13	0.7182
ROA	0.16892446	2.23052203	0.01	0.9396
SIZE	-0.00192453	0.00235726	0.67	0.4143
VAR	-231.34222994	170.43256388	1.84	0.1747
SKEW	0.15001667	0.11632036	1.66	0.1972
COUP	-3.93672314	6.69317760	0.35	0.5564

Table 8. TTEST PROCEDURE - REORGANIZED VS ACQUIRED

VARIABLE : LAW

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	0.31914894	0.47118643	0.06872960	0	1.00000000
1	12	0.33333333	0.49236596	0.14213381	0	1.00000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.0898	16.5	0.9295
EQUAL	-0.0923	57.0	0.9268

FOR H0: VARIANCES ARE EQUAL, F'= 1.09
WITH 11 AND 46 DF PROB > F'= 0.7774

VARIABLE : BANK

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	0.31314191	0.22962455	0.03349418	0.00258000	0.73408000
1	12	0.20814250	0.20485995	0.05913797	0.00722000	0.78756000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	1.5449	18.7	0.1391
EQUAL	1.4425	57.0	0.1546

FOR H0: VARIANCES ARE EQUAL, F'= 1.26
WITH 46 AND 11 DF PROB > F'= 0.7139

VARIABLE : TAX

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	8.12185106	11.7012488	1.70680255	0	55.0000000
1	12	47.67550000	148.8573673	42.97142054	0	520.0000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.9197	11.0	0.3774
EQUAL	-1.8464	57.0	0.0700

FOR H0: VARIANCES ARE EQUAL, F'= 161.84
WITH 11 AND 46 DF PROB > F'= 0.0001

VARIABLE : LIQ

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	1.77714298	3.05260902	0.44526879	0.26864000	21.20760000
1	12	1.81016083	1.89085549	0.54584296	0.18260000	7.35946000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.0469	27.6	0.9630
EQUAL	-0.0356	57.0	0.9717

FOR H0: VARIANCES ARE EQUAL, F'= 2.61
WITH 46 AND 11 DF PROB > F'= 0.0882

TABLE 8 (CONT)

VARIABLE : SIZE

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	140.0236596	367.2197344	53.56450344	3.50100000	2297.810000
1	12	119.9232500	189.5568340	54.72034458	3.30000000	554.735000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.2625	34.6	0.7945
EQUAL	0.1827	57.0	0.8557

FOR H0: VARIANCES ARE EQUAL, F′= 3.75
WITH 46 AND 11 DF PROB > F′= 0.0217

VARIABLE : COUP

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	0.12850277	0.08028132	0.01171023	0.01894000	0.50000000
1	12	0.13142750	0.07530820	0.02173960	0.05016000	0.33000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.1184	17.9	0.9070
EQUAL	-0.1140	57.0	0.9097

FOR H0: VARIANCES ARE EQUAL, F′= 1.14
WITH 46 AND 11 DF PROB > F′= 0.8688

VARIABLE : VAR

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	0.00047772	0.00547493	0.00079860	-0.00633000	0.02452200
1	12	-0.00134725	0.00285026	0.00082280	-0.00488000	0.00304700

VARIANCES	T	DF	PROB > |T|
UNEQUAL	1.5916	34.2	0. 1207
EQUAL	1.1118	57.0	0.2709

FOR H0: VARIANCES ARE EQUAL, F′= 3.69
WITH 46 AND 11 DF PROB > F′= 0.0232

VARIABLE : SKEW

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	-0.98582247	4.42156793	0.64495197	-15.9060000	14.8318000
1	12	-1.15792000	4.76817483	1.37645351	-9.50299000	9.46822000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.1132	16.2	0.9113
EQUAL	0.1185	57.0	0.9061

FOR H0: VARIANCES ARE EQUAL, F′= 1.16
WITH 11 AND 46 DF PROB > F′= 0.6766

TABLE 8 (CONT)

VARIABLE : OWN

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	1121.148936	751.7560884	109.6548954	265.0000000	5160.000000
1	12	855.333333	321.5783047	92.8316604	433.0000000	1639.000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	1.8501	43.1	0.0712
EQUAL	1.1912	57.0	0.2385

FOR H0: VARIANCES ARE EQUAL, F' = 5.46
WITH 46 AND 11 DF PROB > F' = 0.0043

VARIABLE : FA

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	47	0.26758240	0.37951765	0.05535834	-1.09062000	0.98979800
1	12	0.43211133	0.31553320	0.09108659	-0.05973000	0.98049300

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-1.5436	20.0	0.1384
EQUAL	-1.3822	57.0	0.1723

FOR H0: VARIANCES ARE EQUAL, F' = 1.45
WITH 46 AND 11 DF PROB > F' = 0.5205

Reorganized versus Liquidated

Table 9 presents the results of the logit analysis for the 47 reorganized and 42 liquidated firms. According to the chi-square statistic of 26.77 (11 df) the model is significant at the $\alpha = 0.005$ level. The variance of returns variable (VAR) is significant at the $\alpha = 0.0035$ level and has a positive BETA, supporting Golbe's hypothesis that liquidation is less likely to occur as variance of returns is increased. The coupon rate variable (COUP) is significant at the $\alpha = 0.0604$ level also with a positive BETA, providing further rebuttal of Bulow and Shoven's argument that the greater the amount of funds required to be of banklenders, the more likely the firm will be liquidated. A more reasonable argument is that the greater the potential loss to the existing bondholders, the more likely the firm will be continued in some form.

The skewness of returns variable (SKEW) is significant at the $\alpha = 0.0136$ level and has a negative BETA, which contradicts Golbe's hypothesis that the greater the potential return with a limited downside return, the more likely a firm will be continued. This is not too surprising because as the owners make riskier investments, they reduce the value of the existing debt. The riskier a firm's investments become, the more likely the existing creditors are to force liquidation rather than sustain a transfer of wealth to the stockholders. Another possible explanation for this finding is that the variance and skewness variables are highly correlated. However, the correlation coefficient between these two variables for the reorganized and liquidated groups is only 0.1035.

The model is also estimated with the coupon rate variable adjusted for the level of interest rates at the time of filing. As Table 10 reveals, the interest rate variable (INT)

once again drops in significance. For the Baa adjustment, INT is significant only at the $\alpha = 0.1136$ level and for the prime rate adjustment the significance is at the $\alpha = 0.0840$ level.

Interestingly, the tax loss caryovers variable (TAX) enters the model at a significance level of $\alpha = 0.0874$ for the Baa adjustment and a significance level of $\alpha = 0.0946$ level for the prime rate adjustment both with a negative coefficient. The negative coefficient is opposite of what was hypothesized. While financial theory recognizes that tax loss carryovers can be recognized only if the firm continues either through reorganization or acquisition, it is also possible that this variable is proxying for the extent of financial distress which exists at the time of bankruptcy filing. That is, a firm with large tax loss carryovers may in fact be the one for which liquidation is the highest value creating option.

The t-tests in Table 11 find that the coupon interest (COUP) and variance of returns (VAR) variables have means significantly different when grouped by reorganized versus liquidated outcomes. The coupon interest rate for the reorganized firms has a mean of 12.85% while the mean for the liquidated group is 9.92%. These means are significantly different at the $\alpha = 0.0121$ level. The variance of returns variable averaged 0.00048 for the reorganized firms and -0.00187 for the liquidated firms and are significantly different at the $\alpha = 0.0183$ level. This further supports the findings of the logit analysis that the liquidated outcome is significantly different from the reorganized outcome for firms which have filed bankruptcy.

Table 9. LOGIT ANALYSIS OF REORGANIZED VERSUS LIQUIDATED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF REORGANIZED (N = 47)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 123.10

MODEL CHI-SQUARE = 26.77 WITH 11 D.F. (-2 LOG L.R.) P = 0.0050.***

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.64902327	0.85042904	0.58	0.4454
LAW	-0.54297357	0.67161287	0.65	0.4188
OWN	0.00006982	0.00036946	0.04	0.8501
LIQ	-0.01675496	0.08448616	0.04	0.8428
BANK	0.64381916	1.16382265	0.31	0.5801
TAX	-0.03113117	0.01916112	2.64	0.1042
FA	-0.10735822	0.36738541	0.09	0.7701
ROA	-0.19919219	0.88336073	0.05	0.8216
SIZE	0.00008873	0.00032131	0.08	0.7824
VAR	322.21786334	110.46696796	8.51	0.0035 ***
SKEW	-0.21036256	0.08524821	6.09	0.0136 **
COUP	11.39622659	6.06822768	3.53	0.0604 *

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

Table 10. REORGANIZED VERSUS LIQUIDATED GROUPS - INTEREST ADJUSTED

DEPENDENT VARIABLE: OUTCOME = 0 IF LIQUIDATED (N=42)
1 IF REORGANIZED (N=47)

Baa ADJUSTMENT

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY= 123.10
MODEL CHI-SQUARE= 24.77 WITH 11 D.F. (-2 LOG L.R.) P=0.0099 ***

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.56066682	0.90467631	0.38	0.5354
LAW	0.00404493	0.59554952	0.00	0.9946
OWN	0.00008161	0.00036228	0.05	0.8218
BANK	0.57532187	1.14787765	0.25	0.6162
TAX	-0.03279388	0.01918282	2.92	0.0874 *
LIQ	-0.01962513	0.08408094	0.05	0.8154
ROA	-0.31387736	0.90172953	0.12	0.7278
SIZE	0.00009140	0.00031571	0.08	0.7722
INT	1.02724550	0.64919298	2.50	0.1136
VAR	333.45303875	110.34282638	9.13	0.0025 ***
SKEW	-0.21299794	0.08720745	5.97	0.0146 **
FA	-0.11916925	0.36454735	0.11	0.7437

PRIME RATE ADJUSTMENT

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY = 123.10
MODEL CHI-SQUARE = 25.34 WITH 11 D.F. (-2 LOG L.R.) P = 0.0081 ***

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.63487774	0.89779912	0.50	0.4795
LAW	0.15115586	0.59943942	0.06	0.8009
OWN	0.00007327	0.00036569	0.04	0.8412
BANK	0.30890483	1.15749664	0.07	0.7896
TAX	-0.03231289	0.01932926	2.79	0.0946 *
LIQ	-0.00905177	0.08187710	0.01	0.9120
ROA	-0.28820958	0.89866839	0.10	0.7484
SIZE	0.00006517	0.00032018	0.04	0.8387
INT	0.98657770	0.57093511	2.99	0.0840 *
VAR	324.26510122	111.24370713	8.50	0.0036 ***
SKEW	-0.21215446	0.08645626	6.02	0.0141 **
FA	-0.12757089	0.36441851	0.12	0.7263

Table 11. TTEST PROCEDURE - REORGANIZED VS LIQUIDATED

VARIABLE : LAW

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.28571429	0.45722996	0.07055211	0	1.00000000
1	47	0.31914894	0.47118643	0.06872960	0	1.00000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.3395	86.4	0.7351
EQUAL	-0.3389	87.0	0.7355

FOR H0: VARIANCES ARE EQUAL, F' = 1.06
WITH 46 AND 41 DF PROB > F' = 0.8486

VARIABLE : BANK

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.29779524	0.22871072	0.03529083	0.00471000	0.83177000
1	47	0.31314191	0.22962455	0.03349418	0.00258000	0.73408000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.3154	86.0	0.7532
EQUAL	-0.3153	87.0	0.7533

FOR H0: VARIANCES ARE EQUAL, F' = 1.01
WITH 46 AND 41 DF PROB > F' = 0.9838

VARIABLE : TAX

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	17.17892857	38.64899835	5.96366992	0	208.0000000
1	47	8.12185106	11.70124877	1.70680255	0	55.0000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	1.4601	47.7	0.1508
EQUAL	1.5309	87.0	0.1294

FOR H0: VARIANCES ARE EQUAL, F' = 10.91
WITH 41 AND 46 DF PROB > F' = 0.0001

VARIABLE : LIQ

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	2.11801619	3.42257437	0.52811469	0.00000000	20.77210000
1	47	1.77714298	3.05260902	0.44526879	0.26864000	21.20760000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.4935	82.7	0.6230
EQUAL	0.4967	87.0	0.6207

FOR H0: VARIANCES ARE EQUAL, F' = 1.26
WITH 41 AND 46 DF PROB > F' = 0.4499

TABLE 11 (CONT)

VARIABLE : SIZE

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	299.1493333	1446.758640	223.2397048	2.95800000	9382.680000
1	47	140.0236596	367.219734	53.5645034	3.50100000	2297.810000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.6931	45.7	0.4917
EQUAL	0.7287	87.0	0.4682

FOR H0: VARIANCES ARE EQUAL, F' = 15.52
WITH 41 AND 46 DF PROB > F' = 0.0001

VARIABLE : COUP

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.09318262	0.04130011	0.00637275	0.01228000	0.23160000
1	47	0.12850277	0.08028132	0.01171023	0.01894000	0.50000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-2.6493	70.4	0.0100
EQUAL	-2.5632	87.0	0.0121

FOR H0: VARIANCES ARE EQUAL, F' = 3.78
WITH 46 AND 41 DF PROB > F' = 0.0001

VARIABLE : VAR

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	-0.00187145	0.00335946	0.00051838	-0.00971000	0.00892800
1	47	0.00047772	0.00547493	0.00079860	-0.00633000	0.02452200

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-2.4674	77.5	0.0158
EQUAL	-2.4047	87.0	0.0183

FOR H0: VARIANCES ARE EQUAL, F' = 2.66
WITH 46 AND 41 DF PROB > F' = 0.0019

VARIABLE : SKEW

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.00144945	4.70989341	0.72675233	-12.84250000	15.90600000
1	47	-0.98582247	4.42156793	0.64495197	-15.90600000	14.83180000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	1.0161	84.4	0.3125
EQUAL	1.0197	87.0	0.3107

FOR H0: VARIANCES ARE EQUAL, F' = 1.13
WITH 41 AND 46 DF PROB > F' = 0.6747

TABLE 11 (CONT)

VARIABLE : OWN

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	1198.476190	794.4828119	122.5913594	232.0000000	3465.000000
1	47	1121.148936	751.7560884	109.6548954	265.0000000	5160.000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.4701	84.6	0.6395
EQUAL	0.4716	87.0	0.6384

FOR H0: VARIANCES ARE EQUAL, F' = 1.12
WITH 41 AND 46 DF PROB > F' = 0.7129

VARIABLE : FA

BOUT	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	42	0.29111507	0.88241670	0.13615985	-4.99569000	0.96189500
1	47	0.26758240	0.37951765	0.05535834	-1.09062000	0.98979800

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.1601	54.4	0.8734
EQUAL	0.1665	87.0	0.8682

FOR H0: VARIANCES ARE EQUAL, F' = 5.41
WITH 41 AND 46 DF PROB > F' = 0.0001

Continued versus Liquidated

When grouping acquired firms with the reorganized firms and performing the logit analysis on the 59 "continued" firms versus the 42 liquidated firms, the results, presented in Table 12 are in agreement with those in Table 9. The model is significant at the $\alpha = 0.013$ level and the coupon rate (COUP), variance of returns (VAR) and the skewness of returns (SKEW) variables are significant and their signs remain the same. The coupon rate is significant at the $\alpha = 0.0153$ level, the variance of returns is significant at the $\alpha = 0.0097$ level and the skewness of returns is significant at the $\alpha = 0.0182$ level.

When the coupon rate is adjusted for the level of interest rates, (see Table 13) the signs of the variables remains the same. The Baa adjustment leads to a model significance of $\alpha = 0.0381$ with the interest rate variable (INT) significant at the $\alpha = 0.0490$ level, the variance of returns variable (VAR) significant at the $\alpha = 0.0073$ level, and the skewness of returns (SKEW) significant at the $\alpha = 0.0195$ level. When the prime rate is used for the adjustment the model is significant at the $\alpha = 0.0259$ with the interest rate variable (INT) significant at the $\alpha = 0.0265$ level, the variance of returns variable (VAR) significant at the $\alpha = 0.0107$ level, and the skewness of returns (SKEW) significant at the $\alpha = 0.0196$ level.

Overall, the model is statistically significant in distinguishing between liquidated and reorganized firms. Furthermore, the variance of returns variable is significant and has the correct sign. The skewness and the coupon rate variables are also significant but

have the opposite sign of that predicted by theory as above. These results suggest that additional research is needed to understand this finding.

Effect of the Law Change

In all of the above logit analyses, the dummy variable (D_L) used to indicate a shift in the data due to the change in the law was found to be insignificant. The results of the logit model to test for interactive effects are presented in Table 14. The overall model is significant at the $\alpha = 0.0299$ level. The coupon interest rate (COUP) is significant at the $\alpha = 0.0524$ level, the variance of returns (VAR) is significant at the $\alpha = 0.0016$ level and skewness of returns (SKEW) are significant at the $\alpha = 0.0089$ level. These variables all have the same sign as in the previous continued versus liquidated analysis.

The only interactive variable found to be significant is the the one associated with the variance of returns variable. The interactive variable (LVAR) represented by the product of the dummy law variable and the variance of returns variable is significant at the $\alpha = 0.0245$ level with a negative BETA. Tables 14.a. and 14.b. show that after adjusting for the interest rate proxy, the model drops slightly in significance to $\alpha = 0.0751$ (Baa) and $\alpha = 0.0703$ (Prime) levels. The significant variables remain significant and with the same sign. The effect suggested by these results is that the law change works to reverse the effect of the variance of returns variable. That is that the interactive effect of the law dummy variable on the variance of returns variable is to reduce the likelihood of continuance after the law change.

Table 12. LOGIT ANALYSIS OF CONTINUED VERSUS LIQUIDATED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF CONTINUED (N = 59)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 137.14

MODEL CHI-SQUARE = 23.95 WITH 11 D.F. (-2 LOG L.R.) P = 0.0130**

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.40720685	0.82421343	0.24	0.6213
LAW	-0.47881487	0.62361480	0.59	0.4426
OWN	-0.00029219	0.00037177	0.62	0.4319
LIQ	-0.02454926	0.08099979	0.09	0.7618
BANK	0.19785481	1.11565872	0.03	0.8592
TAX	-0.00436269	0.00436496	1.00	0.3176
FA	-0.07893037	0.36373297	0.05	0.8282
ROA	0.29055240	0.77694015	0.14	0.7084
SIZE	-0.00009298	0.00028342	0.11	0.7429
VAR	260.23873112	100.56872839	6.70	0.0097 ***
SKEW	-0.16481514	0.06980587	5.57	0.0182 **
COUP	14.55028520	6.00192657	5.88	0.0153 **

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

Table 13. CONTINUED VERSUS LIQUIDATED GROUPS - INTEREST ADJUSTED

DEPENDENT VARIABLE: OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF CONTINUED (N = 59)

Baa ADJUSTMENT

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 137.14
MODEL CHI-SQUARE = 20.57 WITH 11 D.F. (-2 LOG L.R.) P = 0.0381.**

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.27438356	0.86630265	0.10	0.7514
LAW	0.22190953	0.53821484	0.17	0.6801
OWN	-0.00028376	0.00036344	0.61	0.4349
BANK	0.17908019	1.09973084	0.03	0.8706
TAX	-0.00202928	0.00395329	0.26	0.6077
LIQ	-0.02990777	0.07884682	0.14	0.7045
ROA	0.22524671	0.79106481	0.08	0.7758
SIZE	-0.00011108	0.00027171	0.17	0.6827
INT	1.23135577	0.62558135	3.87	0.0490 **
VAR	268.69817223	100.20368295	7.19	0.0073 ***
SKEW	-0.16480228	0.07054103	5.46	0.0195 **
FA	-0.11038734	0.35713749	0.10	0.7573

PRIME RATE ADJUSTMENT

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY = 137.14
MODEL CHI-SQUARE = 21.81 WITH 11 D.F. (-2 LOG L.R.) P = 0.0259.**

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.40311813	0.86143767	0.22	0.6398
LAW	0.40055731	0.54364699	0.54	0.4612
OWN	-0.00028100	0.00036793	0.58	0.4450
BANK	-0.03851696	1.11412427	0.00	0.9724
TAX	-0.00161954	0.00393928	0.17	0.6810
LIQ	-0.01440661	0.07720405	0.03	0.8520
ROA	0.23062161	0.79754130	0.08	0.7725
SIZE	-0.00014101	0.00027644	0.26	0.6100
INT	1.16271349	0.52406485	4.92	0.0265 **
VAR	257.23095425	100.72379827	6.52	0.0107 **
SKEW	-0.16425398	0.07035537	5.45	0.0196 **
FA	-0.11571520	0.35712345	0.10	0.7459

The t-tests in Table 15 show that the means of the ownership concentration (OWN), size (SIZE), coupon interest rate (COUP), and free assets (FA) variables are all significantly different across the law change. The means of the adjusted interest rates are not significant, however. These results indicate that the law change may have affected concentration of ownership, size, and free assets. The size and free assets results may be due to two very large firms filing for bankruptcy after the law change creating an outlier effect.

The results of these analyses of the effect of law change are contradictory and inconclusive. A possible explanation of these results is that the judicial system enacted by the 1978 Reform Act was not fully operationalized until 1984. This suggests further research is in order to determine whether the Reform Act of 1978 had any significant effect on the outcome of firms which have filed for bankruptcy.

Table 14. CONTINUED VERSUS LIQUIDATED GROUPS WITH LAW VARIABLE

DEPENDENT VARIABLE: OUTCOME = 0 IF LIQUIDATED, 1 IF CONTINUED

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 137.14

MODEL CHI-SQUARE= 34.77 WITH 11 D.F. (-2 LOG L.R.) P=0.0299**

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.63954962	1.28697398	0.25	0.6192
LAW	-0.28311646	3.23030174	0.01	0.9302
OWN	0.00011170	0.00060992	0.03	0.8547
BANK	0.48163630	1.46298061	0.11	0.7420
TAX	-0.02645899	0.02250899	1.38	0.2398
LIQ	-0.03433027	0.10020561	0.12	0.7319
ROA	0.33810930	0.93048138	0.13	0.7163
SIZE	0.00009971	0.00151386	0.00	0.9475
COUP	18.40216254	9.48637087	3.76	0.0524 *
VAR	489.54409411	155.46881876	9.92	0.0016 ***
SKEW	-0.22321170	0.08527715	6.85	0.0089 ***
FA	0.06240356	0.39428281	0.03	0.8742
LOWN	-0.00046324	0.00075657	0.37	0.5404
LBANK	-0.45454546	2.93477928	0.02	0.8769
LTAX	0.02391830	0.02468420	0.94	0.3326
LLIQ	0.18944696	0.40805357	0.22	0.6425
LROA	1.37344281	6.49407403	0.04	0.8325
LSIZE	-0.00031078	0.00155300	0.04	0.8414
LCOUP	4.22131702	16.96580793	0.06	0.8035
LVAR	-609.28702860	270.80728293	5.06	0.0245 **
LSKEW	0.16030108	0.25499859	0.40	0.5296
LFA	-2.73575542	5.13359916	0.28	0.5941

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

TABLE 14A

CONTINUED VERSUS LIQUIDATED GROUPS WITH LAW VARIABLE

BAA ADJUSTED COUPON RATE

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY = 137.14

MODEL CHI-SQUARE = 30.91 WITH 21 D.F. (-2 LOG L.R.) P = 0.0751*

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.43013379	1.30393274	0.11	0.7415
LAW	-0.34089061	3.07094654	0.01	0.9116
OWN	0.00013878	0.00061198	0.05	0.8206
BANK	0.57800560	1.44460847	0.16	0.6891
TAX	-0.02599054	0.02189752	1.41	0.2353
LIQ	-0.02839730	0.09449825	0.09	0.7638
ROA	0.27590182	0.92055927	0.09	0.7644
SIZE	0.00015168	0.00149027	0.01	0.9189
INT	1.42090958	0.84692242	2.81	0.0934 *
VAR	503.48471541	155.88115551	10.43	0.0012 ***
SKEW	-0.22607662	0.08630346	6.86	0.0088 ***
FA	0.06951336	0.38922034	0.03	0.8583
LOWN	-0.00041084	0.00075008	0.30	0.5839
LBANK	-1.24110090	2.86486446	0.19	0.6649
LTAX	0.02290667	0.02382514	0.92	0.3363
LLIQ	0.05651418	0.34700967	0.03	0.8706
LROA	-1.81189818	5.72968339	0.10	0.7518
LSIZE	-0.00033409	0.00152354	0.05	0.8264
LINT	0.33296928	1.80930222	0.03	0.8540
LVAR	-539.89282282	260.86222000	4.28	0.0385 **
LSKEW	0.05283563	0.26422129	0.04	0.8415
LFA	-0.16354781	4.35805381	0.00	0.9701

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

TABLE 14B

CONTINUED VERSUS LIQUIDATED GROUPS WITH LAW VARIABLE

PRIME ADJUSTED COUPON RATE

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY= 137.14

MODEL CHI-SQUARE= 30.91 WITH 21 D.F. (-2 LOG L.R.) P=0.0751*

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.54416723	1.30192140	0.17	0.6760
LAW	0.10588006	3.00892692	0.00	0.9719
OWN	0.00020806	0.00061757	0.11	0.7362
BANK	0.23215534	1.45668637	0.03	0.8734
TAX	-0.02255635	0.01964486	1.32	0.2509
LIQ	-0.00825760	0.08938832	0.01	0.9264
ROA	0.32722595	0.90603469	0.13	0.7180
SIZE	0.00007738	0.00147923	0.00	0.9583
INT	1.24358080	0.69683383	3.18	0.0743 *
VAR	489.96289356	157.71252766	9.65	0.0019 ***
SKEW	-0.23150913	0.08722562	7.04	0.0080 ***
FA	0.05712516	0.38514837	0.02	0.8821
LOWN	-0.00056360	0.00077464	0.53	0.4669
LBANK	-1.12559618	2.87021687	0.15	0.6949
LTAX	0.01916625	0.02171760	0.78	0.3775
LLIQ	-0.00812255	0.33108512	0.00	0.9804
LROA	-2.36209792	5.46454640	0.19	0.6656
LSIZE	-0.00029344	0.00151339	0.04	0.8463
LINT	0.14444307	1.43212513	0.01	0.9197
LVAR	-531.96340964	262.47441845	4.11	0.0427 **
LSKEW	0.06483063	0.26670261	0.06	0.8079
LFA	0.19203155	4.09273265	0.00	0.9626

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

Table 15. TTEST BY LAW

VARIABLE : OWN

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	969.757143	499.677793	59.7229193	232.0000000	2487.000000
1	31	1441.903226	1030.341832	185.0548559	312.0000000	5160.000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-2.4281	36.4	0.0202
EQUAL	-3.1083	99.0	0.0025

FOR H0: VARIANCES ARE EQUAL, F' = 4.25
WITH 30 AND 69 DF PROB > F' = 0.0001

VARIABLE : BANK

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	0.28895129	0.22031439	0.02633261	0.00258000	0.73577000
1	31	0.31027161	0.24304206	0.04365164	0.01588000	0.83177000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.4182	52.8	0.6775
EQUAL	-0.4345	99.0	0.6649

FOR H0: VARIANCES ARE EQUAL, F' = 1.22
WITH 30 AND 69 DF PROB > F' = 0.4965

VARIABLE : TAX

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	11.07208571	28.46777139	3.40254948	0	208.0000000
1	31	29.04200000	93.70336478	16.82962113	0	520.0000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-1.0466	32.5	0.3030
EQUAL	-1.4666	99.0	0.1457

FOR H0: VARIANCES ARE EQUAL, F' = 10.83
WITH 30 AND 69 DF PROB > F' = 0.0001

VARIABLE : LIQ

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	2.04945757	3.53505844	0.42252030	0.26864000	21.20760000
1	31	1.63684839	1.68399231	0.30245395	0.00000000	7.75557000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.7941	98.4	0.4291
EQUAL	0.6183	99.0	0.5378

FOR H0: VARIANCES ARE EQUAL, F' = 4.41
WITH 69 AND 30 DF PROB > F' = 0.0001

TABLE 15 (CONT)

VARIABLE : ROA

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	-0.13812843	0.35838757	0.04283551	-2.91400000	0.05454000
1	31	-0.17069935	0.23061005	0.04141879	-0.80920000	0.10008000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	0.5466	85.8	0.5861
EQUAL	0.4645	99.0	0.6433

FOR H0: VARIANCES ARE EQUAL, F' = 2.42
WITH 69 AND 30 DF PROB > F' = 0.0091

VARIABLE : SIZE

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	82.9446143	190.173501	22.7300809	2.95800000	1109.620000
1	31	476.7206452	1705.348493	306.2896312	5.81000000	9382.680000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-1.2821	30.3	0.2095
EQUAL	-1.9171	99.0	0.0581

FOR H0: VARIANCES ARE EQUAL, F' = 80.41
WITH 30 AND 69 DF PROB > F' = 0.0001

VARIABLE : COUP

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	0.09125186	0.03770114	0.00450615	0.01894000	0.23710000
1	31	0.16318645	0.09153340	0.01643988	0.01228000	0.50000000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-4.2200	34.6	0.0002
EQUAL	-5.6124	99.0	0.0001

FOR H0: VARIANCES ARE EQUAL, F' = 5.89
WITH 30 AND 69 DF PROB > F' = 0.0001

VARIABLE : INTBAA

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	0.97266066	0.38837807	0.04642006	0.19936842	2.21796071
1	31	1.08380128	0.55230932	0.09919768	0.11487371	3.06372549

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-1.0148	43.7	0.3158
EQUAL	-1.1590	99.0	0.2492

FOR H0: VARIANCES ARE EQUAL, F' = 2.02
WITH 30 AND 69 DF PROB > F' = 0.0168

TABLE 15 (CONT)

VARIABLE : INTPR

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	1.15386484	0.46017698	0.05500167	0.17520814	2.30849890
1	31	1.15731274	0.65389098	0.11744229	0.09692186	3.44827586

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.0266	43.7	0.9789
EQUAL	-0.0304	99.0	0.9758

FOR H0: VARIANCES ARE EQUAL, F' = 2.02
WITH 30 AND 69 DF PROB > F' = 0.0170

VARIABLE : VAR

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	-0.00088856	0.00498178	0.00059544	-0.00971000	0.02452200
1	31	-0.00037726	0.00335841	0.00060319	-0.00557000	0.00892800

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.6032	82.8	0.5480
EQUAL	-0.5207	99.0	0.6037

FOR H0: VARIANCES ARE EQUAL, F' = 2.20
WITH 69 AND 30 DF PROB > F' = 0.0188

VARIABLE : SKEW

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	-0.78802090	5.01994374	0.59999804	-15.90600000	15.90600000
1	31	-0.16149535	3.35464907	0.60251276	-10.47970000	9.46822000

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-0.7368	83.4	0.4633
EQUAL	-0.6341	99.0	0.5275

FOR H0: VARIANCES ARE EQUAL, F' = 2.24
WITH 69 AND 30 DF PROB > F' = 0.0165

VARIABLE : FA

LAW	N	MEAN	STD DEV	STD ERROR	MINIMUM	MAXIMUM
0	70	0.22336336	0.72949557	0.08719140	-4.99569000	0.98979800
1	31	0.45680919	0.24356437	0.04374545	-0.31562000	0.85063900

VARIANCES	T	DF	PROB > |T|
UNEQUAL	-2.3931	94.4	0.0187
EQUAL	-1.7352	99.0	0.0858

FOR H0: VARIANCES ARE EQUAL, F' = 8.97
WITH 69 AND 30 DF PROB > F' = 0.0001

Chapter Five: Summary and Directions for Future Research

Introduction

In this chapter, the results and main conclusions are reviewed and summarized and suggested directions for future research are presented. The first section summarizes the study and highlights the main contributions and the second section points out the limitations of the study and suggests possible extensions and improvements.

Summary

The present study develops and estimates a model to statistically distinguish among liquidated, acquired, and reorganized firms which initially filed bankruptcy. The results of the study reveal that the model clearly distinguishes between liquidated and reorganized firms and to some extent between liquidated and acquired firms. In contrast to a prior study which categorizes acquired firms as liquidated, the present study demonstrates that if they are to be assigned to either other group, it should be the reorganized firms.

When analyzing acquired firms versus liquidated firms the variables that demonstrate statistically significant influence on the outcomes between the groups are ownership concentration and coupon interest rate. The ownership concentration variable is as hypothesized from an agency viewpoint. The coupon rate effect is opposite to that expected by theory and is adjusted for current interest rates. The significance of the coupon rate effect is reduced and the variance of returns becomes significant with the hypothesized sign. The results of the analysis of the acquired firms versus the reorganized firms found no statistically significant difference between the groups. The t-tests for differences between the means of the variables separated by groups are in agreement with the logit analyses. The results of these analyses suggest that prior studies which grouped acquired firms with liquidated firms were doing so inappropriately. Further, studies which ignored acquired firms were unnecessarily reducing their sample size.

When grouping the acquired firms with the reorganized firms into an intuitively appealing "continued" group, the variables that statistically influence the outcomes

among the groups are variance of security returns, the average coupon rate, and skewness of security returns. The variance of returns variable has the hypothesized sign. The skewness of returns and the average coupon rate have signs opposite to those hypothesized. The average coupon rate variable becomes insignificant when adjusted for current interest rates, suggesting that the coupon rate was proxying for these rates. The skewness of returns variable may be misspecified due to omitted relevant explanatory variables. Further research is needed to understand this finding. It is interesting to note that the variables significantly influencing the outcome of a bankruptcy filing are market variables rather than financial statement variables. This suggests that the market has assimilated the appropriate information in ascertaining the outcome of firms which have filed for bankruptcy.

The binary variable representing the change in the bankruptcy code (effective in 1979) was not statistically significant in any of the estimated models. The results of the interactive model suggests that only the variance of returns variable interacts with the law change dummy variable. One possible explanation for the insignificance of this frequently discussed and presumably important change in the bankruptcy law is that the judicial system enacted by the 1978 law to deal with bankruptcy cases was not fully operationalized until 1984. The T-Tests found significant differences between means across the law change for the ownership concentration, size, coupon interest rate, and free assets variables. The results of the two analyses are contradictory and inconclusive.

Limitations and Future Research

This dissertation, as any other study of the problems of bankruptcy, must deal with limited data. The number of bankrupt firms of sufficient size and/or importance to be included in the major data bases is limited. Further, once the firms that are included in the data bases become financially distressed, the filing of information becomes sporadic and untimely. A continuing buildup of a database of bankrupt firms will allow for continued research in the areas covered in this study.

The results of the logit analysis and the T-Tests for the effect of the law change are contradictory and inconclusive. This suggests that additional study is required. As data becomes available for firms which have filed after 1984 when the court system was fully in place addition research could provide the results expected.

Many of the variables motivated by the existing theories covering bankrupt firms are found to present no significant influence on the outcome of the troubled firm. More importantly, the variables that do exhibit significant influence are market variables rather than the financial statement variables often used in prior research. Further study of the market reactions to financially distressed firms is indicated by this study.

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Appendix A. List of Firms in Study

COMPANY	FILING DATE
ACHE-HAMILTON MANUFACTURING CORP	01 Mar 78
AERODEX	09 Jun 76
AGUIRE CO.	09 Mar 78
ALLIED ARTISTS INDUSTRIES INC.	05 Apr 79
ALLIED SUPERMARKETS INC.	07 Nov 78
AMERICAN FASHION GIRL FASHIONS	05 Feb 75
APPLIED MAGNETIC CORP.	02 Dec 80
ARLAN'S DEPARTMENT STORES	15 May 73
ARMAC ENTERPRISES INC.	24 Mar 76
ASSOCIATED FOOD STORES INC.	17 Jun 75
ASSOCIATED TRANSPORT INC.	23 Apr 76
AUTO-TRAIN CORP.	09 Sep 80
AVIEN INC.	29 Dec 70
BALDWIN UNITED CORP	27 Sep 83
BARCLAY INDUSTRIES INC.	06 Nov 81
BECK INDUSTRIES INC.	28 May 71
BERVEN CARPETS CORP.	11 Aug 82
BOHACK CORP.	31 Jul 74
BOTANY INDS INC.	22 Feb 73
BRANCH INDUSTRIES INC.	17 Aug 83
BRANIFF INTERNATIONAL	14 May 82
CAREER ACADEMY INC.	13 Dec 74
COIT INTERNATIONAL INC.	02 Sep 75
COMPUTER APPLICATIONS INC.	02 Oct 70
COOPER-JARRET INC.	28 Dec 81
CS GROUP INC.	16 Aug 82
DATA ACCESS SYSTEMS INC.	24 Jan 83
DAYLIN INC.	27 Feb 75
DCA DEVELOPMENT CORP.	05 Feb 73
DECITRON ELECTRONICS CORP.	09 Feb 71
DEI INDUSTRIES INC.	03 Sep 71
DRECO ENERGY SERVICES LTD.	28 Jun 82
EAGLE CLOTHES INC.	02 Nov 77
EASTERN FREIGHTWAYS INC.	23 Apr 76
ELECTRONIC COMPUTER PROGRAMMING	17 Mar 76
FARRINGTON MFG. CO.	20 Jan 71
FEDERALS INC.	17 Aug 72
FRIGITEMP CORP.	21 Mar 78
GAC CORP.	26 Jan 76
GARLAND CORP-CLA	29 Apr 80
GATEWAY SPORTING GOODS CO.	28 Sep 81
GIANT STORES CORP.	20 Aug 73
GLADDING CORP.	11 Apr 77
GLASROCK MEDICAL SERVICES	04 Jan 83
GRAY MFG. CO.	19 Oct 75
GRUEN INDUSTRIES	15 Apr 77
HRT INDUSTRIES INC.	24 Nov 82

COMPANY	FILING DATE
INTERSTATE STORES INC.	22 May 74
KENTON CORP.	04 Jan 74
LAFAYETTE RADIO ELECTRONIC CORP	07 Jan 80
LEADER INTERNATIONAL INDUSTRIES	03 Dec 73
LEASING CONSULTANTS INC.	20 Aug 70
LIONEL CORP.	22 Feb 82
LYNNWEAR CORP.	26 Feb 81
M.H. FISHMAN	27 Dec 74
MAGIC MARKER CORP.	21 Jun 79
MAMMOTH MART INC.	14 Jun 74
MANSFIELD TIRE AND RUBBER CO.	02 Oct 79
MANVILLE CORP.	27 Aug 82
MEGO INTERNATIONAL INC.	15 Jun 82
MEISTER BRAU INC.	12 Jul 72
MILO ELECTRONICS CORP.	03 Jul 70
MOBIL HOME INC.	05 Dec 84
NATIONAL BELLAS HESS INC.	30 Oct 74
NEISNER BROTHERS INC.	02 Dec 77
NELLY DON INC.	18 May 78
OLD TOWN CORP.	05 Jun 73
OPEN ROADS INDS.	16 Nov 76
PATERSON PARCHMENT PAPER CO.	23 Dec 74
PIEDMONT INDUSTRIES INC.	23 Feb 79
PLAZA GROUP INC.	10 Dec 74
POLORON PRODUCTS INC.	14 Apr 81
PLAZA GROUP INC.	10 Dec 74
POTTER INSTRUMENT CO.	22 Apr 75
RAI INC.	16 Feb 73
REVERE COPPER AND BRASS INC.	28 Oct 82
RICHMOND TANK CAR CO.	10 Jan 83
ROBINTECH INC.	11 Jul 83
ROYAL INNS OF AMERICA INC.	25 Apr 75
RUPP. IND. INC.	05 Feb 76
SAXON INDUSTRIES INC.	16 Apr 82
SEQUOYAH INDUSTRIES INC.	24 Jan 74
SHEFFIELD WATCH CORP.	03 Jun 71
SHENANDOAH OIL CORP.	18 Aug 78
SHULMAN TRANSPORT ENTERPRISES INC.	03 Aug 78
STEELMET INC.	23 Feb 83
STELBER INDUSTRIES INC.	12 Mar 76
STELLER INDUSTRIES INC.	09 Apr 75
STRATTON GROUP LTD	18 Sep 73
TENNA CORP	05 Dec 79
TEXAS GENERAL RESOURCES INC.	01 Apr 83
TMA CO.	31 Jul 72
TOBIN PACKAGING CO. INC.	28 Sep 81
TRANSOGRAM CORP.	01 Mar 71
UNITED MERCHANTS & MANUFACTURERS	13 Jul 77

COMPANY	FILING DATE
UNIVERSAL AIRLINES INC.	09 May 72
US FINANCIAL	15 Sep 75
W.T. GRANT CO.	03 Oct 75
WEST CHEMICAL PRODUCTS INC.	24 Jan 79
WESTERN ORBIS	03 Jun 76
WILLCOX & GIBBS	25 Jul 78
WOODMOOR CORP.	01 Feb 74

Appendix B. Logit Analyses with Overall Average Imputation

TABLE 4B

LOGIT ANALYSIS OF ACQUIRED VERSUS LIQUIDATED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF ACQUIRED (N = 12)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 57.21

MODEL CHI-SQUARE = 12.19 WITH 11 D.F. (-2 LOG L.R.) P = 0.3494

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.93189805	1.47226083	0.40	0.5268
LAW	-0.66239101	1.10122380	0.36	0.5475
BANK	-2.58877558	2.24515564	1.33	0.2489
TAX	0.00092791	0.00749712	0.02	0.9015
LIQ	0.03161139	0.13528822	0.05	0.8152
ROA	3.37456547	3.35975576	1.01	0.3152
SIZE	-0.00026704	0.00101622	0.07	0.7927
COUP	22.07862890	10.71053404	4.25	0.0393 **
VAR	196.06851655	179.77011933	1.19	0.2754
SKEW	-0.05850846	0.10420944	0.32	0.5745
FA	0.11508286	0.59896932	0.04	0.8476
OWN	-0.00124359	0.00070764	3.09	0.0789 *

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

TABLE 7B

LOGIT ANALYSIS OF ACQUIRED VERSUS REORGANIZED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF REORGANIZED (N = 47)
1 IF ACQUIRED (N = 12)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING COUPERCEPT ONLY = 59.60

MODEL CHI-SQUARE = 8.89 WITII 11 D.F. (-2 LOG L.R.) P = 0.6316

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	0.01787208	1.31661061	0.00	0.9892
LAW	0.31076537	0.94463437	0.11	0.7422
BANK	-1.91594177	2.04536368	0.88	0.3489
TAX	0.01019982	0.01154779	0.78	0.3771
LIQ	-0.04157683	0.15208079	0.07	0.7846
ROA	0.83956391	2.91045810	0.08	0.7730
SIZE	-0.00166696	0.00229351	0.53	0.4673
COUP	-3.90869125	6.45814821	0.37	0.5450
VAR	-179.28929581	157.30511078	1.30	0.2544
SKEW	0.11223106	0.10889872	1.06	0.3027
FA	0.84606899	1.29354309	0.43	0.5131
OWN	-0.00055935	0.00068713	0.66	0.4156

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

TABLE 9B

LOGIT ANALYSIS OF LIQUIDATED VERSUS REORGANIZED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF LIQUIDATED (N=42)
1 IF REORGANIZED (N=47)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY= 123.10

MODEL CHI-SQUARE= 21.02 WITH 11 D.F. (-2 LOG L.R.) P=0.0331**

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	0.96252532	0.82597203	1.36	0.2439
LAW	0.60771582	0.66360803	0.84	0.3598
BANK	0.60793958	1.13529269	0.29	0.5923
TAX	0.02593219	0.01734105	2.24	0.1348
LIQ	0.02693703	0.08238160	0.11	0.7437
ROA	0.23490810	0.86340503	0.07	0.7856
SIZE	0.00004901	0.00030423	0.03	0.8720
COUP	13.31898500	6.06324881	4.83	0.0280 **
VAR	218.19091688	99.73885339	4.79	0.0287 **
SKEW	0.15046817	0.07603689	3.92	0.0478 **
FA	0.11569434	0.36129665	0.10	0.7488
OWN	0.00007951	0.00035349	0.05	0.8220

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

TABLE 12B

LOGIT ANALYSIS OF LIQUIDATED VERSUS CONTINUED GROUPS

DEPENDENT VARIABLE : OUTCOME = 0 IF LIQUIDATED (N = 42)
1 IF ACQUIRED (N = 59)

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY = 137.14

MODEL CHI-SQUARE = 19.03 WITH 11 D.F. (-2 LOG L.R.) P = 0.0605 *

VARIABLE	BETA	STD.ERROR	CHI-SQUARE	P
INTERCEPT	-0.74256765	0.80130424	0.86	0.3541
LAW	-0.57269883	0.61826073	0.86	0.3543
BANK	0.18388143	1.09285360	0.03	0.8664
TAX	-0.00480694	0.00442431	1.18	0.2773
LIQ	-0.03064534	0.07971496	0.15	0.7007
ROA	0.16813166	0.77051817	0.05	0.8273
SIZE	-0.00010077	0.00027512	0.13	0.7142
COUP	15.95421311	6.01584586	7.03	0.0080 ***
VAR	169.63166212	89.89486777	3.56	0.0592 *
SKEW	-0.11760456	0.06562464	3.21	0.0731 *
FA	-0.07971167	0.35670919	0.05	0.8232
OWN	-0.00017704	0.00034561	0.26	0.6085

* SIGNIFICANT AT 10% LEVEL
** SIGNIFICANT AT 5% LEVEL
*** SIGNIFICANT AT 1% LEVEL

The vita has been removed from the scanned document