A STUDY OF VOLUNTARY ADMINISTRATION:
STATISTICAL MODEL PREDICTIONS AND EXPERTS' JUDGEMENTS REGARDING THE
REORGANISATION DECISION AND SUCCESS OF REORGANISED COMPANIES

by

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ABSTRACT

The voluntary administration procedure, embodied in Part 5.3A of the Corporations Law, was introduced as part of Australia's corporate insolvency regime in June 1993. Voluntary administration has become the most widely used means of dealing with corporate insolvency in Australia since its inception. Over the first four years of operation, (July 1993 to June 1997) 5760 companies entered voluntary administration (ASIC 1998).

A primary purpose of voluntary administration is to provide a flexible and relatively inexpensive procedure by which a company can attempt to reorganise its affairs and continue trading. Since the inception of voluntary administration there has been little empirical research conducted to analyse the operation and effect of the legislation's provision for company reorganisation.

Legislation that provides the opportunity for company reorganisation may create adverse incentives to prolong the existence of non-viable firms (Martel 1991). Critical to the efficient operation of reorganisation legislation is the decision regarding which companies should be permitted to attempt reorganisation. Returning inefficient firms to the market may result in economic costs that are greater than the benefits derived from saving a few distressed companies. This thesis focuses on the reorganisation decision. A statistical model is developed, based on the coalition behaviour decision theory, which provides some insight into the behaviour of parties involved in the reorganisation decision.
A further statistical model is developed that addresses the problem of identifying suitable (successful) reorganisation candidates from a pool of distressed companies. This model should be of value to those required to decide which companies should attempt reorganisation. Improved understanding of what contributes to success in company reorganisation may be useful in minimising the incidence of reorganisation of inefficient companies. Furthermore, comparison of this model with the actual decision model provides some understanding of inefficiencies in the reorganisation decision.

In addition to the development of environmental models, the research presented in this thesis examines the relationship between information cues and insolvency experts' decisions regarding companies' prospects in reorganisation. Very few (if any) previous studies have examined human information processing in the context of decisions regarding company reorganisation.

The main objectives of this thesis are 1) to model the voluntary administration decision with a view to identifying and explaining financial constructs likely to distinguish companies that will reorganise from those that liquidate, 2) to assess the usefulness of financial data in determining whether a company that enters voluntary administration is likely to attempt reorganisation or liquidate, 3) to determine the financial constructs that distinguish companies that reorganise successfully and those that reorganise unsuccessfully, 4) to examine the reorganisation decision task performance of expert human decision-makers who are provided with environmental data, and 5) to examine and compare environmental model and experimental task results with a view to gaining
some understanding of the efficiency of the voluntary administration decision process.

In relation to the effect of variables on the reorganisation decision, results indicated that companies are more likely to reorganise if they have better short-term liquidity, a higher debt to assets ratio, a greater ratio of current debt to total assets and some value in equity. This suggests that a coalition between unsecured creditors and managers/equity dominates the reorganisation decision. For the model that examined the effect of variables on reorganisation success, the results show that companies are more likely to reorganise successfully if they have higher levels of debt to total assets, higher levels of debt to equity, a better current ratio (short-term liquidity) and greater levels of return on assets (profitability) prior to entering administration. This analysis suggested that companies that are successful in the post insolvency period have an underlying profitable business and are able to pay unsecured creditors in the short term.

Comparison of results for the models show that the underlying financial constructs of firms that attempt reorganisation and those that reorganise successfully in voluntary administration differ. The difference in model constructs may be explained by the operation of coalition behaviour affecting the reorganisation decision. Overall, the results indicate the operation of voluntary administration may be biased toward the reorganisation of inefficient companies.

For the human information processing experimental task the decision accuracy of insolvency experts was significantly lower than environmental model accuracy. This was
found to be the case for the reorganisation decision and for identifying suitable companies for reorganisation. Environmental cues were of some use to subjects in identifying companies that liquidated, but were of little use in identifying companies that would reorganise. The superior performance of the environmental models indicates that the models may be a useful aid to those making reorganisation decisions.

The findings presented in this thesis have implications for insolvency policy that adopts a flexible regime for company reorganisation, which is a feature of the Australian voluntary administration law. Findings suggest that modification of the voluntary administration decision process may result in improved efficiency. Finally, the findings lend support to the usefulness of examining coalition behaviour in modeling the reorganisation decision. This provides a theoretical framework for further development of parsimonious bankruptcy reorganisation prediction models.
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STATEMENT OF ORIGINALITY

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

James Routledge.
CHAPTER ONE
INTRODUCTION

1.1 Background to Voluntary Administration Legislation

The voluntary administration procedure, embodied in Part 5.3A of the Corporations Law, was introduced as part of Australia’s corporate insolvency regime in June 1993. The new legislation resulted from a review of insolvency law carried out by the Australian Law Reform Commission in their General Insolvency Inquiry (Report No. 45 1988, the 'Harmer Report'). The Commission recommended changes to Australian insolvency law because of concern that there was:

"... little emphasis upon or encouragement of a constructive approach to corporate insolvency by, for example, focusing on the possibility of saving a business (as distinct from the company itself) and preserving employment prospects." (Harmer Report 1988, par.53).

The Explanatory Memorandum to the Corporate Law Reform Bill (1992, par.448) observed that too frequently liquidation was embraced by companies which could have continued trading and which may well have ultimately survived. Prior to the implementation of voluntary administration, an insolvent company had few viable options other than proceeding with winding up. The company could attempt to institute a scheme of arrangement under Section 411 of the Corporations Law as an alternative to winding up. However, this provision was rarely used due to the time and cost involved in obtaining the necessary court approvals and meeting the onerous requirements for ratification of the scheme (Crutchfield 1994). Alternatively, the company could appoint an official manager. This option was only available if the company was certain to repay all creditors in full - an unlikely prospect for most
companies in financial distress!

The primary purpose of voluntary administration is to provide a flexible and relatively inexpensive procedure by which a company can attempt to formulate an arrangement with its creditors. The objectives of voluntary administration that are outlined in Section 435A of the Corporations Law are twofold: to save the business conducted by the company or, alternatively, to improve the return to creditors that would have resulted from an immediate winding up of the company.

Central to the operation of the legislation is protection of the company’s property during the voluntary administration process. Moratorium provisions contained in Division 6 of the voluntary administration legislation give this protection by preventing creditors from taking action against the company or its property during the period of the administration. The moratorium provides time for the appointed administrator to investigate the affairs of the company and for development of a deed of company arrangement (the reorganisation plan). The proposed deed of company arrangement will outline how the company plans to address its financial problems, and may involve a compromise agreement with some creditors (Crutchfield 1994).

1.2 Motivation for This Research

The voluntary administration provision in the Corporations Law has become the most widely used means of dealing with corporate insolvency in Australia since its inception. Over the first four years of operation, (July 1993 to June 1997) 5760 companies entered voluntary administration (ASIC 1998). However, since the inception of voluntary administration there has been little empirical research
conducted to analyse the effect of the legislation. For this reason, this thesis will critically examine the relatively new and potentially valuable strategic alternative for distressed companies and, in so doing, will provide a reference for future research in the area.

The thesis is concerned with the first objective of the voluntary administration legislation, which provides an insolvent company with the opportunity to attempt reorganisation of its affairs with a view to continued trading. While many voluntary administrations end in company liquidation, there is evidence that shows a substantial number of companies that have entered voluntary administration attempt reorganisation of their affairs. Hodson and McEvoy (1995) examined a sample of 140 deeds of company arrangement and estimated that approximately 20 percent of companies that entered voluntary administration continued trading.

Legislation that encourages a constructive approach to company insolvency by allowing for reorganisation, with associated preservation of employment and business activity, is attractive for those directly affected by insolvency. However, it is important to consider the overall cost and long term efficiency of allowing financially distressed or insolvent companies to reorganise and continue trading. Insolvency law plays an important economic role in eliminating inefficient firms from the market. Providing the opportunity for company reorganisation may create adverse incentives to prolong the existence of non-viable firms (Martel 1991). Returning inefficient firms to the market may have economic costs that exceed the benefits that accrue from saving a few distressed companies. Consideration of the efficiency of the voluntary administration reorganisation provisions provides motivation for this thesis.
The voluntary administration decision process, which is shaped by legislative provisions, is critical to the efficiency of the legislation's operation. Failure of the legislation to promote efficient decision-making regarding which firms should attempt reorganisation is likely to have an adverse effect. Lack of prior research and understanding of the decision process in voluntary administration thus provides further motivation for this thesis. Accordingly, a contribution of this thesis is to develop an environmental model that provides some insight into the behaviour of parties who are involved in deciding whether a company should be reorganised or liquidated.

The efficiency of decision-making in voluntary administration would be improved if companies that are likely to successfully reorganise could be identified. Therefore, this thesis focuses on the problem of distinguishing suitable reorganisation candidates from a pool of distressed companies. Improved understanding of what contributes to success in company reorganisation may be useful in minimising the incidence of reorganisation of inefficient companies. Indeed, previous financial distress research has highlighted the potential cost associated with inefficient decisions that prolong the existence of a company with poor future prospects. For example, Altman (1977, pp.44-45) reported that the costs to a lending institution of granting credit to a firm that defaults is thirty-five times as great as the effect of withholding a loan to a company which survives. Given this, the second environmental model developed in this thesis aims to distinguish successful from unsuccessful companies attempting reorganisation. This model will provide a useful reference for those making decisions regarding which companies that enter voluntary administration are suitable candidates for reorganisation.
In addition, the model developed that distinguishes successful from unsuccessful companies that reorganise provides a contribution to an important area of financial distress research. This area of research is concerned with the development of models that discriminate between distressed firms that survive, and distressed firms that fail. Past research dealing with financial distress, particularly bankruptcy prediction modelling, has been criticised for its focus on discriminating between bankrupt and non-distressed firms. Gilbert, Menon and Schwartz (1990, p.161) noted that “while bankruptcy studies appear impressive, it is questionable whether such models have the capacity to influence bankers and other resource suppliers, who have to assess the likelihood of bankruptcy for problem companies”. Wood and Piesse (1987) also questioned the information value of prior bankruptcy modelling concerned with ex-post discrimination between risky companies that have failed and non-risky companies that have not failed. They suggested a stronger case for information value could be made if models discriminated between ‘at risk’ firms that survive, and ‘at risk’ firms that fail. With the introduction of the voluntary administration reorganisation procedure, the problem of identifying ‘at risk’ companies that may survive has taken on significant importance in Australia. However, little (if any) prior research has addressed this task in the Australian setting. This thesis makes a contribution to this area of financial distress research.

Further motivation for this thesis arises from the opportunity to apply underlying theory in development of financial distress prediction models relevant to company reorganisation. Application is made in this thesis of 'coalition behaviour' theory (Bulow and Shoven 1978, White 1981, 1989). The theory assumes the decision to reorganise or to liquidate is made by various coalitions of equity holders (with
management as assumed agent), unsecured creditors and (secured) lenders. In prior studies, the coalition behaviour model has been applied in examining the operation of the United States Chapter 11 reorganisation procedure. In this thesis, the coalition behaviour theory is drawn upon in developing theoretical propositions and in identifying relevant predictor variables for environmental models.

Growth in use of voluntary administration presents significant opportunities and challenges for insolvency accountants. Understanding the operation of the voluntary administration legislation and its suitability for particular clients is important for those providing insolvency advice. For example, timely recommendation to initiate voluntary administration may provide a company and its officers with important advantages as the company attempts to formulate a plan for its survival (Crutchfield 1994). The legislation provides insolvency accountants with only a short time in which to investigate the affairs of a company and to make a recommendation to creditors regarding the company's future. Consequently, environmental prediction models developed in this thesis may be useful to these decision-makers.

Finally, this thesis explores aspects of information processing of environmental model data by insolvency accountants. A substantial body of research has addressed human information processing in the accounting setting. For example, prior studies of financial distress prediction have focused on the use of accounting information by bank loan officers (see for example Libby (1975), Casey (1980) and Zimmer (1980)) and auditors (see for example Simnett and Trotman (1989)). Lack of prior research that has addressed human information processing aspects of decision making for company reorganisation provides further motivation for this thesis.
1.3 Research Objectives

The focus of this thesis is the reorganisation/liquidation decision for companies that enter voluntary administration. As discussed in the previous section, the extent to which the reorganisation/liquidation decision allows only suitable companies to reorganise is important to the efficient operation of the voluntary administration legislation. Therefore, the objectives of this thesis are formulated in the context of whether the reorganisation provision embodied in the legislation provides an efficient mechanism for dealing with corporate insolvency. In addition, as this thesis seeks to add to the existing accounting financial distress research, the analysis is primarily concerned with the information content of financial data for decision-makers.

The events associated with voluntary administration that are relevant to the objectives of this thesis are summarised in Diagram 1.1 below.

Diagram 1.1 – Summary of Events in Voluntary Administration
This thesis studies the reorganisation event and the performance event for both environmental prediction models and human decision making.

Specific objectives relevant to the development of environmental models are:

1. to draw upon the ‘coalition behaviour’ theory in order to model the voluntary administration decision, with a view to identifying and explaining financial constructs likely to distinguish companies that will reorganise from those that will liquidate;

2. to assess the usefulness of financial data in determining whether a company that enters voluntary administration is likely to attempt reorganisation or to liquidate (the reorganisation event); and

3. to determine the financial constructs that distinguish companies which reorganise successfully from those which reorganise unsuccessfully (the performance event).

If decision making in voluntary administration approaches efficiency, the financial constructs that distinguish successful and unsuccessful reorganisations should be similar to those that distinguish companies which reorganise from those which liquidate. Consideration of the difference between these model constructs will provide some insight into the efficiency of the voluntary administration decision process. Therefore, following the development of such models, a fourth objective is to examine and compare the models with a view to gaining some understanding of the efficiency of the voluntary administration decision process. The relevance of the difference in financial constructs for the models will be discussed with reference to coalition behaviour theory.
The final objective of this thesis is to examine the performance of expert human decision-makers in reorganisation decision tasks for both the reorganisation and performance events. This will be accomplished by administering an experimental task designed to 1) test the performance of insolvency experts in making reorganisation decisions, and 2) examine how these experts use environmental data in decision making.

In summary, the above discussion of motivation and objectives for this research demonstrates that this thesis seeks to contribute to existing accounting research related to financial distress prediction:

1. by using data for Australian companies that have entered voluntary administration, a context in which there has been little or no past empirical research.
2. by drawing on a theoretical framework as the basis for selection of financial variables included in environmental prediction models;
3. by extending previous research on environmental modelling of financial distress prediction in developing prediction models for both the reorganisation decision and the likelihood of success for reorganised companies;
4. by providing some insight into the efficiency of the voluntary administration reorganisation/liquidation decision.
5. by extending previous human information processing research to the area of decision making in the context of company reorganisation.

1.4 Method

The research design selected for this thesis is discussed in detail in Chapters four and six. Chapter four discusses the research methods for the development of
environmental prediction models that form the centrepiece of this research. In overview, the research design for the modelling work in this thesis is passive observation. The development of prediction models (addressed in detail in Chapter four) involves the ex-post gathering of archival financial data for companies that enter voluntary administration. Financial report information is used to calculate financial ratios selected as independent variables in models developed. Chapter six outlines the experimental research design used to compare the performance of human decision-makers with that of the environmental models developed.

In contrast to many of the prior financial distress prediction studies, the selection of independent variables for prediction models in this thesis is underpinned by reference to the coalition behaviour theory for bankruptcy decisions. This theory provides a reference for ascertaining the likely behaviour of parties involved in the voluntary administration decision process. Chapter four discusses in detail the attributes of coalition behaviour and the manner in which they are operationalised by the financial ratio items included as independent variables in the environmental models.

Data analysis involves development of multivariate prediction models using the logistic regression technique. Use of multivariate financial distress models has progressed considerably since Altman (1968) first applied Multivariate Discriminant Analysis (MDA) to bankruptcy prediction. More recently, financial distress models have been developed using the statistical technique of logistic regression. This is primarily due to the advantage of not having demanding statistical assumptions for predictor variables, and the ability to interpret the significance of the contribution of predictor variables (Wilson 1996, Zavgren 1983).
The relevance of environmental (statistical) models, developed as the centrepiece of this thesis, will be tested by a further experimental task discussed in detail in Chapter six. The experimental task is designed to test the performance of insolvency practitioners' decision-making for financially distressed companies which have entered voluntary administration. Comparison of prediction performance of human decision-makers with environmental models will be made. In addition to assessing overall performance in the prediction task, data will be gathered on how decision-makers' use information cues provided in financial profiles that correspond with variables used in the environmental models. A comparison will be made between decision-makers' use of information cues and significant predictors in the environmental models.

In addition, analysis of data gathered in a prediction task questionnaire will be presented. This will provide some insight into the processing of information in the experimental task by decision-makers.

1.5 Structure of the Thesis

This thesis is divided into seven chapters. Chapter two contains a summary of the literature relating to 1) legal and economic theory underpinning insolvency law policy, 2) the efficiency of reorganisation legislation, 3) relevant financial distress studies, and 4) relevant human information processing studies within accounting settings. Chapter three presents the results of an exploratory study that investigates the general operation of the voluntary administration legislation. This chapter focuses on the causes of financial distress for companies that enter voluntary administration. It also examines the background and circumstances of the administrator's appointment and
administration outcomes. The exploratory study provides a background for development of environmental prediction models in the next chapter. Chapter four outlines the development of environmental models. Theoretical propositions and research methodology are discussed, and data and subject selection are described. Chapter five details the results and discusses findings relating to the theoretical propositions concerned with the relationship between independent variables and:

1. the likelihood of a company attempting reorganisation (the voluntary administration decision);

2. the likelihood of success for companies that attempt reorganisation.

Chapter six provides further analysis of the voluntary administration decision by presenting the results of an experimental task that reviews the information processing and performance of human decision makers (insolvency practitioners) provided with financial profiles for distressed companies. Chapter seven contains the conclusions from the study by providing a summary of how the research objectives were achieved, outlining the limitations of the research, illustrating how the thesis has contributed to the existing financial distress prediction research, and indicating further profitable avenues for research in the financial distress paradigm. The appendices provide examples of the material used in the exploratory study and experimental task.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The research objectives outlined in the previous chapter suggest that the literature relevant to this thesis concerns:

1. the legal and economic theory underpinning insolvency law objectives;
2. the efficiency of reorganisation legislation;
3. financial distress studies, particularly those dealing with firm reorganisation; and
4. human information processing studies within accounting settings.

The first section of the review of literature presented in this chapter discusses the value-based insolvency law objectives on which legislation such as voluntary administration is formulated. The value-based approach is contrasted with the alternative economic account of what insolvency legislation should aim to achieve. This comparison raises substantive questions regarding the suitability of constructive, value-based insolvency law. Moreover, it identifies the key rationale for value-based insolvency legislation as being the minimisation of economic costs associated with insolvency. This background discussion provides motivation for the analyses presented in this thesis.

The second section of the literature review concerns the problem of efficiency of reorganisation legislation. Literature is reviewed that identifies the costs associated with providing for reorganisation of insolvent companies. This review highlights the need to minimise these costs to promote efficiency, and establishes a link between economic cost and post insolvency performance.
The next section reviews studies that have addressed reorganisation of distressed firms. In addition, relevant financial distress prediction studies are reviewed. The purpose of this section of the literature review is to identify prior research that is relevant to the development of environmental prediction models. Moreover, literature reviewed in this section provides a reference to theoretical models of bankruptcy that are discussed in detail in the subsequent development of theoretical propositions. Finally, the chapter provides a review of relevant studies that have addressed human information processing in the context of financial distress decisions.

2.2 Insolvency Law Objectives

Section 435A of the Corporations Law outlines the objectives of the voluntary administration legislation. It states that voluntary administration is to provide for the business, property and affairs of an insolvent company to be administered in a way that:

(a) maximises the chances of the company, or as much as possible of its business, continuing in business; or

(b) if it is not possible for the company or its business to continue in existence, results in a better return for the company's creditors and members than would result from immediate winding up of the company.

The construction of these objectives, particularly the former that provides for corporate rehabilitation, flows from the value-based account of insolvency law. Value-based theory sees the role of insolvency law as providing a framework for decision making that allows a full response to the problem of financial distress. The value-based approach recognises that "crises in insolvency are not only a crisis of dollars,
but also a crisis of values experienced in individual ways by those who have contributed to and are affected by the enterprise” (Korobkin 1991, p.766). Value-based insolvency law is described by Korobkin (1991, p.722) as a kind of “group therapy” where the values of the participants in financial distress are rehabilitated into a coherent and informed vision of why the corporation should exist. This approach to insolvency generally provides a framework that is designed to rescue, rehabilitate or re-organise the firm as a means of dealing with insolvency, as is the case with voluntary administration.

The Harmer Report (1988) suggested that Australian insolvency law should be reformed by implementing an insolvency procedure based on the value-based approach to dealing with corporate insolvency. Accordingly, the voluntary administration procedure was intended, where possible, to provide for the saving of business operations and to preserve employment prospects. The Harmer Report noted that if just a few corporations could be saved from winding-up then voluntary administration would be a worthwhile addition to the Corporations Law. The type of situation that the new legislation is intended to address was illustrated by Baird and Jackson (1984, p. 101) in their treatise on the economic theory of bankruptcy law. They noted that the economy of an entire town could be affected when a business closes. Many employees may be put out of work. Also, failure of one firm can lead to the failure of other firms. For example, those supplying materials and those using the firm’s finished product may be affected. The desirability of facilitating this value-based approach to address the wider economic impact of insolvency appears to be self-evident. However, when the objectives and effect of value-based insolvency legislation (such as the voluntary administration reorganisation procedure) are
examined from the perspective of the alternative economic theory of bankruptcy law, its desirability appears questionable.

Baird and Jackson, in the mid 1980’s, presented what has been termed a compelling economic account of bankruptcy law (Lightman 1994). The substantial impact of their economic account is evident in the literature and was acknowledged as having set the terms of scholarly debate relating to bankruptcy law for the next decade (Scott 1986). The premise of the economic account is simple in that it focuses on a single economic issue. Baird and Jackson (1984, p.100) proposed that bankruptcy law at its core should:

"... be designed to keep individual actions against assets, taken to preserve the position of one investor or another, from interfering with the use of those assets favoured by the investors as a group."

Baird and Jackson thus defined the singular objective for bankruptcy law as enhancing the collection efforts of creditors with defined legal property rights (Warren 1987).

The reasons Baird and Jackson offered for their narrow approach to insolvency law objectives are significant to this thesis. First, they observed that fashioning remedies for the entire harm a failing business may bring is difficult and beyond the competence of a bankruptcy procedure. Secondly, they pointed to the economic costs associated with providing value-based insolvency legislation. For example:

1. Keeping some firms alive will do more harm than good, as the majority will return to insolvency with considerable economic cost.

2. Even when the firm does not return to insolvency, the income stream from future trading, discounted to present value, may not exceed the liquidation value of assets. Assets are thus tied into an unproductive investment.
3. Limiting the ability of investors to reclaim their assets through moratorium provisions will produce negative economic outcomes. The increased risk perceived by investors will introduce a cost of uncertainty that may cause a corresponding increase in lending interest rates and tightening of lending policy.

Thirdly, Baird and Jackson pointed to the potential for opportunism on the part of those making decisions regarding the fate of the insolvent firm. For example, unsecured creditors will have a vested interest in keeping the firm going as long as there is some hope for an improved return, as they will probably receive little (or nothing) if the firm is liquidated. The interests of unsecured creditors are different from the interests of secured creditors who have a legal claim over assets in the event of liquidation. Baird and Jackson (1984) argued that allowing unsecured creditors to make decisions on the fate of the firm, while the rights of secured creditors are subject to a moratorium, is effectively allowing them to gamble with other peoples' money. In this situation, lenders are presented with increased risk, which may be offset by higher interest rates or a tighter lending policy (Lightman 1994).

This economic theory stands in sharp contrast to the value-based approach that offers a 'dirty, complex, elastic, interconnected view of bankruptcy' (Warren 1987, p.811). Proponents of the economic account would reject the position taken by the Harmer Report that insolvency law needs to, or in fact should attempt to, address the wider social issues that result from bankruptcy.

While this thesis is not directly concerned with an analysis of insolvency law theory, the argument raised by the competing theories about what insolvency law should aim
to achieve provides motivation for this thesis. By examining both the reorganisation
decision and success of companies that attempt reorganisation under voluntary
administration, this thesis contributes to understanding the implications of the value-
based approach to insolvency law. Decisions regarding the future of distressed
cOMPaniess that enter voluntary administration will have a substantial influence on the
existence and level of economic costs that Baird and Jackson associated with value-
based legislation.

2.3 Efficiency of Reorganisation Legislation

Miller (1993, p.616) noted that “debtors, like some poets, do not go gently into that
good night”, and further observed “they are often assisted in those efforts at life
support by a bankruptcy code that materially strengthens their hands in negotiations
with the creditors”. This draws attention to potential problems with insolvency
legislation that provides for reorganisation yet fails to filter out firms that should be
liquidated as a matter of economic efficiency.

White (1989, p.130) argued that when reorganisation is an alternative to liquidation,
too many firms are likely to continue operating in the same loss making manner,
effectively delaying the movement of resources to higher value uses. White (1994)
further discussed the implications of corporate bankruptcy reorganisation and
provided a game theoretical model that examined the effectiveness of the United
States Chapter 11 reorganisation procedure as a filtering mechanism for identifying
efficient and inefficient firms. The model demonstrated the occurrence of a pooling
equilibrium in which both efficient and inefficient firms attempted reorganisation.
White concluded that a lack of information about the nature of the firm, that is,
whether it is efficient or inefficient, caused the reorganisation decision process to operate with error. While the model dealt specifically with Chapter 11 reorganisations, the conditions that exist with the voluntary administration procedure are similar. Therefore, the suitability of the voluntary administration reorganisation procedure as a filtering mechanism for efficient and inefficient firms may be questioned.

Martel (1991, p.55) further commented on the effect of information asymmetry on the reorganisation decision, noting that “bankruptcy procedures are characterised by incomplete information...this divergence of information can result in a sub-optimal solution to the debtor’s financial problems”. Litigation relating to the operation of voluntary administration indicates that it may also be characterised by incomplete information. For example, in *Wood v Laser Holdings Ltd & Ors* (1996) 14 ACLC 801, approval was given by creditors to a deed of company arrangement obtained by what was described by the court as an 'underhand bargain'. In this instance, a director of the company in question had purchased debts and proxy votes to secure ratification of a deed of company arrangement by the creditors. The arrangement was clearly not constructed for advancing the interests of creditors as a whole. The court noted that had the creditors known of the directors' actions, they would have been better able to judge what was in their best interests and would not have ratified the deed of company arrangement.

Similarly, in *Deputy Commissioner of Taxation v Woodings* (1995) 13 ACLC 469 the administrator of a deed of company arrangement had recommended that creditors vote in favour of the proposed deed. Apparently, the administrator was unaware that a director of the company in question had been involved in businesses that had been
passed on through a succession of insolvent companies. Wallwork J, noted that had the administrator known of the full history of the business in question and its operator, he would not have recommended a deed of company arrangement. These examples suggest a potentially significant level of information asymmetry in the operation of voluntary administration that may result in sub-optimal decision-making as highlighted by Martel (1991) and White (1994).

Empirical studies in other jurisdictions have examined the reorganisation/liquidation decision process in statutory reorganisation and have found evidence of both Type I and Type II errors that indicate filtering failure. A Type I error occurs when creditors accept a reorganisation plan proposed by a non-viable enterprise, and a Type II error occurs when a reorganisation plan proposed by a viable firm is rejected. Fisher and Martel (1995) examined 338 reorganisation plans that had occurred under Canadian reorganisation law between 1978 and 1987. Of the 182 firms in the sample with accepted plans, 34 subsequently entered liquidation. Therefore, a Type I error occurred in 19 percent of the cases. This indicated that a significant number of non-viable firms had been provided with the opportunity to reorganise their affairs by the Canadian statutory process, which is similar to the Australian voluntary administration process. As it is not possible to determine when a Type II error occurs, the study provided an estimate of the incidence of this type of error by referring to the incidence of Type I errors and the fact that 59 plans were rejected. If all of the 59 firms whose plans were rejected were viable, the incidence of Type II error would be 28.5 percent. This calculation provided an upper-bound estimate of Type II error. By calculating a range of possible Type I and Type II errors, based on different error rates associated

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1 Calculated as 59 / (59 + 148), where 148 is the number of firms less the Type II error (182 − 34).
with the decisions for the 59 firms whose plans were rejected, the incidence of Type I error was estimated to be at least four times that of Type II error. The calculation method for Type II error presented provided some insight into the possible incidence of incorrect decision-making. However, the actual incidence of Type II error cannot be determined with any confidence from the results.

Studies that have investigated the costs associated with bankruptcy suggest that failure to ensure that only suitable firms are reorganised may be costly. Altman et al (1977) estimated (in the context of bankruptcy prediction) that a Type I error is 35 times more costly to decision-makers than a Type II error. Increased cost is attributed to the fact that a Type I error would cause a lender to make an inappropriate loan that may lead to the loss of principal. In contrast, a Type II error would preclude a lender from making an appropriate loan, leading to a less costly loss of potential interest earnings (Lindsay & Campbell 1996). This finding may have implications for reorganisation in bankruptcy, particularly where the reorganised company returns to insolvency some time after receiving support from creditors by way of continued or increased funding as part of a reorganisation plan.

Bradley and Rosenzweig (1992) presented empirical data concerning the survival rate of firms attempting reorganisation under the United States Chapter 11 procedure. The results of their study showed a reasonably high level of filter failure; of the 162 firms in the sample 27, or 17 percent, had failed within two years of the filing date and 62, or 38 percent, had failed within four years of the filing date. Based on this data, Bradley and Rosenzweig argued that reorganisation postpones the inevitable demise of many firms.
Further evidence of filter failure with respect to firms entering reorganisation under Chapter 11 in the United States is provided by Hotchkiss (1995, p.3), who observed that “the substantial number of firms emerging from Chapter 11 that are not viable, or need further restructuring provides little evidence that the process effectively rehabilitates distressed firms and is consistent with the view that there are economically important biases toward continuation of unprofitable firms”. The study reported that in the five years after reorganisation, a significant percentage of firms were operating below the industry average with respect to profitability. Over this five year period an average of 70.3 percent of firms had a ratio of operating income to sales that was below the industry average; the average for return on investment was slightly less at 66.5 percent. For each of the five years after reorganisation the industry adjusted median return on sales were negative, and significantly different from zero at \( p<.05 \) based on a two-tailed Wilcoxon signed rank test. This result suggested that reorganised firms in the sample were performing poorly compared to industry their counterparts. Moreover, Hotchkiss found that many firms increase in size after bankruptcy, with much of the change occurring in the first post bankruptcy year. However, this growth did not correspond with increased profitability.

The findings of the studies reviewed above have implications regarding the efficiency of reorganisation legislation. The studies suggest that reorganisation legislation tends to operate inefficiently because incorrect decisions are made regarding the suitability of firms for reorganisation. Moreover, it appears that the legislative procedures do not provide an adequate filtering mechanism. The overall effect of filter failure has been considered in prior studies that have reviewed the Chapter 11 reorganisation legislation. These studies are reviewed in the following section.
Bradley and Rosenzweig (1992) conducted an empirical investigation of reorganisations conducted under the United States Chapter 11 procedure to examine whether the legislation promoted more efficient asset allocations. The hypothesis that the Chapter 11 legislation failed to provide managers with appropriate incentives to allocate resources to their 'highest value' use was supported by empirical data. Their study examined, inter alia, the effect of reorganisation on the wealth of bondholders and stockholders as a proxy measure of social cost. They argued that if the Bankruptcy Reform Act of 1978 (which made it significantly easier for firms to reorganise by obtaining court protection from creditors) curtailed the inefficient liquidation of viable corporations, there would be an expected wealth increase for bondholders and stockholders under the Act. Comparison was made of the effect of bankruptcy on the change in bondholder and stockholder wealth in pre and post-Act periods. Bradley and Rosenzweig concluded that the social costs of bankruptcy increased under the Bankruptcy Reform Act.

It should be noted, however, that the methodology employed in empirical tests presented by Bradley and Rosenzweig has been questioned. Altman (1993) suggested that the empirical tests that show worse returns to investors were seriously flawed, and referred to two major problems with the Bradley and Rosenzweig findings. The first problem was the failure to control for seniority of the bond issues used in the pre and post-Act sample; and the second was the failure to take into account the change in capital structure that typified United States firms between the pre and post-Act environment. Altman (1993) presented further empirical data that contradicted the findings of Bradley and Rosenzweig. Return to bondholders in the pre and post-Act environment was examined while controlling for seniority of bonds. The findings of
improved returns to bondholders under the liberal post-Act reorganisation environment were claimed to provide empirical support for the argument that the Bradley and Rosenzweig results were suspect.

White (1983) examined the effect of changes to the United States bankruptcy code effected in late 1979 that preserved reorganisation as an option for failing firms, but made it more difficult to use the reorganisation procedure. The results of White's (1983) calculation of bankruptcy cost before and after the legislative change indicated that the new reorganisation provisions increased economic efficiency through lower aggregate bankruptcy costs as a result of reducing the likelihood of reorganisation of firms in bankruptcy. The calculation suggested that aggregate bankruptcy costs decreased (at the upper bound) by some (US)$12.2 billion per year. This result indicates that the structure of reorganisation legislation can have a substantial effect on the efficiency of its operation. It is evident from both the Bradley and Rosenzweig and White studies discussed above that statutory rules contained in insolvency legislation have a pronounced effect on allocation of resources and, therefore, economic efficiency.

Prior research reviewed in this section demonstrates that legislative regimes, such as voluntary administration and Chapter 11, interfere with the process of voluntary exchange. Posner (1972) argued that one of the fundamental economic principles that should be recognised in legal rule making is that resources tend to gravitate toward their 'highest value' use if exchange is permitted. Reorganisation legislation clearly imposes limitations on exchanges, and therefore it can prevent resources from reaching their highest value use. Long-run efficiency requires that resources move
from lower to higher value uses. Hirsch (1979) identified ‘highest value use’ with efficiency, and noted that resources so employed will produce the largest possible output. Miller (1990, p.617) noted that liquidation causes a firm’s assets to “flow to other firms elsewhere in the economy” and that opportunities which the failing firm foregoes will be taken up by others, perhaps when the economic climate becomes more favourable. Therefore, the notion that preserving an insolvent business operation is to be viewed as desirable from an efficiency standpoint may be questionable. Indeed, delaying or preventing the needed movements of resources may have social costs that can he higher in the long run than the social cost associated with insolvency (Miller 1990, pp.617-618).

In summary, prior research reviewed in this section consistently indicates that reorganisation legislation tends to be inefficient due to the existence of filter failure (reorganisation of unsuitable firms) associated with the operation of reorganisation legislation. It appears that the existence of information asymmetry or a lack of information available to decision-makers leads to sub-optimal decisions about the suitability of firms for reorganisation. Moreover, prior research suggests the performance of reorganised firms in the post insolvency period characteristically suffers as a result of financial distress. Therefore, providing for reorganisation as an alternative to liquidation may mean that many firms will continue to operate in a loss-making manner. The review of studies in this section highlights the importance of investigating the efficiency of the reorganisation decision associated with value-based insolvency legislation. This thesis seeks to contribute to the literature by examining the decision process in voluntary administration and reviewing the efficiency of decision-making by assessing the performance of companies that reorganise. In
addition, the prediction models developed in this thesis may serve to inform future
decision making associated with voluntary administration.

2.3.1 Post Insolvency Performance

Voluntary administration provides the opportunity for financially distressed
companies to continue trading. The performance of a company during the post-
insolvency period will likely be affected as the company attempts to overcome
financial distress and the stigma attached to insolvency by the market. This is
highlighted by studies that have examined the performance of firms that have
attempted reorganisation under the United States Chapter 11 procedure. These studies
have generally reported a significantly negative return on assets or profitability below
industry average for firms in the post insolvency period (see for example Bradley and

Wruck (1990) argued that the process of recovery from financial distress provides the
firm with an opportunity to create value as it reassesses its strategy and restructures
operations. Financial distress was described as forcing managers to undertake value
increasing organisational changes they would not otherwise have undertaken. Wruck
(1990, p.435) noted that the shock effect of financial distress cannot be completely
reversed “but management can make decisions that improve the firm’s depressed
state”. Of importance to this thesis is how well companies that attempt reorganisation
make the value increasing changes that Wruck suggested may occur, and whether
these changes adequately compensate for the effects of financial distress.

Financial distress leads to what is termed the indirect cost of insolvency, or costs
associated with “lost opportunities” (Warner 1977, p.339). These lost opportunities can result from lost managerial energies, lost sales, lost profits, the higher cost of credit or inability to obtain credit or issue securities to finance new opportunities (Altman 1984, p.1071). Wruck (1990) identifies these indirect costs as the opportunity costs imposed on a firm due to the fact that financial distress affects its ability to conduct 'business as usual', and outlines three problem areas for a distressed firm that may contribute to indirect bankruptcy costs. First, the legal framework of the insolvency administration may limit the right to make certain management decisions. Second, financial distress can reduce demand for the firm’s product and increase its production costs. Third, management spends considerable time resolving financial distress, which will represent an indirect cost to the firm if the time could be spent more productively elsewhere.

When a company attempts reorganisation, indirect costs may have a significant effect on the company’s performance. Indirect bankruptcy costs can be incurred leading up to the incidence of insolvency and, importantly, may continue to be incurred after the administration process has facilitated reorganisation (Altman 1984).

Measurement of indirect insolvency costs has long been recognised as a difficult task. Warner (1977, p.339) noted that as the “indirect costs of bankruptcy are mainly lost opportunities, they are inevitably difficult, if not impossible to measure”. Altman (1984) formulated a model for measuring indirect insolvency costs using a proxy measure, based on calculations of foregone sales and profits. The model used regression analysis to estimate the lost profit attributable to insolvency. Actual profit was subtracted from estimated profit to calculate the reduction in profit caused by
insolvency. The model involved regressing the firm’s sales on appropriate industry sales for a specified period. Altman applied this model to calculate the indirect insolvency costs for 19 firms before bankruptcy and indirect bankruptcy costs were found to be significant and variable across industry types.

Other studies have examined the effect of indirect insolvency costs for reorganised companies by using more 'traditional' measures of firm performance. Hotchkiss (1995) examined post bankruptcy performance for a sample of firms by comparing firm operating margin with average industry operating margin over a period of five years after bankruptcy. This comparison was used to allocate firms to groups for logistic regression analysis, with grouping based on whether the firm performed at or below the average industry operating margin in the post-bankruptcy period. Results showed that in the post reorganisation period firms were characterised by poor performance, providing further evidence of the existence of an indirect insolvency cost for reorganised firms.

Opler and Titman (1994), in their study of corporate performance in financial distress examined sales growth, stock returns and operating profits as measures of performance. Their study involved 46,799 firm-years of data for the period 1972 to 1991. They reported that distressed firms that were highly leveraged lost market share (sales) to their less leveraged competitors in industry downturns. Decline in sales was identified as attributable to either manager driven downsizing in response to industry turndown, reluctance by customers to do business with distressed firms, or aggressive behaviour by competitors in an effort to drive out vulnerable firms. The latter two factors were found to lead to financial distress costs. Moreover, the study established
that the observed decline in sales is, in part, customer and competitor driven rather than the result of management cost cutting through downsizing. The work of Opler and Titman (1994) also suggested indirect insolvency costs might be significant for distressed firms that attempt to reorganise.

Review of the literature in this section has further highlighted concerns relating to the efficiency of reorganisation legislation. Prior research suggests that, despite attempts to improve a firm's distressed state by reorganising its affairs, indirect costs of insolvency are likely to affect the firm's post insolvency performance. While reorganisation may ameliorate the effect of insolvency on performance, continued effects of financial distress are likely to be experienced in the post insolvency period. The issue of performance of reorganised companies remains largely unexplored with respect to the Australian reorganisation legislation. One of the contributions of this thesis is to examine the success (performance) of companies that attempt to reorganise under voluntary administration.

2.4 Studies of Reorganised Firms

A number of prior studies have identified variables that can have an effect on 1) whether a firm will reorganise (the reorganisation decision), and 2) the likelihood of success for firms that attempt to reorganise. A review of these studies is presented in this section.

Fisher and Martel (1995) studied 338 firms that attempted reorganisation under Canadian law, and determined a number of factors that distinguished reorganisation plans that were accepted from those that were rejected by creditors. The study focused
on the reorganisation decision, and provided some insight into what creditors considered important in determining whether reorganisation should proceed. They referred to coalition behaviour theory that had been developed by Bulow and Shoven (1978) and White (1981, 1989) in specifying their model of creditors' decision-making behaviour. Logistic regression analysis was used by to determine variables that affected the acceptance of a reorganisation plan by creditors.

The results of Fisher and Martel's logistic regression analysis indicated that three variables significantly affected the likelihood that creditors would accept a reorganisation plan (at $p<.05$). First, accepted plans were found to include a substantial cash payment to creditors. Fisher and Martel suggested a substantial cash payment signals future success. Second, higher planned pay-off in reorganisation (compared to estimated pay-off in liquidation) was significant in determining creditors' acceptance of the proposed plan. Third, where debt structure comprised a large amount of secured claims the probability of plan acceptance was greater. Acceptance of a plan by secured creditors was considered to provide positive signalling to unsecured creditors. Fisher and Martel suggested this finding was consistent with the proposition by Fama (1985) that banks, who generally are the holders of secured credit, play an important signalling role because of their access to private information about firms.

Casey, McGee and Stickney (1986) examined the potential information value of accounting data in distinguishing between bankrupt firms that successfully reorganise under the United States Chapter 11 procedure and those that are ultimately forced to liquidate. The study examined data for 113 firms: 57 of which were liquidated, and 56
successfully reorganised. The study referred to White’s (1981, 1984) application of coalition behaviour theory to firm reorganisation as a basis for choice of predictor variables. Casey et al suggested the outcome of bankruptcy proceedings are affected by the firm’s level of free assets that are available as collateral for further borrowing; firm size, as larger firms had additional borrowing capacity; the firm’s earnings prospects, which indicated an ability to operate profitably in the near future; and the equity commitment of management in the firm, as equity is generally eliminated in liquidation. Accounting ratios and financial variables were selected as operational proxies for elements of the specified model. The dichotomous dependent variable grouped companies according to whether the company had liquidated, or reorganised and continued in operation for at least three years after the court had confirmed the reorganisation plan. Probit analysis was used to determine overall differences between the successful and unsuccessful firms. Two independent variables were identified as significant predictors of successful reorganisation: a higher ratio of retained earnings to total assets, representing past profitability; and a higher percentage of free assets (non-collateralised tangible assets divided by total tangible assets) which Casey et al suggested indicates greater borrowing capacity. Classification accuracy for the model was reported at 69.4 percent for the estimation sample, and 58.5 percent for a holdout sample.

Campbell (1996) developed a prediction model to forecast the probability of bankruptcy reorganisation for closely held firms under the United States Chapter 11 procedure. The sample comprised 121 closely held companies (82 reorganised and 39 liquidated) that had filed a Chapter 11 petition. Choice of independent variables for the study was based on 1) evidence from prior studies, 2) Campbell’s (1993) earlier
analysis of firm value maximisation and bankruptcy costs, and 3) White’s (1983, 1989) discussion of creditors’ coalition behaviour for reorganisation decisions under the United States Chapter 11 procedure. The study reported that firms in the sample were more likely to reorganise if they were larger, had greater asset profitability (measured by return on assets), had fewer secured creditors, had more free assets (assets not that were not pledged as collateral security against previous borrowings) and had numerous secured creditors whose security value was less than the face value of their claim.

One of the few empirical studies that have focused on the operation of the Australian voluntary administration legislation was reported by Frost-Drury et al (1998(a)). First, this study investigated the proposition that companies entering voluntary administration could be distinguished from healthy companies. This proposition was made on the basis that companies entering voluntary administration are distressed, and should be distinguishable from healthy firms. The study also investigated the proposition that companies entering voluntary administration can be distinguished from companies that directly entered liquidation. This proposition was based on the legislation's objective of providing an opportunity for 'basically sound' companies to avoid liquidation. Frost-Drury et al suggested that the nature of financial distress for companies that liquidate is different from that for 'basically sound' companies that choose to attempt reorganisation making them readily distinguishable. The study referred to the previous findings of Gilbert et al (1990) and Ward and Foster (1997) that indicated different types of financial distress are characterised by different underlying constructs. The relevance of studies by Gilbert et al (1990) and Ward and Foster (1997) to this thesis are discussed in more detail in section 2.5.4 of this chapter.
Frost-Drury et al tested their propositions by developing two logistic regression models. The first model examined whether the financial characteristics of companies that entered voluntary administration could be distinguished from the financial characteristics of non-distressed companies. In this model, companies that entered voluntary administration were reported as having fewer assets in working capital, lower return on total assets, and negative owners' equity compared to non-distressed companies. The second model examined whether the financial characteristics of companies entering voluntary administration could be distinguished from the financial characteristics of companies that directly entered liquidation. This model indicated that companies with a larger asset base and higher leverage were more likely to choose voluntary administration than liquidation.

Frost-Drury et al (1998(a), pp.14-15) commented that the findings suggest that “while distress is generally signalled by poor profit performance and greater proportions of assets tied to working capital, the latter is more likely to lead to liquidation. The prospect of choosing voluntary administration is enhanced for more levered firms with larger asset levels”. Moreover, they suggested the decision to enter voluntary administration is motivated by concern for underlying realisable assets.

These results are important to this thesis as they demonstrate a need to investigate more fully the financial constructs related to financial distress associated with companies that attempt reorganisation under voluntary administration. With respect to the decision to reorganise, the study indicated that capital structure and asset levels are important, rather than the company’s prospects as indicated by past profitability. This may have implications regarding the efficiency of the voluntary administration
legislation. Furthermore, the results provided further evidence that companies affected by different types of financial distress may be distinguished based on their financial profile.

An empirical investigation of 30 firms reorganised under the United States Chapter 11 procedure was undertaken by Franks and Torous (1989), who analysed the value and type of securities issued in reorganisation by the sample firms. The purpose of the study was “to understand the institutional procedures of Chapter 11 from an empirical examination of thirty firms that have emerged from Ch.11 proceedings” (Franks and Torous 1989, p.747). Relevant to this research are their findings regarding the effect of reorganisation on a firm's investment and financing decisions. The results showed that value was often transferred back to equity in reorganisation. Franks and Torous suggested this results from the bargaining framework of Chapter 11, which allows management and equity to influence recontracting under the reorganisation plan, and discussed this finding in the context of the work of Myers (1977).

Myers (1977) demonstrated 1) that the treatment of a firm in default is crucial to its investment decisions, and 2) that if company growth is financed with debt, managers, acting in the interests of equity holders, will in some circumstances have incentive not to invest in positive net present value projects in an effort to protect the value of equity. The rationale for this behaviour is that with a capital structure dominated by debt (which is often the case in insolvency), the net present value of an investment will accrue to debt rather than equity holders. Franks and Torous (1989, p.765) argued that reorganisation will eliminate or ameliorate this problem where the reorganisation plan increases the claim of equity. This reinstatement of the value of equity in a failing
firm will restore incentives to invest in growth opportunities as equity and management will share in the net present value of investments.

The work of Franks and Torous suggested that management and equity will act together to maintain their interests in the firm. Their analysis showed that management and equity would bargain to preserve or increase their claim over the firm's assets. In addition, where reorganisation occurs, post insolvency performance is likely to be affected by the level of equity (management) interest in the firm, as this may influence investment decisions. Moreover, how the reorganisation plan deals with equity holders' interests was shown to be important to post insolvency performance.

The study by Hotchkiss (1995) also provided some valuable data on how firm and restructuring characteristics affect the performance of reorganised firms. Three separate logistic regression analyses were performed in the study. Different classification regimes for post bankruptcy performance were employed for each of the logistic regression models developed. For the first model, classification was based on the incidence of a second bankruptcy or reorganisation attempt; for the second, whether the firm had reported a negative income in two of the first three years following reorganisation; and for the third, whether the firm had reported an operating margin (before depreciation) that was lower than the industry median in each of the three years following bankruptcy. Independent variables were the log of total assets; business diversity, coded by the number of different industry codes reported by the firm; pre-bankruptcy industry adjusted operating margin measured over the two years before bankruptcy; and the post bankruptcy industry change in operating margin over two years subsequent to reorganisation.
Results of Hotchkiss' three logistic regression analyses showed that a large number of the firms that attempt to reorganise under Chapter 11 are not viable or soon require further restructuring. Analyses indicated that larger firms were associated with a lower probability of reporting negative income. While pre-bankruptcy operating margin was not a significant predictor of post bankruptcy performance, the model coefficients indicated that "worse performance before bankruptcy was associated with worse performance after bankruptcy" (Hotchkiss 1995, p.18). Also, where the average operating margin for the firm's industry was improving in the post bankruptcy period, a second bankruptcy or reorganisation attempt was more likely to occur, suggesting that industry conditions affected post insolvency performance.

Central to the Hotchkiss (1995) study was an examination of the effect of management change on post bankruptcy performance. The study examined the hypothesis that post bankruptcy performance is related to management changes. Change of chief executive officer at the time of reorganisation plan proposal was made by 55 percent of firms in the sample; the level of change had risen to 70 percent at the time of exit from bankruptcy. The study noted that Gilson (1989), Betker (1993) and LoPucki and Whitford (1993) similarly reported high management turnover for distressed firms. The result also demonstrated that post bankruptcy retention of the firm's chief executive officer was related to worse post bankruptcy performance, and suggested that leaving incumbent management in place leads to a continuation of unprofitable investment. The result indicated that corporate governance structure might play an important role in reorganisation success.

Exploratory empirical analysis was carried out by Jensen-Conklin (1992) on firms that
filed for reorganisation under the United States Chapter 11 procedure and had a reorganisation plan confirmed by the courts. The study was concerned with determining the existence of any factors that might indicate a reorganisation plan’s successful consummation, determined by whether or not creditors were paid in full under the plan. Of the 45 firms that comprised the sample, only 26 plans were consummated, of which nine provided for liquidation of the firm. Jensen-Conklin found that plans funded solely from operations, and plans that provided greater pay out to creditors were less likely to be successful. Furthermore, shorter term plans, particularly those providing the agreed return to creditors over less than twelve months were more successful. In addition, greater size, measured by amount of liabilities, correlated with an increased chance of plan consummation.

Comerford (1976) examined the financial characteristics of 52 firms that had filed bankruptcy petitions under the United States Chapter 11 procedure. The sample comprised 26 firms that had filed Chapter 11 petitions and were subsequently liquidated, and 26 firms that had reorganised their affairs and continued operation for a period of two years. The objective of the study was to identify financial characteristics that distinguished firms that liquidated from those that successfully reorganised. The study used the principal components data reduction method to extract orthogonal factors representing financial dimensions for companies in the sample. Eighteen original ratios were reduced to six significant factors groups, and the highest loading ratio for each factor was included in the subsequent multivariate discriminant analysis (MDA).

Comerford reported that the MDA model using the reduced set of ratios selected
based on factor loading did not significantly discriminate between the two groups. Another model was developed using stepwise MDA with variables included in the model based on the \( F \)-to-enter parameter. Six ratios were selected for the discriminant function using this method. The second model was a significant discriminator at \( p=0.002 \), and correctly classified 85 percent of cases' actual group membership. A holdout validation test was also performed for the model, and it was concluded that the discriminant power of the second model was not caused by bias in the data. The six ratios that comprised the discriminant function included three ratios representing measures of liquidity, two ratios representing profitability and one leverage ratio.

Table 2.1 provides a summary of studies reviewed in this section. The table shows the objective, dependent variable(s) and significant results for each study.
### Table 2.1 - Summary of Reorganisation Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Objective</th>
<th>Dependent Variables</th>
<th>Significant Variables</th>
</tr>
</thead>
</table>
| Fisher & Martel (1995)       | Determine factors that distinguished reorganisation plans accepted by creditors | Acceptance / Rejection of reorganisation plan (reorganisation decision) | 1. Liquidation / reorganisation payoff rate  
2. Cash Payments ÷ Total Payments  
3. Secured Claims ÷ Total Liabilities |
| 338 Firms Canada             |                                                                          |                                                                     |                                                                                        |
| Hotchkiss (1995)             | Examine post bankruptcy performance of firms that had undergone reorganisation under U.S. Chapter 11 procedure. | Three models developed:  
1. Return / Non return to bankruptcy after reorganisation  
2. Positive / Negative operating income in reorganisation  
3. Industry compared operating margin (greater or less than industry average over 3 years) | Larger firms (Natural Log of Total Assets) associated with lower probability of reporting negative income (Size)  
Industry performance  
Retention of CEO in bankruptcy |
| 197 Firms United States      |                                                                          |                                                                     |                                                                                        |
| Campbell (1996)              | Develop a prediction model to forecast the probability of bankruptcy reorganisation. | Liquidated / Reorganised                                           | 1. Return on Assets (Profitability)  
2. Natural Log of Total Assets (Size)  
3. Non Pledged Assets (Free Assets)  
4. Type of business  
5. Number of under-secured creditors  
6. Number of secured creditors |
| 121 Closely Held Firms United States |                                                                 |                                                                     |                                                                                        |
| Frost-Drury et al (1998)     | Develop models to distinguish:  
1. VA's from liquidations  
2. VA's from non-failed companies | Two models developed:  
1. Entered VA / Liquidated  
2. Entered VA / Non-failed | Model 1:  
1. Log of Total Assets (Size)  
2. Working Capital Ratio  
Model 2:  
1. Working Capital Ratio  
2. Return on Total Assets  
3. Positive/Negative Owners' Equity |
| 52 Unlisted Companies:  
(13 VA's., 13 Liquidated and 26 Non Failed) |                                                                          |                                                                     |                                                                                        |
### Table 2.1 - Summary of Reorganisation Studies (cont’d)

<table>
<thead>
<tr>
<th>Study</th>
<th>Objective</th>
<th>Dependent Variables</th>
<th>Significant Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jensen-Conklin (1992)</td>
<td>Exploratory empirical analysis concerned with determining the</td>
<td>Successful / Unsuccessful reorganisation (based on whether terms of the firm’s</td>
<td>Successful plans were proposed by larger firms (Total Liabilities)</td>
</tr>
<tr>
<td>45 Firms</td>
<td>“existence of any indicia regarding the likelihood of a plan’s potential</td>
<td>reorganisation plan were complied with)</td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>for full consummation”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casey, McGee &amp; Stickney (1986)</td>
<td>Examine the potential information value of accounting data in</td>
<td>Reorganised / Liquidated</td>
<td>1. Non-Collateralised Assets ÷ Total Tangible Assets (Free Assets)</td>
</tr>
<tr>
<td>113 Firms</td>
<td>distinguishing firms in bankruptcy that reorganise versus those that</td>
<td></td>
<td>2. Net income ÷ Total Assets (Earnings Prospects)</td>
</tr>
<tr>
<td>United States</td>
<td>liquidate. Variable selection based on White’s ‘coalition model’.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong (1983)</td>
<td>Distinguish firms that reorganise, liquidate or continue operating</td>
<td>Reorganised / Liquidated</td>
<td>Level of Free Assets positively related to successful reorganisation</td>
</tr>
<tr>
<td>99 Firms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LoPucki (1983)</td>
<td>Exploratory study to determine the characteristics of firms that reorganised and continued to exist for up to three years from time of bankruptcy filing</td>
<td>Successful / Unsuccessful reorganisation</td>
<td>Larger firms were significantly more successful (Size)</td>
</tr>
<tr>
<td>41 Firms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2.1 - Summary of Reorganisation Studies (cont’d)

<table>
<thead>
<tr>
<th>Study</th>
<th>Objective</th>
<th>Dependent Variables</th>
<th>Significant Variables</th>
</tr>
</thead>
</table>
| Comerford (1972)     | Develop a multivariate model based on financial characteristics to distinguish firms that succeed in Chapter 11 reorganisation compared to those that failed | Successful / Unsuccessful reorganisation | MDA model included the following ratios:  
1. Quick Assets + Total Assets (Liquidity)  
2. Quick Assets / Current Liabilities (Liquidity)  
3. Total Debt + Total Assets (Leverage / Stability)  
4. Net Income + Total Assets (Profitability)  
5. Current Assets / Current Liabilities (Liquidity)  
6. Net Income / Stockholders Equity (Profitability) |
| 52 Firms             |                                                                           |                                      |                                                                                       |
| United States        |                                                                           |                                      |                                                                                       |
| Franks & Torous (1989) | To understand the institutional procedures of Chapter 11 and financing / investment decisions from an exploratory empirical examination of firms that have emerged from Ch. 11 proceedings. | (Not applicable)                     | Capital structure: level of debt / equity interest.                                    |
| 30 Firms             |                                                                           |                                      |                                                                                       |
| United States        |                                                                           |                                      |                                                                                       |
Review of the prior reorganisation studies shows that the operation of Australia's company reorganisation mechanism (voluntary administration) remains largely unexplored. This thesis will extend prior research relating to reorganisation in other jurisdictions to gain some insight into the operation of the unique Australian reorganisation process.

Multivariate studies reviewed in this section also present some methodological issues that will be addressed in this thesis. The objective of studies by Comerford (1976), Casey et al (1986), Campbell (1996) and Frost-Drury et al (1998) was to distinguish firms that reorganise from those that liquidate. Firms included in these studies were classified as 1) a reorganisation if they reorganised and continued operation for a specified period, or 2) a liquidation. While the models provide some insight as to the difference between reorganised and liquidated firms, the relevance of the models is questionable. The models do not take into account firms that reorganise and subsequently fail due to sample selection procedures that eliminated these firms.

Furthermore, the models may not provide accurate information about companies that successfully reorganise, as post insolvency performance is not considered in the classification of companies. Many of the companies that were classified as 'successful' in reorganisation may have performed poorly. Hotchkiss (1995) partly addressed this problem in her study that examined the effect of variables on post bankruptcy performance. However, the development of her set of independent variables was also limited.

The application of coalition behaviour theory in these studies is also questionable.
This is particularly so for the study by Casey et al (1986), as variable selection was made entirely on the basis of application of the theory to the reorganisation decision, yet the study purported to examine firm 'success' in reorganisation. Coalition behaviour theory deals with decision making in bankruptcy, yet the classification regime for firms in the models developed in the studies reviewed were not representative of the actual reorganisation decision as unsuccessfully reorganised firms were not included in the samples. Therefore, the models developed provide little information about the reorganisation decision. While the study by Fisher and Martel (1995) directly addressed the reorganisation decision, the development of their independent variable set was limited due to its ad-hoc approach.

Application of the models to the important problem of understanding the reorganisation decision of identifying suitable candidates for reorganisation is therefore limited. This thesis addresses these issues by developing models for 1) the actual reorganisation decision, and 2) identifying, from a pool of distressed companies, those companies that are likely to reorganise successfully. In addition, this thesis will make a contribution by presenting a discussion of coalition behaviour theory in the context of the Australian voluntary administration reorganisation process.

In relation to model development and variable selection the following conclusions can be drawn from the review of literature:

1. Application of the coalition behaviour theoretical model has proved to be useful in studies that have involved examination of the reorganisation decision.

2. Financial and non-financial variables have been demonstrated to have significant
information value in discriminating between firms that fail and those that reorganise.

3. Variation in post insolvency performance may be explained by financial and non-financial variables measured at the time of, as well as before, reorganisation.

While this section has reviewed studies that have examined the reorganisation process in various jurisdictions, there is a closely associated body of literature dealing with bankruptcy prediction. The following section will specifically deal with this body of literature and its relevance to this thesis.

### 2.5 Bankruptcy Prediction Studies

Closely related to prior research that has examined the reorganisation of financially distressed firms is a substantial body of literature dealing with bankruptcy prediction. Bankruptcy prediction studies are numerous, and prediction models have been well refined over many years. Therefore, this body of literature provides a useful background for methodological and variable selection issues relevant to model development in this thesis. This is demonstrated by the reference to previous bankruptcy studies as a basis for model development in reorganisation studies (see for example Comerford 1976). However, the range of bankruptcy prediction studies is large and not all directly relevant to this thesis. The following sections will discuss the use of financial ratios and non-financial variables in prediction studies generally. Particular emphasis will be given to reviewing of Australian bankruptcy prediction studies. In addition, a review of more recent prediction studies that have developed models that discriminate between types of distressed firms is presented. These studies suggest that different types of financial distress are represented by different underlying
constructs. This is of particular relevance to this thesis in relation to distinguishing distressed companies that reorganise successfully from those that reorganise unsuccessfully.

2.5.1 Bankruptcy Prediction - Financial Ratio Variables

The considerable interest in financial distress prediction over many years has led to numerous studies that have identified financial ratio variables that contain useful information for distress prediction. Significant among the early studies in this area was the work of Beaver (1966) who presented a univariate model using financial ratios to indicate the usefulness of traditional financial ratios in discriminating between bankrupt and non-bankrupt firms. Since this early study, financial ratio prediction models have been continually refined. For example, Altman’s (1968) use of multivariate discriminant analysis to distinguish bankrupt from non-bankrupt firms is acknowledged as a major advancement for financial distress prediction research.

The number of financial ratios that have been employed in the various prediction studies is large. Chen and Shimerda (1981) reviewed prior prediction studies and listed forty-one ratios that had been found to be useful predictors in models developed in twenty-six different prediction studies. They pointed out that variables employed were usually selected based on ad hoc pragmatism rather than on the basis of theory. Typically, selection was based on data that was readily available from financial statements.

Pinches, Mingo and Carruthers (1973) used factor analysis to determine the long-term stability/change patterns during 1951-1969 in financial ratio patterns for the United
States. The results yielded seven financial ratio factor patterns that were reasonably stable over time. This suggested common ratio classifications, and offered an empirical basis for grouping financial ratios. Chen and Shimerda (1981) further addressed the question of which ratios from the multitude that have been used in prior research should be included in a study. They reviewed five contemporary studies that had used principal components analysis to reduce the significant number of ratios that could be used (the studies were by Pinches and Mingo 1973, Pinches, Mingo and Carruthers 1975, Stevens 1973, Libby 1975, and Pinches, Eubank, Mingo and Carruthers 1975). Their review confirmed the existence of common groupings of financial ratios suggested earlier by Pinches, Mingo and Carruthers (1973). Chen and Shimerda demonstrated the existence of seven financial factors with which ratios could be associated by performing a principal components analysis of 39 ratios for 1053 United States firms. The seven factors suggested by Pinches, Mingo and Carruthers (1973) and confirmed by Chen and Shimerda were:

1. financial leverage;
2. capital turnover;
3. return on investment;
4. inventory turnover;
5. receivables turnover;
6. short term liquidity; and
7. cash position.

Importantly, the study showed that a minimum number of ratios, one ratio in most cases, should be selected to represent each factor in statistical analysis. As ratios within a factor are often highly correlated, inclusion of more than one ratio may lead to problems with multicollinearity, which can distort the dependent and independent variable relationship. The advantage of this approach to financial ratio selection is that a reasonable number of ratios can be selected to represent, without redundancy, the
principal financial dimensions of data available from financial statements.

### 2.5.2 Australian Bankruptcy Prediction Studies

Particular attention is given in this section to Australian bankruptcy prediction studies, with their methodology and significant variables highlighted.

Shailer (1990) compared the multivariate performance of 'traditional' accounting ratios with financial statement information, decomposition measures and accounting trend measures as predictors of bankruptcy. The ratios selected were based on those used in prior studies. Models were developed from a base sample of 102 companies, with 72 companies used as a holdout sample to test the predictive ability of models. Shailer reported that for the holdout sample, trend variables provided best overall predictive performance. However, the non-traditional financial variable models did not provide a substantial enhancement in predictive success over traditional variables. For example, overall prediction error rate of the trend measures model was 32.7 percent, compared with the traditional ratio model rate of 36.4 percent.

McNamara et al (1988) pointed to the differences between the characteristics of public and private companies as sufficient reason to develop a separate failure prediction model for private companies. Their study sought to develop a reliable and expedient model from a sample of 147 companies that would indicate whether a company was showing some of the characteristics that are associated with failure. Discriminant analysis was used to develop a model from ratios selected based on their use in prior studies. The final model included six of the original seventeen ratios that were included in the analysis. Prediction of group membership (healthy versus bankrupt)
was impressive at 85 percent for a holdout sample of forty companies. In assessing the importance of individual ratios, the study showed that surviving companies were more likely to have a better equity position (as measured by retained earnings/total assets); were more profitable in the short and long term, and accordingly had more retained earnings and were better able to meet tax and interest charges; had lower debt as a component of capital structure (total liabilities/total assets); had greater contribution of shareholders to the company's financing; and had a better liquidity position measured by a higher proportion of current assets to total liabilities.

Lincoln (1984) refined earlier distress prediction studies in three areas. First, by employing a methodology for independent variable selection that ensured that no arbitrary limit was placed on the number of variables selected. Second, by presenting separate analysis for industry groups, and thirdly by providing a measure of insolvency risk from the probabilities yielded by analysis. Discriminant functions were selected on the basis that they provided 1) the best classification accuracy, and 2) the absence of ambiguity in their interpretation. Results indicated that classification would be more accurate if prediction models are developed separately based on a single industry, as the best discriminant functions differed across selected industries. Lincoln demonstrated the usefulness of ratio based prediction models by application of the models developed in determining an insolvency risk index. The operation of the insolvency risk index was successfully demonstrated in a case example for a surviving company. Lincoln concluded that all of the factors that influence the success of a company are reflected in its financial statements.

Izan (1984) also developed a corporate failure classification model using an industry-
relative approach. The study was based on a substantially larger sample than had been used in prior studies. Predictor variables were selected based on objective assessment of their ability to provide early warning indicators of financial distress. The five financial ratios selected were adjusted to an industry relative value by dividing the 'raw ratio' by the industry median comparable to the ratio measurement. Interest coverage and market value of equity/total liabilities were reported as significant variables in the models developed using discriminant analysis. Classification accuracy for the model was impressive at 91.9 percent for both the original sample and for a holdout sample. Results of classification accuracy for two and three years prior to bankruptcy fell from the original 91.9 percent to 82 percent and 75.5 percent respectively. Izan reported that 100, 70 and 40 percent of companies in a holdout sample were correctly classified one, two and three years prior to failure. Comparative classification results were provided for a 'raw-ratio' model, which was not as accurate as the industry-relative model (89.9 percent accuracy).

Castagna and Matolcsy (1981) analysed a sample of 21 failed and 21 non-failed companies using a number of discriminant analysis models. Their study focused on the classification accuracy of discriminant analysis models using different sets of financial ratio predictor variables. Ratios used were those they had previously found to be useful discriminators, which included measures of profitability, liquidity, debt coverage, leverage and capitalisation. Models were developed using both five and ten ratios from the original predictor variable set, with slightly less accuracy reported for the model using the smaller number of ratios. Best results for the ten variable model (equal prior probability, Lachenbruch test linear model) was a classification accuracy of 93 percent. Results of Australian studies are summarised in Table 2.2 below.


Table 2.2 - Summary of Australian Financial Distress Prediction Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Objective</th>
<th>Dependent Variables</th>
<th>Significant Financial Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shailer (1990)</td>
<td>To compare the performance of a variety of financial measures in discriminating between bankrupt and non-bankrupt companies</td>
<td>Failed (subject to winding-up petition) / Non-Failed</td>
<td>1. Pre-tax Operating Income / Interest Expense</td>
</tr>
<tr>
<td>172 Companies</td>
<td></td>
<td></td>
<td>2. Bad Debts Expense / Protect Operating Income</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Current Assets / Retained Earnings</td>
</tr>
<tr>
<td>McNamara et al.</td>
<td>To provide a reliable and expedient model for identifying private companies that may soon fail.</td>
<td>Failed (subject to court order to winding-up) / Non-Failed</td>
<td>4. Current Liabilities / Cash / Market Value of Listed Securities / Net Trade Debtors</td>
</tr>
<tr>
<td>Companies</td>
<td></td>
<td></td>
<td>6. Absolute Value of Income Before Tax / Interest and Depreciation / Taxed Liabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Izan (1984)</td>
<td>To investigate the indications of corporate distress in Australia, and to construct a business failure model that could be applied across a broad cross-section of industrial sectors</td>
<td>Failed (receiver or liquidator appointed) / Non-Failed</td>
<td>1. Earnings Before Interest and Taxes / Tangible Total Assets</td>
</tr>
<tr>
<td>103 Companies</td>
<td></td>
<td></td>
<td>2. Earnings Before Interest and Taxes / Interest Payments</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Current Assets / Current Liabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Funded Debt (Borrowing’s) / Shareholder Funds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Market Value of Equity / Total Liabilities</td>
</tr>
<tr>
<td>Study</td>
<td>Objective</td>
<td>Dependent Variables</td>
<td>Significant Financial Variables</td>
</tr>
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<td>---------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Property and Finance Companies: 1. Profit Before Interest and Tax ÷ Total Assets 2. Total Liabilities ÷ Total Assets</td>
</tr>
</tbody>
</table>
The brief review of Australian financial distress prediction studies indicates:

1. Classificatory success of the models varies widely.
2. Sample sizes are generally small, reflecting the few cases of listed company failure and the difficulty associated with accessing small (unlisted) company data.
3. Variables pertaining to profit performance, liquidity, leverage and company size persistently appear in Australian studies as significant predictors of financial distress.

### 2.5.3 Bankruptcy Prediction - Non Financial Variables

In the previous section a number of studies were cited that have identified financial variables that are relevant to bankruptcy prediction. Research indicates that incorporation of both traditional financial ratio variables and non-conventional variables may enhance the power of the model limited to the financial ratios (Watson 1996).

Peel, Peel and Pope (1986) and Peel and Peel (1988) used non-conventional variables in addition to accounting data in their distress prediction studies. Their empirical results suggested that non-financial variables, which included management change and time lag in company reporting, enhanced predictive power. Information relating to corporate governance structure has been found to improve the power of bankruptcy prediction models. Daily and Dalton (1994) tested the incremental value of corporate governance variables over financial variables in a bankruptcy prediction model for 114 firms. They reported a marked improvement in the prediction success rate when non-financial variables were included in the model. Tennyson, Ingram and Dugan (1990) developed a prediction model based on both financial ratios and narrative
disclosures in the accounts: the model composed of both financial ratios and narrative scores was clearly superior to single data set models. Other non-financial variables that have been reported as relevant include reporting lags (Lawrence 1982, Whittred and Zimmer 1984, Keasey and Watson 1987) and macroeconomic variables (Foster 1986, Rose, Andrews and Giroux 1982).

Studies that have exclusively used non-financial data to predict financial distress further indicate that these variables have valuable information content. For example, Lussier conducted a comprehensive evaluation of the value of non-financial data in predicting small business failure. The study tested the information value of fifteen variables that had been identified in twenty journal articles as contributing to success versus failure for a matched sample of 216 firms (108 failed, 108 successful). Lussier reported a logistic regression model that predicted a group of businesses as failures or successes more accurately than random guessing over 99 percent of the time.

Review of financial distress literature that has examined the information content of non-financial variables for bankruptcy prediction suggests that model development and refinement may require consideration of non-financial variables in addition to traditional financial ratio variables.

2.5.4 Bankruptcy Prediction - Types of Financial Distress

More recently, financial distress prediction literature has suggested that the information value of models developed which discriminate between healthy firms and failed firms is limited. Peel and Peel (1987) suggested a major weakness of work on failure prediction models is that the non-failed samples used were restricted to include
only healthy companies. They suggested that the traditional two-group failure analysis does not take into account a 'grey area', in which the classification of firms as failed or non-failed is indeterminate. To support this suggestion, Peel and Peel demonstrated that a 'traditional' logit failure prediction model, developed from a sample of failed and healthy companies, could not effectively distinguish between failed and loss making companies.

Gilbert et al (1990, p.161) suggested a stronger case for the information value of prediction models could be made if the models discriminate 'at risk' firms that survive and 'at risk' firms that fail. To test this proposition, Gilbert et al assessed the ability of a stepwise logistic regression prediction model, developed from an estimation sample comprised of bankrupt and non-bankrupt firms, to predict the status of firms in a holdout sample of bankrupt and financially distressed firms. Classification accuracy for the estimation sample from which the model was developed was 88.5 percent (90.8 percent on a holdout sample). In contrast, classification accuracy of the model was poor when applied to a sample of bankrupt/financially distressed firms, with only 66.7 percent of firms in the holdout sample correctly classified. The results confirmed that traditional bankruptcy models perform poorly when attempting to identify likely bankruptcies from a pool of distressed or problem companies. Also, the results indicated that the financial characteristics of distressed and bankrupt firms are somewhat similar, making the discrimination of these firms more difficult than for bankrupt / non-bankrupt (healthy) firms. Gilbert et al concluded that the dimensions that set apart bankrupt from healthy firms might be different from those that separate bankrupt from distressed (but not bankrupt) firms. Financial ratios used as predictor variables in the study were drawn from two prior studies: nine from the work of Casey
and Bartczak (1985), and five from Altman's (1968) Z-score model. Significant variables in the bankrupt/ non bankrupt (healthy) estimation model included; earnings before interest and taxes/total assets, cash flow from operations/total liabilities, and stockholders' equity/total liabilities. For the bankrupt/financially distressed model significant variables included: cash flow from operations/total liabilities, cash/total assets, stockholders' equity/total liabilities and retained earnings/total assets.

Further evidence of different types of financial distress, and the need to consider closely the relevance of traditional financial distress prediction models was presented by Ward and Foster (1997). Their study developed, from United States data, two financial distress prediction models using different dependent variables. The dichotomous dependent variable for the first model was coded according to whether the firm was 1) healthy, or 2) had filed for bankruptcy protection. For the second model, the dependent variable indicated whether the firm was 1) healthy, or 2) had experienced a loan principal/interest default or debt accommodation. Independent variables for the models were consistent, and were derived from previous bankruptcy prediction studies. Ward and Foster (1997) reported differences in significant predictor variables for models based on the different distress events, and concluded that bankruptcy and loan default/accommodation measure different constructs.

The approach of the bankruptcy prediction studies reviewed above is particularly relevant to this thesis as they focus on the problem of distinguishing different types of financially distressed companies. Peel and Peel (1987) and Gilbert et al (1990) demonstrated that traditional bankruptcy prediction models do not adequately deal with this problem, and highlighted the need for further development and refinement in
this area of distress prediction research. This is relevant to the problem of distinguishing distressed companies that reorganise successfully from distressed companies that reorganise unsuccessfully. The studies reviewed provide a useful methodological reference for this thesis as they indicated that distressed companies that reorganise successfully might be distinguished from companies that reorganise unsuccessfully because they are experiencing different types of financial distress. This thesis adds to prior research in this area by developing an environmental model that should provide some information regarding the types of financial distress associated with companies that attempt reorganisation.

2.5.5 Bankruptcy Prediction Studies - Summary

Conclusions from the review of bankruptcy prediction studies, which are summarised below, provide an important background for this thesis:

1. Both financial ratio and non-financial data has information value in discriminating between healthy and distressed companies.

2. Bankruptcy studies and model development using Australian data is relatively limited, perhaps due to problems with data availability. Sample size for prediction studies in the Australian setting have been small for the same reason. Prior research has only developed models concerned with the classification of companies as failed/non-failed.

3. Selection of independent variables has generally been problematic due to the absence of a theoretical basis for variable selection. Large numbers of financial ratios have been used across a range of studies. However, prior studies demonstrate that ratios can be associated with a smaller number of financial factors. Information content may be adequately represented by a smaller number
of ratios chosen to represent these factors.

4. Studies that are more recent have demonstrated a need for further investigation of constructs that represent different types of financial distress. This research suggests that traditional bankruptcy prediction models do not adequately address financial distress decisions that involve distinguishing types of distressed companies. For example, distinguishing ‘at risk’ firms that survive from those that fail; or, failed firms from non-failed poor performing firms. Although this issue has been explored in the context of failure prediction, this thesis makes a contribution by examining types of financial distress within the setting of company reorganisation. This is achieved by addressing the problem of distinguishing distressed firms that reorganise successfully from those that are unsuccessful in reorganisation.

2.6 Human Information Processing Studies

Discussion in previous sections of this chapter has focused on prior research related to financial distress and company reorganisation from an environmental predictability viewpoint. These studies have provided evidence that financial and non-financial data are useful in predicting financial distress events, such as business failure and reorganisation. Sophisticated prediction models, particularly for business failure, have been developed as a valuable tool to aid decision-makers. Another important body of research that is relevant to the analysis of financial distress events is in the area of human information processing. Joint examination of ‘environmental predictability’ and ‘human information processing’ aspects of financial distress events and prediction is well established in the literature (Houghton and Woodliff 1987). This section will briefly review prior studies that are relevant to the objectives of this thesis.
In reviewing this area of literature it should be stressed that very few (if any) previous studies have examined human information processing in the context of decisions regarding company reorganisation. The introduction and widespread use of voluntary administration means that this area of decision making has become increasingly important, yet it remains largely unexplored. Consequently, this thesis attempts to contribute to existing literature by considering human information processing associated with decisions made under the voluntary administration mechanism for company reorganisation.

2.6.1 The Brunswick Lens Model

Human information processing studies relevant to financial distress events have generally been based on the Brunswick Lens Model (see Brunswick 1952). Libby (1975) provided one of the first examples of application of the Brunswick Lens Model framework. He analysed the judgement accuracy of bank loan officers in a business failure prediction task. Subsequent studies have extended the application of Libby’s seminal work (see for example Zimmer (1980), Abdel-khalik and El-Sheshai (1980), Casey (1980 and 1983), and Houghton (1984)).

Libby (1975) discussed the application of the Lens Model to decisions made by users of accounting information, and highlighted the model’s three components:

1. the criterion variable or event about which the decision-maker is interested in (e.g. failure/non-failure or reorganisation/liquidation);

2. the decision maker’s decision – his or her judgement of the particular event; and

3. the information set or cues.
Brunswick's model is illustrated in Diagram 2.1 below.

**Diagram 2.1 – The Lens Model Framework**

The left side of the Lens model represents the environmental or predictive ability system which describes the relationship between information cues and a relevant environmental event (Libby 1975, p.477). In this thesis the environmental events of interest are 1) the reorganisation decision, and 2) the performance event (successful or unsuccessful reorganisation). The information cues are items of accounting information – primarily accounting ratios calculated in the period immediately prior to the reorganisation decision. The right side of the model is the behavioural or decision maker system, which describes the relationship between the information cues and the
decision-maker’s judgement (Libby 1975, p.477). The decision-makers in this study are insolvency practitioners. Imperfections in the left side of the model represent the extent to which the information cues fail to reflect exactly the criterion event. Imperfections in the right side of the model involve sub-optimal processing of data by the human decision-makers (Houghton and Woodliff 1987, pp.538).

Houghton and Woodliff (1987, pp.538-539) noted that a critical aspect of the Lens Model is that imperfect human decisions may be a product of either or both “(1) imperfect information describing the criterion variable and, (2) imperfect cue utilisation by the human”. This thesis is concerned with examining the efficiency of decisions made regarding a company’s reorganisation prospects. Therefore, in addition to examining the relationship between information cues and the reorganisation event (environmental models), it is important to examine the relationship between information cues and the relevant decision-maker’s judgement. This examination may provide a valuable insight as to how relevant decision-makers’ utilisation of cues might be improved by reference to environmental models, resulting in increased efficiency for reorganisation decisions.

Similar application of prediction models has been reported in studies concerned with auditor assessments of going-concern status for companies. In one of the first of these studies, Altman and McGough (1974) suggested that models and methodologies used in bankruptcy prediction could be applied to the prediction of going-concern continuity. Their comparison of the performance of auditors’ decisions with and environmental models indicated the models were superior in identifying going-concern problems. Subsequent studies have tended to confirm the superior predictive

### 2.6.2 Human Information Processing – Prior Studies

Prior human information processing research has examined a number of bankruptcy decisions for which accounting cues are relevant to human decision-makers. Those most relevant to this thesis include bank loan officers’ prediction of financial distress, and auditors’ use of bankruptcy prediction models as an aid to the going concern judgement.

Libby (1975) reported the seminal contribution to bankruptcy prediction research, in a study that provided forty-three experienced loan officers with financial profiles for 60 real but disguised companies, half of which had failed. The task for loan officers was to distinguish failed firms from survivors. The loan officers were found to be reasonably accurate predictors of corporate failure. Prediction achievement for the experimental task averaged at 74 percent, with a high degree of consensus among subjects in their responses.

In a replication study, Zimmer (1980) found the mean prediction accuracy of subjects to be 77.1 percent. Casey (1980), in a similar study, observed that bank loan officers achieved only a 56.7 percent accuracy rate for a similar task. Lack of prior probability disclosure has been suggested as the cause of this conflicting result. Subsequent studies have examined the effect of prior probability disclosure and information set effect on prediction accuracy (Abdel-khalik and El-Sheshai (1980), Casey (1983), Houghton (1984) and Houghton and Segupta (1984)). Results suggested lack of
disclosure of prior probability will cause some variance in prediction accuracy rates, and the more representative of reality the experimental materials were, the higher would be the subjects accuracy (Van Breda and Ferris 1992).

The Lens Model Framework has also been applied with auditors as subjects. The decision event in these studies has included going-concern decisions and failure prediction. Results in these studies have also reported reasonable levels of prediction accuracy (for example, see Kida 1980, Simnett and Trotman 1989).

In addition to determining subjects’ prediction accuracy, prior studies have also examined how subjects used cues and their attitude to the experimental task. For example, Libby (1975) and Zimmer (1980) reported on the effect of individual differences, judgmental consensus, and self-insight into accuracy of each prediction.

Particularly relevant to this thesis is a study by Houghton and Woodliff (1987) that examined whether human information processors could accurately predict a firm’s future success. Success was determined by firm performance, measured by relative earnings per share. The study was concerned with determining whether subjects could predict future levels of earnings per share from previous years’ financial ratios. Subjects, who were bankers and students, were required to make predictions concerning 1) failure and non-failure cases, and 2) relatively high and low earnings per share cases. Prediction accuracy for bankers was 54.1 percent and 49.8 percent for the students, compared to 66.67 percent for a cross-validated discriminant model. Houghton and Woodliff suggested the reasons for subjects’ poor predictive performance could be a result of subjects not being sufficiently expert to perform the
task effectively, or that the task was extremely difficult (or impossible). A review of subjects’ responses showed they were consistently using a set of variables to distinguish companies that were different from those found to be useful discriminators in the reasonably successful discriminant model. This relates closely to the decision event examined in this thesis - the reorganisation decision, which requires decision-makers to determine the likely prospects (performance) of distressed companies.

Prior research that has examined the performance of human decision makers has found that additive models of decision makers’ predictions can be more accurate predictors of environmental events than the individuals themselves. Superior accuracy of these ‘models of man’ can be attributed to an individual’s loss in accuracy, caused by the inconsistent application of his or her judgement policy exceeding the increase in accuracy derived from his or her valid use of non-linear relationships between cues and the decision event (Zimmer 1981). Results of previous studies that have compared the prediction accuracy of human decision-makers and their additive models for financial distress prediction tasks have been mixed. For example, Libby (1976) reported individuals outperforming their models for an experimental study of loan officers’ predictions of corporate bankruptcy. Zimmer (1981) reported on an experiment for a group of Australian bank loan officers. Zimmer’s (1981) study reported that most loan officers were outperformed by their ‘models of man’. However, when cross-validated models of man were compared to loan officers, the difference between the mean accuracy was not significant. In this thesis, performance of the model of man will be compared to the performance of man for experimental task subjects. The purpose of this comparison will be to assess whether inconsistent application of judgement policy affects the prediction accuracy of insolvency experts
when deciding on the suitability of a company for reorganisation

Prior human information processing research demonstrates the usefulness of financial cues to various subjects required to make financial distress related decisions. Previous studies using the Lens Model Framework provide a valuable reference that is readily extended to examining prediction accuracy of human decision-makers faced with other decision events. However, human information processing aspects of the decision as to whether a company should reorganise, and the likelihood of that reorganisation being successful have not yet been directly addressed. This thesis contributes to the existing human information processing literature by applying the Lens Model Framework to decision events associated with company reorganisation under voluntary administration.

2.7 Summary of Relevant Points from the Literature Review

This review has identified conflicting theories as to what insolvency legislation should set out to achieve. The Australian legislature has embraced the value-based approach to dealing with insolvency through the introduction of voluntary administration. The aim of the legislation is to preserve businesses and jobs where possible. Some argue that this approach is costly in the long run. A review of previous studies in other jurisdictions indicates the existence of costly filter failure where inefficient firms attempt to reorganise. This is reflected by studies that have reported generally poor performance for reorganised firms.

Further, this review has identified useful measures of post insolvency performance and variables that are likely to affect the level of performance. Methodologies useful for development of multivariate prediction models for companies likely to be
successful in the post insolvency environment have been identified. Review of the literature further indicates that information which will assist in determining post insolvency performance can be found in both conventional financial ratios and non-financial variables. Moreover, it appears that a combination of both variable types will enhance the predictive ability of models developed.

Furthermore, in light of the above discussion concerning use of financial ratio variables in bankruptcy prediction studies, close consideration needs to be given to the underlying financial constructs of distressed companies involved in the reorganisation process. The more recent findings in financial distress prediction research suggest that types of financial distress are represented by different financial constructs. These findings are important to this thesis as they suggest different constructs may be associated with companies that:

1. attempt reorganisation as opposed to those which are liquidated; and
2. successfully reorganise, as opposed to unsuccessful reorganisations.

Investigation of these constructs may assist in understanding the 'filter failure' problem, whereby inefficient companies are reorganised, representing an important contribution to understanding the mechanism of company reorganisation.

This thesis is concerned with testing propositions relating to variables that are postulated to have an effect on 1) a company's reorganisation prospects (the reorganisation decision), and 2) success in reorganisation. Reference was made in prior studies to the coalition behaviour model that attempts to explain the reorganisation process. This will be discussed thoroughly in the next chapter in development of theoretical propositions. Therefore, the 'brute' empirical approach
(Watson 1996) of building a model purely on the basis of statistical power, or selecting predictor variables on an ad-hoc pragmatic basis that has characterised prior studies in this area is avoided.

Finally, review of prior human information processing studies demonstrated the importance of examining the relationship between environmental information cues and decision makers' judgement for financial distress decision events. However, human information processing aspects of the decision as to whether a company should reorganise, and the likelihood of that reorganisation being successful have not yet been addressed. This thesis contributes to the existing literature by applying the Lens Model Framework to decision events associated with company reorganisation.
CHAPTER THREE
EXPLORATORY STUDY

3.1 Introduction

As discussed in the introductory chapter, the voluntary administration legislation is a relatively new addition to Australia's insolvency regime. Accordingly, little is known about how the legislative process embodied in voluntary administration has been implemented. This chapter presents the results of an exploratory study that investigated the operation of voluntary administration legislation.

As there has been little prior research regarding the voluntary administration process, one of the objectives of the exploratory study was to gather information that would provide an overview of the legislation’s operation. A further objective was to examine the general operation of the administration process with a view to finding information that might be relevant to the development of environmental models in the later chapters of this thesis. Accordingly, a range of data were collected in the exploratory study with a view to identifying features of the voluntary administration process relevant to 1) the reorganisation decision, and 2) the performance of companies that attempt reorganisation.

The exploratory study obtained data from insolvency practitioners about companies that had entered voluntary administration. Practitioners were contacted by mail survey, and were requested to provide data relating to voluntary administrations for which they had been appointed as the administrator. Each practitioner surveyed was asked to select two voluntary administrations they had completed; one administration they considered to be ‘successful’, and another administration they considered to be
'less than successful'. Therefore, the information gathered in the exploratory study related to administrations across a range of outcomes.

Practitioners were requested to complete a questionnaire that sought a variety of data for each administration that they selected. The first part of the survey focused on gathering information pertaining to the background of insolvent companies that enter voluntary administration. Specifically, information was requested regarding who initiated the appointment of the administrator; whether there had been a previous attempt to reorganise company debt during the twelve months prior to administration; what company’s business activity was; whether there was a secured creditor that fell within the definition of s 441A of the Corporations Law (Cth), and if this creditor chose to enforce its charge within the required decision period.

In the next section of the exploratory study, information was sought relating to the nature of financial distress experienced by the companies. Information was requested from practitioners about what they considered had contributed to the company's financial distress. Practitioners were asked to rate the importance of a number of factors as contributors to the company’s insolvency. The factors were derived from a prior study by Williams (1986) that had examined reasons for firm failure.

The final section of the exploratory study sought information concerning the outcome of the administration. This included the details of any deed of company arrangement that had resulted from the administration.

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1 Administrators could select any administration they had completed since the commencement of the voluntary administration regime.
2 Section 441A provides that the holder of a charge over all, or substantially all, of the company’s assets may elect to enforce the charge within ten business days of the administrator’s appointment.
The exploratory study questionnaire and covering letter is reproduced as Appendix 1. In addition, a complete summary of responses is provided at Appendix 1(a).

This chapter proceeds as follows. First, details regarding data collection for the exploratory study are presented. Next results of the study are presented in sections relating to:

1. the nature of the financial distress of companies in the sample;
2. the background and circumstance of the administrators appointment; and
3. the administration outcomes.

The chapter concludes with a discussion of the results of the exploratory study and their relevance to the development of environmental models in this thesis.

3.2 Data Collection

Data for the exploratory study was obtained by a mail questionnaire sent to 270 insolvency practitioners throughout Australia. In total, 48 questionnaires were returned, from 27 different respondents. The survey instructions requested that practitioners provided information for two administrations (as discussed in section 3.1). Despite this request, six of the respondents provided details for only one administration. In addition, some of the returned questionnaires were incomplete, which is reflected in the number of reported cases for some survey results presented in this chapter. Data for companies that entered administration during the years 1993 to 1997 were obtained from the survey.

The low overall response rate to the survey (about 10 percent) raises the prospect of non-response bias in the sample. It is suggested that the low response rate was
attributable to the time required for practitioners to compile a meaningful response to the questionnaire. Many of the responses were from large, well-known insolvency firms, which possibly indicates small firms with limited resources were less likely to respond. Checking of late respondents as a surrogate for non-respondents did not reveal any patterns that would indicate the nature of any non-response bias. However, the possible effect of non-response should be recognised as a limitation of the exploratory study results.

3.3 Factors Contributing to Financial Distress

The first part of the exploratory study examined factors that may have contributed to the distress of a company. The objective was to gain some insight into the nature of the financial distress experienced by companies that enter voluntary administration. A summary of factors that might lead to insolvency were derived from a previous study by Williams (1986), which examined the reasons for failure of some five thousand firms between 1973 and 1985. He reported thirty-one factors that summarised the reasons for failure of firms in his sample. The thirty-one factors were classified into the following categories: financial management and liquidity, management incompetence and inexperience, inflation and economic conditions, poor books and records, sales/marketing problems, staffing problems, union problems and interference, and failure to seek and use external advice.

Respondents to the exploratory study were required to indicate the extent to which they felt that each of the thirty-one factors contributed to the company's insolvency by rating their effect on a five-point scale. Table 3.1 presents factors that respondents indicated were important. Factors that had an average rating of 'marginal' and above
have been reported.

<table>
<thead>
<tr>
<th>Table 3.1 – Summary of Factors Contributing to Insolvency</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Management Experience, Skill and Ability</td>
<td>3.02</td>
</tr>
<tr>
<td>Undercapitalisation at Start up</td>
<td>2.91</td>
</tr>
<tr>
<td>Inadequate Sales</td>
<td>2.85</td>
</tr>
<tr>
<td>Lack of Financial Planning</td>
<td>2.75</td>
</tr>
<tr>
<td>Industry Wide Turndown</td>
<td>2.42</td>
</tr>
<tr>
<td>Failure to Seek and Use External Advice</td>
<td>2.27</td>
</tr>
<tr>
<td>Bad Debts and Slow Collections</td>
<td>2.13</td>
</tr>
<tr>
<td>Problems with Staff Supervision, Motivation and Productivity</td>
<td>2.13</td>
</tr>
<tr>
<td>Inability to Borrow Needed Funds</td>
<td>2.12</td>
</tr>
<tr>
<td>Inability to Assess Risk of Expansion or New Investment</td>
<td>2.12</td>
</tr>
<tr>
<td>Inadequate Books and Records</td>
<td>2.00</td>
</tr>
<tr>
<td>Reliance on Too Few Customers / Suppliers</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Scale values were labelled as follows: 1=no effect, 2=marginal, 3=moderate, 4=significant, 5=major.

The responses suggest that poor management was an important contributor to the financially distressed state of companies in the sample. The factor 'lack of management experience, skill and ability' was rated as the most important contributor to this distress. Several factors associated with the category 'financial management
and liquidity’ also rated highly. These were - lack of capital, lack of financial planning, poor collections, bad debts, inability to borrow needed funds and poor risk assessment for expansion activities. The factor ‘inadequate sales’ also rated highly. The only external (uncontrollable by the company) factor that was rated highly by respondents as contributor to insolvency was ‘industry wide downturn’.

The results here generally concur with the findings of Williams’ (1986) study, which suggested that internal reasons for failure predominated over those from external sources. More than 80 percent of the business failures in Williams’ sample reported internal or controllable causes resulting from management deficiencies as major factors leading to their failure.

### 3.4 Background To Appointment of Administrator

Next, the exploratory study focused on the circumstances in which the appointment of the administrator occurred. In addition, the role of substantial chargeholders was examined. This type of creditor can avoid the moratorium provisions contained in the legislation that prevent action by creditors against the company during the period of the administration. Enforcement of the charge will effectively veto the appointment of the administrator\(^3\).

For the majority of companies (94 percent), company directors initiated the appointment of the administrator. Furthermore, in 40 percent of cases, the directors’ appointment of an administrator was prompted by action initiated by persons dealing with the company. The nature of this action included:

\(^3\) See section 441A of the Corporations Law.
1. the application for winding up;
2. the issue of writs summons and demands;
3. recovery action by the Australian Taxation Office;
4. the appointment of a controller; and
5. recovery action by a secured creditor.

The average time between the above-described action being taken and appointment of the administrator was three months, with the range being from zero to eight months. In addition, thirty-six percent of companies in the sample had attempted to reorganise company debt during the twelve months prior to appointment of the administrator. The findings suggest that directors may be adopting strategies to avoid insolvency administration for as long as possible.

3.4.1 Role of the 'Substantial Charge Holder'

The support of a secured creditor holding a substantial charge over all, or substantially all, of the company's assets is critical to the success of an administration. This is because a substantial chargee can choose to remain outside of the moratorium provisions of voluntary administration. Section 441A of the Corporations Law provides an exception to the general moratorium on creditors' claims against the company during administration by providing that a substantial charge holder may elect to enforce its charge within ten business days of notification of the administrator's appointment. Enforcement of the charge would effectively leave the administrator powerless to deal with the company's property or conduct its affairs. While enforcement of the charge will not necessarily end an administration, it is unlikely that continuing the administration after enforcement will serve any practical
Of the 48 companies for which data was provided in this study, 37 or approximately 79 percent had a secured creditor with a substantial charge over the company's property. Substantial chargees enforced their security in only three cases. Respondents indicated that most substantial chargees chose not to enforce the charge because they felt their security was adequate. In addition, they were confident that the administrator would protect the value of their security, and they expected to be paid in full under the subsequent deed of company arrangement. Other reasons provided for not enforcing the charge included: concurring with the deed of company arrangement improved the position of the chargee; the secured creditor was a director, or associated with directors; and the secured creditor had appointed the administrator.

This finding indicates that, in the most cases, substantial chargees consider their position to be adequately secured or, at the least, are being convinced that administration will not harm their financial interests.

### 3.5 Administration Outcomes

The exploratory survey also sought information from respondents regarding the outcomes for companies that had entered administration. Information was requested relating to the return provided to creditors; the deed of company arrangement provisions for reorganising the company's affairs; whether the deed's terms had been complied with; and the costs of administration.

Examination of return to unsecured creditors for the 45 companies that provided
information indicated that unsecured creditors share in at least some of the going concern value of the company where reorganisation occurs. Companies were grouped according to the outcome of the administration to enable comparison of returns across the outcome groups. The outcome categories used were - rehabilitation, sold as going concern, liquidating deed and failed deed or wound up. Table 3.2 presents relevant data from the sample companies in these four groups.

<p>| Table 3.2 – Return to Unsecured Creditors Classified by Administration Outcome |
|-------------------------------|-----------------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number</th>
<th>Average Return (cents per dollar)</th>
<th>Average Time (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reorganised</td>
<td>14 (31%)</td>
<td>57</td>
<td>2</td>
</tr>
<tr>
<td>Sold As Going Concern</td>
<td>8 (18%)</td>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td>Liquidating Deed</td>
<td>12 (27%)</td>
<td>21</td>
<td>0.5</td>
</tr>
<tr>
<td>Failed Deed or Wound Up</td>
<td>11 (24%)</td>
<td>(3 reported a nil return)</td>
<td>__</td>
</tr>
</tbody>
</table>

Average return across all groups was 37 cents per dollar. Improved return for companies in the sample that concluded administration with a reorganisation plan (57 cents per dollar) appears to indicate that this outcome may preserve some of the 'going concern' value of the business. However, it is necessary to make some qualifications to this result. First, most of the companies in this category were those that insolvency practitioners considered to be ‘successful’\(^4\). It is possible that practitioners selected companies that achieved significant success, therefore, the results may be biased. Secondly, as some of the returns were provided for over a

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\(^4\) Respondents were asked to provide data for a 'successful' and a 'less than successful' administration.
lengthy period the time value of money needs to be taken into account. Thirdly, the return provided for in the deed of arrangement may not eventuate if the reorganisation subsequently failed.

For companies in the sample that entered a deed of company arrangement, 47 percent failed to comply with the terms of the original deed with respect to the return promised to unsecured creditors. Outcomes differed from the deed provisions in the following ways:

1. the company was subsequently wound up;
2. the amount or timing of return to unsecured creditors varied; and
3. legal action to have the deed overturned delayed completion.

This finding suggests that the return to unsecured creditors specified in the deed of company arrangement resulting from the administration process is somewhat illusory. This may have implications for the efficiency of the administration process. The promise of improved returns to unsecured creditors may serve to coerce support for a reorganisation plan in circumstances where the company is not a suitable candidate for reorganisation. Furthermore, the fact that a number of companies were liquidated or failed to comply with obligations to unsecured creditors specified in the deed of company arrangement indicates that the administration process may allow for the reorganisation of inefficient companies.

Finally, information regarding changes that had been made to the operation and management of the company as a result of administration was also requested from respondents. Management change and closure of part of the business were reported as
the most common changes effected as part of the reorganisation plan.

3.5.1 Successful Versus Unsuccessful Administration Outcomes

The environmental models developed later in this thesis focus on the usefulness of company characteristics in determining administration outcomes. Data for companies in the exploratory study were examined to determine whether company characteristics might be useful in determining administration outcomes. For this analysis, companies in the exploratory study sample were classified as 'successful' or 'unsuccessful'. Subsequently, comparison of company industry classification and size (measured by total assets) between the successful and unsuccessful groups was performed.

In order to group each company's administration outcome as successful or unsuccessful, consideration was given to whether the company's deed of arrangement:

1. provided for continued trading; or
2. involved sale of the company's business as a going concern; or
3. involved sale of a substantial part of the business that provided for continuation of core business activity with a minimal loss of employees (<25 percent).

If any of these criteria were met, the company was classified as having a successful administration outcome. The administration outcome could be determined for 43 of the 48 companies for which data was available.

Administration outcomes were first classified by industry type. The results are reported in Table 3.3 below. The percentage of successful and unsuccessful administration outcomes varied across the industry groups. Companies with retail business operations proved to be the most successful, with 86 percent of companies in
that group classified as having a successful administration outcome.

Table 3.3 – Administration Outcomes Classified by Business Type

<table>
<thead>
<tr>
<th></th>
<th>Retail</th>
<th>Service</th>
<th>Manufacturing</th>
<th>Other $^5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>6 (86%)</td>
<td>6 (43%)</td>
<td>7 (58%)</td>
<td>4 (33%)</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>14</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

The chi-square test was used to determine whether the differences between the industry groups were significant. The analysis revealed the differences were not significant ($\chi^2 (1, 45) = .14$, ns).

Insolvent companies that comprised the sample were also classified by size (based on amount of assets) and administration outcome. Table 3.4 presents the result of this classification.

Table 3.4 - Administration Outcomes Classified by Company Size

<table>
<thead>
<tr>
<th></th>
<th>&lt;$500k</th>
<th>$500k to 1m</th>
<th>&gt;=$1m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>4 (25%)</td>
<td>5 (56%)</td>
<td>11 (61%)</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>12</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>9</td>
<td>18</td>
</tr>
</tbody>
</table>

Results indicate that the greater the size of the company, the greater the likelihood of

$^5$ This category includes companies in the building/construction, mining and importing classifications.
a successful administration outcome. The chi-square test was again used to determine whether the differences between the companies that had been grouped by size were significant. The analysis revealed the differences were marginally significant at $p < .1$ ($\chi^2(1, 43) = .09$).

The extent to which these results can be generalised is limited. First, consideration needs to be given to the limited sample size both overall, and within company industry and size classifications. Secondly, the effect of a number of other factors may have influenced the results. However, the results suggest financial and other company characteristics may have valuable information content regarding the likelihood of successful reorganisation.

3.6 Administration Costs

Respondents were requested to provide information on the direct costs of the administration. The average direct cost for the 38 firms for which data was provided was $164,279, with a range from $2,666 to $2,488,627. Table 3.5 shows average direct cost of administration as a percentage of total assets grouped by company size.

<table>
<thead>
<tr>
<th>Table 3.5 – Direct Administration Costs as a Percentage of Total Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Average cost as percentage of total assets</td>
</tr>
</tbody>
</table>

The data indicates that the direct (or administrative) cost component of voluntary administration is a decreasing function of company size. A similar scale effect has
been found in a number of previous studies that have examined costs associated with insolvency administration. Campbell (1993) reported a similar scale effect in his study of bankruptcy reorganisations in the United States. Campbell’s work demonstrated that costs become less material to the probability of reorganisation success as firm size increases. This may partly explain why larger firms are more likely to successfully emerge from administration. Arguably, it would not be attractive for creditors of a financially distressed company to sanction administration if substantial costs would significantly erode the value of the assets available for the satisfaction of their claims.

3.7 Discussion of Results

The objective of the exploratory study was to investigate the features and practical operation of the voluntary administration legislation with a view to finding information that might be relevant to development of environmental models in this thesis. Accordingly, the discussion of results of the exploratory study focuses on how the findings relate to 1) the reorganisation decision, and 2) the performance of companies that attempt to reorganise.

3.7.1 The Reorganisation Decision

Results of the exploratory study that have implications for the reorganisation decision are discussed below.

1. A majority of the companies in the sample had a secured creditor with a substantial charge over the assets of the company. This security position provides the creditor with the opportunity to enforce the charge held over the company’s assets; however, this occurred in very few cases. Comments by secured creditors
indicated their decision not to enforce the charge was based on having sufficient, and often additional, security. Moreover, the findings suggested that the company would attempt to have substantial charge holders 'on board' at the time of appointment of the administrator. This indicates a substantial charge holder will be indifferent to the reorganisation decision if the reorganisation plan provides adequate protection of their interests.

2. The results suggest unsecured creditors play an important role in the reorganisation decision. The average return to unsecured creditors for the companies in the sample was 56 cents per dollar, which far exceeds the payment likely to be received by unsecured creditors in liquidation. Unsecured creditors will not be likely to oppose a reorganisation plan that provides this level of return. However, the actual return to unsecured creditors for many of the reorganised companies was less than that agreed to in the deed of company arrangement; and in some cases the company was liquidated at a later date.

3. The exploratory study results suggest the decision to attempt reorganisation will be made by parties that would act in an opportunistic manner. Results showed that voluntary administration is generally proposed by directors as a delaying tactic. As directors will stand to lose everything in liquidation, they would be likely to propose a reorganisation attempt. In addition, the results suggest that secured creditors are generally indifferent to the reorganisation decision due to the protection of their security interest. Unsecured creditors will probably approve any plan that promises a greater return than would be received in liquidation. Therefore, none of the parties involved in the decision process is likely to be concerned about the actual prospects of the company.

---

6 One estimation of return in liquidation is 7.3 cents per dollar (See Rose and Law (1995)).
The literature reviewed in Chapter two demonstrated that the reorganisation decision is important to the efficient operation of the voluntary administration legislation. The exploratory study findings related to the reorganisation decision discussed above highlight the importance of further examining the reorganisation decision. Further discussion of features of the reorganisation decision process outlined in this exploratory study is presented in Chapter four.

3.7.2 Reorganisation Performance

The exploratory survey results also have implications regarding the performance of reorganised companies and the efficiency of the reorganisation process, which can be summarised as follows

1. For the exploratory study sample, company directors generally initiated the administrator's appointment. Moreover, in approximately half of the cases the directors' action was coerced by the threat of other legal action over several months, or was the result of a failed attempt at some form of debt reorganisation. These findings indicate that the decision to enter voluntary administration may represent a delaying tactic by directors. If this were the case, the company's financial distress would have been further compounded by lack of prompt action by directors. This would suggest that many of the companies entering voluntary administration and subsequently attempting reorganisation may have little chance of recovery.

2. The actual return to unsecured creditors for many of the reorganised companies was less than that agreed to in the deed of company arrangement, and in some cases the company was liquidated at a later date. The implication of these findings
is that the administration process appears to allow inefficient companies to reorganise. The failure to meet obligations under the deed would probably be due to the continued effects of financial distress. In addition, it would be costly for companies to attempt reorganisation and subsequently be liquidated. In this situation, the costs would be both direct and indirect (the costs associated with lost opportunity). Data relating to direct administration costs presented in section 3.6 above indicates that the direct costs of administration alone are substantial.

3. Results of the investigation of factors contributing to insolvency may also have implications for post-insolvency performance. Factors that contributed to company insolvency were predominantly 'internal' rather than 'external'. Poor management generally, and poor financial management in particular were the factors most highly rated as having led to financial distress. The administration process is relatively short, and it is unlikely that substantial changes to the company's management could be effected in a short time frame. Therefore, poor management may continue to be a problem for the company in the post-insolvency period. This finding is particularly relevant for closely-held companies that attempt to reorganise, as the owner-managers of these companies cannot be easily replaced. Overall, the findings related to determining the factors that contribute to insolvency suggest that companies attempting reorganisation may not be able to adequately address internal problems that led to their financial distress. The result would be business operations that continue in the same inefficient manner during the post insolvency period.

4. The exploratory study results also suggest company characteristics may have an effect on the likelihood of a company reorganising successfully. When companies in the exploratory study sample were grouped according to administration
outcomes (successful and unsuccessful) and then classified according to 1) business type and 2) size (measured by total assets), variation was found between the classification groups. The general implication of this result is that it supports the investigation of financial and other company characteristics that may have information content regarding the likelihood of successful reorganisation. Moreover, as the results here indicate, if there is a difference between the underlying constructs of successful and unsuccessful companies that reorganise, the constructs could be operationalised for the development of environmental prediction models. This is discussed further in Chapter four.

3.8 Summary

This chapter has considered the results of an exploratory study that examined aspects of the operation of the voluntary administration process. The exploratory survey provided a useful insight into the voluntary administration decision-making process. The results suggested that the decision to attempt reorganisation is not based on a consideration of the company's actual prospects in reorganisation. The exploratory survey further suggested that a substantial percentage of companies that attempt reorganisation continue to show symptoms of financial distress. This was indicated by the high level of recidivism to insolvency among those companies that attempt to reorganise. Finally, results indicated that, from a pool of distressed companies that attempt to reorganise under voluntary administration, successful and unsuccessful reorganisations might be distinguished on the basis of financial and other characteristics. This is an important finding which is developed further in subsequent chapters that discuss environmental prediction models for company reorganisation.

7 A statistically significant difference was only found for company classification based on size.
CHAPTER FOUR

DEVELOPMENT OF THEORETICAL PROPOSITIONS AND RESEARCH METHODS - ENVIRONMENTAL MODELS

4.1 Introduction

The review of literature outlined in Chapter two identified various financial and non-financial variables that have been found in prior research to affect the reorganisation decision and post-insolvency performance for firms that attempt reorganisation. This thesis adds to the existing financial distress research in this area by examining the effect of variables on company reorganisation under voluntary administration. This chapter outlines the research methodology and theoretical propositions for development of environmental models that:

1) determine whether a company is likely to reorganise or liquidate (the 'reorganisation decision'); and

2) distinguish, from a pool of distressed companies, those companies that are likely to successfully reorganise (with success being determined by comparing the company's profitability with industry profitability).

For the two environmental models developed, independent variables include financial ratio and indicator variables. Selection of the independent variables is based on the results of the prior financial distress prediction studies outlined in Chapter two, and the coalition behaviour model (that is discussed in detail later in this chapter). The environmental models are developed using logistic regression analyses. The first logistic regression analysis examines whether selected variables are useful in determining whether the voluntary administration decision will be to reorganise or liquidate a company. Importantly, examination of the results of this analysis will
provide some insight into how coalition behaviour affects the reorganisation decision. The second logistic regression analysis examines whether the same selected independent variables can distinguish between successfully reorganised companies and unsuccessfully reorganised companies. Success is determined by examining performance (profitability) after reorganisation. The underlying proposition for development of this model is that successful and unsuccessful companies that reorganise have different financial profiles due to the different nature of their financial distress.

Comparison of the two environmental models is important to the objective of gaining some understanding of the efficiency of the voluntary administration decision process. The first model will highlight constructs that are important to decision-makers in determining whether a company should reorganise. If the decision process is efficient, these constructs should be similar to those in the second model that distinguishes companies that reorganise successfully from those that reorganise unsuccessfully. Therefore, comparison of the second ‘performance’ model with the ‘decision’ model may provide useful information about how the actual voluntary administration decision process departs from efficiency. The coalition behaviour theory is drawn upon to explain model differences revealed by this comparison. For a meaningful comparison of the models to be possible, the same independent variables are used in both the reorganisation model and performance model.

In summary, individually and by comparison, the models will provide valuable information for determining:

1. whether a company is likely to reorganise or liquidate (the reorganisation
decision);
2. whether companies are suitable candidates for reorganisation; and
3. whether voluntary administration decisions are efficient under the current legislative regime.

This chapter proceeds as follows. First, the dependent and independent variables are identified and discussed. Next, features of the coalition behaviour model and its application to the voluntary administration decision are discussed. This leads to the development of theoretical propositions. Then the research methodology and research design are described. Finally, the chapter concludes with a summary.

4.2 Dependent and Independent Variables

4.2.1 Dependent Variables

The dichotomous dependent variables for the two environmental models developed in this thesis are determined by:

1. whether the company reorganises or liquidates; and
2. whether a company is successful or unsuccessful in reorganisation, determined on the basis of the company's post insolvency performance compared to average performance for companies in the same industry group.

The first model requires companies to be grouped according to whether the outcome of voluntary administration is reorganisation or liquidation (the reorganisation decision). For this reorganisation/liquidation dichotomous dependent variable, a company will be classified as a liquidation:

1. if the administration ended in liquidation; or
2. the administration ended with a deed of company arrangement that provided for winding-up (a ‘liquidating deed’).

The second model requires reorganised companies to be grouped according to whether their reorganisation is successful or unsuccessful. For development of the successful versus unsuccessful reorganisation dichotomous dependent variable, companies will be grouped according to whether their average post insolvency return on assets for three years after reorganisation equals or exceeds the industry average\(^1\).

It should be recognised that return on assets may not be the optimal measure for profitability on which to classify companies as successful or unsuccessful. Return on sales may be a preferable measure of profitability as it may tend to minimise problems with companies that continue to undergo structural change during reorganisation. However, for many companies included in the sample, available data will be limited to key income statement and balance sheet items that will not include sales. Therefore, data limitations prevent use of return on sales as the measure of profitability.

Furthermore, as post-insolvency return on assets is an interval measure, it would be possible to carry out least-squares regression with actual return on assets as the dependent variable. However, if this method of analysis were adopted the result would not be readily comparable with the result for the reorganisation decision model (which uses logistic regression). The importance of model comparison to the objectives of

\[^1\] An alternative dependent variable would have been a dichotomous classification based on whether companies survived or failed in the post insolvency period. This approach would not take into account those companies that attempt reorganisation and perform poorly over a substantial period of time.
this thesis has been outlined above. Therefore, logistic regression analysis with dichotomous classification for the dependent variable is used\(^2\).

4.2.2 Independent Variables

Independent variables will primarily comprise financial ratios that operationalise company characteristics. The use of financial ratio data in the development of financial distress prediction models is supported by the review of financial distress literature in Chapter two. The review showed that financial ratio data have consistently proved to be useful as an aid to financial distress decision-making. The exploratory study presented in Chapter Three indicated that many factors may influence the operation of the voluntary administration process, however, investigation of all of these factors is outside of the scope of this thesis. Therefore, while it is important to acknowledge that many factors could influence the decision regarding a company's future, this thesis will focus on development of models using key financial ratio data.

Selection of independent variables and development of theoretical propositions is based on analysis of the reorganisation decision by means of the coalition behaviour model, findings of prior studies and the exploratory study presented in Chapter Three. The advantage of drawing upon the coalition behaviour theory to select independent variables is that parsimonious models can be developed. For the models developed, just a few financial ratios are required to operationalise relevant constructs. This is important, as in many cases only key financial data is available for distressed

\(^2\) For completeness, modelling of reorganisation success where the dependent variable is kept continuous is presented in Appendix 5.
companies\textsuperscript{3}. Prior research will be drawn on to identify suitable financial ratio variables that can be used to represent model constructs.

Reference to underlying theory in selection of independent variables in this study differs from the approach in many of the studies reviewed in Chapter two. Development of prediction models in prior financial distress studies has been characterised by a lack of theoretical underpinning (Zavgren 1983). Prior studies have generally developed models based on ad-hoc choice of or statistical predictive power. This approach has been criticised as, in the absence of theory, the results do not permit generalisation (Ball and Foster 1982), and a sustained correlation between variables and the event predicted cannot be expected (Blum 1974).

The next section discusses, in detail, the coalition behaviour model that will provide theoretical support for model constructs and propositions developed later in the chapter.

4.3 Development of Theoretical Propositions

4.3.1 Coalition Behaviour Theory

The development of an understanding of corporate financial decisions for distressed firms has been given considerable attention in prior research. Of importance to this thesis is the choice made by stakeholders regarding the future of an insolvent company. One approach that has been successful in modelling decisions made regarding the fate of insolvent firms is application of the coalition behaviour theory. In essence, the coalition behaviour theory assumes that a subset of interested parties, a

\textsuperscript{3} This is often the case for proprietary companies with no reporting requirements under corporate law.
coalition, controls the behaviour of the financially distressed firm.

Bulow and Shoven (1978) first argued that coalition behaviour could be examined to determine whether a firm would continue to operate or liquidate. Their discussion related to decisions made under the United States bankruptcy regime. They included as prospective coalition members, three claimants to the cash flows and assets of the firm: bondholders, bank lenders and equity holders. The coalition they described as driving decision-making was comprised of two parties: the bank (lender) and equity holders. The key assumption of the models' operation was that the bank and equity holders have the bankruptcy decision power and act in their own joint interests, not considering the outcome of the third set of claimants, the bondholders. The study by Bulow and Shoven established the precise conditions under which bankruptcy will occur for a distressed company by determining the behaviour of the three claimants. The rationale for suggested coalition behaviour was based on the following:

1. Banks with large loans recognise that, under certain financial conditions, they have power to enforce bankruptcy or to decide to extend credit to permit continuance.

2. Equity holders are the residual claimants in bankruptcy, and accordingly will always seek to avoid bankruptcy.

3. Bondholders are a non-cohesive group of creditors with claims against the firm. Unlike the banks, small individual investors cannot negotiate to alter the terms of their loans when bankruptcy is likely.

Bulow and Shoven (1978) demonstrated how financial distress decisions could be parsimoniously modelled by examining coalition behaviour. The simplicity of the model allows its application to be extended to other decisions for distressed firms.
Application of the model to determine the likely outcome of financial distress decisions requires consideration of 1) the existence of parties that might form coalitions, 2) the coalitions that might form, and 3) how the coalitions that form will drive decision making, based on the key assumption of self-interested behaviour.

Since the work of Bulow and Shoven, coalition behaviour theory has been applied to modeling other financial distress decisions. Relevant to this thesis is the theory's application to decision-making regarding whether a distressed company should be reorganised under the United States Chapter 11 reorganisation procedure. White (1980, 1989) applied the model to evaluate and to investigate reorganisation decisions made under the United States Chapter 11 procedure. White's (1980) application of coalition behaviour theory identified the provision of firm reorganisation as an alternative to bankruptcy as having a major effect on the efficiency of the United States bankruptcy regime. White (1989) later used the coalition behaviour model to present a more complete analysis of efficiency considerations for the Chapter 11 reorganisation procedure. The coalition behaviour theory, particularly White's discussion of its application to firm reorganisation decisions, has been referred to extensively in finance literature relevant to investment decisions for distressed firms.4

Concepts discussed by White in applying coalition behaviour theory to analyse the Chapter 11 reorganisation decision can be readily applied to the reorganisation decision in voluntary administration. Application of the theory provides guidance as to the financial dimensions that will distinguish companies for which the decision will be to reorganise from those for which the decision will be to liquidate. The application

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of the coalition behaviour theory to the voluntary administration reorganisation
decision process is discussed in detail in the following section.

4.3.2 Coalition Behaviour and Company Reorganisation

White's (1983, 1989) application of the coalition behaviour model to the United States Chapter 11 bankruptcy reorganisation procedure assumed that a subset of interested parties, a coalition, controls the behaviour of the distressed firm. The prospective members of decision-making coalitions included equity holders (with management as assumed agent), (secured) lenders and unsecured creditors. The coalition assumption operates when the firm is failing: that is, when the firm has insufficient assets to pay obligations due in the current period, and to avoid bankruptcy, the firm must obtain new finance. White demonstrated that, for the Chapter 11 procedure, the decision-making coalition is most often comprised of equity holders and some particular group of creditors.

White provided empirical support for the coalition behaviour model by analysis of United States bankruptcy statistics. Moreover, she demonstrated that the choice between reorganisation and liquidation is directly related to the firm's financial position, as this impacts on the decision that will be arrived at by the 'coalitions' that arise in the reorganisation decision process. Prospective coalition parties have diverse interests that will determine their response to the reorganisation or liquidation decision. The following discussion illustrates this.

Equity and management will probably receive nothing in liquidation. As the value of the firm may not be in excess of existing liabilities and the cost of liquidation, equity
will receive little or no return in liquidation. In addition, managers will lose their jobs and will be paid no further dividends if the firm is liquidated. Therefore, the interests of management and equity are closely aligned. White (1983, 1989) suggested that managers could be viewed as agents for equity in the coalition model.

Unsecured creditors, like equity and management, may receive little or nothing in liquidation. Therefore, they will also have an interest in the firm's continuation. They will probably accept a reorganisation plan that provides them with at least the same return as they would receive in liquidation, or the prospect of sharing in any going-concern value of the firm.

Secured creditors have a legal claim over the firm's assets, and will determine their response to a reorganisation plan based on protection of their security and repayment of existing debt from the liquidation value of the firm. Secured creditors may also be a source of additional funds to continue operations provided adequate security is available.

An obvious agreement that all parties should arrive at is that reorganisation rather than liquidation should occur if the value of the firm's assets is greater in reorganisation than in liquidation. Reorganisation will be worthwhile if the going concern value of the company exceeds the liquidation value of its assets plus costs of reorganisation. If this is the case, any party harmed by the reorganisation can be compensated by the other parties and remain better off than they would be in liquidation (White 1983, p.14). This suggests firm profitability is an important financial factor in determining whether reorganisation will proceed, and whether the reorganisation is likely to
succeed.

For an insolvent company, continuation may require additional funding. White showed that the coalition between equity and secured creditors\(^5\) will be critical in this situation. The support of secured creditors by their continuing to provide existing or increased funding will be vital if reorganisation is to proceed. The prospect of new or revised lending arrangements between equity and secured creditor(s) will be enhanced if there is some debt forgiveness in the reorganisation plan. As equity is likely to be wiped out in liquidation, it will be willing to give up its claim against the assets of the firm to obtain finance for reorganisation. Debt forgiveness will also result if the reorganisation plan provides that unsecured creditors are paid less than the face value of their claims, and payment is extended over many periods during the operation of the plan. Unsecured creditors will probably accept a pay-off rate that approximates the amount they would receive in liquidation. Any debt forgiveness will mean that new loans will be smaller and easier to obtain in reorganisation.

White’s coalition model, however, highlighted problems that may exist with coalitions involving equity and secured creditors making reorganisation decisions when the firm’s future earnings are uncertain. Equity has little to lose by reorganising, as it will receive little or nothing in liquidation. If a coalition between equity and secured lenders successfully proposes a reorganisation plan that involves future risky activity with uncertain earnings, equity and secured lenders stand to gain without bearing risk due to the security held by creditors and the limited liability of equity holders. Any loss is shifted to ex-post debt rather than coalition members. The coalition, according

\(^5\) Secured creditors are likely to be major secured creditors.
to White (1983, p.11), bases its decision on a 'good outcome' only. Provided the 'good outcome' return exceeds costs of reorganisation plus the pay-off to unsecured creditors required to gain acceptance of the plan, the coalition will favour reorganisation despite the fact that future earnings are uncertain and going concern value may not exceed liquidation value. This suggests that earnings prospects are critical to both the reorganisation decision and post-reorganisation performance.

Additionally, the firm will be in a better position to obtain needed finance if it has free assets that can be offered as security. However, White (1983) suggested that, when faced with the prospect of bankruptcy, the equity holders might attempt to convert unsecured debt to secured debt and obtain new loans to delay shutdown. Furthermore, managers have a tendency to continue operations as long as possible, even after the firm's liabilities exceed its assets. Moreover, White pointed out that when a firm is losing money, any free assets could be quickly absorbed. The above discussion suggests that pay-off rate to unsecured creditors (or, the level of debt forgiveness), the level of owner's equity claims on the firm's assets, and the firm's leverage will affect the reorganisation decision and the firm's survival prospects.

In summary, White (1984, 1989) postulated the following financial characteristics as having an effect on the reorganisation decision:

- future profitability: reorganisation may be worthwhile to all prospective decision makers if the going concern value of the company exceeds the liquidation value of its assets plus costs of reorganisation;
- pay-off in reorganisation compared to liquidation: unsecured creditors will generally receive a zero or low return in liquidation, therefore, their opportunity
cost is low if the firm reorganises; also, immediate pay-off to unsecured creditors will provide some debt forgiveness;

- equity commitment: owners' equity and managers' jobs will likely be eliminated in liquidation thereby providing incentive to form coalitions to avoid liquidation; also, equity can give up its claim to company assets to secure further borrowing; and

- leverage position: distressed firms that delay action will often have secured liabilities that will equal the total value of assets, leaving few free assets to secure borrowing or to pay unsecured creditors

Examination of prior studies indicates some consistency between financial characteristics that have been found to affect the decision as to a company's fate and those suggested to be important by the coalition behaviour model. Table 4.1 presents a summary of financial factors previously found to have a significant effect in prior studies that have examined the reorganisation process (see Chapter two, section 2.5). More detailed reference is made to these studies in the development of theoretical propositions in the next section.

Table 4.1 - Summary of Financial Factors Found to Affect The Reorganisation Decision

<table>
<thead>
<tr>
<th>Study</th>
<th>Earnings Prospects</th>
<th>Financial Leverage</th>
<th>Liquidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbell (1996)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Franks &amp; Torous (1989)</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Casey et al (1986)</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Hong (1983)</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Comerford (1972)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>
The discussion in this section has demonstrated how coalition behaviour theory can be applied to the reorganisation decision for companies in financial distress. Importantly, the discussion has shown that the coalition behaviour model is useful for identifying and explaining the financial constructs that will affect the reorganisation decision.

4.3.3 Theoretical Propositions

Theoretical propositions outlined in this section draw upon the coalition behaviour model discussed in the preceding section. In addition, findings of prior studies reviewed in Chapter two are referred to in support of the propositions developed. The literature reviewed in Chapter two and the exploratory study in Chapter three indicated there are variables extraneous to the coalition model that are likely to have an effect on the dependent variables in this study. These variables are also discussed and propositions made regarding their effect.

Two sets of propositions are developed that are relevant to the two environmental models presented in this thesis. The first set of propositions outline the expected relationship between selected independent variables and the likelihood that a company will reorganise (the reorganisation decision). The coalition behaviour model provides the primary reference for formulating this set of propositions. The second set of propositions developed address the relationship between independent variables and success in reorganisation. This second set of propositions is supported by findings in prior studies and analysis of coalition behaviour. The second set of propositions effectively suggest the financial profile for a company that:

1) can secure a decision to reorganise; and

2) is likely to have higher levels of post-insolvency performance.
Eleven propositions are presented in the next section. The first eight relate to the effect of financial constructs of leverage, short-term liquidity, earnings prospects and size on the dependent variables. A further two propositions address the effect industry classification on the criterion variables. The final proposition made relates to the difference in underlying constructs for the two environmental models developed.

4.3.4 Development of Propositions

Securing additional funding to continue operations will be difficult for a company with high levels of debt and little or no unsecured assets available to offer as security. Casey et al (1986) found the level of free assets to be a significant discriminator between firms that liquidate and those that reorganise under the United States Chapter 11 procedure. Their measure of free assets was the ratio of uncollateralised assets (i.e. not given as security) to total assets.

The coalition behaviour model suggests that parties interested in pursuing reorganisation may implement various strategies to secure additional funds. For example, equity holders may give up their remaining claim over the company's assets to secure support of major lenders. Also, where unsecured creditors can be coerced to accept less than the face value of their claims, the resultant debt forgiveness will free up assets. However, as the level of debt in the company's capital structure increases it would become harder for coalitions to successfully implement these strategies to secure reorganisation. As leverage increases, equity’s claim over the company’s assets will diminish, thereby reducing its ability and incentive to have the company attempt reorganisation. Debt forgiveness achieved by paying unsecured creditors less than the face value of their claims may not be sufficient to secure additional funding if the
company's leverage is extremely high. Therefore, it is proposed that the company's leverage will affect the reorganisation decision. Highly levered firms will probably have difficulty gaining support for reorganisation and funding for continued operations from various creditor coalitions.

This discussion suggests there are two aspects of leverage that will affect the reorganisation decision:

1. the amount of debt in the company's capital structure, which will affect its ability to secure the co-operation of coalitions of creditors that might provide additional funds in reorganisation; and

2. the level of equity in the company's capital structure, and the incentive for the equity (and management) to avoid liquidation.

Financial ratios will be included in models that measure these two aspects of the company's leverage position.

Prior studies have indicated that performance of financially distressed companies that attempt reorganisation will be affected by capital structure, particularly the level of debt or leverage (Franks and Torous 1989, Comerford 1976). Franks and Torous (1989) proposed that managers of highly levered companies have an incentive to make inefficient investments in financial distress situations, as the cost of such action accrues to debt not equity. This suggests that higher leverage will lead to poor post insolvency performance.

In the context of reorganisation under voluntary administration, however, the following points need to be considered regarding the effect of leverage. Incentives to
take on inefficient investments are reduced by insolvent trading provisions in the Corporations Law. For example, section 588G of the Corporations Law provides that officers can be liable for compensation and penalties for insolvent trading. In addition, where a company has significant levels of debt, it is likely that a lender will hold a charge over all of the assets of the company. This form of security is associated with close monitoring of the company’s position, which would quickly reveal any investment likely to compromise the debtor's security position. The security allows the debt holder to avoid reorganisation and force liquidation if there is concern regarding security position. Moreover, continued survival of the company's business will be largely dependent on support of such a creditor. In the context of voluntary administration, it appears that management-equity may have a reduced incentive to take on inefficient investments.

The following propositions are suggested regarding the effect of a company’s leverage on reorganisation:

\[ P1(a): \text{Highly levered companies are less likely to reorganise} \]

\[ P1(b): \text{Lower levered companies will have higher levels of post-insolvency performance} \]

Fisher and Martel (1995) and Comerford (1976) identified liquidity as a significant financial dimension affecting prospects in reorganisation. Fisher and Martel (1995) examined the impact of a firm’s liquidity on the creditors’ decision as to whether reorganisation should proceed. The level of return offered in reorganisation was found to affect the decision of unsecured or under-secured creditors. They suggested this was due to creditors recognising that liquidation would provide the unsecured creditors
with poor returns after senior claims were satisfied. The prospect of an improved cash payment under a reorganisation plan, made possible by the firm’s short-term liquidity, was likely to secure creditors' acceptance regardless of the company’s long term prospects. Therefore, higher levels of short-term liquidity should increase the likelihood that unsecured creditors will work to secure reorganisation in coalition with other claimants.

The level of short-term liquidity will also affect the performance of a company in reorganisation. It is suggested that levels of short-term liquidity that allow a company to make immediate and substantial payments to trade creditors will limit the indirect costs associated with insolvency. Payments will, somewhat, restore creditors' confidence in the future prospects of the reorganised company’s business. Arguably, this would reduce indirect insolvency costs associated with the stigma of financial distress (at least in the short term).

Acceptance of an immediate payment of less than the face value of unsecured creditors' claims also provides some amount of debt forgiveness, improving the company's overall position. The following propositions are therefore suggested:

\[ P2(a): \text{Companies with higher levels of short-term liquidity are more likely to reorganise} \]

\[ P2(b): \text{Companies with higher levels of short-term liquidity will have higher levels of post-insolvency performance.} \]

White (1981, 1984), in modelling the outcome of bankruptcy proceedings, demonstrated that firms that successfully reorganised had more attractive earnings
prospects. Casey et al (1986, p.252) noted that firms expected to operate profitably in the near future should be able to generate funds internally or obtain funds from external borrowing in order to emerge successfully from bankruptcy proceedings.

In some circumstances, past profitability may be a valid indicator of reasonable future earnings prospects. For example, a company with a profitable underlying business operation may become insolvent due to cash flow problems associated with rapid expansion. This type of company would be an ideal candidate for reorganisation: the short breathing space provided by the voluntary administration moratorium providing an opportunity for restructuring immediate obligations while preserving the profitable underlying business.

Gilson, John and Lang (1990), examined the features of firms that privately restructured debt and compared them with the features of firms that reorganised under the United States Chapter 11 procedure. They reported that firms which privately restructured their debt had significantly superior performance as measured by stock returns. Their explanation for the difference was that superior performance is associated with a smaller reduction in going concern value resulting from reorganisation. This results in a higher firm market value/firm liquidation value, thereby increasing incentives to renegotiate debt privately rather than risk asset sales likely to result in a Chapter 11 reorganisation. This finding highlights the importance of profitability as an indicator of the existence of going concern value; or the excess of a firm's value in continuation over what would be available in liquidation.

Where a company can demonstrate going concern value, various coalitions are likely
to form as parties see the opportunity to share in the going concern value of the company. This supports the importance of earnings prospects as a reliable indicator of post insolvency performance. The following propositions are therefore suggested:

\[ P3(a): \text{Companies with good earnings prospects (indicated by past profitability) are more likely to reorganise} \]

\[ P3(b): \text{Companies with good earnings prospects (indicated by past profitability) will have higher levels of post-insolvency performance.} \]

In addition to the variables discussed above as having an effect on the reorganisation decision and post-insolvency performance, prior research has consistently identified other variables that have an effect on the dependent variables in this study. These are company size and the industry in which the company’s business operates. The exploratory study in Chapter three also indicated these variables might have an effect. As both of these variables have been consistently been found to be important in prior studies there is an attempt to control for their effect in this study. Discussion of the effects of these variables and development of propositions are presented in the following section.

The literature reviewed in Chapter two suggests the economic environment in which a financially distressed firm operates will have a significant effect on its performance. Hotchkiss (1995), in her study of firms reorganising under Chapter 11, reported that poor industry performance in the post bankruptcy period was significantly related to the incidence of a second bankruptcy or the requirement for a further reorganisation. Chaterjee et al (1996) indicated that ‘better quality’ firms with reasonable future prospects are characterised by lower levels of economic stress. Campbell (1996)
reports that the type of business is a significant predictor of a successful reorganisation outcome. Arguably, this finding may relate, inter alia, to industry conditions for similar business types in his sample. D'Aveni (1989) provided evidence that an inefficient firm is more likely to 'linger' if it is in an industry with a higher growth rate of demand. In this situation, the inefficient firm may survive because of its improving environment. Lower economic stress will not bring about industry “shake-outs”. Therefore, it is suggested that dramatic downturn in industry performance, or high levels of economic stress, will effectively preclude many companies from reorganising. A 'hostile' environment will have the effect of filtering out inefficient firms.

Based on evidence that industry classification will have some effect on reorganisation prospects and performance for individual companies, a control variable based on industry classification⁶ will be included in analysis. The following propositions are suggested regarding the effect of industry classification.

\[ P4(a): \text{Industry classification will affect a company's ability to reorganise} \]

\[ P4(b): \text{Industry classification will affect a company's level of post-insolvency performance.} \]

Studies that have examined the effect of company size on reorganisation prospects indicate that larger companies are more likely to reorganise. White (1983) suggested larger firms are more likely to have previously raised unsecured capital, and assets generated by such borrowing may provide collateral for additional borrowing when the firm is faced with financial distress. In addition, previous research by Warner

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⁶ Industry Classification is based on ANZSIC codes.
Altman (1986) and Campbell (1996) has indicated the existence of an economy of scale with respect to bankruptcy costs for larger firms. Larger firms’ bankruptcy costs are likely to be less significant when measured as a ratio of size.

The above discussion suggests that larger firms are more likely to secure additional funding in reorganisation, and are less likely to be further distressed by costs associated with bankruptcy. This leads to the following propositions:

**P5(a): Larger companies are more likely to reorganise**

**P5(b): Larger companies will have higher levels of post-insolvency performance**

Having developed theoretical propositions that relate company characteristics to the likelihood of reorganisation and subsequent performance, the final proposition presented will deal with the constructs for each model developed.

As discussed in previous sections, this thesis develops:

1) a prediction model for the reorganisation decision; and
2) a prediction model for companies that reorganise successfully versus unsuccessfully based on the level of post-insolvency performance.

To the extent that ‘coalition’ behaviour promotes efficient decisions as to whether a company should reorganise, there should be consistency between the reorganisation and reorganisation performance models. However, the review of literature in Chapter two suggests the reorganisation decision can be affected by various factors. For example, Fisher and Martel (1995) reported that information asymmetry may lead to inefficient decisions and ‘filter failure’. Moreover, the nature of coalition behaviour may influence the efficiency of the reorganisation decision. The exploratory study
presented in Chapter Three suggested that the decision to attempt reorganisation would be inefficient as it indicated decision-making in voluntary administration is based on stakeholders' self-interest rather than a consideration of the company's prospects. In addition, the prior research of Gilbert et al (1990) and Ward and Foster (1997) suggested underlying constructs associated with different distress events may be dissimilar. The nature of the financial distress experienced by companies that are able to reorganise successfully would probably differ from those companies that are unsuccessful in reorganisation (companies that should have been liquidated). Therefore, it is expected that significant variables in the reorganisation decision model and the reorganisation performance model will differ. This leads to the following proposition regarding the two environmental models developed:

_P6: Differences will exist between significant variables in prediction models for the reorganisation decision and for reorganisation performance._

The preceding section outlined theoretical propositions regarding the relationship between financial characteristics of companies that attempt to reorganise under voluntary administration, and the likelihood of their reorganisation and subsequent performance. Diagram 4.1 summarises the relationships discussed in development of theoretical propositions.

### 4.4 Model Development

Development of models for testing propositions requires that each of the financial factors included as predictors in propositions be operationalised. This section will discuss and define individual independent and dependent variables used in the models.
4.4.1 Predictor Variables

Essentially, the experimental procedure for this analysis is to develop prediction models from the sample of companies. Predictor variables are selected in this section to operationalise financial constructs in propositions developed. Chen and Shimerda’s (1981) ‘seven-factor space’ is used to identify financial ratio variables that have been found to represent financial dimensions included in propositions developed in this thesis. The factors were developed from analysis of prior financial distress prediction
studies that have used financial ratios as predictor variables.

Factor analysis has been commonly used in prior studies to reduce a large number of financial ratios for development of parsimonious prediction models. This method of analysis provides a reduced variable set that captures the underlying financial characteristics of the sample. The reduced variable set can then be used in multivariate discriminant analysis (MDA) or conditional probability analysis for development of a discriminant model. Chen and Shimerda (1981) examined five major studies that had used factor analysis to reduce the number of financial ratio independent variables. They reported that the reduced sets of financial ratios and the original set of financial ratios accounted for a similar amount of variance. Based on this finding they suggested it is appropriate to choose only one ratio from each factor when conducting analysis. The approach recommended by Chan and Shimerda has been successfully implemented in a number of studies concerned with bankruptcy prediction (see Stevens 1973, Libby 1975, Pinches, Eubank, Mingo and Carruthers 1975, Pinches, Mingo and Carruthers 1977, Laurent 1979, Gombola and Ketz 1983, Ezzamuel et al 1987 and Clarke 1990).

Chen and Shimerda (1981) highlighted the fact that many of the financial ratios that can be calculated are highly correlated with one another, and that elimination of overlapping information will remove redundant data. They note that inclusion of more than one ratio from a factor may lead to multicollinearity that will distort the relationship between the dependent and independent variables, causing the results of analysis to be sample-sensitive.
The review by Chen and Shimerda (1981) of the use of financial ratios in prior studies suggested that adequate prediction models could be developed with a relatively small set of financial ratio based independent variables. As this thesis aims to develop parsimonious models, the finding of Chen and Shimerda regarding use of limited numbers of ratios in models is important. In accord with their findings, financial constructs outlined in propositions have been operationalised by selection of just one or two financial ratios. The selected ratios were drawn from those that Chen and Shimerda suggested corresponding with the various financial constructs defined in the theoretical propositions. Final selection of ratios was based on those calculable from key financial data readily available at the time of appointment of the administrator (see discussion at 4.2.2). The financial constructs, selected ratios and related propositions for models in this thesis are defined in Table 4.2 below.

Problems exist with the ratio that has shareholders' equity as the denominator. This is because some of the companies have negative equity values. Ratios calculated with negative values for equity would be misleading. Therefore, for the ratio of total liabilities to total equity, a categorised form of the financial ratio was calculated based on its distribution for the sample of companies. This method of addressing problems with ratio calculation was suggested by Cybinski (1995), who found the original ratio information value was preserved for models developed using categorised independent variables\(^7\). The ratio was coded with a value of one to five: five representing ratios with a negative equity position, and values of one to four being quartile groups for ratios with a positive equity value.

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\(^7\) Cybinski tested groupings consisting of three and five categories, and found that the five category grouping gave a slightly superior "goodness of fit" of the model to data. Cybinski's study did not aim to find the best categorisation regime, however, it did indicate that reliable models could be developed using discrete categorisation of financial ratio independent variables.
Table 4.2 - Independent Variables and Propositions

<table>
<thead>
<tr>
<th>Financial Construct</th>
<th>Ratio or Variable</th>
<th>Relevant Proposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Leverage</td>
<td>Total Liabilities/Total Assets</td>
<td>P1</td>
</tr>
<tr>
<td></td>
<td>Total Liabilities/Owners’ Equity (coded 1 to 5, 1 lowest ratio, 5 = negative equity)</td>
<td></td>
</tr>
<tr>
<td>Short-Term Liquidity</td>
<td>Current Assets/Current Liabilities</td>
<td>P2</td>
</tr>
<tr>
<td></td>
<td>Current Liabilities/ Total Assets</td>
<td></td>
</tr>
<tr>
<td>Earnings Prospects</td>
<td>Operating Profit / Total Assets</td>
<td>P3</td>
</tr>
<tr>
<td>Industry Classification</td>
<td>Indicator Based on ANZSIC Grouping</td>
<td>P4</td>
</tr>
<tr>
<td>Size</td>
<td>Total Assets</td>
<td>P5</td>
</tr>
</tbody>
</table>

4.4.2 Dating Convention

The estimation sample used for development of logistic regression models included companies that had entered voluntary administration between July 1993 and 1995 (discussed in section 4.5.2). The time line shown as Diagram 4.2 illustrates the dating convention used for categorising financial data: Point ‘A’ represents the date of appointment of the administrator. This date is used as a reference point for determination of relevant accounting periods, both before and after the appointment of the administrator. The financial year-end closest to the time of the administrator’s appointment is the reference year in the dating convention.

Diagram 4.2 - Dating Convention

-5 -4 -3 -2 -1 A (0) +1 +2 +3 +4 +5

For example, if the administrator is appointed during 1994 (i.e. between 1/1/94 and
30/12/94), 1994 becomes the reference financial year. Financial reports for 1993 represent the first full year prior to administration (-1), 1992 the second, and so on. Predictor variables were calculated for each full year prior to year 'A', up to a maximum of five years where data was available.

For liquidating companies in the sample, no data are relevant after year ‘A’ as the company does not generally continue trading after the short period of administration. For reorganised companies, the same dating convention used for years before administration was used for years after administration. For the earlier example of a company that commenced administration during 1994, financial reports for 1995 represent the first full year of post-insolvency results (+1), 1996 the second, and so on.

The dating convention described ensures models are developed based on predictor variables calculated from financial data available at the earliest point in time before the appointment of the administrator.

4.5 Research Methods

4.5.1 Research Design

The research design outlined in this thesis is essentially experimental, with ex-post-facto data gathering (Abdel-khalik and Ajinkya 1979). As the data are derived from events that occurred without direct intervention or manipulation of independent variables and subjects, there has been a departure from the 'true experimental' research design. This form of experimental research design typically rates lower on

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8 The dating convention adopted ensured that the financial data used for model development was based on reports lodged at least six months before the appointment of the administrator. This may overcome problems associated unusual accounting treatments or transactions as the appointment of the administrator became imminent.
internal validity and higher on external validity than a true experimental design. However, there are benefits with respect to increased external validity (the extent to which results are generalisable to other samples), for research in applied disciplines such as accounting (Abdel-khalik et al 1979)). Generalisability of results, that is the transferability of results to other samples, is important for this thesis. Improved decision making regarding the future of companies that enter voluntary administration will probably reduce the economic cost of financial distress in the long term.

A significant problem with the research design adopted for this thesis is the difficulty in controlling the effect of extraneous variables on the dependent variable. The proposed relationship between selected financial ratio variables may not easily be defined due to 'noise' from extraneous, non-experimental variables. Abdel-khalik et al (1979) identify research methods that can be adopted to control for the influence of extraneous variables. These include:

1. thorough or limited randomisation of experimental units (in sample selection);
2. pair matching (common in prior bankruptcy prediction studies); and
3. extraneous variables being included in the model as additional independent variables.

The literature reviewed in Chapter two and the exploratory study in Chapter three suggested a need to control for two extraneous variables - company size and industry type. The research design adopted in this thesis is to include both variables as additional independent variables.

4.5.2 Selection of Estimation Sample

The procedure for selecting the sample of reorganised companies for the estimation
sample was as follows:

1. A listing of all companies that appointed an administrator under Part 5.3A for the calendar years 1993 to 1995 was obtained from the Australian Securities Commission (now Australian Securities and Investments Commission, hereafter referred to as ASIC). Voluntary administration began operation in July 1993; therefore, companies were selected from those that commenced administration during the first two and a half years of the operation of the voluntary administration legislation.

2. Company data available from Internet search facilities provided by ASIC (the ‘National Names Index’, see http://www.asic.gov.au) was reviewed for each company to determine 1) if the company was still registered, 2) whether a liquidator had been appointed, and 3) the likelihood of financial data being available for a relevant company. Key financial data were available for most companies until 1996, when the ASIC reporting rules no longer required inclusion of key data in the company’s annual return. Determination of whether financial information would be available for a company was based on the number of pages included in the annual report lodged with ASIC as indicated by National Names Index data.

3. For the companies selected, ASIC document numbers were obtained for annual reports from the National Names Index. Annual Returns and Annual Reports for years before and after the appointment of an administrator were obtained from ASIC where available.

4. To facilitate analysis, data were collected for equal numbers of companies that concluded voluntary administration with a deed of company arrangement, and companies that were liquidated following voluntary administration. Liquidated
companies were selected that had at least some financial data available for the years prior to appointment of the administrator.

5. Annual reports were obtained for 110 different companies. Subsequent review of annual reports substantially reduced the number of companies for which useful data had been obtained. Companies were excluded from the final sample if they were a) trustee companies that had not traded, or b) had not included of any financial data in annual returns, or c) had missing data. Review of documents identified a further three companies that had been subject to appointment of a receiver/manager or provisional liquidator for a substantial period leading up to the appointment of an administrator. For these companies, appointment of an administrator was more a ‘conversion’ to an alternative form of external administration. These circumstances were inconsistent with other cases in the sample, as the three companies’ operation and financial position at the time of appointment of an administrator under voluntary administration had likely been affected by the prior commencement of the insolvency administration. As the analysis in this thesis is concerned with the decision to reorganise and subsequent performance of companies that trade under normal circumstances up to the time of entering voluntary administration, removal of the cases from the sample was also deemed to be appropriate.

6. The final sample comprised 67 companies, consisting of 34 reorganised companies, and 33 liquidated companies. Companies in the sample included 46 proprietary companies, 17 unlisted public companies and 4 listed public companies. For the liquidating companies, nine had entered a deed of company arrangement that was clearly a ‘liquidating deed’; the remaining companies
had formally entered liquidation.

Selection of the estimation sample is subject to problems associated with data bias and the presence of extreme values. The problem of data bias resulting from using a non-random based sample for model estimation has been previously identified as a common problem with studies of financial distress (see Zmijewski 1984, Palepu 1986 and Manski and Lerman 1977). The data used here suffers from selection bias, as firms experiencing financial distress are known to be less likely to lodge accounting reports for the required prior time (Cybinski 1995, Zmijewski 1984). In addition, the final sample of companies may not properly represent the prior probability of reorganisation/liquidation. Ohlson (1980) and Palepu (1986) suggest bias can be overcome by adjustment of proportions of companies in the sample or by adjustment to the constant term of logit models respectively. However, there is no substantial data providing estimation of the prior probability of liquidation or reorganisation for companies entering voluntary administration to allow for adjustment for this sampling problem.

The presence of extreme values has been shown to have a major influence on the parameter estimates of distributions (Frecka and Hopwood 1983). To minimise problems with outliers and extreme values data screening was carried out. This involved testing for both univariate and multivariate outliers in the sample. This is reported in Chapter five.

Watson (1996), in reviewing financial distress studies, notes that an unfortunate practical limitation of financial distress studies is that the sample size of failed
companies is often small. Moreover, sample size can be further reduced by a lack of necessary data for sample companies. These constraints on sample selection were relevant to sample selection for this thesis, particularly the reduction in sample size due to incomplete data for individual companies. For the purposes of comparison with the sample for this study, an example of sample sizes for significant prior distress prediction studies compiled by Watson (1996) is reproduced in Table 4.3 below. The sample size of 34 reorganised companies, and 33 liquidated companies available for analysis in this thesis compares favourably with these prior studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size of Failed Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altman (1968)</td>
<td>33</td>
</tr>
<tr>
<td>Deakin (1972)</td>
<td>32</td>
</tr>
<tr>
<td>Altman, Haldeman and Narayanan (1977)</td>
<td>53</td>
</tr>
<tr>
<td>Dambonlena and Khoury (23)</td>
<td>23</td>
</tr>
<tr>
<td>Hamer (1983)</td>
<td>44</td>
</tr>
<tr>
<td>Taffler (1983)</td>
<td>46</td>
</tr>
<tr>
<td>Peel, Peel and Pope (1986)</td>
<td>34</td>
</tr>
<tr>
<td><strong>Average sample size</strong></td>
<td><strong>31</strong></td>
</tr>
<tr>
<td><strong>Australian Studies</strong></td>
<td></td>
</tr>
<tr>
<td>Izan (1984)</td>
<td>53</td>
</tr>
<tr>
<td>Castagna &amp; Matolcsy (1981)</td>
<td>21</td>
</tr>
<tr>
<td>Shailer (1990)</td>
<td>51</td>
</tr>
<tr>
<td>Lincoln (1984)</td>
<td>41</td>
</tr>
<tr>
<td><strong>Average sample size</strong></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

4.5.3 Validation Sample

Due to the small sample, it was considered that the most effective validation should be derived using the Lachenbruch (1975) 'hold-one-out' method. This is consistent with other studies which have used a similar technique for small sample sizes.
4.5.4 Statistical Method

Multivariate analysis of financial ratios to predict business failure has been developed over a number of years. Statistical methods used to develop prediction models have included multivariate discriminant analysis and, more recently logistic regression. The most recent financial prediction technique is based on the application of neural networks from the artificial intelligence literature. Use of neural networks has proved to be a useful alternative to conventional multivariate statistical techniques. While there is some evidence that neural networks allow increased prediction accuracy, the benefits of this prediction technique over statistical models are not conclusive. For example, Trigueiros and Taffler (1996) criticised the method of application of neural network methods and overfitting of models, and Altman, Marco and Varetto (1994) found little or no difference in classification performance between neural networks and conventional multivariate statistical techniques. In contrast, Coats and Fant (1991), Salchenberger, Cinar and Lash (1992), Tam and Kiang (1992), Fletcher and Goss (1993), Wilson and Sharda (1994) and Back, Laitinen and Sere (1996) provide evidence that using neural networks can increase accuracy in failure prediction. This thesis adds to the substantial literature that has developed statistical prediction techniques and models and focuses on recently developed conventional multivariate statistical techniques in preference to neural networks.

Altman (1968) first applied Multivariate Discriminant Analysis (MDA) to bankruptcy prediction. This significant study served as a model for a substantial body of subsequent work. However, serious questions have been raised about the restrictive statistical requirements associated with use of MDA in financial failure models (Maddala 1983). The technique requires that the independent variables are
multivariate normal and the covariance of the groups is equivalent. Watson (1996, p.40) states that research looking at the normality assumptions of financial ratios indicates that the assumption is frequently violated. More recent models of bankruptcy risk have been developed using the statistical techniques of logit and probit analysis [see for example, Ohlson (1980), Zmijewski (1984), Zavgren (1983) and Hall and Stark (1986)]. Logit and probit techniques utilise distribution functions that are very similar. Watson (1996, p. 42) notes that "it does not matter whether one uses a probit model or a logit model. Logit is the most frequently used in the financial distress literature...".

Advantages of these conditional probability models were discussed by Wilson (1996) who suggested that:

- they do not have the same demanding statistical assumptions as MDA;
- research indicates logit outperforms MDA (although not conclusively); and
- the logit model is markedly superior in classifying failed firms.

Rigorous statistical comparison by Hamer (1983) of the methods indicates that, for bankruptcy prediction, overall classification success of logit models may be slightly more accurate and certainly no less accurate than MDA models. Moreover, comparison in an empirical study by Press and Wilson (1978) of the merits of logistic regression maximum likelihood estimators with those of discriminant function estimators indicated that logistic techniques outperformed classical discriminant analysis but not by a large amount. The results of Press and Wilson (1978) agreed with the conclusion reached by Halperin, Blackwelder and Verter (1971) that maximum likelihood estimation methods are preferable where the normality
assumptions are violated.

One important difference between MDA and logistic regression is that the former does not allow testing of the significance of individual variables (Zavgren 1983). Logistic regression provides a distinct advantage in that it allows the coefficient on each variable to be interpreted individually as to its importance. In consideration of the above discussion, logistic regression, using maximum likelihood estimation is the multivariate statistical method used for model development in this thesis. The logistic regression models developed took the following form:

\[
P(r/\text{liq}) = \frac{e^z}{(1 + e^z)}
\]

\[
P(s/\text{ns}) = \frac{e^z}{(1 + e^z)}
\]

Where: \(P(r/\text{liq}) = \) probability of reorganisation / liquidation and \(P(s/\text{ns}) = \) probability of success/non-success in reorganisation; \(e = \) the base of the natural logarithm; and \(z = \beta_0 + \beta_1X_1 + \beta_2X_2 + \ldots + \beta_pX_p\) where \(X\) is the independent variable (financial data) for each company, and \(\beta_0, \beta_1, \ldots, \beta_p\) are the coefficients estimated from the data.

Testing of individual propositions requires examination of whether coefficients for variables are significantly different from zero. The method adopted for this test is to build the model with and without individual variables, and base the test of propositions on whether there is a significant change in log-likelihood with the variable included in the model (Hauck and Donner 1977). This test is used in preference to the Wald statistic generated by the statistical package SPSS 9.0 used for data analysis. When the regression coefficient is large, the Wald statistic may lead to a
failure to reject the null hypothesis, when it should be rejected (Norusis 1997).

4.6 Summary

This chapter discussed the theoretical propositions and research methodology relevant to development of models to investigate the effects of key financial variables on the reorganisation decision and the probability of success in reorganisation.

Propositions regarding the effect of financial variables were developed by drawing on the research reviewed in Chapter two and the coalition behaviour theory. Reference to the coalition behaviour theory is important to development of environmental models because its application theory based parsimonious models to be developed.

The research methodology outlined 1) how the estimation sample of companies that attempted reorganisation under voluntary administration was selected, 2) how the models were developed, 3) what statistical method was used, and (4) what the research design included.
CHAPTER FIVE

DATA ANALYSIS AND RESULTS – ENVIRONMENTAL MODELS

5.1 Introduction

The purpose of this chapter is to develop environmental models based on variables defined in the previous chapter and to present results of testing the hypotheses developed in Chapter four concerning company reorganisation outcomes. Validation testing for models developed is also presented. This chapter proceeds as follows. First, results are presented relating to hypotheses that predict the effect of variables on the reorganisation decision. Then, results relating to hypotheses that predict the effect of variables on reorganisation success are presented. Finally, the chapter concludes with a summary. Chapter seven will discuss the findings of this chapter within the context of the literature.

5.2 Data Screening

As discussed in Chapter four, logistic regression analysis is the statistical method used for development of models and testing of hypotheses in this thesis. Logistic regression is a robust analysis technique that has no assumptions about the distribution of predictor variables; the predictor variables do not have to be normally distributed, linearly related, or of equal variance within each group (Tabachnick and Fidell, 1996). Therefore, the focus of data screening was to review companies in the estimation sample for outliers among independent variables. Screening for multivariate outliers was performed by reviewing diagnostic statistics available from the SPSS logistic regression procedure. Measures of the Studentized residual, which indicates the change in the model deviance if the case is removed, and Cook’s Distance, which measures the influence of a case were examined. One case was identified as an outlier
using these diagnostic techniques. This company was a ‘no liability’ operation engaged in mineral exploration, that had been capitalising large amounts of exploration expenditure up to the time of appointment of the administrator. Considering the unusual nature of the company’s financial profile it was deemed appropriate to remove the case from the sample\(^1\). Therefore, the final sample for the reorganisation decision model was comprised of 33 reorganised and 33 liquidated companies. Correlations among independent variables are reported in Table 5.1 below.

<table>
<thead>
<tr>
<th></th>
<th>TLTA</th>
<th>TLOE</th>
<th>CACL</th>
<th>CLTA</th>
<th>OPTA</th>
<th>INDUSTRY</th>
<th>LNTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLTA</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLOE</td>
<td>0.400</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CACL</td>
<td>-0.111</td>
<td>-0.320</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLTA</td>
<td>0.700</td>
<td>0.296</td>
<td>-0.122</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPTA</td>
<td>-0.149</td>
<td>-0.184</td>
<td>0.171</td>
<td>0.107</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>0.498</td>
<td>0.265</td>
<td>0.105</td>
<td>0.635</td>
<td>0.377</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>LNTA</td>
<td>-0.400</td>
<td>-0.183</td>
<td>0.033</td>
<td>-0.343</td>
<td>0.269</td>
<td>0.326</td>
<td>1.000</td>
</tr>
</tbody>
</table>

TLTA = total liabilities / total assets  
TLOE = total liabilities / owners’ equity  
CACL = current liabilities / current liabilities  
CLTA = current assets / total assets  
OPTA = operating profit / total assets  
LNTA = natural log of total assets

*For the categorical variable industry, the value for Eta is reported as a measure of the strength of association between this variable and other interval scaled variables. In all other cases within the table, Pearson correlation coefficients are reported.

A positive correlation (of approximately 0.70) between total liabilities/total assets and current liabilities/total assets is significant. Tabachnick and Fidell (1996) suggest a cut-off point of 0.70 for inclusion of a variable when considering correlation with other variables and problems with multicollinearity. The correlation between these variables is at the margin of this cut-off. The logistic regression analysis presented below shows no problem with model convergence, nor are standard errors for model

\(^1\) The company capitalised $6.4 million of ‘Exploration and Evaluation Expenditure’ over two years; this amount was written down to $1.15 million in the year of administration by revaluation of assets and loss on disposal of tenements.
parameters exceedingly large, which indicates multicollinearity is not a problem.

Correlation of estimates output provided by SPSS logistic regression procedure also gives an indication of potential problems with multicollinearity. Problems are likely to be present if the correlation of estimates value approaches one. The correlation of estimates value between total liabilities/total assets and current liabilities/total assets is −0.166. To further test for problems with multicollinearity, logistic regression analysis was run with and without the significantly correlated variables. Results of models with and without the variables were not substantially different. It was concluded that problems with multicollinearity were not evident, and all independent variables were retained in the final model.

5.3 Reorganisation Decision Model

5.3.1 Summary Statistics

The first set of hypotheses concern the relationship between financial variables and the outcome of the reorganisation decision. Examination of summary statistics indicates very little difference between liquidation and reorganisation groups’ mean values for predictor variables. The Summary statistics are presented in Table 5.2 below. To identify statistically significant differences between mean values in the univariate setting, t-tests and a Chi-square test were performed on interval scaled and categorical variables respectively. Significance values, based on a two-tailed test as each comparison had two possible directions, show only INDUSTRY classification to be significantly different between the groups.
**Table 5.2 Summary Statistics – Liquidation and Reorganisation Outcomes**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Liquidation ($n=33$)</th>
<th>Reorganisation ($n=33$)</th>
<th>t-statistic</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLTA</td>
<td>1.593</td>
<td>2.485</td>
<td>33.00</td>
<td>0.04</td>
</tr>
<tr>
<td>TLOE</td>
<td>3.788</td>
<td>1.474</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>CAACL</td>
<td>1.367</td>
<td>2.695</td>
<td>15.60</td>
<td>0.01</td>
</tr>
<tr>
<td>CLTA</td>
<td>0.946</td>
<td>2.144</td>
<td>12.64</td>
<td>0.03</td>
</tr>
<tr>
<td>OPTA</td>
<td>-0.227</td>
<td>0.778</td>
<td>0.88</td>
<td>-4.17</td>
</tr>
<tr>
<td>TA</td>
<td>11 057 450</td>
<td>29 061 131</td>
<td>136 m</td>
<td>38 655</td>
</tr>
<tr>
<td>LNTA</td>
<td>14.225</td>
<td>1.920</td>
<td>18.73</td>
<td>10.56</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** denotes significant at $p<0.05$

Chi-square statistic is reported for Industry categorical variable. Fisher's Exact test is reported, as cell counts are less than 5 for some categories.

Industry coverage (cell counts) for test were: mining – 4, manufacturing – 16, wholesale – 2, retail – 12, construction – 2 and service – 30.

TLTA = total liabilities / total assets
TLOE = total liabilities / owners' equity
CAACL = current assets / current liabilities
CLTA = current liabilities / total assets
OPTA = operating profit / total assets
TA= total assets (raw value)
LNTA = natural log of total assets
5.3.2 Hypothesis Testing – Reorganisation Decision Model

To further test the research hypotheses concerned with the relationship between predictor variables and to develop an environmental model of the reorganisation decision, logistic regression analysis was conducted. Results of the analysis are presented in Table 5.3 below.

Coefficients for the leverage variables (TLTA and TLOE) are both significant at \( p<.01 \). Results indicate that reorganisation is more likely as the level of debt to assets ratio increases. Therefore, while TLTA is a significant predictor of the reorganisation decision, the direction of its effect is opposite to that stated in Proposition 1(a). For the variable TLOE, the results indicate that as the debt to equity ratio increases the likelihood of reorganisation decreases. Thus, only partial support for Proposition 1(a) is found. Interaction of the two measures of leverage included in the model may need to be considered. The results tend to indicate that companies are more likely to reorganise where higher levels of debt exist in the capital structure. However, where the level of debt eliminates owners’ equity the prospect of reorganisation may diminish.

Coefficients for both short-term liquidity variables (CACL and CLTA) are significantly different from zero at \( p<.05 \) for the former and \( p<.001 \) for the latter. In relation to the likelihood of a decision being made to proceed with company reorganisation, the results show full support for Proposition 2(a) - that companies with higher levels of short-term liquidity are more likely to reorganise.
Table 5.3 Logistic Regression Results – Liquidation and Reorganisation Outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>( \chi^2 ) to remove</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLTA</td>
<td>3.658</td>
<td>1.490</td>
<td>10.845</td>
<td>0.001**</td>
</tr>
<tr>
<td>TLOE</td>
<td>-1.935</td>
<td>0.636</td>
<td>14.538</td>
<td>0.000**</td>
</tr>
<tr>
<td>CAACL</td>
<td>0.193</td>
<td>0.192</td>
<td>4.339</td>
<td>0.037**</td>
</tr>
<tr>
<td>CLTA</td>
<td>5.388</td>
<td>1.839</td>
<td>14.963</td>
<td>0.000**</td>
</tr>
<tr>
<td>OPTA</td>
<td>-1.465</td>
<td>1.519</td>
<td>0.937</td>
<td>0.333</td>
</tr>
<tr>
<td>LNTA</td>
<td>0.548</td>
<td>0.304</td>
<td>3.815</td>
<td>0.051*</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td></td>
<td></td>
<td>41.744</td>
<td>0.000**</td>
</tr>
<tr>
<td>Mining</td>
<td>-42.204</td>
<td>36.216</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>-2.915</td>
<td>1.086</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wholesale</td>
<td>0.597</td>
<td>2.082</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>-1.524</td>
<td>1.095</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>109.60</td>
<td>56.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Model Results**

-2 Log Likelihood: 46.853
\( \chi^2 \) (11, \( n=66 \)): 44.913
Significance: 0.000
Nagelkerke Pseudo \( R^2 \): 0.658

*denotes significant at \( p<0.1 \), ** denotes significant at \( p<0.05 \)

TLTA = total liabilities / total assets  
TLOE = total liabilities / owners' equity  
CLTA = current liabilities / total assets  
OPTA = operating profit / total assets  
CAACL = current assets / current liabilities  
LNTA = natural log of total assets
Proposition 3(a) stated that past profitability would be associated with increased likelihood of company reorganisation. With the coefficient for the past profitability indicator (OPTA) not significantly different from zero at $p = 0.33$, the results do not support this proposition.

Proposition 4(a), that industry classification affects the likelihood that a company will reorganise, is also supported by the analysis (significant at $p < 0.001$). Industry classification variables were entered into the analysis as categorical variables, with the last classification used as an arbitrary reference category. Therefore, the coefficients relate the effect of each industry category compared to the service industry category. The results are important as they indicate the likelihood of reorganisation varies across industries, supporting Proposition 4(a). Given small cell counts for some of the industry classifications, the external validity of suggesting that one industry classification is more likely to reorganise than others would be questionable. However, the overall results strongly support the proposition that industry classification is an important variable in prediction of the reorganisation decision. In this study it appears that companies in the mining industry are more likely to be classed as liquidations; and companies in the construction industry are more likely to be classed as reorganisations. These results must be treated with caution due to the small cell counts for some industry classifications. Importantly, as has been the case in prior studies, the results indicate industry classification has information content in addition to financial information.

Company size, measured by total assets, was included in the model based on results of prior research that indicated it would have a significant effect on the likelihood of
reorganisation. Table 5.3 shows that the size measure (LNTA) is significant at $p<.05$. This result supports Proposition 5(a) that increased company size is associated with a greater likelihood of company reorganisation.

As discussed in Chapter four, coalition behaviour theory is useful in explaining how various parties involved in the reorganisation decision might behave, and how this behaviour relates to a company’s financial position. Having identified the financial constructs that distinguish companies that attempt reorganisation from those that liquidate, reference can be made to coalition behaviour theory to determine the nature of the decision process in voluntary administration.

Based on the results of the reorganisation decision environmental model the decision-making coalition is more likely to choose reorganisation when:

1. There is a reasonable prospect of some immediate payment to creditors: this is reflected in the significance of an increased short-term liquidity ratio as an indicator the coalition is likely to choose reorganisation.

2. The company has greater levels of current debt: this is reflected in the significance of an increased current debt to assets ratio as an indicator that the coalition is likely to choose reorganisation.

3. The level of debt has taken up any remaining owner’s equity: this is reflected in the significance of increased debt to equity ratio as an indicator that the coalition is less likely to choose reorganisation.

Coalition behaviour most likely to produce these results would involve decision making driven by unsecured creditors and management/ equity. Unsecured creditors
would be likely to agree to reorganisation where higher levels of short-term liquidity provide a level of return at least equivalent to what would be received in liquidation. The higher current debt to assets ratio for reorganised companies may suggest that they have larger amounts of unsecured short-term debt. Management /equity would support reorganisation, as they would receive little in liquidation due to the high debt to equity ratio.

An important result of the multivariate analysis presented in this section is that past profitability was not associated with increased likelihood of reorganisation. This may indicate that the actual going concern value of the company is not of primary concern to coalition decision-makers. This finding has implications regarding the efficiency of the decision process encouraged by the voluntary administration process.

5.3.3 Classification Results – Reorganisation Decision Model

The classification model developed by the logistic regression analysis was statistically significant at \( p < 0.01 \) \( (\chi^2 (11, 33) = 44.913, p < 0.001) \). The value for Nagelkerke’s \( R^2 \), which quantifies the proportion of explained variation in the outcome variable by the logistic regression model, was impressive at 65.8 percent. The model's ability to classify the sample companies as either liquidations or reorganisations, based on a 0.5 cut-off criterion, is summarised in Table 5.4.

Reorganisation is predicted if the model estimates a probability of reorganisation greater than or equal to 50 percent; conversely, liquidation is predicted if the model estimates a probability of reorganisation of less than 50 percent. Classification of actual outcomes by the model was impressive with 79 percent (26/33) of liquidations
and 82 percent (27/33) of reorganisations correctly classified. Overall, the model correctly classified 80 percent (53/66) of companies in the sample.

Table 5.4 - Classification Table for Liquidation and Reorganisation Outcomes (One-Year Prior)

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted 0 (liquidation)</th>
<th>Predicted 1 (reorganisation)</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (liquidation)</td>
<td>26</td>
<td>7</td>
<td>78.79%</td>
</tr>
<tr>
<td>1 (reorganisation)</td>
<td>6</td>
<td>27</td>
<td>81.82%</td>
</tr>
</tbody>
</table>

(60.30% Overall)

Diagram 5.1 is a histogram of the estimated probabilities of reorganisation. The symbol used for each case designates the group to which the case actually belongs (1 = reorganisation, 0 = liquidation). Examination of Diagram 5.1 shows correctly classified cases clustered at respective ends of the plot. This diagram indicates the model classifies the observed data reasonably well, with liquidated companies having generally low predicted probabilities and reorganised companies having generally high predicted probabilities. For liquidations, 67 percent of correctly classified companies had predicted probabilities of less than 0.25. For reorganised companies, 73 percent of correctly classified cases had predicted probabilities of more than 0.75. The majority of misclassifications occurred in the remaining region around the predicted probability of 0.5.
Diagram 5.1 - Observed Groups and Predicted Probabilities for Liquidation and Reorganisation Outcomes

Predicted Probability is of Membership for 1.00
The Cut Value is .50
Symbols: 0 - liquidated company
         1 - reorganised company
Each Symbol Represents 1 Case.
5.3.4 Model Validation Testing – Reorganisation Decision Model

As a general rule a prediction model will fit the sample from which it was drawn better than any other sample. To assess whether overfitting of the sample data is a problem for results in this study a holdout procedure was employed. The holdout procedure employed to test predictive validity of the model was the ‘leave one out’ or Lachenbruch (1975) method. The holdout procedure involves removing each case from the sample, calculating estimation model coefficients from the remaining cases and subsequently classifying the holdout case based on the calculated coefficients. If overfitting is a problem the prediction model will achieve a substantially higher level of predictive accuracy on the estimation sample than it does for the holdout procedure. Results of the holdout testing procedure are summarised in Table 5.5 below.

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 (liquidation)</td>
<td>1 (reorganisation)</td>
</tr>
<tr>
<td>0 (liquidation)</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>1 (reorganisation)</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(The cut value is 0.50)

For companies that reorganise and those that enter liquidation, the classification results for the holdout test were lower than for the estimation sample. Overall classification success for the estimation sample was 80 percent, compared to 68 percent for the holdout procedure. Classification success for liquidations was 79 percent for the
estimation sample and 64 percent for the holdout test; for reorganisations classification success was 82 percent for the estimation sample and 73 percent for the holdout test. The overall difference in classification success for the estimation sample indicates that some degree of overfitting is present with the model developed from the estimation sample. Reasonable classification results, compared to chance, are still obtained using the holdout procedure. This suggests the model is relatively stable. The small sample size is likely to be a contributing factor to the degree of overfitting indicated by the results.

5.3.4.1 Model Validation - Prior Year Results for Reorganisation Decision Model

To further test the validity of the logistic regression model developed for the reorganisation/liquidation decision, the model was applied to data available for companies in the sample for years prior to the incidence of reorganisation. The model was applied for data available in the second and third years before the year in which the administrator was appointed (see Chapter 4, section 4.4.2 for dating convention used in analyses). The number of companies for which data was available generally decreased as the time before administration increased. This was due to missing data, companies failing to lodge required reports and some companies being registered after the specified prior years\(^2\). Nevertheless, the results indicate that the model developed is reasonably stable over time.

The reorganisation / liquidation model is concerned with the decision made by various 'coalitions' that form during administration based on a company's immediate position. The nature of that decision, which results from coalition behaviour, will greatly affect

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\(^2\) Some companies were registered before the 'three years prior' time period.
the make-up of the resulting pool of companies that reorganise, which is reflected in the significant financial constructs in the model. For this reason, the results of testing the model on prior years' data can only be used to confirm the stability of the estimation model. Table 5.6 shows the classification results obtained for the model in the prior years.

Table 5.6 - Classification Results for Liquidation and Reorganisation Outcomes
Prior Years Financial Data

<table>
<thead>
<tr>
<th>Two Years Prior</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 (liquidation)</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>1 (reorganisation)</td>
<td>14</td>
<td>19</td>
</tr>
</tbody>
</table>

(The cut value is 0.50)

<table>
<thead>
<tr>
<th>Three Years Prior</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 (liquidation)</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>1 (reorganisation)</td>
<td>12</td>
<td>16</td>
</tr>
</tbody>
</table>

(The cut value is 0.50)

Generally, the model was stable when applied to prior years' data. As would be expected, the model's predictive accuracy decreased as time before the appointment of the administrator increased. As a company trades during the years prior to insolvency, its financial constructs will change as it attempts to deal with financial distress.
5.4 Reorganisation Success Model

While hypotheses testing presented in the preceding section was concerned with the effect of variables on the company reorganisation decision, the following section examines the effect of variables when distinguishing reorganised companies based on reorganisation success. One case was excluded from the original sample of 33 reorganised companies, as it was not possible to classify the company as successful or unsuccessful due to missing data for the post insolvency period. The final sample consisted of thirty-two reorganised companies. Hypothesis testing was again conducted using logistic regression analysis. Reorganised companies are distinguished on the basis of whether their return on assets in the post-insolvency period is comparable to the average for similar companies in their industry. Reorganised companies were considered successful in this second model where their average return on assets equals or is greater than industry average over three years subsequent to voluntary administration (see section 4.2 for a discussion of dependent variables used in model development).

5.4.1 Summary Statistics - Reorganisation Success Model

Examination of summary statistics presented in Table 5.7 below indicates some differences between companies grouped according to successful and unsuccessful reorganisation. A t-test was used to identify significant differences between mean values. Probability values indicate that mean company profitability (indicated by return on assets) is significantly different between groups at $p<0.05$. Mean leverage, measured by TLTA, is marginally significantly different at $p<0.10$.

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3 As an interesting corollary, multiple regression using return on assets is presented in Appendix 5.
### Table 5.7 Summary Statistics for Successful and Unsuccessful Reorganisations

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Successful (n=13)</th>
<th>Unsuccessful (n=19)</th>
<th>t-statistic/Chi-square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.Dev.</td>
<td>Max</td>
<td>Min</td>
</tr>
<tr>
<td>TLTA</td>
<td>2.693</td>
<td>3.482</td>
<td>2.78</td>
<td>0.39</td>
</tr>
<tr>
<td>TLOE</td>
<td>3.789</td>
<td>1.273</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>CACL</td>
<td>3.889</td>
<td>9.681</td>
<td>2.42</td>
<td>0.01</td>
</tr>
<tr>
<td>CLTA</td>
<td>1.012</td>
<td>0.852</td>
<td>1.82</td>
<td>0.05</td>
</tr>
<tr>
<td>OPTA</td>
<td>0.210</td>
<td>0.942</td>
<td>0.09</td>
<td>-0.93</td>
</tr>
<tr>
<td>TA</td>
<td>10 381 041</td>
<td>33 586 345</td>
<td>184m</td>
<td>10.64</td>
</tr>
<tr>
<td>LNTA</td>
<td>13.663</td>
<td>1.841</td>
<td>19.03</td>
<td>41 667</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>4.754</td>
<td>3.313</td>
<td>0.034</td>
<td>0.861</td>
</tr>
</tbody>
</table>

* denotes significant at p<0.1, ** denotes significant at p<0.05

Chi-square statistic is reported for Industry categorical variable. Fisher’s Exact test is reported, as cell counts are less than 5 for some categories. Industry coverage (cell counts) for test were: mining – 4, manufacturing – 16, wholesale – 2, retail – 12, construction – 2 and service – 30.

TLTA = total liabilities / total assets  
TLOE = total liabilities / owners' equity  
CACL = current assets / current liabilities  
CLTA = current liabilities / total assets  
OPTA = operating profit / total assets  
TA= total assets (raw value)  
LNTA = natural log of total assets
5.4.2 Hypotheses Testing – Reorganisation Success Model

Logistic regression analysis was conducted to test the research hypotheses concerned with the relationship between predictor variables and success in reorganisation. Results of the analysis are presented in Table 5.8.

The analysis shows that the coefficients for TLOE (leverage), CACL (short-term liquidity), OPTA (profitability) and INDUSTRY (industry classification) are significantly different from zero at \( p<0.05 \). Also, the coefficients for TLTA (leverage) and LNTA (size) are marginally significantly different from zero at \( p<0.10 \). In relation to propositions relating to reorganisation success, the results show full support for Proposition 2(b), that companies with higher levels of short-term liquidity will have higher levels of post-insolvency performance; Proposition 3(b), that companies with past profitability will have higher levels of post-insolvency performance; and Proposition 4(b), that industry classification will affect a company's post insolvency performance.

Results concerning the effect of leverage on reorganisation success are opposite to that suggested in Proposition 1(b). On the basis of model results, reorganisation success is associated with higher leverage, measured by both variables (TLTA and TLOE) included in the model. The result for leverage measured by TLTA is consistent with the result for the reorganisation decision model. However, the sign for the TLOE coefficient is opposite to that for the reorganisation decision model. This indicates the likelihood of success in reorganisation increases as the value of equity diminishes. Earlier analysis of coalition behaviour suggested the equity/management agency would have little to lose by attempting reorganisation, and would be willing to
undertake risky investments when faced with financial distress. Consistent with this, the reorganisation decision model indicated that where some equity value existed the decision would be more likely to reorganise. Results for this model indicate that where the value of equity is diminished, or is entirely absorbed by increasing levels of debt, the company is more likely to successfully reorganise. It is likely that where equity has been substantially diminished or absorbed, equity's ability to form coalitions with a view to attempting reorganisation will be limited, thus decreasing the likelihood of continued risky investment.

The coefficient for variable (LNTA) is negative, indicating that larger companies are less likely to reorganise successfully. However, the marginal significance of this independent variable (p = 0.099) means the effect of company size on reorganisation success is inconclusive.

Comparing results for the reorganisation success model reported above with that developed for the reorganisation decision shows a striking difference between the effect of the profitability variable. Therefore, Proposition 6 is fully supported. For the reorganisation decision model, profitability was a non-significant variable with a negative coefficient, meaning that lower profitability is associated with increased likelihood of reorganisation. In contrast, for the reorganisation success model, profitability is both significant and positive. This result has implications regarding the efficiency of the liquidation/reorganisation decision as the results indicate that past profitability is an important variable in distinguishing, from a pool of distressed companies, suitable candidates for reorganisation.
Table 5.8 Logistic Regression Results for Successful and Unsuccessful Reorganisations

<table>
<thead>
<tr>
<th>Variable</th>
<th>B (n=32)</th>
<th>S.E.</th>
<th>$\chi^2$ to remove</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLTA</td>
<td>13.673</td>
<td>18.622</td>
<td>3.477</td>
<td>0.062*</td>
</tr>
<tr>
<td>TLOE</td>
<td>6.607</td>
<td>7.738</td>
<td>4.256</td>
<td>0.039**</td>
</tr>
<tr>
<td>CAICL</td>
<td>14.667</td>
<td>17.920</td>
<td>13.547</td>
<td>0.000**</td>
</tr>
<tr>
<td>CLTA</td>
<td>-0.488</td>
<td>3.388</td>
<td>0.022</td>
<td>0.882</td>
</tr>
<tr>
<td>OPTA</td>
<td>40.549</td>
<td>55.653</td>
<td>9.662</td>
<td>0.000**</td>
</tr>
<tr>
<td>LNTA</td>
<td>17.031</td>
<td>737.205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MIN</td>
<td>-1.889</td>
<td>3.182</td>
<td>2.720</td>
<td>0.099*</td>
</tr>
<tr>
<td>WH5</td>
<td>5.812</td>
<td>736.207</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WH5</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Model Results

| -2 Log Likelihood | 11.669 |
| $\chi^2$ (10, n=32) | 31.561 |
| Significance       | 0.0005 |
| Nagelkerke Pseudo $R^2$ | 0.846 |

* denotes significant at $p<0.1$, ** denotes significant at $p<0.05$

TLTA = total liabilities / total assets
TLOE = total liabilities / owners' equity
CAICL = current assets / current liabilities
CLTA = current liabilities / total assets
OPTA = operating profit / total assets
LNTA = natural log of total assets
5.4.3 Classification Results - Reorganisation Success Model

The classification model developed from the logistic regression analysis was statistically significant. The industry adjusted post-insolvency performance model was significant at $p<0.01$ ($\chi^2 (10, 32) = 31.561$). Nagelkerke's $R^2$, which indicates the proportion of variation in the outcome explained by the model, is impressive at 84.6 percent.

The model's ability to classify the sample companies as either successful or unsuccessful reorganisations, based on a 0.5 cut-off criterion, is summarised in Table 5.9. Classification of actual outcomes by the models was impressive, with 89 percent (17/19) of unsuccessful and 85 percent (11/13) of successful reorganisations correctly classified. Overall, 87.5 percent (28/32) of companies in the sample were correctly classified by the model.

<table>
<thead>
<tr>
<th>Table 5.9 - Classification Results For Successful and Unsuccessful Reorganisations (One-Year Prior)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
</tr>
<tr>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>0 (unsuccessful)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1 (successful)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

(The cut value is 0.50)

Diagram 5.2 is a histogram of the estimated probabilities of successful company reorganisation. Examination of Diagram 5.2 shows correctly classified cases strongly clustered at respective ends of the plot, indicating the model classifies observed data very well.
Diagram 5.2 - Observed Groups and Predicted Probabilities
For Successful and Unsuccessful Reorganisations

Predicted Probability is of Membership for 1.00
The Cut Value is .50
Symbols: 0 - unsuccessful reorganisation
        1 - successful reorganisation
Each Symbol Represents 1 Case.
The four misclassified cases occurred in the region between a predicted probability of 0.25 and 0.75. Application of the model to decision making could take into account the distribution of classifications by closely examining the reorganisation prospects for any company that falls below a 0.75 predicted probability of successful reorganisation.

5.4.4 Model Validation Testing – Reorganisation Success Model

To assess whether overfitting of the sample data is a problem for the reorganisation performance model the Lachenbruch or ‘leave one out’ holdout procedure was employed. The holdout procedure involved removing each case from the sample, calculating estimation model coefficients from the remaining cases, and subsequently classifying the holdout case based on the calculated coefficients. If overfitting is a problem the prediction model will achieve a substantially higher level of predictive accuracy on the estimation sample than it does for the holdout procedure.

Results of the holdout testing procedure are summarised in Table 5.10 below. For both successful and unsuccessful companies that reorganise, the classification results for the holdout test were similar to results for the estimation sample. Overall classification success for the estimation sample was 87.5 percent, compared to 83.2 percent for the holdout procedure. Correct classification of successful companies was 90 percent for both the estimation sample and for the holdout test; for unsuccessful companies, classification success was 85 percent for the estimation sample and 77 percent for the holdout test. The classification success for the holdout procedure suggests there is no overfitting problem with the model developed from the estimation sample.
Table 5.10 – Model Validation Testing: Classification Table for Successful and Unsuccessful Reorganisations

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (unsuccessful)</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>1 (successful)</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

(The cut value is 0.50)

5.4.4.1 Model Validation - Prior Year Results for Reorganisation Success Model

To further test the validity of the logistic regression model developed for successful and unsuccessful reorganisations, the model was applied to data available for companies in the sample for years prior to the incidence of reorganisation. The model was applied for data available in the second and third years before the year in which the administrator was appointed (see Chapter 4, section 4.4.2 for dating convention used in analyses). The number of companies for which data was available generally decreased as the time before administration increased. Application of the model to prior years' data provides an assessment of the stability of the model over time. Table 5.11 shows the classification results obtained for the model in the two years prior to the year immediately before appointment of the administrator. Classification success results are mixed. Results for prediction of unsuccessful companies are good with the model correctly classifying 76 percent of cases on average over the two years. In contrast, results for companies that successfully reorganise are poor, with 42 percent of cases correctly classified on average over the two years.

The results suggest the model developed from financial data immediately before
reorganisation is not stable over time with respect to identifying companies that are successful in reorganisation. As financial distress increases, and the company approaches the time of administration, it is likely that action might be taken to improve the company's position. This would affect the company's underlying financial constructs. Also, the process of reorganisation itself may alter the position of a company significantly. The model examines the position of the company prior to implementation of a reorganisation plan, and attempts to predict outcomes based on financial position and performance at the time of appointment of an administrator. If a reorganisation plan is implemented the company's position may alter dramatically in the post-insolvency period which would not be reflected in the predictor variables.

Table 5.11 - Classification Results for Successful and Unsuccessful Reorganisations Prior Years Financial Data

<table>
<thead>
<tr>
<th>Two Years Prior</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td>0 (unsuccessful)</td>
<td>1 (successful)</td>
</tr>
<tr>
<td>0 (unsuccessful)</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>1 (successful)</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(The cut value is 0.50)

<table>
<thead>
<tr>
<th>Three Years Prior</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed</td>
<td>0 (unsuccessful)</td>
<td>1 (successful)</td>
</tr>
<tr>
<td>0 (unsuccessful)</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>1 (successful)</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(The cut value is 0.50)
However, the results for companies that perform poorly after reorganisation are stable over time. Therefore, many of the companies that enter voluntary administration and emerge with a reorganisation plan in place have, for some time exhibited, characteristics that suggest they are likely to perform poorly. The results have important implications regarding the efficiency of voluntary administration legislation. It appears it is possible for companies that have, for some time, exhibited poor prospects for success in reorganisation to proceed with a reorganisation plan.

The ability of the model developed to predict companies that are likely to perform poorly in reorganisation could be used to improve the reorganisation decision in voluntary administration. As the model includes readily available financial data as predictor variables it represents a simple tool that could be used to determine a company's prospects for future profitable use of assets.

5.5 Summary

This chapter has considered the results of testing propositions relating to the usefulness of company characteristics, particularly financial ratios, as predictors of:

1. whether a company is likely to reorganise in voluntary administration; and
2. whether a company that attempts reorganisation in voluntary administration is likely to be successful, based on return on assets compared with average industry returns.

The results reported for the first set of propositions relating to the reorganisation decision show:

1. Support for application of coalition behaviour theory to development of
parsimonious environmental prediction models based on readily obtainable financial data for determining reorganisation decision outcomes.

2. Companies are more likely to reorganise if they have better short-term liquidity, a higher debt to assets ratio, a greater ratio of current debt to total assets and some value in equity. This finding suggests that a coalition between unsecured creditors and managers/equity dominates the reorganisation decision. Unsecured creditors will benefit from an immediate and possibly improved return over that received in liquidation. Moreover, managers and equity would be significantly worse off if the company were to liquidate: managers would lose their jobs and equity would receive little or nothing in light of the greater levels of debt to assets indicated by the model for companies that reorganise.

3. The reorganisation decision is affected by industry classification.

4. Larger companies, with size measured by total assets, are more likely to reorganise.

5. Holdout validation testing indicated the decision model is relatively stable. The small decrease in classification accuracy for the holdout test could be attributed to the sample size.

6. Generally, the model was stable when applied to data for years prior to the year from which the estimation sample was drawn. The predictive ability of the model declined over the two financial years prior to the estimation year (the year of the administrators appointment).

For the second set of propositions that relate to reorganisation success the results show that:

1. Reorganised companies are more likely to be successful if they have higher levels
of debt to total assets, higher levels of debt to equity, a better current ratio (short-term liquidity and greater levels of return on assets (profitability) prior to entering administration. The results indicate that, despite their financially distressed position, companies that perform well (or are successful) in the post-insolvency period have an underlying profitable business and can pay unsecured creditors in the short-term. The results also suggest that where equity is diminished or absorbed by debt, the company is more likely to reorganise successfully. Equity (operating in conjunction with management) has incentive to reorganise regardless of the company's prospects, as it will likely lose everything in liquidation. Moreover, equity/management will be less risk averse regarding future investment. The diminished position of equity may effectively remove the influence of this party in the reorganisation decision and process, improving the company's prospects.

2. Success in reorganisation was also affected by industry classification.

3. Holdout validation testing indicated the reorganisation success model is stable and does not exhibit problems associated with overfitting. Classification accuracy for the holdout test was similar to that for the estimation model.

4. Testing of the model developed from data obtained immediately prior to the appointment of the administrator on prior years' data indicated the model was stable over time with respect to prediction of poor performing (unsuccessful) companies that attempt to reorganise but not for successful companies. This suggests that information content of data gathered prior to the implementation of reorganisation in voluntary administration is limited, and prediction of reorganisation success may be improved by examining the characteristics of the reorganisation plan itself. However, historical data appears to be more useful in
identifying unsuccessful companies.

5. Comparison of results for the two models confirmed the proposition that underlying financial constructs of firms that reorganise and those that reorganise successfully in voluntary administration would differ. The results suggest the difference in models can be explained by the operation of coalition behaviour in the reorganisation decision, particularly by the dominance of the management/equity and unsecured creditor coalition and its effect on the reorganisation decision.

Overall, the results presented in this chapter have important implications. First, the analysis lends support to the coalition behaviour model of reorganisation choice (White 1984, 1989). Importantly, this provides a basis for further development of a parsimonious bankruptcy reorganisation prediction model based on a theoretical background.

For policy-makers the results presented here are hardly reassuring. Arguably, the voluntary administration procedure appears to be problematic in terms of possible bias toward reorganisation of inefficient companies. The intent of the legislation was to allow viable companies the opportunity to reorganise. Failure of the voluntary administration decision to adequately filter inefficient companies may add to the overall economic cost associated with insolvency. Results indicate the behaviour of parties involved in the reorganisation decision is inefficient, and may well allow companies with few prospects for recovery to proceed with reorganisation.
CHAPTER SIX

COMPARISON OF ENVIRONMENTAL MODELS
AND EXPERT DECISION MAKERS

6.1 Introduction

The results presented in Chapter five suggest that the coalition behaviour model is useful for analysis of the reorganisation decision made in voluntary administration. Moreover, it appears that coalition behaviour has a significant effect on the efficiency of the reorganisation decision, tending to allow companies that have poor prospects to reorganise. The logistic regression models developed indicate that companies more likely to reorganise do not have an underlying financial position that would normally be associated with good prospects for a reasonable level of post-insolvency performance. Furthermore, the poor overall performance of reorganised companies in the sample indicates that the reorganisation plans are often ineffective in turning around a company's distressed state. The underlying constructs that differentiate reorganised and liquidated companies conform to what would be expected under the coalition behaviour model. The results suggest that the reorganisation decision is largely made on the basis of opportunistic behaviour by a coalition comprising equity/management and unsecured creditors.

Analysis was also presented that distinguished 'successful' from 'unsuccessful' companies that reorganised. Notably, the constructs that distinguish these groups of companies were those that would normally be associated with, or signal, a reasonable level of post-insolvency performance. Arguably, if the decision process was efficient, these constructs should also be found to distinguish between reorganised and liquidated companies, rather than constructs that can be associated with inefficient coalition behaviour. The complicated bargaining process that gives rise to coalition
behaviour in voluntary administration appears to result in distorted and inefficient
decision-making.

This thesis has focused on the usefulness of basic financial data for decision making
about companies that enter voluntary administration. The statistical (environmental)
models presented in Chapter five indicate that financial data are relevant to the
decision making process, and may have valuable information content regarding the
future prospects of companies that attempt reorganisation under voluntary
administration. The purpose of this chapter is to further focus on the reorganisation
decision process, by examining the decision making and performance of an important
party to the decision process - insolvency practitioners (those who will be appointed
as administrators).

This chapter describes a study designed to determine whether basic financial data
provides useful information to insolvency experts in the prediction of 1) whether a
company is likely to reorganise, and 2) whether a company that is a suitable candidate
for reorganisation can be identified from a pool of distressed companies. Specifically,
results are presented for an experimental task that required practitioners to examine
data based on models developed in the previous chapters.

The practitioners’ task was to make a decision on whether the company should
attempt reorganisation or liquidate. Additionally, where reorganisation was selected,
subjects were required to assess the likelihood of success for the company.
Subsequently, a task questionnaire required respondents to comment on several
aspects of their decision process and to indicate their level of insolvency related
experience. The purpose of this task was to:
1. directly compare the performance of insolvency practitioners' decisions and their models with prediction performance of environmental models;  
2. examine how practitioners used information cues in their decision making; and  
3. compare the efficiency of insolvency experts' decision making, based on their use of cues from basic financial data included in the models, with the actual voluntary administration decision.

The lack of practical realism is an important limitation for this type of analysis. For example, the small set of information cues may not be representative of those normally used by practitioners in this task. In addition, the decision environment is artificial in that incorrect decisions by the practitioners will not reduce their reputation capital, as would be the case in the real world.

This chapter proceeds as follows. First, results relating to comparisons between the decision accuracy of subjects with the classification accuracy rates of the environmental models are given and explained. Additional analysis is presented that examines the effect of the subjects' confidence assessments on prediction accuracy. Second, results relating to the decision accuracy of each subject and the model of man for each subject are presented and discussed. Also, models of man are reviewed to determine how subjects used information cues. Third, in an attempt to explain individual differences in prediction accuracy, the responses to task related questions (debriefing questions) are correlated with accuracy. Finally, the chapter concludes with a summary.
6.2 Research Methodology

6.2.1 Subjects

The subjects for this experimental task were Australian insolvency practitioners. From a listing published by the Insolvency Practitioners Association of Australia (IPAA) contact details for approximately 136 insolvency firms were obtained. Firms were contacted by letter and requested to participate in the experimental task\(^1\). Twenty-one firms provided completed responses for the experimental task. A further eleven respondents indicated they were no longer engaged in insolvency work, or declined to complete the experimental task. Therefore, the response rate was 24 percent overall, with 15 percent of responses useable for analyses. The non-random sample of subjects generally had considerable expertise in conducting insolvency administrations. All of the respondents were in senior positions within the firms contacted, and therefore had considerable experience in the type of decision making relevant to the experimental task. Table 6.1 below provides a subject description summary.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Insolvency experience</td>
<td>17</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Engagements where reorganisation/liquidation has been at issue</td>
<td>143</td>
<td>1</td>
<td>1000</td>
</tr>
<tr>
<td>Age</td>
<td>44</td>
<td>29</td>
<td>62</td>
</tr>
<tr>
<td>Present Position</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In addition to those that completed the experimental task material, a further eight respondents replied and indicated they had chosen not to complete the material. These
responses were interesting, in that they provided a useful insight into the value to some insolvency practitioners of the information cues presented in the experimental task. Below is a brief summary of respondents' reasons for not completing the task:

1. Not enough information was provided to make a serious attempt at providing estimates of probability or confidence requested.
2. Ratio analysis is seldom used in this type of decision.
3. Response based on cues provided would be pure guesses and meaningless.
4. Attempting to second-guess the administrator, who would make a decision with the benefit of all available information, is an exercise in futility.
5. Task decisions cannot be made from financial profiles in isolation.

Interestingly, some of these respondents listed items of information that are useful in their decision making that can be directly associated the cues provided. For example, several mentioned the ability of the company to obtain ongoing financial support, and the likely level of any further funding. These responses suggest some practitioners may not be familiar with financial ratio analysis and its application to decision making.

6.2.2 Experimental Task and Instructions

The approach to administering the experimental task and instructions provided to subjects was based on the extensive body of prior behavioural accounting studies (see for example Libby 1975, 1976, Zimmer 1980, Casey 1980). Each subject was provided with financial profiles of twenty real companies that had entered voluntary

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1 This method of contacting firms was adopted as insolvency experts experience heavy demands on their time, making it difficult (if not impossible) to conduct the experiment in the firm's offices. Providing subjects with task materials by mail allowed them to complete the task at a convenient time. Problems with this approach were limited by clearly communicating instructions and procedures for completion of the task through the firm's senior managers.
administration between 1993 and 1996\(^2\). Financial profiles contained information cues consistent with those utilised in models developed in Chapter five. Financial data cues were provided for both years prior to the decision year. Half of the companies had concluded administration by liquidation; the other half had concluded administration with a deed of company arrangement that provided for reorganisation of the company's affairs. Each subject was advised that (a) the firms had been randomly drawn from a population containing equal proportions of liquidated/reorganised firms, the latter containing 50% deemed successful reorganisations, and (b) the cost of misclassifying (i) a liquidation/reorganisation and (ii) a successful/unsuccesful reorganisation was the same. Subjects were required to identify companies that should attempt reorganisation, and companies that should be liquidated (replicating the reorganisation decision). Where subjects identified a company as one that should attempt reorganisation, they were requested to estimate the probability of the company achieving a return on assets that equals or exceeds the industry average in the first three years after reorganisation\(^3\). Subjects were also requested to estimate the probability of the outcome they had indicated, and to rate their confidence in each prediction. A debriefing questionnaire followed the completion of financial profiles. The questionnaire requested information concerning subjects' experience, overall confidence, and use of cues provided in completing the experimental task. Subjects were also required to rate the amount of relevant information (information load), irrelevant information (data load), uncertainty, and information value in performing

\(^2\) This was a sub-sample of companies included in the original environmental model. The smaller but more manageable number of companies was deemed more appropriate for the experimental task to minimise problems associated with subjects experiencing information overload or fatigue during the task.

\(^3\) The rating scale for this question ranged from 'even chance' (at .5) to 'high chance' (at 1). Subjects were unable to rate a company that they selected as suitable to attempt reorganisation as having a less than even chance of 'success', as defined by the industry compared return on assets. This constraint on subjects' response allowed more meaningful comparison of expert decision making results with the environmental model for successful/unsuccesful reorganisations.
the task. Experimental task instructions, a typical financial profile, and the debrief questionnaire have been included as Appendix 2.

Each subject was provided with instructions that emphasised independent work was required, and that the cost of misclassifying either a reorganisation or liquidation was the same. Moreover, brief information was provided about the nature of the study and its relevance to the decision-makers (insolvency practitioners).

6.3 Results

6.3.1 Environmental Models Versus Expert Decision Makers

Initial analysis of data from the experimental task administered to insolvency practitioners was concerned with comparing the performance of environmental (statistical) models developed in Chapter five with the performance of insolvency practitioners (experts). Numbers of correct predictions of the liquidation/reorganisation decision by the subjects are presented in Table 6.2. The binomial theorem indicates that, at the 95 percent confidence level, a subject predicts at a rate better than random accuracy if he or she correctly predicts the status of at least 14 companies. Table 6.2 indicates that only one subject performed better than random accuracy, correctly predicting the outcome for fourteen companies.

The poor performance of insolvency experts in predicting the outcome of the reorganisation/liquidation decision is not surprising considering the findings presented in Chapter five. Results of analyses presented in Chapter five suggest that the nature of coalition behaviour driving the decision to reorganise under voluntary administration is inefficient, with the underlying constructs of the decision model divergent from what would be expected for efficient decisions. Assuming that
insolvency experts looked for cues in the information provided in the experimental task that indicate whether a company is a suitable candidate for reorganisation, the difference between their prediction and actual outcomes is readily explained.

<table>
<thead>
<tr>
<th>Correct Predictions - Overall</th>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 **</td>
<td>2</td>
</tr>
<tr>
<td>6 ***</td>
<td>3</td>
</tr>
<tr>
<td>7 ********</td>
<td>7</td>
</tr>
<tr>
<td>8 ****</td>
<td>4</td>
</tr>
<tr>
<td>9 ***</td>
<td>3</td>
</tr>
<tr>
<td>11 *</td>
<td>1</td>
</tr>
<tr>
<td>14 *</td>
<td>1</td>
</tr>
<tr>
<td>Correct Predictions = 161/420 (38.3%)</td>
<td></td>
</tr>
<tr>
<td>Mean = 7.62</td>
<td></td>
</tr>
<tr>
<td>Standard Deviation = 2.04</td>
<td></td>
</tr>
<tr>
<td>Max = 14, Min = 5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct Predictions - Liquidation</th>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 *</td>
<td>1</td>
</tr>
<tr>
<td>2 *****</td>
<td>5</td>
</tr>
<tr>
<td>3 **********</td>
<td>8</td>
</tr>
<tr>
<td>4 ***</td>
<td>3</td>
</tr>
<tr>
<td>5 ***</td>
<td>3</td>
</tr>
<tr>
<td>8 *</td>
<td>1</td>
</tr>
<tr>
<td>Correct Predictions = 91/210 (43.3%)</td>
<td></td>
</tr>
<tr>
<td>Mean = 3.33</td>
<td></td>
</tr>
<tr>
<td>Standard Deviation = 1.53</td>
<td></td>
</tr>
<tr>
<td>Max = 8, Min = 1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Correct Predictions - Reorganisation</th>
<th>Number of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 *</td>
<td>1</td>
</tr>
<tr>
<td>2 **</td>
<td>2</td>
</tr>
<tr>
<td>3 ***</td>
<td>3</td>
</tr>
<tr>
<td>4 *****</td>
<td>5</td>
</tr>
<tr>
<td>5 ****</td>
<td>4</td>
</tr>
<tr>
<td>6 *****</td>
<td>5</td>
</tr>
<tr>
<td>8 *</td>
<td>1</td>
</tr>
<tr>
<td>Correct Predictions = 70/210 (33%)</td>
<td></td>
</tr>
<tr>
<td>Mean = 4.33</td>
<td></td>
</tr>
<tr>
<td>Standard Deviation = 1.80</td>
<td></td>
</tr>
<tr>
<td>Max = 8, Min = 0</td>
<td></td>
</tr>
</tbody>
</table>
Subjects' prediction accuracy was 43 percent for reorganised companies, compared to 33 percent for liquidated companies. Comparison of subjects' mean prediction accuracy (between reorganisation and liquidation) by \( t \) test was performed, and the result was not significant at \( p = 0.05 \) (\( t = -1.732, p = 0.099 \); see Table 6.2).

A \( t \) test was used to determine whether the decision accuracy of the statistical model developed in Chapter five was significantly different from the accuracy rates of human judges (insolvency experts). The result of this analysis is displayed in Table 6.3, which clearly shows superior accuracy of the model over the human decision-makers with respect to the reorganisation/liquidation decision.

<table>
<thead>
<tr>
<th>Table 6.3 – Comparison of Accuracy (Success) Rates of Environmental Model and Human Decision Makers (Reorganisation/Liquidation Decision)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Accuracy (n=21)</strong></td>
</tr>
<tr>
<td>Human</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>7.62</td>
</tr>
</tbody>
</table>

** denotes significant at \( p < .001 \).

As suggested, the significant difference between prediction success for the statistical model and insolvency experts may be attributable to the effect of coalition behaviour distorting the reorganisation/liquidation decision. If this is the case and assuming insolvency experts are rational and objective decision makers, improved results would be expected when comparing insolvency experts' predictions with voluntary administration outcomes determined by post insolvency performance. In determining subjects' prediction accuracy for voluntary administration outcomes (successful versus unsuccessful) a correct prediction was deemed to have been made when:

1. a liquidation or unsuccessful reorganisation was correctly predicted;
2. an unsuccessful reorganisation was classified as a liquidation; and
3. a successful reorganisation was correctly predicted.

This classification determined that the ability of the subject to identify suitable from unsuitable prospects for reorganisation. The accuracy of subjects’ prediction for this outcome is greater than for the reorganisation decision, as shown in Table 6.4.

Prediction accuracy for subjects in this study at 52.6 percent is worse than that generally reported for similar financial distress prediction task studies (task was failure/non-failure prediction). For example, Libby (1975) and Zimmer (1980) reported for loan officers overall prediction success for company failure of 74.4 and 77.1 percent respectively. Casey (1980) reported success of only 56.7 in a similar prediction task for bankers, while Abdel-khalik and El-Sheshai (1980) reported success of 62.3 percent. Poor results for subjects in Casey’s study have been attributed to non-specification of priors. However, there is some conflicting evidence regarding the effect of priors. Abdel-Khalik and El-Sheshai (1980) found no improvement in prediction levels when subjects were provided with information regarding prior probability of bankruptcy (see also Houghton 1984).

Overall success for subjects in identifying suitable candidates for reorganisation in this study appears to be no better than random accuracy. Unsuitable candidates were more readily identified from the pool of distressed companies (59.4 percent), which was nearly double the prediction success rate for suitable candidates (32.3 percent). Poor ability to identify companies that successfully reorganise can possibly be explained by the fact that prospects in reorganisation can only be partly ascertained from historical financial information. Reorganisation under voluntary administration will likely require some restructuring of a company’s affairs. Critical information
related to reorganisation would not be reflected in past financial data, possibly resulting in the poor overall prediction accuracy.

Table 6.4 – Experts’ Prediction Success (Successful/Liquidation and Unsuccessful Reorganisation)

<table>
<thead>
<tr>
<th>Correct Predictions – Overall</th>
<th>Number of Subjects (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 ***</td>
<td>3</td>
</tr>
<tr>
<td>8 ****</td>
<td>4</td>
</tr>
<tr>
<td>9 **</td>
<td>2</td>
</tr>
<tr>
<td>10 *</td>
<td>1</td>
</tr>
<tr>
<td>11 ****</td>
<td>4</td>
</tr>
<tr>
<td>12 *</td>
<td>1</td>
</tr>
<tr>
<td>13 *</td>
<td>1</td>
</tr>
<tr>
<td>14 ***</td>
<td>3</td>
</tr>
<tr>
<td>15 *</td>
<td>1</td>
</tr>
<tr>
<td>17 *</td>
<td>1</td>
</tr>
</tbody>
</table>

Correct Predictions = 221 (52.61%)
Mean = 10.52 (20); Max = 17, Min = 6; Standard Deviation = 3.15

Correct Predictions – Liquidation and Unsuccessful Reorganisation

<table>
<thead>
<tr>
<th>Correct Predictions</th>
<th>Number of Subjects (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 **</td>
<td>2</td>
</tr>
<tr>
<td>5 *</td>
<td>1</td>
</tr>
<tr>
<td>6 *****</td>
<td>5</td>
</tr>
<tr>
<td>7 *</td>
<td>1</td>
</tr>
<tr>
<td>8 *</td>
<td>1</td>
</tr>
<tr>
<td>10 ***</td>
<td>3</td>
</tr>
<tr>
<td>11 *</td>
<td>1</td>
</tr>
<tr>
<td>12 ****</td>
<td>4</td>
</tr>
<tr>
<td>13 **</td>
<td>2</td>
</tr>
<tr>
<td>14 *</td>
<td>1</td>
</tr>
</tbody>
</table>

Correct Predictions = 187 (59.37%)
Mean = 8.91 (15); Max = 14, Min = 4; Standard Deviation = 3.29

Correct Predictions – Successful Reorganisation

<table>
<thead>
<tr>
<th>Correct Predictions</th>
<th>Number of Subjects (n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 *****</td>
<td>7</td>
</tr>
<tr>
<td>2 *****</td>
<td>6</td>
</tr>
<tr>
<td>3 *****</td>
<td>5</td>
</tr>
</tbody>
</table>

Correct Predictions = 34 (32.3%)
Mean = 1.62 (5); Max = 3, Min = 0; Standard Deviation = 1.02
Overall, the results here demonstrate that basic financial data readily available at the
time of appointment of an administrator had little information value for expert
decision-makers required to assess a company's suitability for reorganisation.
However, assessment of the data by expert decision-makers provided some assistance
in the difficult task of identifying companies that are unlikely to reorganise
successfully from a pool of distressed companies. Moreover, when prediction success
for experts is compared with prediction success for environmental models developed
in Chapter five, the usefulness of environmental models in assisting with efficient
decision making is evident.

6.3.2 Self-Insight into Accuracy of Each Prediction

Subjects were also requested to indicate their degree of confidence in each prediction.
The usefulness of financial profile information to subjects is supported if their
accuracy is positively associated with confidence in prediction (Zimmer 1980, p.633).
Tables 6.5a and 6.5b provide the proportion of correct responses for each level of
confidence for liquidation/reorganisation decision and successful/unsuccessful
reorganisations.

For the reorganisation/liquidation decision, the overall results indicate that accuracy
improved marginally with greater confidence (although overall accuracy was low).
For liquidations, accuracy increased where respondents were 'very confident' of their
decision. However, Table 6.5a shows that accuracy was associated with lower levels
of confidence for identifying those companies that attempted reorganisation.
Therefore, the usefulness of financial information to subjects is not supported for the
task of identifying companies that attempt reorganisation. Again, the information cues
may not be useful to subjects, as the decision is a result of coalition behaviour.
Table 6.5b presents analysis of accuracy relating to the liquidation/unsuccessful reorganisation and successful reorganisation decision. Overall results show little change in accuracy for differing levels of confidence. While overall accuracy was low, cues appear to have some information value in assisting with accurate decision making in relation to liquidations only, although this did not correspond with levels of confidence.

<table>
<thead>
<tr>
<th>Prediction</th>
<th>Liquidation</th>
<th>Reorganisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence</td>
<td>Very Confident</td>
<td>Confident</td>
</tr>
<tr>
<td>Fraction Correct</td>
<td>16/38</td>
<td>19/100</td>
</tr>
<tr>
<td>Percentage Correct</td>
<td>42%</td>
<td>19%</td>
</tr>
</tbody>
</table>

Table 6.5a – Subjects’ Correct Response for Confidence Level (Reorganisation/Liquidation Decision)

<table>
<thead>
<tr>
<th>Prediction</th>
<th>Successful/Unsuccessful</th>
<th>Successful Reorganisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence</td>
<td>Very Confident</td>
<td>Confident</td>
</tr>
<tr>
<td>Fraction Correct</td>
<td>61/96</td>
<td>101/175</td>
</tr>
<tr>
<td>Percentage Correct</td>
<td>63.5%</td>
<td>57.7%</td>
</tr>
</tbody>
</table>

Table 6.5b - Subjects’ Correct Response for Confidence Level (Successful/Unsuccessful Reorganisation)
6.3.3 Individual Differences

In an attempt to explain individual differences in prediction accuracy, the responses to the task questionnaire were correlated with the relevant accuracy for 1) the reorganisation/liquidation decision, and 2) for identifying successful from unsuccessful companies in reorganisation. The complete correlation Table is reproduced in Appendix 3. Where it is likely that many variables are correlated with another variable, potential problems exist with interpreting results of the significance of univariate correlation as they may not be independent. Because of these problems, only correlations found to be significant at the 0.01 level are presented.

Respondents who indicated they had a greater number of years of insolvency experience were more accurate \( (r=.568, n=21, p=.023) \). However, when accuracy scores were decomposed to individual scores for correct reorganisations and liquidations, a marginally significant correlation (at \( p<.05 \)) was only found for liquidation decision accuracy. Therefore, from the cues provided, experience was useful in identifying companies that should be liquidated. However, experience provided no enhancement of accuracy scores in selecting companies that are likely to reorganise. None of the other variables measured in the task questionnaire (including information load, data load, uncertainty and information value) were significantly correlated with decision accuracy.

Correlation of subjects’ rating of the value of each information item provided in the financial profiles with accuracy scores showed significant negative correlation between liquidation prediction accuracy and the ratios Total Liabilities/Total Assets \( (r= -.666, p=.001) \) and Current Liabilities/Total Assets \( (r= -.569, p=.007) \). The decision model presented in Chapter 5 indicated that more highly levered companies
(indicated by TL/TA) and companies with higher ratios of current liabilities to total assets are more likely to reorganise. The counter-intuitive relationship between these variables and the likelihood of reorganisation may be the reason for the significant negative correlation. Again, this highlights the difference between companies identified by insolvency experts as suitable candidates for reorganisation and those that attempt reorganisation under voluntary administration.

6.4 Models of Man

Prior research that has examined the performance of human decision makers has found that additive models of decision makers' predictions can be more accurate predictors of environmental events than the individuals themselves. The increase in accuracy of the 'model of man' can be attributed to a loss in accuracy caused by the individuals' inconsistent application of his or her judgement policy exceeding the increase in accuracy from his or her valid use of non-linear relationships between cues and the decision event (Zimmer 1981).

Results of previous studies that have compared the prediction accuracy of human decision-makers and their additive models for financial distress prediction tasks have been mixed. For example, Libby (1976) reported individuals outperforming their models for an experimental study of loan officers' predictions of corporate bankruptcy. Following Libby's (1976) paper, Zimmer (1981) reported on an experiment for a group of Australian bank loan officers. Zimmer's (1981) study reports a majority of loan officers were outperformed by their 'models of man'. However, when cross-validated models of man were compared to loan officers, the difference between the mean accuracy was not significant.

To assess whether inconsistent application of judgement policy affects the prediction
accuracy of insolvency experts when deciding on the suitability of a company for reorganisation, performance of the model of man was compared to the performance of man for experimental task subjects. To compare the decision accuracy of man and model of man, twenty-one logistic regression analyses were run, treating the individual subjects’ prediction of reorganisation/liquidation as the dependent variable, and the relevant information cues as the independent variables. To achieve parsimony, and to avoid overfitting, the stepwise method based on the likelihood ratio test was used to develop the logit models. Moreover, to eliminate bias in the parameter estimates, the jack-knife method of cross validation was employed. This involves ‘holding out’ each case in succession and using the remaining cases in the sample to classify the held out case. Table 6.6 summarises the result of comparison of the average judges’ accuracy rate with the average cross-validated accuracy of the individual models of man.

<table>
<thead>
<tr>
<th>Average Accuracy Rates</th>
<th>Paired t test</th>
<th>Mean Type 1 Error</th>
<th>Mean Type 2 Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>Model of Man</td>
<td>t value</td>
<td>Sig.</td>
</tr>
<tr>
<td>7.60</td>
<td>7.40</td>
<td>0.433</td>
<td>0.670</td>
</tr>
</tbody>
</table>

The results reported here (together with the complete analysis reported in Appendix 4) show that although subjects performed marginally better than validated models of man the results were not significant. Subjects (man) outperformed the model of man on ten occasions; models of man outperformed subjects on six occasions; while on

---

4 Due to the relatively small number of cases compared to the number of variables the stepwise procedure was considered more appropriate than the general model in this instance. This approach accords with earlier studies that have developed models of man.
four occasions the results were even. A paired $t$ test was performed to ascertain whether there was a significant difference between the overall mean accuracy for man and model of man. The result of the $t$ test revealed no significant difference ($t = 0.433$, $p = 0.670$). Marginally better performance of subjects than models of man appears to be consistent with the finding of Libby (1976) in his study of the decision accuracy of bank loan officers. However, in Libby’s study subjects outperformed their models considerably (in twenty-six cases out of forty-three). The non-significant difference between subjects’ performance and validated models of man is also consistent with the findings of Zimmer (1981). Libby (1976, p.11) suggests that where subjects have a considerable amount of task related training this may contribute to improved task performance.

6.4.1 Parameter Estimates in Models of Man

As suggested, the significant difference between prediction success for the statistical model and insolvency experts may be attributed to the effect of coalition behaviour distorting the reorganisation/liquidation decision. If this is the case, differences would be expected between significant variables in the statistical model and those used by insolvency practitioners. Moreover, if it is assumed that insolvency experts are rational decision makers unaffected by self interested coalition behaviour, then important constructs in their decision making should be consistent with those found in the successful/unsuccessful reorganisation model developed in Chapter five.

Table 6.7a presents a summary of information provided by experimental task subjects regarding their use of the cues provided in making decisions. Subjects rated measures of liquidity, profitability, size and leverage (TL/TA) respectively as the most useful items of information in making their decision. Examination of parameter estimates for
models of man developed by stepwise logistic regression, summarised in Table 6.7b, indicate that cues frequently utilised in decision making were:

1. short-term liquidity (higher levels) - CA/CL significant in 11 models, and CL/TA significant in 6 models;
2. leverage (lower levels) - TL/TA significant in 5 models;
3. operating profit (higher levels) – OP/TA significant in 3 models

Parameter estimates for models of man tend to conform to the successful/unsuccessful reorganisation model developed in Chapter five. This is further evidence that poor prediction accuracy for the liquidation/reorganisation decision might be partly explained by the effect of coalition behaviour on the reorganisation decision. Constructs that subjects associate with a company that should be reorganised differ considerably from those of the environmental reorganisation decision model.

<table>
<thead>
<tr>
<th>Information Cue</th>
<th>Mean (10 point scale)</th>
<th>Std. Deviation</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>CACL</td>
<td>7.881</td>
<td>2.156</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>OPTA</td>
<td>7.452</td>
<td>1.774</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>TA</td>
<td>7.214</td>
<td>2.171</td>
<td>2.5</td>
<td>10</td>
</tr>
<tr>
<td>TLTA</td>
<td>6.929</td>
<td>2.087</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>6.214</td>
<td>1.586</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>CLTA</td>
<td>5.5</td>
<td>2.388</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>TLOE</td>
<td>5.119</td>
<td>2.165</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>
Table 6.7b – Coefficients Used in Model of Man

<table>
<thead>
<tr>
<th>CAACL</th>
<th>TLTA</th>
<th>OPTA</th>
<th>CLTA</th>
<th>TA</th>
<th>INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.83</td>
<td>-7.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.21</td>
<td></td>
<td>-3.54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.42</td>
<td></td>
<td>-4.50</td>
<td>-3.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-25.42</td>
<td>5.71</td>
<td>-7.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48.46</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.52</td>
<td>17.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.28 E^{-08}</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.50</td>
<td>-16.64</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.20</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>3.63</td>
<td></td>
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<td>6.57</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4.99</td>
<td>-2.22</td>
<td>-7.34</td>
<td></td>
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</tr>
<tr>
<td>8.32</td>
<td>-17.81</td>
<td></td>
<td></td>
<td>-9.5 E^{-08}</td>
<td></td>
</tr>
<tr>
<td>3.97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CAACL = current assets / current liabilities
OPTA = operating profit / total assets
TA = total assets
TLTA = total liabilities / total assets
CLTA = current liabilities / total assets

* denotes industry was significant in model, however coefficients are not reported as variable is coded as a categorical indicator.

6.5 Summary

Results presented in this chapter show that:

1. The decision accuracy of insolvency experts is significantly lower than environmental model accuracy with respect to both the reorganisation decision and identifying suitable companies for reorganisation from a pool of distressed companies based on their likely levels of post insolvency performance. There were few matches between companies selected by experts as being likely to
reorganise and those that actually attempted reorganisation. The most likely explanation for the results is that, as discussed in the previous chapter, the actual reorganisation decision outcome is greatly affected by coalition behaviour. If this is the case, the reorganisation decision environmental model developed in Chapter five reflects a decision that is made on a substantially different basis to that made by the insolvency practitioners that were the subjects for this experimental task. As discussed in previous chapters, self interested coalition behaviour is likely to lead to inefficient decision making, as various coalitions have little regard for the actual prospects of the company when making the reorganisation decision.

2. Insolvency experts’ accuracy was better for the task of identifying suitable companies for reorganisation. However, their performance still remained significantly worse than that for the environmental model developed in Chapter five. The results also suggested that, from the cues provided, subjects were more able to identify companies that should be liquidated. The findings indicate that further development of statistical models to assist human decision-makers may be useful in improving the efficiency of the reorganisation/liquidation decision in voluntary administration.

3. Correct responses for the reorganisation/liquidation decision were associated with a) higher levels of confidence for identifying companies that were liquidated, and b) lower levels of confidence for companies that were reorganised. This result suggests the cues were more useful to subjects in identifying companies that liquidated, but were of little use in identifying companies that would reorganise.

4. Comparison of performance of man and models of man indicated consistent performance. Subjects performed marginally better than their models of man, however the difference in average accuracy was not statistically significant. This result is consistent with the suggestion by Libby (1976) that subjects with
considerable amounts of task related training would have improved task performance.

5. Examination of parameter estimates for models of man indicate that subjects were more likely to consider a company suitable for reorganisation if it had higher levels of short-term liquidity and lower levels of leverage. While the ratio of operating profit/total assets was rated as being useful to subjects in the decision process debriefing question, it featured in few of the models of man. Generally, the constructs of models of man differed considerably from the decision model developed in Chapter five, lending support to the existence of coalition behaviour in the actual reorganisation/liquidation decision.

6. Individual differences in prediction accuracy could possibly be attributed in part to the experience of the subjects. Respondents that indicated they had a greater number of years of insolvency experience were more accurate. However, when accuracy scores were decomposed to individual scores for correct reorganisations and liquidations, the relationship held only for liquidation decision accuracy.

7. Unsolicited responses made by insolvency practitioners in relation to the experimental task indicate the possibility of ignorance among some practitioners regarding the application of financial ratio analysis to financial distress decisions. This perhaps is a result of the fact that the voluntary administration regime is relatively new, requiring practitioners to learn a new skill with respect to determining prospects for distressed companies. Prior to the introduction of voluntary administration, few company rescues were attempted; therefore practitioners would have been largely occupied with company liquidations. Moreover, this would be consistent with the poor performance of subjects in identifying suitable reorganisation candidates.
CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

This chapter summarises how the research objectives were achieved. In particular, the purposes of this chapter are to:

1. Summarise the research conducted and its results.
2. Outline the limitations of the research.
3. Show the theoretical implications of the findings.
4. Show the practical implications of the findings.
5. Indicate further profitable avenues for research in this area.

Accordingly, this chapter is structured as follows. The first section restates the objectives of this thesis, and summarises how the research was undertaken to accomplish the objectives. The second section discusses the findings arising from the research. Next limitations of the research conducted in terms of internal and external validity and statistical validity are outlined. The fifth section shows the contributions of this thesis in terms of theory concerning financial distress and reorganisation. The sixth section shows the contributions of the thesis in relation to practical considerations relating to financial distress and reorganisation. The final section proposes some possible avenues for future research.
7.1 Research Conducted to Accomplish Thesis Objectives

The main objectives of this thesis were 1) to assess the usefulness of financial data in determining whether a company in voluntary administration is likely to attempt reorganisation or liquidate; 2) apply 'coalition behaviour' theory to model the voluntary administration decision with a view to identifying and explaining financial constructs likely to distinguish companies that will reorganise from those that liquidate; 3) determine the financial constructs that distinguish companies that reorganise successfully and those that reorganise unsuccessfully; 4) examine and compare the results with a view to gaining some understanding of the efficiency of the voluntary administration decision process; and 5) examine the performance of expert human decision makers in reorganisation decision tasks when provided with environmental data.

The first two objectives relate to the reorganisation decision - whether a distressed company should attempt reorganisation or be liquidated. Formulation of these objectives stemmed from a lack of prior research concerning the operation of the relatively new voluntary administration reorganisation procedure, and literature that highlighted efficiency problems with reorganisation law. A review of legal and economic theory literature relating to insolvency legislation policy highlighted potential problems with efficiency of insolvency law that provides a reorganisation mechanism for distressed firms. The literature suggested that legislation providing a reorganisation mechanism should not allow inefficient firms to reorganise, allowing only firms with sound prospects to reorganise. However, evidence from other jurisdictions suggested the reorganisation decision is characterised by 'filter failure' (White 1989, Hotchkiss 1995). Therefore, the
literature highlighted the importance of investigating the reorganisation decision.

Research conducted to address the first two objectives of this thesis involved developing an environmental prediction model for the reorganisation decision. As the literature review revealed, prior studies had demonstrated the usefulness of accounting data in determining the likelihood of reorganisation for a company in financial distress. The second objective was specifically addressed by referring to 'coalition behaviour' theory in the development of the environmental model. This was motivated by criticism that previous development of prediction models has been characterised by a lack of theoretical underpinning (Ball and Foster 1982, Zavgren 1983). Prior studies have generally developed models based on ad-hoc choice of independent variables or statistical predictive power. This approach has been criticised as, in the absence of theory, the results do not permit generalisation and a sustained correlation between variables and the event predicted cannot be expected (Blum 1974).

The third main objective of this thesis was addressed by development of a further environmental model that investigated the financial constructs that distinguish successful and unsuccessful companies that reorganise. Reorganised companies in the sample were classified as successful or unsuccessful based on their performance in the post insolvency period. The model may provide a useful reference for decision-makers, as the constructs provide information regarding the financial profile of companies that may be suitable candidates for reorganisation.
The fourth objective of this thesis was to gain some understanding of the efficiency of the voluntary administration decision process. This was accomplished by examining and comparing the constructs of models developed for 1) the reorganisation decision, and 2) successful and unsuccessful reorganisations. Reference to 'coalition behaviour' theory in development of the decision model facilitated analysis and discussion of differences between the decision and success models.

The formulation of the fifth objective (concerning the performance of expert human decision makers in reorganisation decision tasks) stemmed from the fact that few (if any) prior studies had examined aspects of human information processing of accounting information in the context of company reorganisation. An experimental task was used to examine performance of expert human decision-makers (experienced insolvency practitioners) in predicting 1) whether a company would reorganise (replicating the reorganisation decision), and 2) determining the likely success for reorganised companies.

7.2 Summary of Results

Chapter three presented the results of an exploratory study that examined aspects of the operation of the voluntary administration process. With regard to the reorganisation decision, one of the main findings of the exploratory study was that the decision to reorganise is likely to be made by unsecured creditors. Their support appears to be secured by the promise of greater returns than would be received under liquidation. The exploratory survey also indicated that a substantial number of companies that attempt
reorganisation do not overcome problems with financial distress, as many companies in the sample returned to insolvency following administration. The exploratory survey results indicate that, from a pool of distressed companies that attempt to reorganise under voluntary administration, successful and unsuccessful reorganisations may be distinguished on the basis of financial and other characteristics. This was an important finding with respect to development of environmental prediction models. Other findings of the exploratory study are summarised below.

1. Internal reasons for failure predominated over those from external sources. Poor management was the key factor contributing to the distressed state of companies in the sample.

2. For the majority of companies, the directors had initiated the appointment of the administrator.

3. In 40 percent of cases, the directors' appointment of an administrator was prompted by action initiated by persons dealing with the company. This suggests directors may adopt strategies of delaying insolvency administration for as long as possible.

4. Secured creditors holding a substantial charge over the company's assets generally considered their security position would not be harmed by administration.

5. Direct costs associated with administration vary considerably, and appear to decrease as a percentage of company size (measured by total assets) as size increased.

In relation to the environmental model that examined the effect of variables on the reorganisation decision, the following results were obtained:

1. Companies are more likely to reorganise if they have better short-term liquidity, a
higher debt to assets ratio, a greater ratio of current debt to total assets and some value in equity.

2. A coalition between unsecured creditors and managers/equity dominates the reorganisation decision. Unsecured creditors will benefit from an immediate and possibly improved return over that received in liquidation. Moreover, managers and equity would be significantly worse off if the company were to liquidate: managers would lose their jobs and equity would receive little or nothing in light of the greater levels of debt to assets indicated by the model for companies that reorganise.

3. There was support for application of coalition behaviour theory to development of parsimonious environmental prediction models based on readily obtainable financial data for determining reorganisation decision outcomes.

4. The reorganisation decision is affected by industry classification.

5. Larger companies, with size measured by total assets, are more likely to reorganise.

For the second environmental model that examined the effect of variables on reorganisation success the results show that:

1. Companies are more likely to reorganise successfully if they have higher levels of debt to total assets, higher levels of debt to equity, a better current ratio (short-term liquidity) and greater levels of return on assets (profitability) prior to entering administration.

2. Companies that are successful in the post-insolvency period have an underlying profitable business and can pay unsecured creditors in the short term.

3. Where equity is diminished or absorbed by debt, the company is more likely to
reorganise successfully. The diminished position of equity may effectively remove the influence of this party in the reorganisation decision and process, improving the company’s prospects.

4. Success in reorganisation is affected by industry classification.

5. The model was stable over time with respect to prediction of unsuccessful companies that attempt to reorganise, but not for successful companies. Therefore, historical data appears to be most useful in identifying unsuccessful companies.

Comparison of results for the models show that the underlying financial constructs of firms that attempt reorganisation and those that reorganise successfully in voluntary administration differ. The difference in model constructs may be explained by the operation of coalition behaviour affecting the reorganisation decision. It appears that the dominance of the management/equity and unsecured creditor coalition has a substantial effect on the decision. Overall, the results indicate the operation of the voluntary administration procedure is biased toward reorganisation of inefficient companies. This may add to the overall economic cost associated with insolvency.

For the human information processing experimental task presented in Chapter six, the following results were obtained:

1. The decision accuracy of insolvency experts is significantly lower than environmental model accuracy with respect to both the reorganisation decision and identifying suitable companies for reorganisation.

2. The results suggest that, from the cues provided, subjects were more able to identify
companies that should be liquidated.

3. Cues were more useful to subjects in identifying companies that liquidated, but were of little use in identifying companies that would reorganise.

4. Comparison of performance of man and models of man indicated consistent performance. Subjects performed marginally better than their models of man, however the difference in average accuracy was not statistically significant.

5. Examination of parameter estimates for models of man indicate that subjects were more likely to consider a company suitable for reorganisation if it had higher levels of short term liquidity and lower levels of leverage. While the ratio of operating profit/total assets was rated as being useful to subjects in the decision process debriefing question, it featured in few of the models of man.

6. Generally, the constructs of models of man differed considerably from the decision model developed in Chapter five, lending support to the existence of coalition behaviour in the actual reorganisation/liquidation decision. Overall, the reorganisation decision environmental model developed in Chapter five reflects a decision that is made on a substantially different basis to that made by the insolvency practitioners that were the subjects for this experimental task.

7. Individual differences in prediction accuracy may be partly attributed to the experience of the subjects. Respondents that indicated they had a greater number of years of insolvency experience were more accurate. However, when accuracy scores were decomposed to individual scores for correct reorganisations and liquidations, the relationship held only for liquidation decision accuracy.

Comparison of prediction accuracy of models and human decision-makers suggests
prediction models may be a useful aid to those making reorganisation decisions.

7.3 Limitations of the Research

With respect to development of environmental models a major limitation relates to sample size and sampling method. Data collection for analysis presented in this thesis proved difficult and costly. Financial data for companies that enter voluntary administration is difficult to obtain. Limited numbers of public companies, for which financial data is available, have entered voluntary administration. Also, the majority of private companies that enter voluntary administration have no reporting requirements. Therefore, an unfortunate practical limitation of this thesis is the small sample size of reorganised companies for which data could be collected. Moreover, problems with sample size were compounded by a further reduction in sample size caused by missing data for companies in the sample. Small sample size is clearly a limitation to the generalisability of results for environmental models developed in this thesis. Logistic regression analysis on small samples contains potential over-fitting, and models may be unstable. To assess confidence that can be placed in results of data analysis and results, holdout tests are provided where relevant. As a holdout sample was not available, the alternative was to perform cross validation tests based on the Lachenbruch (1979) 'leave one out' or 'jack-knife' procedure. Cross validation tests are reported where relevant. Additionally, reporting their application to data for prior years indicates stability of the models developed. Generalisability of results could be determined more accurately by further testing of the models with an independent holdout sample.
Selection of the estimation sample is subject to problems associated with data bias and presence of extreme values. The problem of data bias resulting from using a non-random choice-based sample for model estimation has been previously identified as a common problem with financial distress studies. The final sample of companies may not properly represent the prior probability of reorganisation/liquidation in the population. Over-sampling of failed firms is likely to result, due to the low overall incidence of firm failure in the population of firms (Zmijewski 1984). Failure to represent the underlying population can lead to inconsistent and biased estimates, and result in overstatement of environmental model accuracy (Piesse and Wood 1992). Problems with over-sampling may not be as pronounced in this study as the sample is taken from the pool of distressed firms that have entered voluntary administration. However, the approximately equal samples of reorganised and liquidated companies that comprised the final sample may not be representative of the population. Data bias can be overcome by adjustment of proportions of companies in the sample or by adjustment to the constant term of logit models (Ohlson 1980, Palepu 1986). However, lack of substantial data providing estimation of the prior probability of liquidation or reorganisation for companies entering voluntary administration prevented such adjustment in this thesis. Possible bias may render any environmental model parameters reported in this thesis as being not directly applicable to the general model that purports to discriminate between liquidated and reorganised companies for all companies that enter voluntary administration.

The presence of extreme values has also been shown to have a major influence on the parameter estimates of distributions (Frecka and Hopwood 1983). To minimise problems
with outliers and extreme values data screening was undertaken, which identified one outlier case in the sample.

Models developed in this thesis relied on accounting based measures for independent and dependent variables. Accounting-based measures may be subject to bias from managerial manipulations or differences in accounting procedures or policy choices. This further limits the extent to which results can be generalised.

Another limitation in relation to the generality of the results to companies that enter voluntary administration stems from the selection of companies from a certain time period. As the voluntary administration legislation came into operation in mid 1993, some of the reorganisation decisions for companies in the sample were made while the legislation was relatively new. Lack of experience with the new regime may have had some effect on advice provided by administrators, and subsequent decisions made by creditors.

For the experimental task reported in Chapter six, problems in respect of external validity were minimised by giving clear instruction to subjects who completed the experimental task. Although it was not possible to conduct the experiment in offices of respondent firms, procedures for completion of task material were clearly communicated by both the instructions and senior managers to ensure validity. Every attempt was made to ensure that the sample selected was suitable for the experimental task. The subjects (insolvency practitioners) generally represented first and second tier insolvency firms, and had considerable experience in insolvency work. However, sample selection bias may still
have been present due to the low response rate.

A further limitation, in terms of external validity, relates to the nature of the experimental task. The information in the experimental task may have lacked practical 'realism'. Accordingly, results from the experiment may not be generalisable to other situations. While the results indicate that financial profiles do have some information content for decisions relating to company reorganisation, it could be contended that the financial profiles provided to subjects are not representative of the type of information used by insolvency experts in assessing a company's prospects. However, to minimise potential problems, the following procedures were adopted for the experimental task. First, to ensure that valid comparison was made of the performance of human decision-makers and environmental models the sample of companies used for the experiment was the same sample used for development of the environmental model. Also, comparison of human decision-makers' performance was made with cross-validated results for the environmental model. Secondly, the models of man were cross-validated using the jackknife technique.

7.4 Theoretical Implications of the Research

The opening chapter of this thesis proposed five possible contributions of the current study to the existing accounting research relating to financial distress prediction. The discussion that follows shows how the research conducted has lead to these contributions.

The first contribution to accounting research proposed was the use of data for Australian
companies that have entered voluntary administration, for which there has been little or no past empirical research. Despite difficulties in obtaining data, analysis is presented for a suitable sample of public and privates companies. The analysis presented in this thesis represents one of the first substantial empirical studies of Australian companies that enter voluntary administration. Few (if any) previous studies have examined both the reorganisation decision and 'success' for a sample of companies that reorganise.

The second theoretical contribution proposed that this thesis would extend prior research by using a theoretical model as the basis for selection of financial variables included in environmental prediction model for the reorganisation decision. This was achieved by application of the coalition behaviour economic model to the reorganisation decision. Prior studies have referred coalition behaviour theory to studies of the United States Chapter 11 and Canadian reorganisation law. Reference to the theory in prior studies has generally been ad-hoc, and has not tested the application of the theory by development of a complete decision model using financial data. Other studies have not applied the model to the actual reorganisation decision, but to distinguishing companies that are successful in reorganisation from those that liquidate. In this thesis, discussion of coalition behaviour theory served to identify financial constructs relevant to the reorganisation decision, and to formulate testable theoretical propositions regarding the effect of financial variables on the reorganisation decision. The findings lend support to the usefulness of examining coalition behaviour model in modelling the reorganisation decision. This provides a basis for further development of parsimonious bankruptcy reorganisation prediction models based on a theoretical background.
The third and fourth theoretical contributions relate to extending previous research on financial distress prediction by developing prediction models for both the reorganisation decision, and the success of reorganised companies. Examination of these two important aspects of company reorganisation for a sample of companies that had entered voluntary administration provided valuable insight into the efficiency of the Australian legislation. Findings reported in this thesis show differences in financial constructs for these models, which indicate inefficient decision making. For the reorganisation decision model, characteristics of companies that reorganise appear to suggest the reorganisation decision is driven by a 'coalition' of management/equity and unsecured creditors.

Significant variables in the model do not suggest the decision is based on assessment of the companies long-term prospects, rather the best short-term outcome for the decision-makers. In contrast, the constructs for the successful/unsuccessful reorganisation model indicate that success in reorganisation is likely for companies with sound underlying profitability. Arguably, the difference between the models represents, to some degree, the departure of the reorganisation decision from efficiency. The difference identified between the models has important theoretical implications for financial distress research concerned with reorganisation. The findings of this thesis have identified an important consideration in assessing the efficiency of reorganisation procedures.

The fifth theoretical contribution proposed to extend prior human information processing research to the area of decision making in the context of company reorganisation. This was accomplished by means of an experimental prediction task that examined the
performance of insolvency practitioners in determining whether a company should reorganise, and likely performance in reorganisation. The performance of subjects (insolvency experts) undertaking the prediction task was generally poor. Prediction accuracy was significantly better for environmental models than for experimental task subjects. Results presented in this thesis indicate that prediction of successful reorganisation, which requires assessment of future performance, is a difficult (if not impossible) task. Also, subjects' decisions as to which companies should reorganise and which should liquidate were inconsistent with the actual reorganisation decision; this appeared to be due to subjects different use of information cues to that represented by the environmental models.

7.5 Practical Implications of the Research

The widespread use of voluntary administration should represent good news for those affected by corporate insolvency. Achievement of the regime's objectives that were outlined in Chapter one should provide for either a greater return to creditors or the opportunity for corporate rehabilitation. Both outcomes are desirable for creditors and the general community. It appears however, that outcomes under voluntary administration do not always represent good news. Evidence suggests that in some instances voluntary administration is being used in circumstances that are unlikely to result in achievement of the legislation's objectives. For policy-makers the research results presented in this thesis are hardly reassuring. Arguably, the voluntary administration procedure is problematic in terms of possible bias toward reorganisation of inefficient companies. The intent of the legislation was to allow viable companies the opportunity to reorganise. Failure of the
voluntary administration procedure to adequately filter inefficient companies may add to the overall economic cost associated with company insolvency.

Results indicate the behaviour of parties involved in the reorganisation decision may be inefficient, allowing companies with few prospects for recovery to proceed with reorganisation. Greater liquidity, which will likely mean reasonable immediate return for unsecured creditors, and positive owners’ equity as distinguishing characteristics for firms that reorganise indicate the decision making ‘coalition’ in voluntary administration is made up of equity and unsecured creditors. As discussed above, equity holders will pursue reorganisation to preserve their interest in the company, and unsecured creditors will support reorganisation if the anticipated return is greater than in liquidation. Decision-makers appear to give little consideration to the company’s prospects for efficient future use of underlying assets. This is supported by model variables that distinguish types of ‘successful’ reorganised companies, which appear to be characterised by underlying profitability.

These findings also have implications for an insolvency policy that adopts a flexible regime for company reorganisation, which is a feature of the Australian voluntary administration law. The trade-off between reducing costs associated with a flexible regime and the economic cost of allowing unsuitable companies to reorganise requires further consideration. Extension of the work presented here to better understand the effects of insolvency law on decision outcomes might be useful for constructing efficient insolvency rules.
To reconcile some of these problems a review and revision of voluntary administration law may be appropriate. Results of analysis in this thesis suggest needed changes in two areas:

1. restricting the use of the reorganisation objective to situations where the company’s circumstances indicate the likelihood of successful reorganisation; and
2. taking steps to modify the decision process to minimise opportunistic use of voluntary administration by self interested coalitions.

Other jurisdictions have more stringent requirements for companies that wish to return to the market following financial distress. For example, the United States Chapter 11 reorganisation procedure involves greater scrutiny by the courts of the validity of a reorganisation plan; German 'Composition Proceedings' require composition plans to be confirmed by the court; and the reorganisation process under French law requires a 'continuation plan' to be approved by the Commercial Court (Iraj 1997, Franks et al 1996). A similar review by the courts of the suitability of reorganisation proposals is suggested as one means of improving the efficiency of the reorganisation decision. Independent statutory review would substantially reduce the likelihood of promotion of grandiose and visionary reorganisation plans. Moreover, it would minimise the potential for future losses associated with a relapse into financial difficulty and reduce the likelihood of intentional abuse of the voluntary reorganisation law.

Overseas experience with administration legislation can be drawn on to outline a mechanism for court involvement with respect to reorganisation attempts under voluntary administration. For example, the United States Chapter 11 procedure requires the debtor
to file with the court a plan that must satisfy thirteen legislative requirements to obtain confirmation. Of particular interest is what is termed the “feasibility requirement for confirmation”, which requires the proponent to demonstrate a reasonable expectation of success. Dal Pont and Griggs (1994, p.316) discuss the Chapter 11 requirement:

“This requirement is designed to prevent confirmation of visionary schemes which promise the creditors more under the plan than the debtor could possibly provide after confirmation. The plan will be confirmed where its proponent can demonstrate a reasonable expectation of success That is, confirmation of a plan, and its attendant costs to certain interests, can only be justified where the company is likely to recover.”

Administration legislation in the United Kingdom requires substantial obligatory involvement of the courts. The Insolvency Act 1986 (UK) requires a company to obtain court approval for administration to commence. Approval will be granted subject to the court’s satisfaction that the company is, or will likely become, insolvent and there is a likelihood that one or more of the purposes outlined in the legislation will be achieved (Crutchfield 1994, p.51). This stands in contrast to the relative ease with which an administrator can be appointed under voluntary administration in Australia.

Requiring statutory approval for some deeds formulated under voluntary administration will likely be opposed on two grounds. First, that the cost of administration will be

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1 Chapter 11 of the Bankruptcy Reform Act 1978 (US), 11 USCA 101-1330.
increased by mandatory involvement of the courts. It is submitted that increased costs can be justified when the following benefits are taken into account:

1. virtual elimination of the chance that a visionary, ill advised rehabilitation attempt will be implemented with high failure risk and associated costs;
2. reduced likelihood of abuse of provisions of voluntary administration; and
3. reduced perceived risk for finance providers that may minimise the negative effect on lending rates and credit policy.

Only the few administrations that conclude with a deed providing for continued trading would require court review. Arguably, if the additional impost of making a submission to the court is beyond the resources of the company its suitability for reorganisation may be questionable. Additionally, it is suggested that the cost of a rescue attempt should be borne by those making the decision. Statutory review would add to the time period of the administration process. However, a moderately extended time frame for the administration process would not represent a significant problem, as the administrator would be able to continue business operations during the period in which confirmation is sought.

Further practical implications of this research stem from the findings in Chapter six regarding expert decision-makers’ (insolvency practitioners) use of financial information in making decisions regarding company reorganisation. The environmental model developed for distinguishing successful and unsuccessful companies that reorganised had high classification accuracy. Therefore, it might be advantageous to employ an
appropriate statistical model as a decision aid for those required to determine whether a company is likely to reorganise successfully.

7.6 Future Research

The research conducted in this thesis has endeavoured to redress some of the deficiencies in the financial distress literature dealing with the reorganisation of distressed firms. Considering the relative infancy of the voluntary administration law, there is substantial scope for further research to extend the results presented in this thesis.

Limitations relating to sample size and selection method were identified in section 7.3 of this chapter. Future research using alternative and possibly larger information sets may give evidence of the extent of generalisation of the results presented in this thesis. Also, validation of results using split samples would provide greater confidence in the findings.

Development of the reorganisation decision environmental model in this thesis was based on coalition behaviour theory. Literature reviewed in Chapter two indicated the nature of the reorganisation decision is likely to have a substantial effect on the efficiency of reorganisation legislation. Future research might consider application of coalition behaviour to model the reorganisation decision in other countries. Examining the reorganisation decision under different legislative settings may provide some idea of the type of reorganisation law that will balance value-based objectives and economic efficiency. A systematic comparative study of the features and efficiency characteristics of the reorganisation decision in different countries may assist in conceptualising an
optimal reorganisation procedure.

In the current study, company size and industry classification were included as variables in environmental models. The review of literature strongly suggested these variables are likely to have an effect on reorganisation outcomes. Accordingly, they were included as control variables. The validity of their inclusion was confirmed by the significance of coefficients for these variables in both logistic regression models developed. Further research may investigate the nature of the effect of these variables on the reorganisation decision and success in reorganisation. With respect to industry, the results presented did not provide any substantial findings regarding the effect of industry type on reorganisation outcomes. Future research may investigate more fully the effect of industry classification on reorganisation.

The results presented in this thesis suggest that companies which successfully reorganise differ markedly in financial structure from those that liquidate. Future research may investigate the differences with a view to development of refined environmental prediction models. While the problem of deciding whether a company should attempt reorganisation is not likely to be reduced solely to consideration of financial terms, development and refinement of suitable environmental models would be a useful tool for decision-makers. Refining of prediction models might also involve:

1. Investigation of the suitability of different financial ratios as measures of the financial constructs included in models developed in this thesis.

2. Inclusion of relevant non-financial variables.
3. Consideration of the validity of the model under different economic conditions, and if necessary, including the condition of the economy as a predictor variable.

Future research may consider alternative and perhaps superior operational definitions of 'success' for companies that reorganise. Particular attention could be given to marginally profitable companies, as the dichotomous categorisation of companies for analysis in this thesis is unlikely to adequately represent the underlying position of these companies. There may be a large number of companies that enter voluntary administration that are neither clearly going concerns nor failures. The measure of success used in analysis presented in this thesis relied on return on assets as a performance measure. As an accounting-based measure, return on assets is possibly subject to bias from managerial manipulations and differences in accounting procedures or policy choices. The nature and extent of this bias could be considered in future research.

This thesis examined the relevance of financial information available at the time of the commencement of administration to predicting the success of reorganised companies. Results presented in this thesis demonstrate that past financial information has some information content that is relevant to determining likely success in reorganisation. Future research may investigate the effect of reorganisation strategy on reorganisation performance. Investigation may focus on how different reorganisation plans affect the performance of companies in the post insolvency period. The nature of reorganisation strategy adopted may have incremental information value that will improve the assessment of a company's prospects for successful reorganisation.
In light of the experimental task results presented in Chapter six, aspects of human information processing that future research might consider include:

1. Investigation of the information needs of human decision-makers. The experimental task reported in this thesis provided insolvency experts with a brief financial profile that may not have reflected the most useful information in practical situations. Investigation might consider the type of information useful in practical situations and how that information is integrated in making decisions regarding the future of the company.

2. More extensive research into the underlying variables that may cause differences in decision performance. Experimental task results indicated that prediction accuracy was associated with subjects' (insolvency practitioners) experience in dealing with insolvency administrations. However, this was not fully investigated. Additional variables might include training, education, age and other factors.

3. Replication of the experimental task with different subjects. Alternative subjects might include bank loan officers, auditors or security analysts. These subjects are likely to have substantial experience in assessing a company's prospects from a brief financial profile.

In modelling the reorganisation decision in voluntary administration in this thesis, the assumption has been made that the administrator remains independent. The administrator was not considered as having an effect on coalition behaviour that affects the reorganisation decision. Future research might relax this assumption and examine more closely the role of the administrator and his or her effect on reorganisation outcomes.
APPENDIX 1
Exploratory Survey -
Covering Letter and Research Instrument

Re: Research Into Voluntary Administrations

As an academic at the Sunshine Coast University College, I am undertaking a study of Voluntary Administrations under Part 5.3A of the Corporations Law. The objective of this study is to identify significant factors that affect rehabilitation attempts on insolvent companies and to explore the relationship between these factors and actual outcomes achieved.

I am seeking the cooperation of insolvency practitioners around Australia, and hope that you will take time to complete the attached questionnaires and return them to me in the enclosed addressed pre-paid envelope. Each practitioner has been requested to provide data from two voluntary administrations.

The following criteria will assist you in selecting administrations:

1. Administrations must have concluded with a deed of company arrangement.
2. Please, if possible, select one administration you would classify as 'successful' and another that you would classify as 'less than successful'.

While this questionnaire has been coded to enable me to monitor responses, please be assured that your answers will be held in the strictest confidence and data will only be published in aggregate form.

Given the time you allocate to completing the questionnaires, I am happy to provide you with the results of the survey. If you would like a copy of the results, please supply your name and address in the space provided on one of the completed questionnaires. In case of any inquiries, please contact me at the address or telephone number below.

My thanks for your response.
SURVEY OF VOLUNTARY ADMINISTRATIONS

BACKGROUND

1. When was the administrator appointed?
   Date: ____________________________

2. Who initiated appointment of the administrator? (please tick the applicable box)
   - Directors (the company)
   - Liquidator
   - Chargee

3. Had any action been taken against the company prior to the appointment?
   - Yes
   - No

4. If your answer was yes to the previous question, please state the nature of the action (ie. application for winding-up etc.)

What was the earliest date of this action?
Date: ____________________________

5. Was there a secured creditor with a charge over the whole or substantially the whole of the company's property?
   - Yes
   - No

6. Did the secured creditor with a charge over the whole, or substantially the whole, of the property choose to enforce that charge within the decision period?
   - Yes
   - No

7. If your answer was no to the above question, please state briefly why you think the secured creditor chose not to enforce the charge.

8. Was a creditors' committee appointed at the first meeting?
   - Yes
   - No

9. What was the main business activity of the company?

10. Had any attempt been made by the company to reorganise its debt during the twelve months prior to appointment of the administrator?
    - Yes
    - No
FACTORS CONTRIBUTING TO INSOLVENCY

14. For each of the factors listed below please indicate the extent to which they contributed to the company’s insolvency and the appointment of the administrator by circling the relevant number. (For example if lack of management experience, skill and ability was not a contributing factor then you should circle 1 for the first question)

<table>
<thead>
<tr>
<th>Factors</th>
<th>Contribution to Insolvency Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Management Experience, Skill &amp; Ability</td>
<td>None</td>
</tr>
<tr>
<td>Inadequate Books and Records</td>
<td>2</td>
</tr>
<tr>
<td>Inadequately Interference and Problems</td>
<td>2</td>
</tr>
<tr>
<td>Excessive Private Drawings</td>
<td>1</td>
</tr>
<tr>
<td>Undercapitalisation at Start-Up</td>
<td>1</td>
</tr>
<tr>
<td>Bad Debts and Slow Collections</td>
<td>1</td>
</tr>
<tr>
<td>Inventory Problems</td>
<td>1</td>
</tr>
<tr>
<td>Inability to Use or Understand Financial Statements</td>
<td>1</td>
</tr>
<tr>
<td>Inadequate Sales</td>
<td>1</td>
</tr>
<tr>
<td>Lack of Financial Planning</td>
<td>1</td>
</tr>
<tr>
<td>Industry-Wide Turndown</td>
<td>1</td>
</tr>
<tr>
<td>Problems With Staff Supervision, Motivation, Productivity</td>
<td>1</td>
</tr>
<tr>
<td>Failure to Seek and Use External Advice</td>
<td>1</td>
</tr>
<tr>
<td>Inability to Get and Keep Good Staff</td>
<td>1</td>
</tr>
<tr>
<td>Inadequately Product Development and Market Analysis</td>
<td>1</td>
</tr>
<tr>
<td>Insufficient Knowledge of Competition</td>
<td>1</td>
</tr>
<tr>
<td>Unproductive Use of Assets</td>
<td>1</td>
</tr>
<tr>
<td>Premature Expansion</td>
<td>1</td>
</tr>
<tr>
<td>Reliance On Too Few Customers / Suppliers</td>
<td>1</td>
</tr>
<tr>
<td>Inability to Cope With Seasonal Fluctuations</td>
<td>1</td>
</tr>
<tr>
<td>Poor Time Management</td>
<td>1</td>
</tr>
<tr>
<td>Acting Without Adequate Risk Assessment</td>
<td>1</td>
</tr>
<tr>
<td>Fluctuation Operations at ‘Excessive’ Interest Rates</td>
<td>1</td>
</tr>
<tr>
<td>Interpersonal Problems Among Owners / Managers</td>
<td>1</td>
</tr>
<tr>
<td>Inability to Assess Risk Associated With Expansion or New Investment</td>
<td>1</td>
</tr>
<tr>
<td>Uninsured Disasters (ie Fire, Embezzlement)</td>
<td>1</td>
</tr>
<tr>
<td>Rapid Rate of Technological Change</td>
<td>1</td>
</tr>
</tbody>
</table>
THE DEED OF COMPANY ARRANGEMENT

15. When did the creditors resolve to accept the deed of arrangement?

Date:______________________________

16. How many persons were employed by the company when the administrator was appointed?

☐ 1 - 20
☐ 20 - 50
☐ 50 - 100
☐ more than 100

17. What was the effect of the deed of arrangement on the number of employees in the company?

☐ No effect
☐ Increase
☐ Decrease by less than 25%
☐ Decrease 26-50%
☐ Decrease 51-75%
☐ Decrease by more than 75%

18. What rate of return is provided to unsecured creditors by the deed?

_________________________ (cents per dollar)

19. Over what time period over is this return expected to be achieved.

☐ less than 3 months
☐ 4 - 6 months
☐ 7 - 12 months
☐ 13 - 18 months
☐ 18 - 24 months
☐ more than 2 years (please specify)

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20. Is the company carrying on business operations?

☐ Yes ☐ No

21. Was the business sold as a going concern?

☐ Yes ☐ No

22. Has there been an injection of capital as part of the business' reorganisation?

☐ Yes ☐ No

23. Have the terms of the original deed been complied with to date, or completed, with respect to returns for unsecured creditors?

☐ Yes ☐ No
24. If you answered no to question 23, how has the outcome differed to that provided for in the deed?

☐ Company has been wound up
   Date: ______________________

☐ Variation to original deed
   (please specify below)

☐ Other (please specify below)

25. Is the administrator of the deed of arrangement involved in the management of the company?

☐ Yes  ☐ No

26. What changes have been made to the operation and management of the company as a result of administration?

☐ Management change

☐ Closure of part of the business

☐ Use of external advisers

☐ Other
   (Please provide some details on your response below)

27. What have been the direct costs of the administration to date?

$ ______________________

28. Please make any further comments on the voluntary administration of this company that you feel are relevant to this study:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
I will be happy to be contacted to provide further information for this study

Contact: ________________________________

Telephone: ________________________________

Please forward a copy of the results of this survey to:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Thankyou for your time and assistance
APPENDIX 1(a)
Exploratory Survey - Summary of Results

SURVEY OF VOLUNTARY ADMINISTRATIONS
Results For 48 Companies

BACKGROUND

1. When was the administrator appointed?

1993 - 1
1994 - 3
1995 - 15
1996 - 25
1997 - 3
No Response - 1

* 12 of the administrations that concluded with a deed had been completed; average return to unsecured creditors was 26.4 cents per dollar.

2. Who initiated appointment of the administrator? *(please tick the applicable box)*

Directors (the company) - 45
Liquidator - 2
Chargee - 1

3. Had any action been taken against the company prior to the appointment?

Yes 19 No 29

4. If your answer was yes to the previous question, please state the nature of the action (ie. application for winding-up etc.)*

Taxation - 4
Application for winding up - 7
Writs, summons or demands - 3
Appointment of controller - 2
Action by secured creditor - 3

What was the earliest date of this action?

Average time prior to appointment of action was approximately 3 months, with a range of nil to 8 months.

* Of the 10 companies that had been subject of winding up application, writ, summons or demand only 2 were successful. This would suggest that timing of action has a considerable impact on administration outcome. All of the 3 companies that were subject to action by the secured creditor had successful outcomes.
5. Was there a secured creditor with a charge over the whole or substantially the whole of the company’s property?

Yes 39 No 9

6. Did the secured creditor with a charge over the whole, or substantially the whole, of the property choose to enforce that charge within the decision period?

Yes 5 No 34

7. If your answer was no to the above question, please state briefly why you think the secured creditor chose not to enforce the charge.

Responses included the following:

Commercial decision - 11
Security over other assets - 6
Confident administrator would protect rights - 6
Adequate security - 9
Appointed administrator - 1
Secured creditor was director or associated with directors - 4
Unable to make decision in time frame - 1
Receiver appointed - 1

8. Was a creditors’ committee appointed at the first meeting?

Yes 22 No 22 NR 4

9. What was the main business activity of the company?

<table>
<thead>
<tr>
<th></th>
<th>Retail</th>
<th>Service</th>
<th>Manufacturing</th>
<th>Building/Construction</th>
<th>Mining</th>
<th>Import/Wholesaling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Successful</strong></td>
<td>4 (80%)</td>
<td>6 (43%)</td>
<td>7 (58%)</td>
<td>1 (16%)</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
</tr>
<tr>
<td><strong>Unsuccessful</strong></td>
<td>1</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5</td>
<td>14</td>
<td>12</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

10. Had any attempt been made by the company to reorganise its debt during the twelve months prior to appointment of the administrator?

Yes 17 No 30 NR 1
**FACTORS CONTRIBUTING TO INSOLVENCY**

14. For each of the factors listed below please indicate the extent to which they contributed to the company’s insolvency and the appointment of the administrator by circling the relevant number. (Scale 1=none, 2=marginal, 3=moderate, 4=significant, 5=major).

<table>
<thead>
<tr>
<th>Factors</th>
<th>Average Score on 5 point scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Management Experience, Skill &amp; Ability</td>
<td>3.0</td>
</tr>
<tr>
<td>Undercapitalisation at Start-Up</td>
<td>2.9</td>
</tr>
<tr>
<td>Inadequate Sales</td>
<td>2.9</td>
</tr>
<tr>
<td>Lack of Financial Planning</td>
<td>2.8</td>
</tr>
<tr>
<td>Industry-Wide Turndown</td>
<td>2.4</td>
</tr>
<tr>
<td>Failure to Seek and Use External Advice</td>
<td>2.3</td>
</tr>
<tr>
<td>Bad Debts and Slow Collections</td>
<td>2.1</td>
</tr>
<tr>
<td>Problems With Staff Supervision, Motivation, Productivity</td>
<td>2.1</td>
</tr>
<tr>
<td>Inability to Borrow Needed Funds</td>
<td>2.1</td>
</tr>
<tr>
<td>Inability to Assess Risk Associated With Expansion or New Investment</td>
<td>2.1</td>
</tr>
<tr>
<td>Inadequate Books and Records</td>
<td>2.0</td>
</tr>
<tr>
<td>Inability to Use or Understand Financial Statements</td>
<td>2.0</td>
</tr>
<tr>
<td>Reliance On Too Few Customers / Suppliers</td>
<td>2.0</td>
</tr>
<tr>
<td>Inventory Problems</td>
<td>1.9</td>
</tr>
<tr>
<td>Inability to Get and Keep Good Staff</td>
<td>1.9</td>
</tr>
<tr>
<td>Premature Expansion</td>
<td>1.9</td>
</tr>
<tr>
<td>Acting Without Adequate Risk Assessment</td>
<td>1.9</td>
</tr>
<tr>
<td>Lack of Product Development and Market Analysis</td>
<td>1.8</td>
</tr>
<tr>
<td>Poor Time Management</td>
<td>1.8</td>
</tr>
<tr>
<td>Unproductive Use of Assets</td>
<td>1.7</td>
</tr>
<tr>
<td>Poor Promotion and Dubious Image</td>
<td>1.7</td>
</tr>
<tr>
<td>Funding Operations at ‘Excessive’ Interest Rates</td>
<td>1.7</td>
</tr>
<tr>
<td>Insufficient Knowledge of Competition</td>
<td>1.6</td>
</tr>
<tr>
<td>Excessive Private Drawings</td>
<td>1.6</td>
</tr>
<tr>
<td>Interpersonal Problems Among Owners / Managers</td>
<td>1.6</td>
</tr>
<tr>
<td>Inability to Cope With Seasonal Fluctuations</td>
<td>1.5</td>
</tr>
<tr>
<td>Union ‘Interference and Problems’</td>
<td>1.4</td>
</tr>
<tr>
<td>Poor Location</td>
<td>1.4</td>
</tr>
<tr>
<td>Rapid Rate of Technological Change</td>
<td>1.3</td>
</tr>
<tr>
<td>Inflation</td>
<td>1.2</td>
</tr>
<tr>
<td>Uninsured Disasters (ie Fire, Embezzlement)</td>
<td>1.0</td>
</tr>
</tbody>
</table>
THE DEED OF COMPANY ARRANGEMENT

16. How many persons were employed by the company when the administrator was appointed?

- 1 to 20 - 30
- 20 to 50 - 7
- 50 to 100 - 5
- more than 100 - 3
- NR - 3

17. What was the effect of the deed of arrangement on the number of employees in the company?

- No effect - 20
- Increase - Nil
- Decrease by less than 25% - 13
- Decrease 26-50% - 2
- Decrease 51-75% - Nil
- Decrease by more than 75% - 9
- NR - 4

18. What rate of return is provided to unsecured creditors by the deed? and
19. Over what time period over is this return expected to be achieved.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Number</th>
<th>Average Return (cents per dollar)</th>
<th>Average Time (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation</td>
<td>14 (31%)</td>
<td>0.57</td>
<td>2</td>
</tr>
<tr>
<td>Sold As Going Concern</td>
<td>8 (18%)</td>
<td>0.33</td>
<td>1</td>
</tr>
<tr>
<td>Liquidating Deed</td>
<td>12 (27%)</td>
<td>0.21</td>
<td>0.5</td>
</tr>
<tr>
<td>Failed Deed or Wound Up</td>
<td>11 (24%)</td>
<td>(3 reported a nil return)</td>
<td>__</td>
</tr>
</tbody>
</table>

20. Is the company carrying on business operations?

- Yes 21
- No 25
- NR 2

21. Was the business sold as a going concern?

- Yes 15
- No 29
- NR 4
22. Has there been an injection of capital as part of the business’ reorganisation?

Yes 16  No 30  NR 2

23. Have the terms of the original deed been complied with to date, or completed, with respect to returns for unsecured creditors?

Yes 26  No 18  NR 4

24. If you answered no to question 23, how has the outcome differed to that provided for in the deed?

- Company has been wound up - 8
- Late payment - 1
- Variation to original deed - 4
- Delay on completion - 1
- Return halved - 1*
- Deed only recently approved (too early) - 2
- Delay due to action to overturn deed - 1

*One respondent that indicated a variation to the deed noted that unsecured creditors agreed to variation involving half original return over a shorter time period.

25. Is the administrator of the deed of arrangement involved in the management of the company?

Yes 6  No 42

26. What changes have been made to the operation and management of the company as a result of administration?

- Management change - 17
- Closure of part of the business - 5
- Use of external advisers - 3
- New equity interest - 2
- Change in capital structure - 1
- Cost cutting measures - 1

27. What have been the direct costs of the administration to date?

The average direct costs for the 38 firms for which the data was provided was $164,279, with a range of $2,666 to $2,488,627. The following table shows average direct cost of administration as a percentage of total assets, grouped by company size:

<table>
<thead>
<tr>
<th>Size (total assets)</th>
<th>&lt;$500k</th>
<th>$500k to 1m</th>
<th>$1m to 5m</th>
<th>&gt;$5m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost as percentage of total assets</td>
<td>21.5%</td>
<td>15.7%</td>
<td>4.0%</td>
<td>8.0%</td>
</tr>
</tbody>
</table>
APPENDIX 2
Research Instrument  Experimental Task
(Instructions to Participants)

Prediction of Company Reorganisation Survey

This booklet contains financial profiles for 20 companies. The companies represent a sample selected from a population containing equal proportions of reorganised/liquidated companies that entered voluntary administration during the years 1993 to 1996.

Your task will be to decide whether each company should attempt reorganisation, or be liquidated. The data provided for each company consists of its size (measured by assets), industry in which the company operates and basic financial ratios. The survey also asks you to comment on the likelihood of success for companies that you consider should attempt reorganisation. Financial profiles are provided for the two consecutive years prior to the appointment of an administrator.

When making your decision, assume the cost of misclassifying a company that should liquidate as a reorganisation is the same as misclassifying a company that should reorganise as a liquidation.

After you have made your 20 decisions and completed the brief task questionnaire, which should take approximately thirty minutes. Responses will be kept strictly confidential.

Your participation in this project is greatly appreciated.
Financial Profile of Company
Company No.1 Industry: Retail Trade

<table>
<thead>
<tr>
<th></th>
<th>19X1</th>
<th>19X2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Liabilities</td>
<td>0.84</td>
<td>0.84</td>
</tr>
<tr>
<td>Total Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>5.16</td>
<td>5.40</td>
</tr>
<tr>
<td>Owners' Equity</td>
<td>1.18</td>
<td>1.19</td>
</tr>
<tr>
<td>Current Assets</td>
<td>0.84</td>
<td>0.84</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owners' Equity</td>
<td>0.16</td>
<td>0.15</td>
</tr>
<tr>
<td>Total Assets</td>
<td>1,955</td>
<td>2,208</td>
</tr>
<tr>
<td>Total Assets ($000's)</td>
<td>1,955</td>
<td>2,208</td>
</tr>
</tbody>
</table>

In 19X3, this company should: (Tick one box)

<table>
<thead>
<tr>
<th>Attempt Reorganisation</th>
<th>Be Liquidated</th>
</tr>
</thead>
</table>

Either (if you ticked liquidation) my estimate of the probability (likelihood) of liquidation is: (Please mark “X” on the scale at the point you feel is appropriate)

Even Chance .5 .6 .7 .8 .9 1 High Chance

Or (if you ticked reorganisation) my estimate of the probability of reorganisation is: (Please mark “X” on the scale at the point you feel is appropriate)

Even Chance .5 .6 .7 .8 .9 1 High Chance

If you ticked reorganised, please estimate the probability of the company achieving a return on assets that equals or exceeds the industry average of in the first three years after reorganisation. The industry average return on assets for this company over the three years after appointment of the administrator was 0.11: (Please mark “X” on the scale at the point you feel is appropriate)

Even Chance .5 .6 .7 .8 .9 1 High Chance

My level of confidence in this prediction is: (Please circle the appropriate number)

Low Confidence High Confidence
1 2 3 4 5 6 7 8 9 10
Task Questionnaire

1. Please rate the value of each information item in relation to its usefulness in helping you to make the reorganisation / liquidation decision: (Please circle the appropriate number)

   a. **Total Liabilities**
      - Total Assets
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10

   b. **Total Liabilities**
      - Net Worth
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10

   c. **Current Assets**
      - Current Liabilities
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10

   d. **Current Liabilities**
      - Total Assets
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10

   e. **Operating Profit**
      - Total Assets
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10

   f. **Total Assets**
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10

   g. **Industry Group**
      - Low Value 1 2 3 4 5 6 7 8 9 High Value 10
2. Rate the load (number of pieces) of relevant information in the financial profiles you feel you needed to process to perform the task.

Low Load

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

High Load

3. Rate the quantity of irrelevant data you feel existed in the financial profiles for the task.

Low Quantity

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

High Quantity

4. Rate the uncertainty you experienced in making your decisions from the financial profiles.

Low Uncertainty

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

High Uncertainty

5. Rate the value of the information in the financial profiles for the task.

Low Value

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

High Value

6. What is your present position? (Please tick the appropriate response)

Partner
Manager
Other: Please specify ______________

7. How many years of insolvency experience have you had? _________ years.

8. How many engagements have you been assigned to in which a decision regarding liquidation or reorganisation was at issue? ______________ engagements.

9. What is your age? ___________ years.

THANK YOU FOR YOUR CO-OPERATION
APPENDIX 3

Correlation Between Experimental Task Prediction Scores and Task Questionnaire Response

<table>
<thead>
<tr>
<th></th>
<th>TLTA</th>
<th>TLOE</th>
<th>CACL</th>
<th>CLTA</th>
<th>OPTA</th>
<th>TA</th>
<th>INDI</th>
<th>Load</th>
<th>Irrel</th>
<th>Uncert</th>
<th>Value</th>
<th>Posit</th>
<th>Years</th>
<th>Engag</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidation</td>
<td>-0.666</td>
<td>-0.423</td>
<td>-0.094</td>
<td>-0.569</td>
<td>0.145</td>
<td>-0.008</td>
<td>-0.072</td>
<td>0.084</td>
<td>-0.015</td>
<td>-0.465</td>
<td>-0.297</td>
<td>-0.179</td>
<td>0.493</td>
<td>0.005</td>
<td>0.194</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.001</td>
<td>0.056</td>
<td>0.686</td>
<td>0.007</td>
<td>0.532</td>
<td>0.974</td>
<td>0.756</td>
<td>0.718</td>
<td>0.949</td>
<td>0.034</td>
<td>0.191</td>
<td>0.437</td>
<td>0.023</td>
<td>0.984</td>
<td>0.400</td>
</tr>
<tr>
<td>Reorganisation</td>
<td>0.153</td>
<td>0.221</td>
<td>0.256</td>
<td>0.250</td>
<td>0.248</td>
<td>0.288</td>
<td>-0.289</td>
<td>0.303</td>
<td>0.018</td>
<td>0.021</td>
<td>-0.152</td>
<td>0.222</td>
<td>0.221</td>
<td>0.266</td>
<td>0.187</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.507</td>
<td>0.335</td>
<td>0.263</td>
<td>0.274</td>
<td>0.278</td>
<td>0.205</td>
<td>0.203</td>
<td>0.182</td>
<td>0.939</td>
<td>0.927</td>
<td>0.510</td>
<td>0.334</td>
<td>0.336</td>
<td>0.243</td>
<td>0.417</td>
</tr>
<tr>
<td>Total Liq./Reor.</td>
<td>-0.365</td>
<td>-0.154</td>
<td>0.154</td>
<td>-0.231</td>
<td>0.306</td>
<td>0.217</td>
<td>-0.337</td>
<td>0.350</td>
<td>0.014</td>
<td>-0.344</td>
<td>-0.380</td>
<td>0.075</td>
<td>*0.568</td>
<td>0.282</td>
<td>0.313</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.103</td>
<td>0.504</td>
<td>0.504</td>
<td>0.313</td>
<td>0.177</td>
<td>0.344</td>
<td>0.135</td>
<td>0.119</td>
<td>0.953</td>
<td>0.127</td>
<td>0.089</td>
<td>0.746</td>
<td>0.007</td>
<td>0.229</td>
<td>0.168</td>
</tr>
<tr>
<td>Successful Reor.</td>
<td>-0.191</td>
<td>-0.061</td>
<td>-0.093</td>
<td>-0.382</td>
<td>0.197</td>
<td>0.355</td>
<td>-0.293</td>
<td>0.120</td>
<td>0.081</td>
<td>*-0.478</td>
<td>-0.312</td>
<td>-0.170</td>
<td>0.358</td>
<td>0.357</td>
<td>0.058</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.406</td>
<td>0.793</td>
<td>0.688</td>
<td>0.088</td>
<td>0.393</td>
<td>0.114</td>
<td>0.197</td>
<td>0.604</td>
<td>0.726</td>
<td>0.029</td>
<td>0.168</td>
<td>0.461</td>
<td>0.111</td>
<td>0.112</td>
<td>0.803</td>
</tr>
<tr>
<td>Unsuccessful and Liq.'s.</td>
<td>-0.180</td>
<td>-0.136</td>
<td>-0.125</td>
<td>*-0.462</td>
<td>0.072</td>
<td>0.224</td>
<td>-0.173</td>
<td>0.022</td>
<td>0.049</td>
<td>-0.388</td>
<td>-0.233</td>
<td>-0.165</td>
<td>0.260</td>
<td>0.239</td>
<td>-0.008</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.436</td>
<td>0.557</td>
<td>0.589</td>
<td>0.035</td>
<td>0.756</td>
<td>0.329</td>
<td>0.452</td>
<td>0.925</td>
<td>0.834</td>
<td>0.082</td>
<td>0.310</td>
<td>0.476</td>
<td>0.254</td>
<td>0.297</td>
<td>0.971</td>
</tr>
</tbody>
</table>

*Denotes Pearson Correlation is significant at the 0.01 level (2-tailed).

TLTA = total liabilities / total assets
TLOE = total liabilities / owner’s equity
CACL = current assets / current liabilities
CLTA = current liabilities / total assets
OPTA = operating profit / total assets
TA = total assets
Load= Load of relevant information needed to perform task
Irrel= Quantity of irrelevant data in financial
Uncert= Uncertainty experienced in making decisions
Value= Value of information in financial profiles
Posit.= Present position
Years = Years of insolvency experience
Engag.= Number of engagements
Age = Age in years
### APPENDIX 4

**Comparison Of Accuracy Rates of Man and Model of Man**

<table>
<thead>
<tr>
<th>Accuracy of Man</th>
<th>Accuracy of Model</th>
<th>Man versus Model of Man</th>
<th>No. of Type 1 Errors</th>
<th>No. of Type 2 Errors</th>
<th>No. of Type 1 Errors</th>
<th>No. of Type 2 Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>10</td>
<td>Model</td>
<td>6</td>
<td>7</td>
<td>0</td>
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<td>7</td>
<td>Model</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>6</td>
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<tr>
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<td>Model</td>
<td>7</td>
<td>8</td>
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<td>7</td>
</tr>
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<td>6</td>
<td>7</td>
<td>Model</td>
<td>7</td>
<td>6</td>
<td>7</td>
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</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Tie</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>Man</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>Man</td>
<td>7</td>
<td>4</td>
<td>10</td>
<td>4</td>
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<td>8</td>
<td>7</td>
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<td>6</td>
<td>6</td>
<td>7</td>
</tr>
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<td>8</td>
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<td>5</td>
<td>8</td>
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<td>6</td>
<td>Man</td>
<td>9</td>
<td>4</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>Man</td>
<td>7</td>
<td>2</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>10</td>
<td>Man</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>Man</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td>Man</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>Man</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>Man</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Tie</td>
<td>8</td>
<td>5</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Tie</td>
<td>8</td>
<td>6</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Tie</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>
APPENDIX 5
Standard Multiple Regression Results

This appendix presents results of modelling of successful/unsuccessful reorganisation where the dependent variable is kept continuous. For the first regression (see Table A5.1), the dependent variable is the average return on assets for companies over a three-year post-insolvency period. The dependent variable in the second regression (see Table A5.2) is industry adjusted return on assets, which is calculated by subtracting the three year post-insolvency industry average return on assets from the companies’ three year post-insolvency average return on assets.

### Table A5.1
Multiple Regression Results for Successful and Unsuccessful Reorganisations
Dependent Variable – Post-Insolvency Average Return on Assets (over 3 years)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B (n=32)</th>
<th>β</th>
<th>t statistic</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLTA</td>
<td>-0.119</td>
<td>-0.405</td>
<td>-1.631</td>
<td>0.120</td>
</tr>
<tr>
<td>TLOE</td>
<td>0.295</td>
<td>0.595</td>
<td>2.296</td>
<td>0.034**</td>
</tr>
<tr>
<td>CACL</td>
<td>0.027</td>
<td>0.251</td>
<td>1.673</td>
<td>0.100*</td>
</tr>
<tr>
<td>CLTA</td>
<td>-0.062</td>
<td>-0.045</td>
<td>-0.204</td>
<td>0.840</td>
</tr>
<tr>
<td>OPTA</td>
<td>1.053</td>
<td>1.048</td>
<td>3.181</td>
<td>0.005**</td>
</tr>
<tr>
<td>LNTA</td>
<td>-0.017</td>
<td>-0.048</td>
<td>-0.295</td>
<td>0.772</td>
</tr>
<tr>
<td>INDUSTRY:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mining</td>
<td>-0.038</td>
<td>-0.010</td>
<td>-0.033</td>
<td>0.974</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>0.263</td>
<td>0.142</td>
<td>0.262</td>
<td>0.796</td>
</tr>
<tr>
<td>Wholesale</td>
<td>0.239</td>
<td>0.062</td>
<td>0.243</td>
<td>0.811</td>
</tr>
<tr>
<td>Retail</td>
<td>0.142</td>
<td>0.082</td>
<td>0.149</td>
<td>0.883</td>
</tr>
<tr>
<td>Service</td>
<td>0.332</td>
<td>0.240</td>
<td>0.355</td>
<td>0.727</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.348</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Model Results
- R = 0.871
- R² = 0.759
- Adjusted R² = 0.611

* denotes significant at p<0.1, ** denotes significant at p<0.05

TLTA = total liabilities / total assets
TLOE = total liabilities / owners' equity
CACL = current assets / current liabilities
CLTA = current liabilities / total assets
OPTA = operating profit / total assets
LNTA = natural log of total assets
### Table A5.2
Multiple Regression Results for Successful and Unsuccessful Reorganisations

#### Dependent Variable – Post-Insolvency Industry Adjusted Average Return on Assets (over 3 years)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$ (n=32)</th>
<th>$\beta$</th>
<th>t-statistic</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLTA</td>
<td>-0.011</td>
<td>-0.215</td>
<td>-1.031</td>
<td>0.318</td>
</tr>
<tr>
<td>TLOE</td>
<td>0.037</td>
<td>0.395</td>
<td>1.810</td>
<td>0.089</td>
</tr>
<tr>
<td>CACL</td>
<td>0.003</td>
<td>0.134</td>
<td>1.028</td>
<td>0.319</td>
</tr>
<tr>
<td>CLTA</td>
<td>-0.033</td>
<td>-0.128</td>
<td>-0.703</td>
<td>0.492</td>
</tr>
<tr>
<td>OPTA</td>
<td>0.111</td>
<td>0.613</td>
<td>2.216</td>
<td>0.042**</td>
</tr>
<tr>
<td>LNTA</td>
<td>-0.033</td>
<td>-0.043</td>
<td>-0.313</td>
<td>0.758</td>
</tr>
<tr>
<td>INDUSTRY: Mining</td>
<td>-0.228</td>
<td>-0.332</td>
<td>-1.343</td>
<td>0.198</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>-0.264</td>
<td>-0.790</td>
<td>-1.727</td>
<td>0.104</td>
</tr>
<tr>
<td>Wholesale</td>
<td>-0.282</td>
<td>-0.409</td>
<td>-1.881</td>
<td>0.078*</td>
</tr>
<tr>
<td>Retail</td>
<td>-0.296</td>
<td>-0.889</td>
<td>-2.057</td>
<td>0.056*</td>
</tr>
<tr>
<td>Service</td>
<td>-0.274</td>
<td>-1.071</td>
<td>-1.924</td>
<td>0.072*</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.174</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Model Results

- $R^2$: 0.921
- $R^2$: 0.848
- Adjusted-$R^2$: 0.743

* denotes significant at $p<0.1$, ** denotes significant at $p<0.05$

TLTA = total liabilities / total assets  
CLTA = current liabilities / total assets  
TLOE = total liabilities / owners' equity  
OPTA = operating profit / total assets  
CACL = current assets / current liabilities  
LNTA = natural log of total assets

The results for these multiple regression analyses are generally consistent with the results for the logistic regression for successful and unsuccessful reorganisation presented in Chapter 5. However, levels of significance for variables differed somewhat between the analyses methods. Consistent with the logistic regression model, the profitability variable (OPTA) was highly significant. This result supports the usefulness of past profitability as a reliable indicator of the possible performance of companies that attempt to reorganise.
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