AN EMPIRICAL INVESTIGATION OF RECENT ACQUISITION ACTIVITY IN THE UK

Thesis submitted for the degree of Doctor of Philosophy

by

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The age of chivalry is gone,

That of sophisters, economists and calculators has succeeded.

- Edmund Burke

(Reflections on the Revolution in France)

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Abstract

This thesis is concerned with acquisition activity in the UK and, specifically the prediction of takeovers. This is an important area for research for three reasons. Firstly, acquisition activity involves a small number of companies but creates very large sums of money. Secondly, acquisition activity can alter the composition of a company or an entire industry very rapidly making it a valuable tool for business. Lastly, there are many different topics within this field, allowing for a wealth of empirical analysis.

A considerable amount of early research was limited to observation leaving some theories with little empirical backing. In addition, many earlier papers do not consider economic conditions. Recently the UK has experienced a boom and a recession. Both of these events may have effected acquisition activity and will be incorporated into this study.

This thesis tackles several issues concerning acquisitions. Firstly, it deals with the level of acquisition activity and determines whether this behaviour is random or predictable. If it is predictable it should be possible to model this behaviour using appropriate indicators. The second issue is the prediction of takeovers identifying the companies likely to become involved in acquisitions. This study incorporates both accounting data and macro-economic factors. Finally, there is an analysis of acquisition benefits, considering the impact on share prices.

The findings here suggest that the level of acquisition activity is predictable. However, in a boom it rises to an unprecedented level, demonstrating bubble-like properties. The empirical work concerning the prediction of acquisitions suggests that takeovers increase firm efficiency and remove poor managers. Furthermore, acquiring companies seek expansion and increased investment opportunities. Examining macro-economic conditions suggests funding and cash flow are important when acquiring in a boom, whilst productivity and market protection are vital in a recession. Finally, it appears that the target firm shareholders benefit irrespective of the outcome of the takeover.

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Introduction

"Nothing brings a prince more prestige than great campaigns and striking demonstrations of his personal abilities." So begins section twenty-one of The Prince, Machiavelli's famous discourse on the art of government. Written in 1514, this treatise became the ultimate text book on realpolitik and essential study for any would-be monarch. The independent principalities that Machiavelli saw are long gone, but his words are as applicable today as they were in the sixteenth century. In the modern age, however, these observations are more appropriately used to describe the behaviour of companies and, more specifically, the actions of firms in the market for corporate control. Acquisitions can be a source of considerable publicity for the firms involved in a takeover bid and such a deal is a clear demonstration of the acquiring company's financial might. The successful completion of a takeover also reflects very positively on the managers of the buying firm, the modern day equivalent of Machiavelli's princes. This study will present an up to date analysis of the behaviour of the market for corporate control as a whole, will examine the characteristics of companies that become involved in takeovers and investigate the motives that prompt these acquisitions. Finally, it will assess the benefits created by these acquisitions for the shareholders of both the acquired and acquiring companies.

Acquisition activity is concerned with the control of companies. The desire to purchase another firm can arise for many different reasons that will be discussed in great detail in later chapters. In short, an acquisition serves to transfer control of a company from one set of individuals to another. With the control of the firm comes the right to decide how the assets of that firm will be used and how that company will develop through the rest of its lifetime. The acquired firm can supplement the purchasing company's original business interests or it can open up whole new areas for future development. Either way it is an investment that involves considerable risks but offers exceptional rewards for those individuals who become adept at this activity.

An acquisition is a highly complex combination of many actions that make each takeover attempt virtually unique. For example, the way that an acquisition is funded

or the response made by the target of the acquisition attempt will be determined by the individual characteristics of the firms that are involved in that particular acquisition and are quite unique. There are however, some aspects that are common to every takeover which makes it possible to research this area.

There are many questions concerning the acquisition activity that remain unanswered. This thesis will attempt to provide answers to several of them. In particular, there are three issues that will be investigated. The first of these is concerned with why the level of acquisition activity in the UK differs widely over time and how this activity could be predicted. In some years there are perhaps fewer than a hundred acquisitions amongst quoted companies whilst in another year the number of takeovers rises to several hundred. Furthermore, the level of acquisition activity appears to follow the general condition of the economy. In previous papers, however, the merger waves have confounded attempts at prediction which leaves this subject open to further work, as here.

The second question is concerned with the individual companies that take part in acquisitions. Are there any features that all these companies have ? If there are, then it should be possible to identify other firms that have a high likelihood of becoming involved in takeovers. Furthermore, this rationale can be applied not only to the acquired firms, as in previous research in this area, but also to the acquiring companies. This analysis can also be extended to cover firms that do not take part in takeovers to determine whether there are any fundamental differences between these companies and the firms that become either targets or bidders in acquisition activity. The next question that will be dealt with is an extension of the second issue. It combines information about the economic cycle with the information about the firms to determine whether the economic cycle can have an impact on the types of firms that become involved in takeovers and if the characteristics of these companies change when the economic cycle moves from boom to recession.

Finally, there is one more issue that this thesis will deal with. The benefits of acquisition activity have already been the subject of some empirical analysis. However

the evidence has not been conclusive. The methodology that is used in many of these papers can sometimes produce erroneous results. Using an improved version of this methodology it should be possible to determine whether takeovers really benefit anyone and if anyone looses out as a result of this process.

Each of these questions has either been investigated previously albeit incompletely or has not been tackled at all. Analysing the behaviour of the market for corporate control as a whole has been the subject of previous research but the results are inconclusive as none of the findings in previous papers can be applied effectively in other time periods. The identification of companies that become involved in acquisitions has also been attempted before but previous articles used a methodology that can be improved upon. Combining macro-economic factors into the analysis of the firms that become involved in takeovers is a completely new innovation and has never been previously attempted. A second innovation is the analysis of the acquiring firms against a control sample of companies that did not take part in takeovers during the sample period. This will identify whether acquiring firms have specific characteristics that make them prone to purchase other companies.

This research will be of interest to several groups of individuals involved in the acquisition process. Lending institutions, such as banks and venture capitalists, would be interested in knowing how the market for corporate control is going to behave in the future before making any decisions about their future business strategy. For example, they might want to consider the probability that a firm will become the subject of an acquisition attempt before lending money to that company as this will have an impact on that firms future performance. Many individual firms would also want to know the probability that they will become involved in takeovers in the future as this could alter their plans for investment. They might also wish to know how the market for corporate control is going to behave as a whole as this could influence their future, particularly if they operate in an industry where acquisition activity is high. Conversely, firms may wish to use some of the techniques here to select a likely target for a takeover attempt or to identify a potential rival in an acquisition that they are planning to make.

This study proceeds as follows. Chapter 1 is a survey of the recent literature associated with mergers and acquisitions. It will also serve to highlight the many areas within this topic where empirical research is lacking or the current research is limited in some way. The topics in this chapter are arranged in the order that they would become relevant in an acquisition and stretch from discussions of the corporate control market as a whole through a wide variety of related subjects to reach takeover defences and the legal aspects of attempting an acquisition. These articles demonstrate the variety of different subject areas that exist within the corporate control market and the assortment of diverse empirical techniques that are used when examining takeovers. Chapter 2 examines the market for corporate control as a whole. Predicting the number of acquisitions that take place in any one time period has been the subject of several articles, see for example Melicher, Ledolter and D'Antonio (1983). These papers often included models that were supposed to predict the level of acquisition activity but none of these results worked effectively in time periods far removed from the data that was used in their construction. These articles have also been unable to predict the advent of merger waves, which remain an inexplicable puzzle. Chapter 2 will examine the level of takeover activity in the UK and determine whether this can be linked to the condition of the economy and, if so, to precisely which macro-economic aspects acquisition numbers can be related. This is important for two reasons. Firstly, this is an area for research in it's own right as there is still considerable debate concerning the nature of the supposed link between the economic cycle and the number of acquisitions. Secondly, the findings of this analysis will help in Chapters 4 and 5 which are concerned with the nature of firms that become involved in takeovers.

Chapter 3 deals with the sampling issues that are relevant in the construction of data sets used in the later empirical chapters. The number of companies that become involved in acquisition activity is relatively small when compared to the remainder of the population of companies in the UK. In order to examine these firms accurately samples need to be created that maximise the amount of data that can be gathered from the involved firms. This raises questions concerning the efficiency, consistency and

bias in estimations when a particular selection procedure is used. These issues need to be discussed and resolved before collecting the data and creating the data sets. This chapter also deals with the collection of the data and relates the motives for acquisitions to the characteristics of involved firms, as discussed in Chapter 1, and to the available accounting variables. In addition to the acquired and acquiring companies, data sets will also be created to pair these firms with companies of a similar size that did not take part in takeovers in the sample period. By comparing involved and non-involved firms it should be possible to determine whether certain companies are predisposed to enter the corporate control market.

Chapter 4 alters the perspective to consider the individual companies that take part in acquisitions, using the data sets created in Chapter 3. It will be possible to identify characteristics of companies that have a high probability of becoming involved in takeovers by examining their accounts and other features of these firms. This analysis will also reveal information concerning the motives that prompt takeover activity. This chapter introduces a new methodology to the analysis of takeovers which is, theoretically, an improvement on the techniques that have been used, such as the technique used by Dietrich and Sorensen (1984). Cox's Proportional Hazard Function is a specific type of duration model which can incorporate information about the life span of a company when calculating the probability of that firm becoming involved in a takeover. This technique will be used here, as will the logit model that has been used in previous papers on this subject. A comparison of the results generated by these two methods will confirm whether there are practical improvements in the use of the hazard function to mirror the theoretical advantages. Chapter 5 is an extension of the investigation started in Chapter 4 which incorporates the results of Chapter 2. These macro-economic factors will be added to the logit and hazard function models by generating principal components. The effect of these terms is identified by interacting the macro-economic components with the accounting variables. Furthermore, the data sets will be split into boom and recession periods to examine whether there are any differences between the factors that distinguish companies that take part in takeovers under different economic conditions.

The penultimate chapter in this study, Chapter 6, will determine the benefits created by acquisitions. In this chapter event studies will be used to determine the level of cumulative abnormal returns that are received by the shareholders of target and bidding firms. In previous event studies concerning the benefits of takeovers the market model is generally used to estimate the returns on a share. It is possible that this methodology can lead to incorrect estimates and, consequently, to biased results. In this chapter both the usual market model and an improved form of the same model will be used. This approach will identify the magnitude of the benefits, either positive or negative, that an acquisition creates for the owners of the shares and should confirm the findings of the previous chapters with respect to the motives for takeovers. Finally, the conclusion summarises the findings of the study and draws the salient points from each investigation. It also suggests areas for future research which arise from this thesis and the issues that remain in the analysis of acquisition activity.

This thesis contributes to the current knowledge concerning acquisition activity in several different areas. Firstly, it analyses the level of acquisition activity during a merger wave in the UK, the years 1987 to 1990, and demonstrates a link between macro-economic factors and the number of takeovers. It also offers a possible explanation for the merger wave phenomena that could account for the failings in previous research on this subject, specifically why no model can be found that predicts the level of takeover activity in more than one time period. The second contribution is in the introduction of a new methodology in the analysis of the companies that take part in takeovers. The hazard function is a theoretical improvement on previously used methods and here its practical superiority is also demonstrated. This technique provides more information than its predecessor, the logit model, and is a better predictor of acquisition activity. Once this improved methodology is used, the motives that prompt takeovers can be more clearly defined and the characteristics of the involved companies can be visualised more effectively. This thesis applies this methodology to both the bidders and the targets of acquisition activity which represents another innovation as previous research tends to be limited to just the targets. Here the analysis compares acquired and acquiring firms to each other and then expands this investigation to analyse these firms in comparison to companies that

do not take part in acquisitions. This presents a more complete view of the types of firms that become involved in takeovers than has appeared in previous research.

The third contribution expands the previous analysis by combining macro-economic factors in the analysis of the firms that take part in acquisition activity to distinguish the influence of external factors on the firms that take part in acquisition activity. This also serves to compare the differences between acquisitions that take place in a boom and acquisitions that take place in a recession.

Finally, in the analysis of the benefits that are created by acquisitions an improvement is made on the methodology that has been previously used. This innovation should improve the accuracy of the results and, consequently, improve the level of information that can be gained from this sort of event study. As before, this study compares the firms that take part in acquisitions with companies that remain uninvolved in takeovers which again presents a more complete picture of the impact that acquisitions can have on the value of shares. This study will also provide more information about the motives for acquisition activity and offer more empirical backing for the findings of the previous empirical two chapters.

Chapter 1. Literature Review

Introduction

This chapter serves to demonstrate the broad nature of this research area. It is important to note that the articles that deal with the subject of mergers and acquisitions are rarely restricted to just one aspect of the topic and many papers will be discussed in more than one of the following sections. This review is composed in such a way that it follows, broadly, the progression of an acquisition. It starts with articles referring to the corporate control market in general terms, section 1.1, and the recent trends within that field. This is followed by section 1.2 which is composed of articles that discuss the impact acquisitions have on the economy and vice versa before progressing to Section 1.3 which deals with the different types of acquisition currently in existence. Section 1.4 examines the motives that are believed to induce acquisitions and is followed by section 1.5 which deals with factors that, although not motives, may hasten the acquisition process. The next step in an acquisition is detailed in section 1.6 which deals with the analysis of the takeover process and the various methods of valuation that are used to estimate how much the target is worth. Section 1.7 deals with the financing of the takeover bid and the medium of exchange. It is essential to fund the process in an appropriate manner and there are several papers that discuss the various options open to the acquiring company and the effect that these choices can have on the final outcome of the acquisition. The next topic, dealt with in section 1.8, is the importance of acquisition defences and the impact that these measures can have on the takeover process. Section 1.9 considers the benefits produced by the acquisition whilst Section 1.10 discusses the legal position and the working of the Mergers and Monopolies Commission as it is important to ensure that a takeover always remains within the parameters set by the current regulations and to understand the consequences for the companies if it does not. It is not sufficient, however, to limit the discussion of regulatory issues to just the UK as there are also the European Community's regulations and standards of acceptable practice to consider. Section 1.11 deals with the papers discussing the European angle and the type of acquisition

activity that exists in other countries. This section also deals with the papers that compare the takeover activity in the UK with acquisitions in other countries and examine the similarities and differences that these articles highlight. An acquisition may take place so that the acquiring firm can attempt some form of radical restructuring. There are many other ways of restructuring a corporation that may be preferable in certain circumstances. Section 1.12 reviews articles that examine the relative merits of takeovers compared with the alternative methods of restructuring a company. Finally, there are the articles that discuss the possibility of predicting acquisition activity and the methods that might be used in an attempt to identify the companies that will become involved in takeovers.

1.1 The Market for Corporate Control

The market for corporate control is continually changing and developing. There are many articles that discuss the trends in the corporate control market but many of them fail to support their claims with any empirical analysis. One article that does offer a comprehensive evaluation of the changing trends is by Hughes (1993). This paper was designed to provide a comprehensive review of the important papers in this area and to collate their results into a clear picture of the development of the corporate control market. The author found considerable evidence that merger activity increased greatly in the 1950's and 60's. This increase in merger activity continued until it peaked with two periods of intense activity in the late 1960's and early 1970's. In particular, the years from 1967 to 1973 demonstrated a level of activity that was at least as great as anything experienced before in the UK. Citing his own research on the topic, Hughes demonstrated that of the top two hundred companies in the country in 1964 thirty-nine had been acquired before 1969 and of the equivalent group in 1969 another twenty-two were either merged or acquired by 1972. This level of activity was very unusual given the general business climate of the time. Hughes explained this behaviour in terms of the incentives and encouragement offered by the Industrial Reorganisation Corporation at that time. Hughes does not mention the first oil crisis, however, which would almost certainly be responsible for the end of that merger wave in 1973 as firms would be highly unlikely to attempt takeovers in a period of such

uncertainty. Moving to more recent periods Hughes demonstrated that the level of activity from 1974 to 1981 was approximately half that exhibited in the late 1960's. He showed that the level of activity grew rapidly to reach new heights in 1986, the year of the Big Bang. These conclusions are based on press reports detailing the cost of these acquisitions in terms of relative expenditure, using the 1962 level as a baseline. After 1986 the number of acquisitions continued to grow until 1989. In this period the level of nominal expenditure was approximately the same as in the late 1960's but, in real terms, was several times greater. Hughes concluded that these bursts of activity in the corporate control market were closely related to the growth in the economy that occurred at approximately the same time. In particular, the positive correlation between the boom experienced in the UK economy in the 1980's and the intense merger and acquisition activity at the same time is apparent. This article continually quoted figures gathered by the Central Statistical Office and reported in the press to illustrate the points that the author made.

Boisi and Essig (1994) concentrated on the patterns of activity in the 1980's and examined acquisitions in the USA. However, this does not prevent the authors from noting several interesting points about the UK market. In particular, they claim that the number of acquisitions did not alter fundamentally throughout that decade despite popular belief that activity reached a peak in the years 1988 and 1989. The essential difference, according to Boisi and Essig, is in the value of the acquisitions in these years which increased enormously. Both authors have been employed within the corporate control industry and so it seems likely that their perspective is accurate despite their failure to provide empirical backing for this statement or to make it clear where their data comes from. The most important point in this paper is the current attitudes in this field and once again this is based on the authors observation and experience. Boisi and Essig claim that, after the extravagant behaviour of the 1980's, the takeover market in the 1990's is far more cautious than previously. In the late 1980's, they noted, acquisitions began to take place that were misguided and generated more by reckless enthusiasm rather than sensible corporate planning. As a result, several of the companies involved found themselves in considerable difficulty and the

entire corporate control market moved towards more cautious selection and careful planning.

The two papers discussed above refer to the fact that the level of acquisition activity seems to track the general level of the economic cycle but they failed to explain why this should be or how the corporate control market fits in with the other markets in the economy. The articles in the next section deal with the perceived links that exist between the economic cycle and the market for corporate control.

1.2 Economic Effects and the Corporate Control Market

An important question that arises when studying acquisition activity is why does the market for corporate control exist ? This is not a question that can be answered simply but an interesting suggestion is made by Scherer (1988). He argued that two market failures could be corrected by the proper functioning of a third market. Scherer believed that competition in production and input markets may fail to eliminate firms that are not minimising costs and maximising profits. Were the stock market operating efficiently, he claimed, these firms would be removed automatically. Thus a market in corporate control is necessary for the efficient working of the economy as a whole, as it will remove those inefficient companies that the market fails to eliminate naturally. Scherer used Line of Business data collected by the Federal Trade Commission to create a sample of four hundred and seventy-one American acquisitions between the years 1950 and 1976. Using ninety-one firms for which data was available, Scherer attempted to illustrate his hypothesis by examining changes in average profitability before and after the takeover. Unfortunately, the results proved to be inconclusive on the subject of market efficiency and the author contended that, if takeovers existed to remove inefficient managers, post-acquisition profits should exceed pre-acquisition profits by a noticeable margin. Again this supposition was not confirmed by his results and Scherer was unable to find an adequate explanation for this which makes his paper inconclusive.

Hughes (1993) also examined the effect of mergers on the economy using a trade-off model. This model is based on the idea that there is a static partial equilibrium trade-off between allocational efficiency losses and the cost-efficiency gains that appear after the takeover. Hughes acknowledged that there are problems with this approach, namely that there is often a difference between social benefits and cost benefits. There are some effects that may induce further mergers which must be considered and the assumption of a self-equilibrating economy with full employment, on which the static model is based, ignores the issues of investment, technical change, export preferences and employment effects which are also involved in the calculation of the social benefits of merger activity. Consequently, the trade-off model tends to produce results that use the issues of allocative efficiency as a proxy for monopolistic power. Hughes appeared to favour a similar perspective to Scherer, namely that the control of a company can be visualised as a valuable asset independent of any other considerations. Under this approach managerial efficiency is ensured by the "survival of the fittest". This implicitly assumes that the bidding firms will always have efficient managers and the targets will have comparatively inefficient managers who will lose their jobs when their firm is acquired. For this theory to work Hughes claimed that the following assumptions must hold. Firstly, that the share price always reflects the expected profitability of a firm and that the bidders are able to identify the presence of poor management as distinct from unfavourable circumstances. Finally, the acquirer must be prepared to alter the wealth-maximising policies of a firm and be confident of making enough money after the merger to recover the cost of the takeover. If these conditions do not hold, mergers are not generated by the efficiency argument and other reason must be identified. Hughes did not empirically test this but seems to believe that an examination of the benefits generated for the different parties in the merger and acquisition process will make the fundamental accuracy of this statement apparent.

A similar theory was advanced by Fairburn and Geroski (1993). The authors contended that when evaluating any merger or acquisition the central concern is the likely effect that such an activity will have on the performance of the entire industry. Fairburn and Geroski called this idea the "Structure - Conduct - Performance Theory". This stated that the performance of the companies within an industry can alter the

conduct of the other firms in that industry and ultimately change the structure of that industry. Fairburn and Geroski began by reviewing a number of previous studies in which this theory was tested. The results of these studies agree with Fairburn and Geroski's conclusion that a link does exist between the structure of the industry and the performance of the companies operating in that industry. The link appears to be non-linear, complex and rather weakly defined but Fairburn and Geroski were in no doubt that it exists. Clearly any factor that dramatically affects the market share of a firm will have a substantial effect on the profits of that company. The most obvious example of these factors in the context of this thesis is a horizontal acquisition. If this theory is correct then it suggests that mergers and acquisitions can alter the profits of all the companies in a certain industry simply by altering the market shares of one or two firms. This idea can also be taken in reverse and, in this case, it states that if the behaviour of a few firms can alter an industry then the nature of the industry can obviously have an impact upon the actions of the firms within it. The extension of this idea is that it may be essential for a company to attempt an acquisition because of the circumstances that it finds itself in.

This leads on, naturally, to consider the impact of the economy on the market for corporate control. If the corporate control market can alter the way that the stock market functions, as Fairburn and Geroski clearly believed, then it is very likely that the behaviour of the economy will have a considerable effect on the level of merger and acquisition activity. This point was discussed at length by Rock (1994). Rock believed that there are several economic forces that influence the overall level of activity in the merger and acquisitions field. He named five and attempted to provide brief explanations of their importance and effect. The first of these is the economic outlook which, the author contended, is probably the most important economic influence on acquisition activity. Rock maintained that if the economic outlook is promising and people are optimistic, activity in the acquisition market will increase significantly. He illustrated this point with the example of the USA in the early 1990's. This economy was actually one of the fastest growing in the world at that time but the market was depressed with a noticeable lack of consumer enthusiasm or confidence. As a result the acquisition market was noticeably depressed compared to the confident

times in the 1980's. Whilst the country and the people involved in the stock market were not feeling conspicuously confident about their economic future, the enthusiasm for mergers and acquisitions was negligible. The second of Rock's economic factors that can have an impact on merger and acquisition activity is the availability of financing alternatives. No acquisition, however beneficial, can progress beyond the planning stage without adequate financing. It is important, then, to consider the availability of funds to those involved and the alternatives that they have. If there are limited funds available to the acquiring companies then they are going to have to consider either retaining earnings or borrowing the necessary funds which may prove to be prohibitively expensive especially when the market as a whole is depressed. The next point is concerned with the balance between the offer made by the bidding firms and the target shareholders' expectations for their company. If the shareholders think that the value of the stock is going to move up significantly in the future then they may not want to sell now, irrespective of the premium offered by the bidder. The fourth point in this paper refers to the strategic challenges produced by the continually changing face of the business world. The laws governing mergers and acquisitions are continually in review in different countries around the world and so the potential acquirer must endeavour to stay abreast of these changes and understand how they might affect any planned takeovers. Finally, there is the reputation of mergers and acquisitions. If the corporate control market is unpopular for some reason then the practitioners will find it harder to complete their deals. In this situation, funding will be more difficult to come by and the shareholders of the bidding company unwilling to take the risk of acquiring another firm. It is unfortunate that Rock had no empirical evidence to offer in support of his conclusions but the rationale behind his approach is clear and he made a persuasive argument for believing that the economic climate must have a considerable effect on the functioning of the market for mergers and acquisitions.

Having reviewed these articles on the nature of the merger and acquisition market in general terms it seems that the market can be viewed both as an essential occurrence that can be used to correct for inefficiencies in other markets and as a less important event that can be triggered by a certain conjunction of external events. To

examine further the literature on mergers and acquisitions it seems appropriate to go on to the papers that are concerned with the different types of acquisitions that exist. Reviewing these articles will make it apparent that there are several different types of takeovers each of which is more or less applicable depending on the desired outcome that prompted the bid in the first place.

1.3 The Nature and Type of Acquisitions

The first paper discussed here is the article by Hughes (1993) which contained a table based on data for the UK produced by the Office of Fair Trading covering the years from 1965 to 1989. This classified mergers and acquisitions into three groups. The largest group by far is the horizontal activities; the combining of two or more firms in the same industry to create one large firm that occupies a much more dominant position in the market. The second group is the diversifying acquisitions, sometimes called conglomerate or unrelated takeovers. These acquisitions refer to the combining of companies that are unrelated and, usually, operate in different industries. The smallest group is the vertical acquisitions. These are the combination of two or more companies that are connected by the production of a certain good. These are the three types of mergers and acquisitions that are most frequently believed to take place and it is rare to see any other types of mergers and acquisitions mentioned in the literature. One of the very few exceptions to this rule is the paper by Lorange, Kotlarchuk and Singh (1994) where the authors claimed that there are four types of acquisition. Lorange, Kotlarchuk and Singh claim that it is essential for a company to continually develop and seek to allocate the available assets in the best manner possible in order to survive and prosper. To do this it is essential to have a clearly defined business strategy that defines the company's fundamental development aims. The types of acquisition that have developed are a direct result of these business strategies and, consequently, it is impossible to understand the correct use of acquisitions without understanding the strategies. This paper started with a brief explanation of the three main types of business strategy that exist today. The first of these is the Portfolio Strategy. This is the development of a set of inter-related businesses that will provide flexibility and stability for the company. The second type of business strategy is the

Business Family Strategy which refers to the building of a set of closely related business activities that are centred around a common type of technology. Lorange, Kotlarchuk and Singh's last type of business strategy is the Business Element Strategy. This plan involved the growth of a competitive product or strategy aimed entirely at capturing the trade from a particular firm. To maximise the chances of a successful outcome to any acquisition activity, it is important to ensure that the acquisition fits with the firm's business strategy. Keeping this in mind, Lorange, Kotlarchuk and Singh suggested that there are four main types of acquisition. The definitions of the first three types of takeovers are the same as in Hughes' (1993) article. The first of these is the horizontal acquisition which is primarily related to the business element strategy. Secondly there is the vertical acquisition which, the authors contended, is most effective when combined with either the business element or family strategies and thirdly there is conglomerate acquisition which focuses on how the target can enhance the overall stability or profitability of the entire conglomerate. The fourth type of takeover is unique to this article and the authors called it a concentric acquisition. This involves an acquirer and target that are related through their use of common techniques or information. By definition, this is often used in conjunction with the business family strategy where such an acquisition can be used to provide an unifying factor for a seemingly disparate collection of firms. The point that the authors were trying to make is that acquisitions are not separate self-contained activities but should be considered in the context of the company's business strategy. Again this paper did not contain any empirical evidence and the conclusions were based on the authors experiences working in the field. A similar approach was taken in a paper by Thompson, Wright and Robbie (1992). The main subject in this paper will be discussed later but the authors suggested that acquisitions should be viewed as just one possible way of restructuring a corporation and all the other alternatives should also be considered in evaluating this action.

The next paper, however, takes a rather different view. Boisi and Essig (1994) suggested that the acquisition of another company is simply a form of arbitrage. This arbitrage is concerned with establishing the best possible way of allocating the assets of the acquired company. This is based on the assumption that acquisitions will always

follow when a firm is perceived to be under-performing. The arbitrage connotations result from the fact that it is impossible to have complete information about the target firm before buying it and the risk element of the arbitrage stems from the existence of incomplete information. The management of the acquiring company are gambling that the target's recent poor performance is solely due to the inefficiencies of the current managers rather than some more fundamental factors. Assuming that these opinions are correct acquisitions are just part of normal every day business operations. This seems sensible when an acquisition is just the tool used to alter the current condition of a company or prompted by the quick actions of an arbitrageur. It is clear, however, that there will never be a consensus of opinion concerning the precise nature of acquisition activity in the literature.

These articles examined the various different ways in which acquisitions can be viewed. Now it seems appropriate to consider the motives that are believed to be responsible for this type of activity. There are a great many factors that are said to induce takeover activity and the following section attempts to summarise this subject.

1.4 Motives for Acquisition Activity

The various motives for acquisition activity constitute one of the largest sections of the literature concerning this subject. This section does not represent all of the motives that exist but, for reasons of clarity, has been restricted to the most frequently discussed motives.

1.4.1 Synergy as an Acquisition Motive

Boisi and Essig (1994) claimed that the most popular motive in the current literature is synergy. This is certainly one of the most frequently mentioned motives. Synergy means a combined action or activity resulting in an outcome at least as great as the sum of the involved parts. Thus any synergistic motive is one that is designed to exploit some form of advantage from the combining of two or more companies, for example economies of scale. The term synergy is used to encompass a great many

different motives, everything from the combining of research and development departments to risk reduction via diversification. In fact, two of the motives that will be dealt with separately, competitive position and tax advantages, can be placed under the heading of synergy. There are several papers that consider synergy to be the only acquisition motive. For example, Spatt (1993), whilst not concentrating specifically on acquisition motives, made it plain that the only motive he considered is the synergistic one. Spatt's paper will be considered in detail later.

Lev (1992) mentioned two other motives but, again, synergy was clearly the most important. Lev's article will be examined in detail in the section concerned with the benefits of the acquisition process. Berkovitch and Khanna (1991) produced an article in which they hypothesised that the perceived value of the synergy gains would be fundamental in determining whether an acquisition took place. This paper involved no data but instead used games theory to replicate the effects of merger activity and tender offers. Berkovitch and Khanna claimed that there is an equilibrium synergy level existing in the normal operation of the market. If the expected synergy level for the prospective action is less than this equilibrium value then a merger is the only option. Alternatively, if the expected level exceeds that value, the authors claim that a tender offer should be forthcoming. This suggests that the synergy gains will always be significantly greater in an acquisition, provided that the offer is accepted early on in the bidding process. This paper failed to consider the behaviour of anyone other than the two firms involved in the takeover attempt and it also assumed that increasing synergy is the only possible motive, which may not prove to be true. Another person who clearly believed in the importance of synergy above all other factors is Achtmeyer (1994) whose paper was designed to present his ideas on how the synergistic benefits of an acquisition can be maximised. Achtmeyer is a corporate lawyer and has spend many years advising companies on how to get the best out of their proposed acquisitions. Achtmeyer pointed out that to maximise the potential synergies in the acquisition a realistic approach needs to be taken in the planning and evaluation of the acquisition. In particular, he noted that the post-acquisition integration needs to be smooth. It is advisable to have a definite plan for this and not to improvise as problems arise. To evaluate the success or failure of an acquisition from a synergistic

perspective is difficult and requires an accurate idea of how the synergies are likely to manifest themselves.

Berkovitch and Narayanan (1993) also found strong support for the importance of synergy. They examined three potential motives for acquisition activity and endeavoured to estimate the proportion of takeovers that each motive generated. Berkovitch and Narayanan examined three hundred and thirty American companies involved in acquisitions between 1968 and 1988. Their hypothesis was that the total gains in the acquisition would be positive only if synergy was the motive. The authors calculated the cumulative abnormal return (CAR) for each of the involved companies based on the changes in the share price around the takeover. From this value the total gains to both the target and acquiring company can be estimated. According to Berkovitch and Narayanan the total gain to the target firm is equal to the CAR multiplied by the market value of the firm's equity, minus the value of shares held by the bidder. In comparison the gains to the acquiring company are the CAR multiplied by the market value of that firm. The total gains are the sum of these values. The results were then examined in the light of the authors belief about the link between the size and sign of the total gain and the motive. In this sample the authors found that synergy was the primary motive, accounting for seventy-five percent of the acquisitions they examined. Unfortunately this paper appears to fail to address the possibility that an acquisition could be prompted by a combination of several motives rather than just one. Equally, the authors did not consider the possibility that the result of an acquisition might not always be as they predict. For example, a takeover motivated by synergy might create a negative total gain and would not be counted as a synergistically motivated action under their approach. This could lead to the misclassification of some of the acquisitions in the sample which could place the final conclusions of the paper in some doubt.

1.4.2 Agency Issues as Acquisition Motives

Synergy, as mentioned above, is not the only very popular motive. One of the others is the agency issue. The agency motive needs to be examined in two parts.

Firstly, there are the issues connected with the managers of the acquiring firm and secondly those concerning the managers of the target company.

The Managers of the Acquiring Company and the Managerial Ambition Motive

This motive represents the idea that acquisitions take place to satisfy the ambitious aspirations of the managers of the acquiring firm. Lev (1992) pointed out that this is considered to be one of the most important motives. There is more prestige in being the manager of a large company than a small one and involvement in the corporate control market as a bidder creates a very positive impression. This provides the managers with the incentive to acquire other firms. How, then, is this an agency problem ? Quite simply the shareholders would prefer to have the company's profits issued in the form of dividends than used in the expensive acquisition of another corporation. The conflict of interests that arises typifies the agency problem. Theoretically the managers have no option but to comply with the desires of the shareholders but it is widely accepted that the level of control that the shareholders have in reality is somewhat limited due to informational inequalities. This is how acquisitions motivated by managerial ambition are able to take place. Several papers have examined this point.

The first to be reviewed is by Larcker (1992). This article hypothesised that the level of control the shareholders are able to exert is reflected in the type of acquisition activity that the company enters into. Larcker offered no empirical work to support this view but based his results on the popular theories about acquisition activity. He concluded that the structure of the managers compensation contract alters their behaviour. For example, if the contract is based on the company's accounts the managers are likely to concentrate on cash based transactions. In particular Larcker believes that this has an impact on the type of acquisition activity the firm undertakes. If the managers are allowed a considerable degree of freedom then the company is likely to attempt higher risk takeovers than firms where the managers are under tighter supervision. In many cases managerial accountability is virtually negligible as there are few effective ways to control them. It has been suggested that shareholder lassitude is

responsible in many cases for the development of this situation. Jensen (1988, 1992) has written two articles that examine this situation. In the first of these papers the author concurred with Larcker's idea. However Jensen went on to speculate that, provided the shareholders receive dividends, they are highly unlikely to concern themselves with the mangers activities. This paved the way for Jensen to propose his "Control Hypothesis of Debt". This theory suggested that it is possible for the managers to gain control of the firms funds whilst still issuing dividends to the shareholders and, thus, retaining their support. Jensen suggested that the managers should issue debt instead of dividends which should ensure that the shareholders will be satisfied, since they will receive the money due to them even if the company fails. This leaves the management free to use the retained earnings to finance an acquisition without any impediment. Jensen even suggested that the managers will consider investments with low potential returns or high risks rather than pay dividends although he offered no empirical evidence to support this theory.

The second paper by the same author (1992) dealt specifically with the problem of funding acquisitions in the face of shareholder disapproval. Jensen called this extended hypothesis his "Free-Cash Flow Theory". He believed that there are instances where the managers of a company are genuinely wrong in their approach and that the market endeavours to inform them of this fact by lowering the company's share price. If the managers do not alter their strategy the share price will remain low and it may become apparent that the only way to force the necessary changes on the company is for another group of managers to gain control. Jensen claimed that agency costs arise from the differences in opinion between the shareholders and the managers. These costs include the efficiency loss induced by the wrong managerial policy.

Jensen's theory combined this concept with his control hypothesis of debt. If the firm is to maximise the value of the shareholder's investment this excess cash must be paid out as dividends. Paying the shareholders reduces the resources available for expansion but a large dividend usually increases the value of the firm on the stock market. Giving the managers control of the "free cash" instead of using it as dividends may result in the company's share price dropping thus making it difficult to attempt a

takeover. Jensen again advocated the issue of debt as an acceptable substitute for dividends. This substitution also reduces the agency costs associated with the free cash flow as it minimises the cash available for the managers to spend at their discretion in the future. Jensen used data from other papers to test the effectiveness of this idea. All this data demonstrated is that a large proportion of the observable behaviour of these companies is consistent with his theory. The author pointed out that this does not prove that these firms have free cash flow but that this was likely as their behavioural patterns would be quite different if this were not the case.

The Managers of the Acquired Company and the Issue of Managerial Control

There is, of course, another side to the agency problem. The ambitious nature of the managers of a successful company might encourage them to go out and acquire other less fortunate firms but how do these other companies get into the position where they are suitable targets for a takeover ? One suggestion is that the incumbent managers have ignored the shareholders wishes for so long that the companies owners are now prepared to consider selling to a potential acquirer to rid themselves of the undesirable management. This idea was examined by Schleifer and Vishny (1988) who observed that controlling the actions of managers can be difficult. In order for the company owners to force the managers to behave as the shareholders want they must be able to both monitor the managers' activities and constrain these actions if necessary. Compensation contracts are supposed to ensure that the managers have the same interests as the shareholders. Unfortunately, these contracts can be prohibitively costly and fail to cover every eventuality. In many cases there are no effective methods for controlling managers available to the shareholders. In the absence of adequate control, the shareholders may be forced to resort to threatening to sell their interests in a takeover. When a company is acquired it is usual for the management to be sacked which should form an effective deterrent for the managers, but sometimes the threat needs to be carried out. This is a very extreme response to the problem but occasionally it is the only possible solution and an acquisition can be invited by the owners of the firm. The authors suggested that takeovers could be improved as a technique for controlling managerial activities if the new managerial team were

compensated in shares which reduced the conflict of interest between managers and shareholders.

Some authors maintain that the threat of an acquisition alone should be enough to bring the managers back into line. One article that put this theory forward was by Dodd (1992). Dodd examined the share prices of both bidding and target firms for several years before an acquisition to illustrate his point. The emphasis of this examination is directed towards any abnormal returns that might exist and how these change when the takeover is announced. Dodd found that in the majority of cases the target firms have negative abnormal returns of up to fifteen percent below average which become positive when the announcement is made. In comparison, the bidding company's shares drop in value. Dodd used this evidence to support his view that the acquisitions are facilitated by shareholder dissatisfaction with the current management, which suggests that these managers would be sacked as soon as the takeover was completed. This would suggest that the management would have a strong incentive to concur with the owners wishes in a takeover attempt.

Agency Issues Concerning External Parties

As has been mentioned before, an acquisition is a very extreme way of disciplining the management. The whole problem results from a lack of accountability and the absence of an effective monitoring system. This problem was debated by Davis and Kay (1993) . They claimed that adequate control mechanisms do exist but are not used correctly. In particular, they believed that non-executive directors should monitor the managers actions on behalf of the shareholders. This is not the case in practice as the people who are appointed to these posts are often nominated by the current managers. Thus the non-executive directors may be subject to the same conflict of interests as the managers and are more inclined to support the managers than fulfil their obligation to the shareholders which, again, forces the company's owners to consider selling as a last resort. The non-executive directors are not the only other people who may suffer from a conflict of interests . This point was made by Foster (1992) who concentrated on the activities of investment bankers. Foster

believed that there are times when investment bankers encourage their clients to enter into acquisitions that are not advantageous to the client. The bankers fee is calculated as a percentage of the cost of the transaction which creates an obvious conflict of interests. This article emphasised the case of Chock Full O'Nuts, an American fast-food manufacturer, who acquired a brewery, Rheingold. According to the chairman's statements in the early 1970's the company was looking for acquisitions to expand their business. Rheingold was acquired but it was soon apparent that this was a very poor investment. By 1977 they were forced to sell the brewery and were left with a very substantial loss to deal with. Chock Full O'Nuts had acquired a firm that was in very serious trouble and in an industry that the management openly admitted they knew nothing about. Foster admitted that this is a very extreme example and investment bankers cannot persistently advise their clients so poorly. Furthermore, it is possible that Chock Full O'Nuts did not take advice on this purchase or might even have ignored advice from their bankers.

This sort of article is unusual, all the others concerned with the agency issue refer to the differing interests of the shareholders and the managers. The latter agency issues, those referring to the target company, often involve the concept of an inefficient management in conjunction with the major issue of controlling the managers. The inefficient managers problem is the first of the efficiency motives.

1.4.3 Managerial Inefficiency as an Acquisition Motive

The managerial efficiency issue can be summarised in the following terms. If the managers of the target firm are inefficient then it is likely that that company will be acquired by a firm that has a more efficient management. This is another very popular motive in the recent literature. For example, Boisi and Essig (1994) noted that one of the most significant advantages in an acquisition is the increase in overall efficiency produced by the arrival of a new and more efficient management. This opinion is echoed by Franks and Harris (1993) who considered that there are only two types of takeovers; allocational and acquisitional. The first of these is designed to bring about the reallocation of the resources of the two companies to a new and more efficient

configuration. The empirical work that was contained in this paper refers to the impact of a referral to the Mergers and Monopolies Commission, which happens to a very small percentage of takeovers in the UK. Jensen (1988) argued that increased activity in the corporate control market exists in the wake of new financing options. He claimed that this will force managers to work more efficiently and be more flexible to ensure their own survival. Managerial incompetence was also considered by Berkovitch and Narayanan (1993). They called it "hubris" and believed that it would result in the target company being undervalued by the stock market. They found that it was responsible for the second largest group of takeovers in their sample. It is generally accepted that managerial inefficiency will result in a devaluation of the target firm, as proposed by several of the authors. It is possible, however, that companies can become undervalued without the mangers being particularly inept, this phenomena is caused by the incomplete information on stock market rather than anything specific to the company.

1.4.4 Acquisition Motives Based on Asymmetric Information

Scherer (1988) considered the impact of informational disparity between the stock market and the target firm. Scherer recalled that stock market prices follow a random walk and it is only semi-strong efficient. Under these circumstances it is possible for a company to be under valued simply by chance. Equally, random shocks to the share price can also place companies in the position to acquire other companies when they are not necessarily genuinely capable of sustaining the acquisitions.

This leads onto the next group of acquisition motives which are those prompted by informational differences. If the managers of the bidding company believe that they know something the rest of the market does not know then this may be the opportunity that they need to undertake an acquisition. In general, these informational differences refer to the perceived value or potential of the involved companies. This motive is particularly popular in the papers that use games theory to model the action of firms in takeovers. Hart (1993) used informational inequalities as the primary takeover motive in his paper. Hart considered a two period economy in an

uncertain environment. The goods in the economy are allocated in period zero and a constrained stock market is defined as one that operates under conditions designed to maximise profitability for the different companies. Hart defined conditions for an equilibrium to establish under which takeovers are permitted. This paper concludes that such an equilibrium exists only if trivial share allocations are considered in the model and the holders of the largest share allocations are able to control the behaviour of the firms. The results can only be optimal if multiplicative uncertainty exists, which is a direct result of the informational limitations of the model. Giammarino and Heinkel (1986) also used games theory to replicate contested acquisitions. They decided that a contested acquisition can be viewed as a game between an informed bidder, who has a realistic notion of the true value of the target firm, and an uninformed bidder who does not have the same level of knowledge. The takeover attempt is modelled as a bidding game with rational expectations and asymmetric information. Expected synergy gains are used to associate probabilities with the signals that the bidders receive. The target firm's shareholders are assumed to accept whichever of the bids offers them the greatest premium in the first few rounds of the game. The game develops following a simple set of rules which are designed to give the uninformed bidder the tactical advantage of bidding second and knowing the value of the other company's offer. Two equilibrium situations result, depending on the behaviour exhibited by the uninformed bidder. In the Passive Competition case the uninformed bidder is indifferent between not bidding and bidding the full value when the informed bidder has made an offer which is less than the target firm is worth. In the White Knight case the uninformed bidder will always counter-bid if the target shareholders refuse the informed bidders first offer. In this manner Giammarino and Heinkel were able to replicate scenarios in which there are sequential bidding patterns, overbidding, managerial resistance and white knights. Whilst the results of this paper demonstrated the sequence of events in a contested takeover, they did not allow the examination of the motive that drives either of the competing companies to make a bid in the first place. The main concern with papers like the two discussed here is that the game theory applications are based on so many assumptions that their findings are difficult to translate to practical applications in the real world, although bidding games can replicate very simplistic scenarios.

These are not the only articles to discuss this topic however and the remaining papers use more realistic methodologies. The main issue with this motive is, as Boisi and Essig (1994) observed it is impossible for the management of the acquiring firms to know everything about the target until after they have acquired it. This means that most acquisitions based on informational asymmetries are generated by the belief that the acquired company is undervalued. The important feature in an informational asymmetry acquisition is that the true value of the target firm should remain hidden from the rest of the market until the acquisition has been completed. This issue was discussed by Franks and Harris (1993) in their paper examining the effects of a referral on an acquisition. If an acquisition is referred there will be an unavoidable delay, irrespective of the final outcome. During this period it is possible that the additional information, which prompted the bidding firm to start the acquisition, could be made available to the rest of the market. Under these circumstances it is possible that the bid will be contested by another potential acquirer and the advantage to the original acquirer will be lost. In an acquisition, it is also possible that information will also be revealed about the nature of the acquiring company. This is the belief held by Eckbo, Giammarino and Heinkel (1990). They claimed that the type of bid made by the acquiring company, and in particular the quantity of cash in the offer, discloses the true value of the bidding company. This article will be reviewed in detail in Section 1.7 which discusses the medium of exchange in acquisitions.

1.4.5 Acquisition Motives Based on Tax Advantages

The next factor that induces acquisitions is the potential tax advantage motive. This is sometimes placed under the synergy heading, but does appear in some of the articles as an independent motive. The idea behind this theory is that the bidding company may be able to create or retain tax advantages by acquiring another firm. There are three main aspects to the potential tax advantages. Firstly, if either the acquired or acquiring firm has incurred losses for tax reasons in recent years it is possible that these losses can be used to reduce the tax liability faced by the company in the future. The second aspect is the idea that by increasing the size of the firm via

an acquisition it is possible for the acquiring company to place itself in a higher tax band which often enables the firm to increase the value of the depreciation that it can write off for tax. Lastly, there is the idea that a takeover enables the acquiring company to increase debt capacity if the acquired firm has unutilised debt capacity. The interest on this debt is sometimes tax-deductible. All of the articles in this section refer to American data where the tax laws are such that these tax gains can become large enough to make an acquisition beneficial. Under the current UK tax laws the degree of tax advantage that a firm could accrue in this way is far smaller than in the USA and it is debatable whether it would be large enough to motivate an acquisition unless it were taken in conjunction with some other motive. Nevertheless, this is a frequently mentioned motive in the recent literature although the empirical investigations of this topic are very limited. This idea is one of the few acquisition motives mentioned by Copeland and Weston (1988) who suggested that it is possible to use one firm's tax position to offset the others, thus benefiting the combined company. Jarrell, Brickley and Netter (1988) also suggested that the tax situation of the new company formed by an acquisition could be far more advantageous than the position either of the involved firms could have reached separately. It is possible that a larger firm may have more options for controlling tax than a smaller company and, since acquisitions increase the size of the firm, this may be one possible source of tax advantages in UK acquisitions although it this aspect has not been the subject of empirical analysis.

1.4.6 Acquisition Motives Based on Market Share and Competitive Position

Another motive for acquisition activity is the use of an acquisition to increase the market share of the bidding firm and to place it in a more advantageous position. This is a motive that is sometimes called synergistic although, like tax, it is often discussed separately. Once again, Copeland and Weston provided a short description of this motive. They stated that a takeover can increase the acquiring firm's share of the market far more quickly than it could through internal growth. A more in depth consideration of this motive was given by Creehan and Leger (1994) who suggested that, provided the sources of potential risk are minimised and the post-acquisition

integration carried out carefully, it is easy to induce a great increase in the competitive position of the acquiring company via the takeover. They pointed out that this gain is facilitated by the existence of a high level of strategic fit between the acquiring and acquired companies, aiding the smooth integration of the two firms, and that the potential strengths and weaknesses of the resulting conglomerate must be evaluated before initiating the takeover.

1.4.7 Diversification as an Acquisition Motive

The last acquisition motive is diversification. This refers to the fact that some companies use an acquisition as a method of gaining access to a new area of the market or even a new country. This is considered to be one of the fastest ways in which a company can make this sort of change in its business practices. The acquiring firm is saved the expense of building new production plants, for example, as this has already been done by the acquired firm and does not even have to break into a new market and establish a recognisable brand name as this probably already exists as well. In addition to these commercial advantages an acquisition can often circumvent barriers to entering a certain industry that exist for political reasons. For example, many governments are protective of industries that they view as essential to their economy and seek to prevent entry to this field to companies that are not based in that country. By purchasing such a firm it is sometimes possible for foreign firms to gain a foothold in these industries and expand their interests in this manner. Hughes (1993) examined the Office of Fair Trading's data on UK acquisitions in the period 1980 to 1989 and found that diversifying acquisitions were the second largest group of takeovers, surpassed only by horizontal takeovers.

1.5 Catalysts of Acquisition Activity

1.5.1 Defence Mechanisms as Catalysts of Acquisition Activity

There are some features of the target companies that, whilst not being motives in their own right, can speed up the takeover process. These "catalysts" are not

important enough to make the firm a target without some other motivation, but they enhance the probability of the firm being acquired if it is considered for some other reason. First of these catalysts are defence mechanisms. The first defence mechanism to be examined in this context is the use of golden parachutes which will be discussed in detail in section 1.8. This refers to the nature of the compensation contracts held by the managers of the target firm which are designed as defence mechanisms. In Larcker (1992) the main hypothesis referred to the level of control that the managers have over the company and how much they can do without intervention from the shareholders. Larcker included the results of a survey that he has conducted into the opinions that shareholders have concerning the use of golden parachutes. He found that the shareholders were generally unhappy about these methods of compensation, which were seen as removing the managers obligation to work efficiently. Larcker also observed that the stock market reacts less favourably to acquisitions where the target managers have golden parachutes as the presence of these contracts can create a conflict of interests. In Berkovitch and Khanna's paper (1991) it is suggested that acquisition activity can be predicted by examining the value of the expected synergy gains in combination with the existence of golden parachutes. In this article takeover bids were modelled as auctions resulting in significant gains in synergy after the event. The authors suggested that the managers of the target company will be given golden parachutes in the event that the tender offer is accepted by the shareholders. In this model a tender offer is always accepted as it is seen to make more money for the shareholders and the expected synergy gain is higher. The assumption that golden parachutes are automatically given to the managers in a tender offer is a considerable simplification of the situation in reality. The authors made no comment either in favour of or against the use of golden parachutes and it is difficult to establish whether or not they approve of this sort of compensation contract. Jensen (1988) is rather more objective. He admits that golden parachutes can reduce the differences between shareholders and management when used carefully. Incorrectly implemented, however, they can have the opposite effect and may encourage the incumbent management to allow the firm to be acquired without making any sort of protest, even if the proposed takeover is contrary to the firm's interests.

Other defence mechanisms can also be catalysts in the acquisition process. It has been found that some techniques are ineffectual and the fact that they exist at all seems to encourage potential acquirers. This idea was tested empirically by Ambrose and Megginson (1992). This paper was an attempt to identify the characteristics that make a company a likely target for an acquisition. Aside from the usual accounting variables they also included terms representing the nature of the takeover defence that the companies had. Ambrose and Megginson found some types of defences had exactly the opposite effect to that which they were intended to have. In particular, voting rights defences appeared to increase the probability of the firm becoming a takeover target.

1.5.2 Institutional Investors and Ownership Structure as Catalysts of Acquisition Activity

The last factor to be considered in this section is the presence of institutional investors. In an acquisition the response made by the institutions to a takeover offer would seem to be very important and likely to have an impact on the outcome. Several papers have addressed this topic including Ambrose and Megginson (1992). The authors added variables representing the level of institutional investment in the companies in their model. They quoted past research that has resulted in conflicting conclusions on this point. For example, they observed that Schleifer and Vishny (1988) found institutional investors provided an extra incentive for the managers to work hard as they provide a closer watch on the company's activities, resulting in a decrease in the probability of the company being acquired. Unfortunately, Ambrose and Megginson were unable to produce any clear results on this subject. Their model was estimated using the data on four hundred and seventy-three companies that were identified as either being targets, bidders or neither of these on the 1st of January 1981. The terms representing the ownership structure were not statistically significant in their model and as such provided no new information on the subject of institutional investors. A similar result can be found in the article by Cosh, Hughes, Lee and Singh (1989). As in Ambrose and Megginson, the authors were sure that institutional investors must have an effect on the corporate control market as they have become so

prominent in the last three decades. In particular, Cosh *et al* wanted to address the impact of these investors on the selection of takeover targets and discover whether the institutions discourage this type of activity to maintain stability in the market or encourage it to create short term gains. The institutions are, potentially, able to influence the amount and direction of the takeover activity of the firms that they invest in. Accordingly, Cosh *et al* made two predictions. First, the increasing institutional dominance of the market will change the behaviour of all companies in the market irrespective of their individual institutional holdings and secondly, agents that are not subject to any form of direct institutional holdings will not be affected. The empirical work in this paper is based on the comparison of two periods. The first period, 1981 to 1983, is typified by low acquisition activity. Fifty-nine companies were found with three years of post-merger data on the Exstat tapes. The second sample is taken from a period of intense activity, 1986, and included seventy-seven companies. Both of the samples were split into subsections depending on the level of institutional investment in the bidding firm. Univariate and Multivariate tests were used to examine the split samples for size, profitability and growth rates. The tests were designed to highlight any differences between the companies with high institutional investment and the firms with little or no institutional investment. Again the results were inconclusive, Cosh *et al* found that the increased presence of institutional investors does not appear to change any of the basic characteristics of the takeover selection process. This is surprising considering that shareholders of the size and importance of the financial institutions would have an effect on the behaviour of companies with whom they are involved.

Perhaps, then, it is not the presence of institutional investors that produces the different levels of acquisition activity that have been observed in differing industries and countries. An alternative suggestion has been provided by Jenkinson and Mayer (1992). In this paper it is suggested that the level of corporate control activity differs across industries and countries because the patterns of corporate governance are traditionally different. The authors compared patterns in company ownership and control in the USA and UK to the same factors in the rest of Europe and Japan. They found that there were notable variations in these areas. In the UK and USA it is usual

for the owners of a company to be removed from the managers of that firm. There is also little sign of any continuity of ownership across the generations. This means that there is no longer the "family interest" in the firm and the concept of family ownership is greatly reduced. This is not true in the other countries that were examined in this paper and, the authors claimed, this is responsible for the far more active and hostile acquisition market that exists in the UK and America compared to many of the other countries in the world. This hypothesis is based on the experiences that Jenkinson and Mayer had working in the corporate control field and contains virtually no empirical work besides a few figures concerning the levels of activity in the different areas. Their conclusions do not appear to be unreasonable, however, and the differing nature of corporate control may well depend on the traditional patterns of behaviour in the relevant countries. Again, the lack of empirical evidence is unfortunate but the theory could explain the diverse levels of activity across the corporate control markets.

1.5.3 Company Under-Valuation and Size as Catalysts of Acquisition Activity

It has been previously mentioned that the value of companies can be altered and that acquisitions can be prompted by informational asymmetries. Equally it is possible, as Scherer (1988) suggested, for the stock market to inaccurately value a firm. The combination of these factors represents another catalyst for acquisition activity. It has been suggested that undervalued companies are more likely to be acquired than other firms. Equally, smaller firms are thought to have a higher probability of becoming acquisition targets than large companies. Dietrich and Sorensen (1984) and Palepu (1986) are amongst the authors who employ both of these factors in their examination of acquisition activity. Once again, this factor is important as is reduces the cost of the takeover as the size of a company is often directly related to the value of shares in that firm. Neither of these factors, or the previous ones in this section, are important enough to generate acquisitions on their own, barring very exceptional circumstances, although they are all factors that may help in the selection of a potential takeover target given that an acquisition has already been decided upon.

1.6 Analysis and Company Valuations

Assuming that a company has decided on an acquisition, it is necessary to analyse and evaluate the takeover to ensure that the most suitable target is selected. This is vitally important in the acquisition process. If the valuation of the firms in the takeover is inaccurate then the acquisition could result in a costly disaster for the bidding company. There are many papers that discuss various methods of analysing potential takeovers and how best to estimate the value of the target to the acquirer. One of the most comprehensive descriptions of the analysis process can be found in the paper by Rappaport (1994) who describes in detail the steps involved in the analysis of a potential acquisition. First, there is corporate self-evaluation. It is important to know the value of the involved firms and how this value will be affected by several different scenarios. This process may bring to light not only the company's suitability for an acquisition but may also demonstrate that another form of strategic restructuring could take place as an alternative. Secondly, the value of the acquisition must be ascertained. Many companies use the discounted cash flow (DCF) methodology to determine the value of a potential takeover and, as with the use of DCF's in ordinary investment analysis, the forecasts will be extended over as many periods as the managers are comfortable with. When the level of uncertainty becomes excessive, there is little point in continuing. The bidder's cost of capital is the appropriate discount rate for the analysis, if the acquisition target's risk level is judged to be the same as the acquirer's. The cost of capital is the minimum acceptable rate of return based on the rate that investors could expect if the funds were invested in some other way. Rappaport's article concluded with a demonstration of this technique based on a fictitious company acquisition.

Reis and Cory (1994) examined the various approaches that can be taken to acquisition analysis and sums them up as the following three options. The first of these is the intrinsic value which captures the discounted present value of the free cash flows generated by the assets of the company. These are evaluated as a going concern plus a terminal value also discounted at an appropriate value. Secondly, there is the acquisition value which can be quite different from the intrinsic value of the firm. The

acquisition value is the value of the firm as it would be traded in the corporate control market and estimates the value that it represents to a potential acquirer. Finally, Reis and Cory considered the liquidation and replacement value. The assets of the firms are very important in the analysis of a potential takeover target and this type of valuation is often useful. To know how much the assets are worth in these two extreme cases can help generate a framework within which the assets can be placed at their current value. The authors also noted that the attendant methodologies are just as important as the evaluation approaches themselves. A few of the most frequently used techniques are mentioned here. Reis and Cory began by observing that the intrinsic value or DCF value of the firm the acquirer is considering buying is, effectively, a time series of future cash flows. The terminal value method, as mentioned above, is often useful as the value of a company under extreme circumstances is examined. Lastly, present value calculations are based on the costs of debt and equity, estimated with the CAPM, to the firm. As with all business evaluation techniques it is important to choose the method most appropriate to the company's decision making process, to ensure that the relevant information is available in the correct form. Once this has been done it should be relatively easy to produce a meaningful acquisition evaluation.

The same issues were considered in the article by Edwards (1994). Edwards noted that the fundamental purpose of any company is to generate wealth for the shareholders through the efficient allocation of assets. If an acquisition can help the management to fulfil this obligation then that is what they should do. There are, however, two other driving forces behind merger and acquisition activity that need to be considered. The first of these is the need to consolidate current businesses activities and the second is to reduce risk via diversification as far as possible. These two objectives may seem to be mutually exclusive but can work together effectively. A company may undertake a horizontal acquisition, for example, to consolidate its business activities. At the same time increasing their market share would reduce the risk of the company loosing out to larger competitors. Thus, it is possible to apply these two initiatives at the same time. Edwards believed that the acquisition activity can be considered as a source of cash flows and split into the following groups. The elements of gross margins include factors representing the nature of the industry and

the company's market share. Next there are the factors in the expense component. This section involves the figures for manufacturing and research expenses. Finally, there are the elements in the resource component. This section includes the values representing the financing, investment and variable costs of production. Once all these factors have been appraised, the complete process can be valued. Edwards claimed that it is usual to employ some form of discounted cash flow measure to represent the value of the acquisition in today's terms. Consequently the valuation process needs to consider the time horizon and a suitable estimation technique. The time horizons are the easiest element to evaluate as the number of years considered is based solely on whatever time span the managers are comfortable using. It has been suggested that the bidding company should use its own cost of capital when enumerating the value of an acquisition although Edwards also considered the idea of using projected earnings after taxes as a substitute for the discounted value technique. Either way he claimed that it is essential to form a matrix of possible outcomes that represent the firm's various options, including the acquisition, before making any decisions.

Ritch (1994) took a similar line. He stated that it is essential to plan thoroughly in advance before attempting an acquisition and suggests the following issues are important. Careful strategic planning is essential to be fully aware of the strengths and weaknesses of the bidding corporation before any sort of successful acquisition can be contemplated. The selection of a target can be difficult and must be done with great care. On the other hand it is important to be able to react quickly to changes in the business environment. Several potential targets probably exist so it is important to examine them thoroughly before making any decisions about which one is going to give the greatest advantage to its acquirer. As with the previous authors, Ritch clearly believed that strategic planning is very important but it is interesting that he also notes that the bidding company may have to move quickly to take account of any sudden changes in the business climate. A brief description of the valuation process was given by Myers (1992). Here it was suggested that incremental cash flows should be substituted for discounted cash flows, as this may give a more accurate result. Unfortunately Myers did not include any empirical testing of his idea although he did explain his methodology in some detail. The cost of a merger is

calculated as the price paid for the target firm less the value of that firm as a separate entity. Comparing this price to the value of the expected synergistic benefits should indicate whether the merger is advisable. Regrettably, Myers did not discuss how the synergistic effects should be measured or what should be done if the acquisition is not being attempted for synergistic reasons.

Throughout the papers discussing the analysis of an acquisition and the techniques that might be used, there are several common themes. It is essential to plan the acquisition well in advance, a realistic approach is obviously necessary and the value of the firms needs to the calculated very carefully to establish the advisability of the selection of the target. This last issue is so fundamental to the success of the acquisition process that has featured in articles as a separate point. Franks and Harris (1993) suggested that the perceived value of the target firm can be a motive for a takeover if the company is seen to the undervalued. Creehan and Leger put a different perspective on the issue of company value, as they believed that the increase in value generated by the takeover is not necessarily financial but is strategic. They suggested that the whole evaluation of an acquisition should be based on the appraisal of the level of strategic fit between the bidding and target companies. The next step in the acquisition process is the raising of finance and the selection of the correct medium of exchange for the bid. This is the next section of papers to be reviewed.

1.7 Financing the Acquisition, Selecting the Medium of Exchange and Approaching the Target Firm

The first three sub-sections here concentrate on a relatively small number of articles most of which were written by people who are involved in the acquisition process. These papers detail the various options that the authors consider to be important and those that they have found to be the most successful. None of these articles incorporate empirical work but are based more on practical issues and the experience of the authors. The last section, Section 1.7.4, involves empirical work as the articles are concerned with the signalling effect of acquisition activity which has been examined empirically by several authors.

1.7.1 Financing Options for Acquisitions

It is obvious that the correct funding of the takeover is fundamental to the success of the venture. To this end it is important to understand the various options that are available and the advantages or disadvantages inherent in using each one. Jensen (1988, 1992) considered issuing of debt instead of dividends as an appropriate way to raise the funds for the takeover. This, however, vastly over-simplifies the options that exist as Still (1994) demonstrated. Still demonstrated several different financing options that are currently popular in the corporate control market. These financing options are dealt with in the same order as they are reviewed here. Still made no comments concerning which of these approaches is the most effective. He contended that the choice of financing should be based on whichever method best suits the acquiring firms current situation.

Revolving Credit and Term Loans

Revolving credit and term loans are formal agreements from the lender to provide a specified amount for a selected period. The borrower can take advantage of this agreement at any time within the "life" of the deal. This technique is often used to insure against unexpected eventualities in the future. The interest rate is usually the London Interbank Lending Rate (LIBOR) plus a premium chosen by the lender. Bridge loans depend on later refinancing and are relatively short term. They are used in acquisitions only if the timetable of the deal is suddenly reduced. Interest rates are usually high, between 2% and 5 % above the prime borrowing rate. These financing methods offer the bidder a great deal of flexibility but cost more than most other methods of raising money.

Private Placements

Private placements consist of the sale of stock to a limited number of carefully selected investors. This sale is generally used to refinance the initial acquisition

funding. Employee stock ownership plans (ESOP's) are often involved in private placements as they are both a retirement plan for the workers and source of fresh finance for the firm without passing stock to outside parties. Leveraged ESOP's are often used to acquire control of the company, whilst non-leveraged ones involve periodic trading in the stock of that company. There is a close link to leveraged buy-outs; where an investment group buys the firm and uses the assets owned by the target to refinance the debt created by the purchase.

Operating Capital Leases and Securitised Credit

Operating capital leases occur when the firm sells its assets and then leases them back, thus releasing the necessary funds for an acquisition. Securitised credit is the issue of an asset backed security. These are useful in the financing of leveraged transactions but are not suitable if the firm cannot support very large levels of debt.

Interest Rate Management

The last factor in Still's paper referred to the various techniques of interest rate management. The ability to alter the nature of the pricing in a credit agreement is very important. The most prevalent techniques are swaps, caps and collars. All of these enable the firm to generate funds if used advisedly. The syndication of credit is provided by a group of banks working together. The rating of debt uses either a commercial or in-house rating to evaluate the perceived risk of the borrowing company in light of its proposed acquisition activity. This rating may be of interest to the banks who could use it to determine whether they are prepared to lend money to the firm. This has a clear impact on the ease with which a company can attempt a takeover.

1.7.2 Selecting the Medium of Exchange

An issue closely related to the financing of the acquisition is the selection of the medium of exchange. It is important to chose the right mixture of assets and cash to suit the present circumstances and, where possible, maximise the profit produced by

the takeover. It is often the case that the method of financing the acquisition and the medium of exchange cannot be dealt with separately but are inextricably intertwined. This article by Slusser and Riggs (1994) considered the selection of the medium of exchange and included some references to raising the necessary finance although this does not appear to be a priority in this paper. The authors discussed several different types of currency that could be used in an acquisitions and mentioned the advantages and disadvantages of each option. They claimed that it is possible to combine these types of bids but did not specify when this would be more or less beneficial than using a single approach. As in Still's article, the authors stated that the precise combination of stock and cash would be unique to each acquisition and based on the individual circumstances.

Specific Securities

First, there are specific securities. If the acquisition is paid for in debt securities then it is essentially funded by the target firm, as the gains produced by the takeover will repay the debt. This can be effective provided that everyone knows the true value of the paper that they are either giving or receiving. This medium of exchange is very popular in buy-outs where the funds required to purchase the company are raised using the assets of the firm as security.

Cash Payments

Cash Payments have the advantage that everyone knows precisely what they are getting and there is no need for any delay in the acquisition. It can also allow for considerable flexibility in the tax-allowances that can be claimed by the purchasing firm, depending on the tax laws in that country. The problem with cash, however, is that the bidding firm must have the funds readily available before launching the bid as there can be no delay in paying when the shareholders accept the offer.

Common Stock Transactions

Common Stock Transactions can be particularly advantageous to sellers who plan to remain shareholders after the acquisition. There may be some tax advantages although these will depend on the current legal position. In the USA exchanging shares is a tax-free transaction although tax is still due when the stock is eventually sold. For this method to be successful it is important for everyone to know the perceived value of the target firms stock. The advantage to the purchasing firm is that they do not have to pay out large sums in cash but instead can issue paper which is much easier. The attraction for the shareholders of the target firm is that they have the opportunity to retain a stake in the firm after the acquisition.

Debt or Preferred Stock

Using debt or preferred stock to finance an acquisition is commonplace when the acquiring firm is facing difficulty raising the funds for the takeover and does not wish to issue securities. In particular, preferred stock is often used in friendly deals where the payment structure is negotiated. The advantage to the shareholders of the target firm is that they may be able to defer taxation when these types of securities are used. This is especially true if instalment notes are used. It is often possible for the shareholders to defer paying tax until the final payment is made whilst still receiving interim payments and earning interest on these payments. The disadvantage in using these types of payments is that the deals are difficult to structure owing to the more complex nature of the medium of exchange.

Convertible Securities and Contingent Payments

Convertible securities can be used as compensation in an acquisitions. Part of the purchase price is contingent on the target reaching some predetermined goal by a certain time. This can be used to bridge large gaps between the bid and ask prices in the acquisition but it relies upon a fair evaluation of the costs and benefits inherent in the transaction. This has the advantage of allowing the purchasing company to pay for

the takeover in instalments which makes funding the purchase less of a strain. The benefits to the shareholders are debatable in this case as they must face the risk that, owing to unpredictable external conditions, the company will fail to meet the goals that are specified in the contract. In this case they will loose out as the later payments will not be forthcoming.

Hansen (1987) offered another possible reason for offering shares rather than cash. He examined forty five acquisitions that took place between mining and manufacturing companies in the years 1976 and 1977. A model of a bargaining game involving asymmetric information was set up to replicate the behaviour of the firms in an acquisition involving both debt financing and incorporating revealed information as the game progressed. Based on the results generated in this manner Hansen was able to conclude that bidding companies will offer shares rather than cash if they are uncertain about the precise value of the target firm. This is, presumably, easier for the acquiring company to fund without having to place an exact value on the target. A cash offer is unambiguous and could lead to rejection from the shareholders if they consider that the offer undervalues their shares. Conversely, the value of a share can alter depending on the circumstances and using such a medium of exchange offers the bidding firm the opportunity to make the target shareholders an offer without making it clear exactly how they have valued the target, which can be to the bidding firms advantage. Higson (1991) also examined the reasons for offering either cash or shares in an acquisition attempt. He gathered information on three hundred and seventy-three companies that were involved in acquisitions between April 1976 and October 1987. Using regression models he was able to link the type of payment using the bid to accounting variables. From the results of this analysis Higson concluded that cash is offered when the acquirer has a high level of liquidity. This corresponds to the notion that acquirers offer cash when they can afford to do so and only use shares when they do not have the necessary funds.

1.7.3 Approaching the Target Company

When the financing of the deal has been determined and the medium of exchange selected, these factors need to be matched by the correct approach to the target company. Several possible approaches are discussed by Ritch (1994). specifically, Ritch suggested four methods of approaching the target firm that may prove useful in the event that opposition is expected from the target's managers. Ritch claimed that most unsolicited takeovers use one of four approaches to gaining the required proportion of the shares available.

The "Saturday Night Special" Approach

The "Saturday night special" is a seven day cash tender offer that is usually launched on a Saturday. The weekend break prevents the target from organising an effective defence by making it difficult for the managers to be assembled until the beginning of the next working week. This approach is very rare these days as the law in most countries prohibits the use of the short time scale essential to the success of this type of surprise move. In the UK the law states that an acquisition must be open for at least twenty-one days which would prohibit the use of such a short run offer structure although there is no embargo on the bid being launched at the weekend.

The "Bear Hug" Approach

The "bear hug" is an unilateral offer made directly to the managers of the target. It usually takes the form of a letter which discloses enough information about the proposed price and conditions that the target company is obliged to make a formal announcement acknowledging that it is the subject of a takeover. Presumably, the resulting improvement in the target's market price and standing are supposed to make it difficult for the board to reject the offer. It can also be followed by an ordinary tender offer if the target does not respond favourably within an allocated time period. Again, it is very difficult to organise a defence as the bid becomes common knowledge at the same time as the managers hear about it for the first time. In the UK the bidding

firm is obliged to make an announcement stating its intention to launch a takeover bid in the near future although it is not obliged to make details of the bid clear in this document, which fits in neatly with this approach.

The "Nibble" Approach

The gradual acquisition of the target's stock, via the stock market in normal transactions, Ritch called the "nibble strategy". In the UK this can be used to gain anything up to thirty percent, although a public announcement must be made when the holding exceeds five percent of the target firm. Once the bidder passes the thirty percent level they must make a tender offer. This gradual activity is easier to finance than either of the surprise methods above, but does allow the target the time it would need to make the acquisition difficult to complete. This is the most common approach in the current market but the laws on disclosure in the UK reduce the element of surprise considerably.

The Swipe Approach

The "swipe" occurs when a tender offer has already been accepted. Another firm offers to buy the same shares at a increased premium. This is a very effective manoeuvre as the current owners have already agreed to a change in control and at a lower price than the new offer. The first bidder has done all the work necessary to persuade the shareholders to sell their stock before the second bidder makes any move. Once the second bidder announces an improved bid it is likely that the shareholders will favour this offer. Such an improved bid is often used to prevent management led buy-outs.

Two Tiered Bids and the Elimination of the Free-rider Problem

Another type of approach that a bidder could use is discussed in a paper by Spatt (1993) who considered the adverse effect of the free-rider problem on takeover bids. This problem arises when the shareholders believe that their shares will soon be

worth more than the bidder is offering if, for example, their company's assets were more effectively allocated. Under these circumstances it is better for the shareholders not to sell their shares and, as a result, the bid could fail even if it is the best thing for the company as a whole. This is the "free-rider problem". Spatt considered this to be a serious issue and, by examining the main research in this area, he was able to bind it together to form a coherent consideration of this issue. He concluded that this free-rider problem can be eliminated with the use of a two-tiered conditional offer. The bidder makes an offer that is constructed in two parts. The first part offers one price if the shares are sold during the acquisition whilst the second part values the share at a lower price if they are sold after the bid has been completed. Once the bidder has gained control of the target it is possible for the management to force the shareholders to sell their shares by instituting an compulsory re-purchase of the remaining stock. The fear of being "greenmailed" and having to accept this second, considerably lower, offer persuades the shareholders to sell their shares during the takeover thus eliminating the free-rider problem.

1.7.4 The Signalling Effect of Acquisitions

When an acquisition is launched this action releases information to the market. Superficially, this information is concerned with the fact that one firm considers itself to be in a position to purchase another company and the identity of that other firm becomes public knowledge. This reveals certain things about the way that the acquiring firm views the target and about the bidders plans for the future. These factors are not the only information that can be gathered from an acquisition bid, however, and the following articles discuss the information that is revealed in the takeover process.

The bid can be used as a signalling device. In particular, the value of the acquiring firm can be inferred from the composition of the offer that it makes in a takeover attempt. Eckbo, Giammarino and Heinkel (1990) claimed that the true value of the bidding firm is revealed by the mix of cash and securities used to pay for the target. They stated that the bidder value is monotonically increasing and convex in the

fraction of the total offer that consists of cash. The authors started by reviewing some other relevant papers. Recent studies have shown that, in the absence of perfectly efficient markets, the gains to target firms are significantly higher in all cash offers than when stocks are exchanged. When asymmetric information is considered, the division of the merger gains is a function of both the size of the bid and the medium of exchange. For example, a large bid implies a high expected "overpayment cost" to the bidder, as offers are accepted only if they equal or exceed the target's value. Conversely, a low offer reduces the probability that the bid will be successful and unsuccessful bids involve the cost of the lost synergy gain. As a result, low bids have a high "lost synergy gain" cost. Eckbo *et al* allowed the bidder to explicitly select the cash-security mix. This creates a signalling role for the cash portion of the offer. They also assumed that bidder makes an offer so large that no target would reject it. All agents are assumed to be risk neutral and the discount rate is zero. The final equilibrium contained a strategy for the bidder and a strategy for the target. This paper focused on pure strategies and identified an equilibrium as the situation in which the bidder chooses offers that are acceptable to both high and low value targets. The authors managed to establish that the equilibrium value of the bidders claim is a function of the amount of cash on offer, the information available to the bidding managers and the beliefs of the target's shareholders. The authors tested their assertion empirically using data from to Canadian companies. The Department of Consumer and Corporate Affairs compiles a Merger Register and the companies were drawn from this list. To be included in the sample, the bid had to occur between January 1964 and December 1982 and be made by a company that was listed on the Toronto Stock Exchange at that time. In addition, the date of the first press announcement could be identified in the Merger Register and the acquisition was for a controlling interest in the target rather than a minority stake. In all of the acquisitions involved in this sample, sufficient stock return data was available and the payment method was either all cash, all stock or a combination of the two. Finally, the target shareholders were not offered the option to select, on an individual basis, their preferred combination of cash and stock. A total of one hundred and eighty-two takeovers satisfied the selection criteria. In fifty-six the payment was a combination of cash and stock, in ninety-two cases the offer was all cash and in thirty-four cases all

stock. The results indicated that in an all cash offer there is no signalling as the target value is common knowledge and there is no overpayment cost. All stock offers occur when the bidder value is common knowledge and consequently any abnormal return for the bidders reflects only the synergy term. In a separating equilibrium, however, both components are involved in the calculation of the abnormal return, as in mixed offers. Mixed offers result in the largest abnormal returns. However, the issue still remains as to whether this gain represents an average signalling gain or a larger synergy revaluation.

1.8 Acquisition Defences

There are a great many acquisition defences that can be used to try to defeat an unwanted takeover attempt. Defensive measures really need to be put in place before the acquisition is launched in order to ensure a speedy response to a takeover. If this is not the case there will be a delay between the acquisition attempt being launched and the company attempting to defend itself. This delay could greatly reduce the chances of a successful defence. Acquisition defences can be split, broadly, into those measures that require shareholder approval, section 1.8.1, and those measures that do not, section 1.8.2.

1.8.1 Defences Requiring Shareholder Approval

Golden Parachutes

This acquisition defence has already been discussed in section 1.5 where it is considered as a possible catalyst for acquisition activity. A golden parachute is a compensation contract that will pay a manager a significant sum if they loose their job for some reason. It is usual for the managers of an acquired firm to be sacked after the takeover so these contracts are most frequently associated with acquisitions. The problem arises when an unwelcome acquisition bid is made. The managers of the target firm have to decide whether they are prepared to risk opposing the bid. If they attempt to resist the acquisition and it is still successful then they have alienated the

managers of the acquiring firm and are highly likely to be sacked. Alternatively, they can choose not to resist the acquisition in the hope that they may be retained after the purchase has been completed. It is possible, however, for an acquisition bid to be made that is clearly not in the best interests of the target firm. In this situation the managers of that firm have a very difficult decision to make and golden parachutes were introduced to resolve this conflict of interests. With a compensation contract already in place the managers are free to defend the company without worrying about the consequences for their own future as, if the worse comes to the worse, they will receive enough money to secure their future until they can find another job. However, as Jensen (1988) noted, this type of contractual agreement is open to abuse by the managers. Compensation contracts are very difficult to structure accurately and the sums of money involved are growing steadily. The value of these contracts has now reached a point where some managers may wish to be sacked in order to realise these funds. Larcker (1992) found that shareholders thought that compensation contracts removed any commitment that the managers had to work effectively. In other cases, the bidding firms have been known to offer golden parachutes to the managers of target firms in order to remove any objections that these managers might have to the proposed acquisition. It is clear to see, however, why golden parachutes are very popular with the managers of potential targets and they are rapidly becoming an everyday part of remuneration packages despite their limited effectiveness.

Supermajority Amendments

Supermajority amendments alter to the minimum number of shares that the bidder must obtain before assuming control of the company. It is possible to alter these levels to some arbitrary value provided that the shareholders approve of the change. For example, a supermajority amendment could specify that a potential acquirer would need eighty percent of the shares to gain control of a firm rather than the usual figure of just over fifty percent. Jarrell, Brickley and Netter (1988) observed that these provisions rarely stop a determined acquisition attempt, but at least ensure that the offer premium is high enough to persuade a very large proportion of the shareholders to sell. This is typical of many acquisition defences, particularly those

requiring shareholder approval. In many cases these defences cannot prevent a determined bid but they do ensure that the shareholders receive a good price for their stock.

Fair Price Amendments

The next type of acquisition defence is the use of fair price amendments. This applies particularly to two-tiered offers that are opposed by the management. It is possible for a firm to define a value that is considered to be a "fair" price for the stock. If an acquisition offer is made that does not exceed this value then the bid is automatically rejected. However, an offer that is considered "fair" can be accepted by the shareholders even if the managers are opposed. Jarrell, Brickley and Netter (1988) found that this defence can do little more than increase the value of the offer bid. It does not deter a resolute purchaser who is prepared to pay a reasonable sum for the shares.

Dual Class Recapitalisation and Cumulative Voting Rights

These two techniques are very similar. A dual-class recapitalisation splits the firm's equity into two groups with different voting rights. The general idea is to ensure that the current management and a select group of owners have a greater percentage of the voting power than can ever be gained by the ordinary shareholders or another firm. Cumulative voting rights also ensure that a small group of shareholders can control the firm irrespective of the wishes of the majority of the owners as these shares represent the majority of the voting stock although they do not represent, numerically, the majority of the shares. In both of these cases it should be impossible for an unwelcome potential acquirer to gain enough shares to take control of the target, provided that the members of this select group of shareholders do not sell their voting rights. Once again, Jarrell, Brickley and Netter (1988) found that both of these techniques were ineffective again a determined acquisition attempt as the shareholders with the controlling stake in the firm can always be persuaded to sell their shares if the offer price is high enough.

In general it appears that these defences are unable to save the company from a determined acquisition attempt but can ensure that the shareholders receive a generous premium in the event that their company is the subject of a takeover.

1.8.1 Defences that do not Require Shareholder Approval

Litigation

In an unwanted acquisition attempt litigation by the target firm's mangers is one of the defences that does not require shareholder approval. Litigation provides the time necessary to prepare an alternative defence against the takeover attempt. Jenkinson and Mayer (1994) observed that legal challenges in the UK in recent years included a large number of appeals to regulatory bodies, such as the Office of Fair Trading, the Takeover Panel and the Mergers and Monopolies Commission. In some other cases, they noted that the target complained to either the Stock Exchange or the courts claiming that the bid breached the accepted codes of practice or violated the law concerning insider trading. During the ensuing delay other bidders may also appear which benefits the target shareholders. Unfortunately, if the litigation prevents an offer being made, the shareholders will loose the opportunity to accept and gain the premium but the managers will have succeeded in preventing the threat to their control of the target company.

Targeted Block Stock Repurchases (Greenmail)

Targeted block stock repurchases occur when the management of a company institute a compulsory repurchase of shares. Under these circumstances the shareholders have no choice and must surrender their shares, hence the popular name of this process "Greenmail". As an acquisition defence this approach requires the managers to buy back enough stock to make it impossible for another firm to gain control. Jarrell, Brickley and Netter (1988) quoted previous research in which it was shown that greenmail can result in significant losses to the shareholders as the

managers rarely pay more than the market price for the shares and often pay considerably less. Despite the losses to the shareholders this technique can make it impossible for an unwanted acquisition to take place. Jensen (1988) argued that that greenmail has an undeservedly bad reputation. The only threat the greenmailer can pose is to buy the stock at a price less than the current market value which, he suggested, can be prevented if the managers introduce a policy so that all repurchases must have majority board approval. If this sort of approval were required it would go some way towards ensuring that the shareholders received a reasonable price for their shares which may improve the reputation of this technique.

Pac-Man

The Pac-man defence is a retaliatory acquisition attempt by the target. When an unwanted acquisition is launched the target responds by launching a takeover bid against the bidder. The aim of this defence is to purchase enough of the bidding firms stock to alarm the bidder enough to persuade this firm to drop the acquisition attempt. This defensive strategy is only effective if the target firm can afford to buy large quantities of shares in the bidder. It is a rarely used defence in the UK but was recently used to great effect by Ranks Hovis McDougal (RHM) against The British Sugar Corporation. British Sugar was effectively repelled without posing any real threat to RHM. An interesting corollary to this tale came a few years later in 1981 when British Sugar became the target of an unwanted takeover attempt by the sugar refining giant Berisfords. British Sugar appealed to the Office of Fair Trading and managed to get the deal referred to the Mergers and Monopolies Commission (MMC) in a classic example of the litigation defence. After a long inquiry by the MMC Berisfords agreed to sell off some sugar retailing interests and the deal was allowed to proceed in 1982. British Sugar continued to resist the acquisition attempt and the deal finally closed in July 1982 with Berisfords just short gaining control. At this point RHM decided to sell the British Sugar shares that it had gained in the earlier pac-man defence to Berisfords. This sale gave Berisfords 50.64% of British Sugar which was, just, a controlling interest.

Poison Pills

One of the most effective acquisition defences is the use of a poison pill. These measures involve imposing economic impediments on the bidder which can prevent the takeover from being profitable. The poison pill works by suddenly altering the financial demands faced by the target firm, for example allowing the shareholders to purchase more shares or altering the re-payment patterns for the firm's debt. According to Jensen (1988), poison pills are the most effective form of take-over defence. They are designed to make the target financially "indigestible" to the bidder. This is done by changing fundamental aspects of the corporation's rules that govern the relationship between the shareholders, the managers and the board of directors. This sort of measure can make the cost of the takeover several times greater than it was previously which is a truly effective deterrent. The only disadvantage to measures like this one is that it deprives the shareholders of the opportunity to realise a profit by selling their shares in a takeover attempt.

White Knights and White Squires

This last acquisition defence takes place when the target manages to persuade a friendly company to launch a takeover bid to contest the unwanted acquisition attempt. The friendly firm is called a "white knight". The managers of the target company agree to support the white knight's acquisition attempt and recommend that the shareholders sell their stock to this firm. In return the white knight agrees to maintain the target firm in a virtually unaltered condition after the acquisition and, in many cases, to retain the incumbent management. This is a rarely used but quite effective defence. The white knight tries to make an offer that is at least equivalent to the offer made by the original bidder and, with the support of the target's managers, this takeover bid should be successful. Failure in this type of defence can occur when the original bidder is determined and keeps raising the offer price until the white knight cannot afford to keep up. The problem with this type of defensive strategy, and the probable cause of its recent decline, is the fact that white knights are not always as chivalrous as they may appear and are not inclined to keep to the deal that they made with the target

management before launching their takeover bid. In some cases, the white knight can turn out to be far worse for the target firm than the original bidder would have been.

An effective compromise is the use of a white squire. Here the target sells enough shares to an interested third party to make it impossible for the unwelcome bidder to gain control. This is safer than the white knight as neither the bidder or the white squire can gain enough shares to take total control of the target company. It is possible that these two firms might eventually come to some compromise so that one of them could gain total control of the target but the careful selection of the white squire should make that unlikely. A suitable white squire is a firm that needs the target in its current form and would loose out if the bidder gained control. If such a white squire can be found this is a very effective acquisition defence.

1.9 Benefits Resulting From Successful Acquisitions

The benefits produced by a successful acquisition are one of the most frequently discussed topics in the corporate control literature. The gains resulting from the acquisition can be split into the benefits accrued by the acquired firm and the benefits gained by the acquiring company. Stock price movements are often used to illustrate the impact of a takeover on the performance of a company. In most cases the deviation between the actual and the expected returns is used to calculate the Abnormal Return (AR) and then the Cumulative Abnormal Return (CAR). A positive CAR is indicative of efficiency gains and suggests that the takeover will create value for the shareholders.

The impact on share price is not, however, the only issue concerning the benefits of acquisition activity. Numerous studies have attempted to determine where the benefits are derived from and to examine the impact that takeovers can have outside the involved firms. The sub-sections here deal with the literature concerning each of these issues in turn.

1.9.1 Benefits to an Acquired Company

The main benefits of an acquisition are generally believed to go to the shareholders of the acquired company. Schleifer and Vishny (1988) noted that this is the conclusion drawn in the majority of recent studies. These results are generally based on the analysis of how the share price is affected by the announcement of the takeover. This view was shared by Dodd (1992). Here the author examined the share prices of both bidding and target companies for fifty-three successful acquisition attempts over a period of several years before the acquisition takes place. The emphasis is placed upon the abnormal returns and how these change when the takeover is announced. The author found that targets are firms that normally have negative abnormal returns which become positive when the acquisition is announced. As such the main beneficiaries of the takeover are the shareholders of the target firm. A similar result can be found in the article by Holderness and Sheehan (1992). Again this paper is based on the study of changes in the share price around the time of an acquisition. The sample was composed of thirty-five companies that were acquired between 1977 and 1982. As with Dodd's paper, Holderness and Sheehan discovered that the shareholders of the target firm were the main beneficiaries. In particular, they examined takeovers involving a group of well-known American corporate raiders. They discovered that the stock market reacts even more favourably than usual when it is announced that the bidding firm is a raider. As a result, the share price rises even more than would be expected and the shareholders are able to benefit to a greater degree.

In a recent article by Weston (1994) the variables that produce these abnormal returns are evaluated. Weston believed that the type of activity, the method of payment, the timing of the action and the number of bidders are all important. Weston found that the positive abnormal returns to the acquired firms were considerable, up to thirty-five percent. This represents a significant increase in the value of the shareholders investment. Edwards (1994) and Jensen (1988, 1992) both found similar results.

The tax effects argument is applicable in the long term under the current UK tax system. The shareholders of the target firm can get tax relief if the acquisition meets four criteria. These are that the acquisition must take the form of an exchange of shares, that the nature of the involved firm's business interests remain substantially unchanged after the takeover, that the majority of the people involved in the business also remain unchanged after the takeover and, finally, that the acquisition occurs for some reason other than to gain tax relief. In the event that the acquisition is funded with cash then capital gains tax is due on the proportion of the offer that is cash. However, it is possible to get relief on this capital gains tax in some circumstances but these are unique to each bid offer. Nevertheless, if the shareholders of the target firm accept shares instead of cash it is possible for them to benefit in this way in addition to the benefits that they receive through the increased value of the acquired firms stock.

It is generally considered that the managers of the acquired company do not benefit in the acquisition process as they are usually sacked when the new owners take control. Larcker (1992) pointed out that it is still possible for these people to benefit to a considerable degree under certain conditions. In particular, he referred to the presence of golden parachutes in the managers compensation contracts. Larcker even suggested that there may be occasions when the value of the parachutes are so high that the managers will actively seek the acquisition of the firm so that they can take advantage of these contracts. The same opinion was held by Agrawal and Walkling (1994) who examined the impact that acquisitions have on the employment of chief executive officers (CEOs). They used data on three hundred and forty four acquisition attempts that involved American firms on the Forbes 800 list. Using descriptive statistics and regression models Agrawal and Walkling found that acquisitions occurred when the CEOs of the target firms have abnormal levels of compensation and more than half were sacked after the firm was acquired. This concurred with Larcker's idea that managers will seek to have their firms purchased in order to realise these benefits. Furthermore, Agrawal and Walkling found that many of the sacked CEOs remained unemployed for at least three years after the takeover. This suggests that, whilst the financial compensation can be considerable, the impact that an acquisition has on the reputation of the managers of the target firm is clearly negative.

A recent paper that considered failed acquisition attempts is by Parkinson and Dobbins (1993). Their sample was relatively small as they only examined seventy-seven successfully defended acquisitions in the UK between 1975 and 1984. By calculating abnormal returns Parkinson and Dobbins found that the returns to the target firm stay abnormally high even when the bid fails. There are two possible reasons for this. Firstly, when an acquisition is launched, the market is forced to reconsider the value of the target and may discover that the target was previously valued at rather less than its true worth. Alternatively, the fact that an acquisition was attempted may persuade the managers of the target firm to work more effectively and utilise the assets of their firm more efficiently. The high returns may be due to market anticipation of this fact.

1.9.2 Benefits to an Acquiring Company

It is generally found that the shareholders of the acquiring firm do not benefit from acquisition activity as the announcement of a takeover attempt is often followed by a decrease in the value of that firm's shares. Cosh, Hughes, Lee & Singh (1989) found that the returns to acquirers rose significantly just before the acquisition and then deteriorated afterwards. In acquiring companies there are usually positive abnormal returns in the years preceding the acquisition that exceed the cumulative negative returns afterwards. Dodd (1992) found exactly the same result when he examined the impact that an acquisition has upon the share prices of companies. Weston (1994) evaluated these losses and found them to be between three and five percent. This result is supported by many papers often in conjunction with the observation that the managers of the acquiring firm benefit even when their shareholders do not.

The managers of acquiring companies benefit through the increased size of their firm that results from the purchase of another company. It is generally acknowledged that there is greater prestige in managing a large firm compared to a small company. An acquisition is one of the fastest ways to increase the size of a firm

and this sort of activity is often rewarded in the managers bonus and increased size of their remuneration package. There has not been any empirical work on this topic to date, presumably because the managers are unwilling to reveal the extent of their wages, and so it is not possible to determine the magnitude of the benefits that these managers receive.

There are also positive gains to the acquiring firm as a whole. Studies that the gains from an acquisition take the form of increased synergy. This was found by Berkovitch and Khanna (1991), Myers (1992) and Achtmeyer (1994) whilst several other authors mention it in conjunction with other gains. For example, Creehan and Leger (1994) believed that an improved competitive position can be gained via an acquisition and this could result in a considerable financial advantage to the acquiring company. According to Berkovitch and Narayanan (1993) the precise composition of the acquisition benefits will depend on the motive behind the acquisition. The authors related the sign of the total acquisition gains to the motive. Assuming that their conclusions are correct, the acquiring firm's management will know in advance what to expect, based on the nature of their motive. This hypothesis was not tested in this paper, as it is a fundamental assumption on behalf of the authors and tends to over simplify matters somewhat. It is undeniably true, however, that the managers of the acquiring firm may select to purchase another firm for some reason that is not immediately obvious to someone outside that company. Higson and Elliot (1994) found increased profits and cash flows followed an acquisition when they examined the results of three hundred and ten acquisitions that took place in the UK between 1976 and 1990. This result also appeared in Kim (1994) who examined one hundred and seventy-seven pairs of companies that were involved in acquisitions between 1980 and 1986 and estimated the cumulative abnormal returns that resulted in each case. He found that the highest acquisition returns occurred when companies with excess cash were involved. The opposite is true, however, in the article by Sawyer and Shrieves (1994) who examined just over four hundred takeovers which they sub-divided into four groups depending on the size of the involved firms. By analysing the differences in accounting ratios between firms in these groups they were able to declare that the bidding firms with free cash lost more in an acquisition than other bidding firms.

1.9.3 The Origins of Acquisition Benefits

It has been frequently observed that the shareholders of the target firm benefit as their shares increase in value when an acquisition is announced. At the same time the bidding company experiences a decrease in the value of its shares. These changes represent some of the benefits generated by the acquisition process. Jarrell, Brickley and Netter (1988) stated that there can be little doubt that the shareholders of target firm benefit in an acquisition. They referred to other articles to support this claim and noted that there is significant evidence which suggests that the target firms experience a large increase in market price with the announcement of a takeover bid. They found that the precise distribution of the gains was unique in each acquisition although there are general points that can be made. The targets receive the majority of the value produced by the combination of the firms and these gains do not appear to be offset by losses to the acquirer. If the gains are not created by a transfer in value from the bidder to the target then where do the gains come from ? The authors suggest there are three possible answers. The first is short term myopia where corporations that engage in long term strategies are frequently undervalued and become targets. Presumably, Jarrell, Brickley and Netter believed that when these long term strategies come to fruition they generate gains that account for the disparity between the value lost by the bidder and the value gained by the target. This does not explain, however, why the gains are virtually immediate whilst these strategies could require a longer time period before any benefits would be realised. The second answer that the authors suggested is the undervalued target theory. The bidders acquire undervalued firms by offering the shareholders a price significantly above the current market price and make a profit as the company is still worth more than they paid for it. The market may review its opinion of the target when the acquisition is launched and may realise that the target is undervalued. If the market then alters the value of the target to correct this error it may add enough to the value of the target to create the gains that accrue in a takeover. Lastly, there is the tax effects theory where the authors suggested that the combined firms may have far more advantageous tax positions than either of the involved firms had separately. As with the short term myopia theory, this tax effect

idea may explain gains in the long term but the gains could not be realised quickly enough to create the scale of gains that are seen within the duration of the bid. In this relatively short period large gains are made by the target firm which these two theories cannot account for. The second of these theories may offer an explanation for these short term gains but it relies on the rather unlikely assumption that market undervaluing every firm that is acquired.

Another article that attempts to identify the origins of the acquisition gains is by Roll (1986). Roll believed that takeovers gains hardly ever exist and are overestimated in the few cases when they genuinely do occur. He claimed that part of the large increase in the value of the target shares is transferred from the bidder. In other words, the value of the offer premium significantly overstates the increase in economic value resulting from the combination of the firms. If there are no synergies or other gains in the acquisition then Roll believed that the valuation can be considered a random variable with a mean value equal to the current market price of the target. If the value of this random variable exceeds the mean, then the bidder will make an offer as this suggests that the target is currently undervalued. Potential bidders should know that any offer in excess of the current market price represents a valuation error on their part. However, simply because the market appears to behave rationally, it does not necessarily mean that all the individual participants are rational. Roll claimed that the market is composed almost entirely of irrational investors whose behaviour cancels out in aggregate to give the illusion of overall rationality. He continued to say that if it is assumed that there are no gains in the takeover process, then the increase in the market value of the target and the corresponding drop in the market value of the bidding firm should even out to zero. Adding the cost of the takeover means that there is an aggregate net loss created by the procedure. This implies that the price of the target will rise on the announcement of the bid and fall back again when the bid fails. Under these conditions Roll made the following three predictions about the pricing of the bidder. Firstly, the share price will drop on the announcement of the takeover bid, secondly, the share price will rise on the abandonment or failure of the bid and thirdly that the share price drops again on the completion of a successful bid. Roll referred to previous papers that examined the activity of the market price of acquisition targets in

which the authors found that the target's price rose on the announcement of a takeover bid and dropped again when the bid failed which is consistent with the predictions of Roll's Hubris Hypothesis. The central prediction in Roll's theory is that the total gains in an acquisition are negative. He selected a few examples from the previous literature to illustrate the main points of this idea. The Hubris hypothesis also predicted a drop in the value of the bidding firm. Roll used the results of previous studies which suggested that the selection of the target and the subsequent bid signals a small upwards revision in the market's estimate of the value of the bidders current assets which is not offset by the prospect of overpaying for the target. Consequently, there is a small downward revision in the bidders value as it becomes more and more obvious that the target will be acquired at too high a price. This idea, that takeover benefits are fictitious and exist only through erroneous valuations, is a radical stand-point in the literature about acquisition gains. The majority of papers claim that there are gains in terms of synergy or improved efficiency.

1.9.4 External Effects of Acquiring a Company

There are external effects generated by an acquisition that are rarely discussed in the literature. One article that does consider the impact of a takeover on factors other than share prices is by Hughes (1993). This paper included a section entitled Post-Merger Performance in which the author listed and discussed several consequences of an acquisition. Hughes offered no empirical analysis of his own but referred to several other works which illustrate the relevant points.

Real Resource Effects

When examining real resource effects the principle comparison is between pre- and post-merger efficiency. The results are broadly neutral with the observed gains and losses generally cancelling each other out but it is possible that a horizontal acquisition of sufficient size could have a detrimental impact on the concentration and composition of the market in which these companies operate. This is the sort of situation that results in an investigation by the Mergers and Monopolies Commission

and in recent years this type of effect has been limited by prompt intervention by the MMC. The acquisitions that Hughes referred to in this section, however, all occurred in the 1960's when the regulations on competition were not so stringent. In the event that the law in the UK changes with respect to acquisitions it is possible that this issue could be promoted to considerable importance once again.

Investment Effects

The next effect is the impact on investment. Hughes quoted previous research in this area in which the authors concluded that the link between mergers, investment and improved relative productivity is more than coincidental. There is a positive change in investments for the acquired and acquiring firms which is significant in horizontal takeovers and non-significant in other acquisitions. From this result Hughes was able to infer that horizontal acquisitions are a convenient manner in which companies can gain access to sectors with profitable investment opportunities that might not otherwise be available.

Technical Effects

Acquisitions have a positive association with investment performance, as mentioned above, which suggests that they may also increase productivity via technical changes. In large firms acquisitions enhance the process of technical improvement. Hughes quoted the example of ICL. The formation of this company, in 1968, was directly linked to an increase in the general level of research and development in the whole country. It is certainly true that Research and Development departments are one of the areas where synergistic benefits are thought to be at their largest and it is often the case that large technological advances follow the combination of two firms

Regional Effects

There may be regional impacts following an acquisition. One of the criteria considered by the Mergers and Monopolies Commission is the predicted impact that an

acquisition will have on the regional balance of activity and employment. In the short-term there is little or no effect but in the long term the results are unfavourable. In particular, acquisitions are often linked to high closure rates and lower rates of employment growth. This has been related to the transferral of control to a location outside the region when a firm based in a certain area is purchased and becomes a subsidiary of another company which is based elsewhere.

1.10 Regulation and Government Policy

Any acquisition activity must remain within the parameters imposed by the law and the code of practice advocated by the regulators. To this end it is important to review these rules and have an appreciation of what will happen if they are contravened. There are two aspects of the law that are applicable to the study of acquisitions in the UK. First there are the rules governing acquisitions as a whole which are based on Government policy and the workings of the Mergers and Monopolies Commission and secondly there are the Stock Exchange laws concerning the dealing of shares on the market.

1.10.1 Government Policy and the Working of the Mergers and Monopolies Commission

Fairburn (1993) aimed to give an overview of the history of acquisition law and the relevant policies in the UK between 1965-1986. This is split chronologically into several sections for clarity. Much of the same material was covered by Franks and Harris (1993).

Inherited Institutions (Pre-1965)

The Mergers and Monopolies Commission (MMC) was created in 1948 and in 1965 the Mergers and Monopolies Act was passed which set down the terms under which referrals could be made by the Board of Trade. Under the conditions of this act the MMC had between six and nine months to decide what action, if any, should be

taken concerning a referred takeover. In 1966 the Industrial Reorganisation Corporation was established to promote business "rationalisation". The creation of this body was a reaction to the feeling at the time that many UK firms were too small to compete in the international arena and the IRC was formed to rectify this problem by funding merger activity if it was felt that the resulting firm could successfully participate internationally. This innovation was followed by a marked increase in the level of acquisition activity in the UK.

Policy 1965-1983

In the first half of this period there were very few mergers that gave rise to concerns about the public interest and so there were very few referrals at this time. The majority of referrals involved horizontal acquisitions, although the first referrals of conglomerate activity also occurred in this period. In 1973 the Fair Trading Act was passed which established the Office of Fair Trading to oversee competition and protect the interests of the consumers. The number of referrals and the types of mergers involved grew throughout the latter part of this period

Policy 1984-1986

This period is notable for the publication of an internal Department of Trade and Industry review of merger policy which concluded with a statement that has become known as the "Tebbit Guide-lines". This stated that in the opinion of Norman Tebbit, then Head of the Department of Trade and Industry, "my policy has been and will continue to be to make references primarily on competition grounds" (Fairburn, 1993, page 250). This means that hostile conglomerate bids and vertical acquisitions cannot be referred in the vast majority of cases. In fact this comment has resulted in an almost total cessation of referrals for all except horizontal takeovers. To date this statement remains the central tenet of acquisition policy in the UK. It is not, however, the only factor that the MMC considers.

Current MMC Procedure

Referred mergers are considered with respect to both non-competition and competition issues. The main non-competition issues are concerned with the impact on the local regional economy and the problem of foreign ownership, which is prohibited in some industries. The impact on competition is the clearest subject of public policy concerns. The MMC has a set of market definitions devised in 1980 which assign the acceptable levels of market power for each industry. If a merger is referred on competition grounds the market share of the post-acquisition firm is computed and compared with the industry benchmarks. If the computed market share exceeds the acceptable level the merger will be rejected on the grounds that it would reduce competition to an unacceptable degree.

1.10.2 Stock Exchange Rules and Legal Issues Concerning Acquisitions

There are many laws that can be applied to acquisitions but the sections here are limited to those legal issues that are directly linked to this process as these are the most important aspects of the law in this case.

Rules Concerning the Disclosure of Holdings

The disclosure of holdings refers to the quantity of shares in a single company owned by an individual or another firm. Holding certain proportions of the total number of shares means that certain responses are required under the current UK legal system. The first important level of holdings is just one percent of the total number of shares. During a period of normal trading there are no obligations associated with this level of investment. However, if the firm is the target of an acquisition attempt then anyone gaining more than one percent of the total shares in that firm must publicly declare this holding. This is to prevent outside parties interfering in the takeover bid for reasons of their own and to prevent the share price of the target firm being falsely inflated by excess buying during this period. When a firm is not involved in an

acquisition, the identity of any individual or firm which gains more than five percent of the total shares must be made public knowledge.

The largest stake that anyone can hold in an individual company before they are legally obliged to launch a takeover bid is 29.99%. If any firm holds more than this percentage of the total number of shares and does not want to attempt an acquisition then they must sell the excess at the first available opportunity and reduce their stake to not more than this figure. This can sometimes happen as a result of another acquisition. The acquiring firm purchases another company and finds that both it and the target firm own shares in a third company. If the combined number of shares in the third firm exceeds this limit then the acquiring company must either sell the excess stock or make a bid for control.

If a firm gains more than fifty percent of the shares in another company then it has a controlling interest in that firm. The only exceptions to this are when the target company has a supermajority amendment in its charter. This acquisition defence, as explained earlier, alters the level of stock required to gain control of the firm to some value in excess of fifty percent. In this case gaining a controlling interest will require a larger percentage of the available shares.

If an individual or firm owns at least seventy-five percent of the shares in another firm then they are entitled to pass special amendments without consulting the rest of the owners. These special amendments could refer to changes in the firms structure or even to altering the name under which it trades. When at least ninety percent of the shares are owned by one person or company then it is possible to apply merger accounting to the purchase. Merger accounting is only applicable when the merger relief is available on the deal. This means that the premium paid on any shares that were issued during the acquisition do not have to be included anywhere on the acquiring company's accounts. Merger accounting means that the target firms assets and liabilities are included at their book value which means that there is no increase in the tax charge for depreciation. The shares used in the takeover are accounted for at their nominal value and the accounts for both firms for the full financial year are used

in the accounts after the purchase. Using this method of accounting means that there is no increase in goodwill to be dealt with on the accounts and both the profits and levels of return on investment for the acquiring firm appear artificially high for the year in which the takeover occurred. Finally, it is possible for a firm or individual to gain one hundred percent of the shares in another firm. If this happens then they have complete control over that company and become the sole owner. This is very rare in normal takeovers but does occur when a firm is taken private or the managers decide to greenmail the shareholders so that they must sell their remaining shares.

Essential Documentation used in an Acquisition

There are also certain documents that must be issued in an acquisition attempt three of which are of great importance. The first of these is the formal announcement that the bidding firm intends to make an offer for another company which is sent directly to the shareholders. The potential acquirer does not have to inform the managers of the target company before they send this letter to the owners. This notice usually contains no details about the proposed takeover or the offer that will be made. This information comes in the second, and most important, of the essential documents which is the Offer Document. This letter states the nature of the bid that is being made, the value of the offer, the time scale that the shareholders have in which to consider the bid and any conditions for acceptance that the bidding firm wishes to impose. For example, if the bid is going to be two-tiered then the precise conditions of both levels of the offer must be stated in this letter. It is possible for the shareholders to receive several Offer Documents in the course of an acquisition attempt if there is more than one bidder or if the offer is revised before the final closing date. Lastly, there is the Form of Acceptance which is usually sent to the shareholders with the Offer Document. This last letter is a form which is used by the target firms shareholders to formally accept the bid that has been made. It also includes a section in which the shareholders can state how they want to be paid in the event that the bidding company offered them a choice.

The form of acceptance must be returned to the purchasing company before the offer period ends. The offer period is the length of time which the shareholders have to decide their response to the offer. In the UK there are three criteria that must be applied when deciding the length of this period which starts on the day that the Offer Document is issued. Firstly, the offer period must be at least twenty-one days long. Secondly, it must end after not more than sixty days although this criterion can be waived if the bid is contested by another firm or referred to the Mergers and Monopolies Commission. Finally, the offer can be revised any number of times within the offer period provided that the shareholders have at least fourteen days to consider each new offer and that there are at least fourteen days left between the revision of an offer and the end of the offer period.

If any of these conditions concerning the declaration of holdings, documentation or the timing of an offer are ignored then the acquisition can be declared unlawful and the individuals responsible could be liable for prosecution. When a litigation defence is used to prevent an unwanted acquisition bid the target firm will often attempt to prove that the acquirer has breached one of these laws.

1.11 Acquisitions and Regulation in Other Countries

Acquisitions involving UK firms do not always remain within the borders of this country and when they involve firms based in other countries there are many new factors that need to be considered. The nature of acquisition activity varies from country to country and the reasons for these different patterns of takeovers need to be examined. There are also international regulations that need to be considered when dealing with firms in other countries. Of particular relevance to UK firms are the European Community regulations which need to be considered when attempting acquisitions with companies based in other member states. Most cross-border takeovers involving UK firms, either as targets or bidders, are with firms based in

Europe, American or Japan. These are the countries considered in the literature concerning international acquisition activity.

1.11.1 Acquisition Activity in Other Countries

There are considerable differences between acquisition activity in the UK and some of the other European countries which were discussed in the paper by Franks and Mayer (1993). The authors proposed to test the hypothesis that the integration of the European capital markets will result in a UK style market for corporate control in the rest of the European community. The authors used data on acquisitions provided by the government statistical departments in the UK, France and Germany to compare the recent trends in these three countries. The results clearly indicated that there is a far more active market for corporate control in the UK than in either of the other two countries. The most important distinction, however, is not the number of takeovers but the nature of these activities. In the UK there is an active market in hostile takeovers. In France this market is very small and in Germany hostile takeovers are almost non-existent. Recently there has been an increase in the number of buy-outs, buy-ins and spin-offs in each of these three countries. Franks and Mayer conducted an analysis of the executive changes in the UK, France and Germany during the first six months of 1988 based on information held on their own database. Their results showed a high level of change in the UK and very low levels of change in France and Germany. They believed that differences in the law between the countries are responsible for this phenomena.

The main regulatory variations between France and Germany and the UK are that the rights of employees, managers and shareholders in France and Germany are strongly protected by the law. In the UK these individuals do not have anywhere near as secure a position and do not have to be consulted about any changes to the control of the company. These measures in France and Germany exist to protect the firms and to maintain a degree of stability in the markets. The laws governing the behaviour of institutions such as banks are also considerably stricter in France and Germany than in the UK, again to create stability. Franks and Mayer noted that UK companies occupy

a far more vulnerable position than their continental counter-parts which can be directly linked to the more active and aggressive market for corporate control that exists here. The authors claimed that there is a trade-off between correcting for managerial failure (easily done in the UK) and encouraging investment (more often seen in other countries). They believe that an equilibrium develops somewhere between the two but precisely where depends on the individual country.

Another paper that contrasts behaviour across countries was by Geroski and Vlassopoulos (1993). In this article the authors contended that the full potential of the internal European market has yet to be realised. The aim of their paper was to describe corporate control activity within Europe and to contrast it with trans-Atlantic activity. They believed that clear patterns of activity have existed from the early 1980's. As with the previous paper, this one starts with an examination of the activity in Europe and the data in this section of the paper was provided by Coopers and Lybrand. The most striking feature was the difference between the number of takeovers in the different European countries. The vast majority take place in the UK, France and Germany and most of these acquisitions involved firms based in the same country. This paper also included data from the American journal Mergers and Acquisitions which clearly showed that American and Canadian firms are active acquirers of European firms and vice versa. These acquisitions are of considerable value compared to the trans-European activities. There is a particularly strong relationship between the USA and UK in this respect. Cross-border takeovers represent a small percentage of the total acquisition activity in the European Community. The value of trans-Atlantic takeovers greatly exceeds the trans-European acquisitions. The authors claimed that this is due to the open nature of the capital markets in those two countries, but they did not discount the suggestion that cultural and lingual similarities may also be a factor. From these results the authors inferred that the European single market has had little effect on the behavioural trends involving European companies.

The idea of investing in other countries was enthusiastically advocated by Hannah (1993). Hannah claimed that past experience of foreign investment in Europe

has been positive. The former West Germany was offered as an example of an economy that had a high proportion of foreign investment (mostly American) and yet suffered no financial distress or noticeable loss of sovereignty. From this starting point Hannah went on to propose the "laissez-faire argument for free trade" (Hannah, 1992, page 280). This is based on the argument that, since each country has different resources, each should produce just the goods at which it is best. Assuming that each country produces these items, it follows that there will be an active trade between them to the benefit of all parties concerned. This is analogous with the idea of free ownership as applied to companies. According to Hannah, free ownership could result in mutual economic gains for all the participants in the same way as free-trade. Increased competition between bidders would mean better returns for shareholders and the free market could bring a wider range of managerial skills to the companies involved. The author admitted that there are, however, some disadvantages to this approach. Foreign ownership of strategic industries is inadvisable for security reasons and there is also the issue of how to reconcile strict reciprocity with national regulatory issues. Three arguments have been offered in recent years against the free-trade idea or, more specifically, against the prospect of foreign ownership. Hannah explained these objections and makes some suggestions about how they could be resolved.

The Strategic Industries Argument

The strategic industries argument states that in an age of rapidly advancing technology it is vital that control of the defence industry does not pass out of the country. Hannah pointed out that the government could protect these industries by nationalising them or by actively discriminating against potential overseas buyers. He argued that this does not seem an adequate reason to oppose a free market in corporate control.

The Headquarters Effect Argument

The headquarters effect issue is concerned with the possibility that multinational subsidiaries are used to make products that are conceived, managed and

marketed elsewhere. This could have an adverse affect on the local economy around the subsidiary. The problem with this objection is that it is impossible to judge what would have happened if the firm had not been acquired by a foreign company.

The Reciprocity Argument

The reciprocity argument claims that strict reciprocity requires all countries should be subject to the same treatment. If this were the case then acquisition activity should be encouraged irrespective of the nationality of the involved firms as it would increase the overall efficiency and profitability of companies in general. This could create problems with regulating national bodies, for example national banking regulation, but could be resolved in the same manner as the strategic industries argument by altering Government policy to protect industries that are considered vital to the economy.

Hannah concluded that there is no reason why free-trade in company ownership should not flourish between different countries and manages to find answers to all of the frequently raised problems with this issue. However, since it appears that most companies prefer to deal with firms in their own country, according to Geroski and Vlassopoulos, some of Hannah's points become irrelevant.

1.11.2 Acquisition Regulation in the Europe Community

The European Community regulations governing companies' behaviour in the field of mergers and acquisitions were discussed by Bishop (1993). This article began by explaining the significance of Articles 86 and 85, which were the basis of the old merger regulations that operated in the EC. There was no mention of mergers and acquisitions in the Community's founding document (The Treaty of Rome) which created a severe problem before these articles were introduced. Articles 86 and 85 include references to unacceptable business practises and were used to form the basis of merger regulation before 1990.

Article 86 states that " any abuse ... of a dominant position within the Common Market ... shall be prohibited as incompatible ... in so far that it may affect trade between member states". (Bishop, 1993, page 298) This article was first applied to the subject of mergers in 1972 but it relates only to the subject of market position and alone could only have a limited effect on international business practises. Article 85 focuses specifically on anti-competitive agreements. Under this provision "all agreements which may have as their objective ... the prevention or distortion of competition [are] inconsistent with the Common Market". (Bishop, 1993, page 301) To fall under this criteria the acquisition must result in a severe impact on the commercial conduct of either of the parties involved. The combination of these two articles made it impossible to vet acquisitions before the event and as a result greatly increased the costs to the firms involved if an acquisition was ruled against. They were also incapable of approving an acquisition, they could only fail to rule against it. This informal system of regulation created a significant degree of inequality in the treatment of acquisitions and as such was ineffective. There was also the problem of whether an acquisition was subject to these rules or the laws of their countries. In 1990 new regulations were introduced to rectify these problems.

The new rules make a clear distinction of responsibility between the EC and the national bodies. The EC rules only apply if each involved company has a turnover in the Community in excess of two hundred and fifty million Ecus. However, an acquisition is exempt if either company generates over two-thirds of its total turnover in one member state. When an acquisition is examined, the market position, economic power and financial position of the firms are considered. Equally, the possibilities of choice of suppliers and consumers and access to suppliers and markets are evaluated. The structure of the markets with regard to both actual and potential domestic, European and international competition must be examined and any barriers to market entry and trends of supply or demand for goods or services concerned need to be identified. The only problem Bishop found with these new regulations is that they split the responsibilities for regulation between the EC and the countries at a time when he felt that greater integration should be encouraged. It also appears that the majority of cases are exempt and fall under national jurisdiction which results in considerable

inconsistencies between the different countries. Nevertheless, international acquisitions offer vast potential for the future and so these regulations are of considerable importance.

1.12 Corporate Restructuring Alternatives

In the literature an acquisition is often regarded as an investment. This is certainly one way to view this activity but a takeover can also be seen as just one possible way of restructuring a corporation. There are times when this approach is not necessarily the best one, a point that is often ignored in the literature. In order to put acquisition activity in an appropriate place amongst the other corporate restructuring alternatives it is essential to understand what these alternatives are and why they exist.

An extensive list of restructuring alternatives can be found in the article by Sikora (1994). Here the decision to acquire or not to acquire was represented as the "buy or build" decision. The acquirer has to decide whether their goals would better be achieved via an acquisition or through internal development. The author pointed out that in the majority of cases this greatly over-simplifies the decision process and ignores the multitude of other restructuring devices that are available to the firm. Sikora examined several of these possibilities in an attempt to illustrate the great diversity of techniques that are available to the modern business.

Strategic Alliances and Joint Ventures

The first alternative is a Strategic Alliance. These agreements defy precise definition, but this is an umbrella under which the involved companies are able to co-operate on a variety of projects that may span a considerable period of time. A strategic alliance may lead to joint ventures at some point or remain nothing more than an agreement that the firms will operate on friendly terms. A joint venture (JV) is one of the more popular types of strategic alliance. In a joint venture two or more companies combine their resources to produce a final result that greatly outweighs the individual contributions. The disadvantage with this approach is that the profits have

to be split in the same way. However this does enable companies to work together when they need to without forcing them to remain in contact at other times when it may no longer be to their advantage.

Minority Investments and Venture Capital

The next two alternatives involve investments options. A minority investment is a technique whereby a large firm can invest in a limited capacity in a smaller one to take advantage of technology or information that the second firm owns. The small firm is given extra funding whilst the larger company is able to use technology or information that is, perhaps, available only to the smaller company. The use of venture capital is closely related to the concept of minority investment. The main difference is that in this case the smaller firms have little or no track record or are using some new technology or information. This makes the process rather riskier than many commercial lenders would be prepared to support but the venture capitalist is prepared to take the gamble hoping that the rewards will justify their faith in the developers.

Licensing Arrangements and Marketing Agreements

Next there is a licensing arrangement. Under a licensing arrangement a company arranges to lease the technological expertise or research owned by another firm. This saves the expense of developing the information independently and helps the other company recover the cost of the research in a considerably reduced period of time. Similarly, a marketing agreement shares the costs of publicising and marketing a new product between several firms. It is possible that the firm that has developed the product does not possess the skills to market it effectively. Another firm may possess those talents but does not have an appropriate product, therefore, it is mutually beneficial for them to work together.

Franchising

Lastly, in this article, there is franchising. This is only really successful if the parent company ensures that it sells franchises to people with the appropriate experience and resources. The franchises are usually in highly specialised fields and consequently need to be sold to individuals who understand those particular areas. This article contained no empirical evidence or tests based on the use of these techniques instead the paper was designed simply to describe these features and suggest that they may be appropriate alternatives in some situations.

A similar approach is taken by Byrne and Willens (1994) who examined many alternative ways of restructuring a corporation other than an acquisition. Some of these alternatives have been discussed in the paper immediately above. The others are explained below.

Minority Positions

This is the same as the minority investment discussed above but Byrne and Willens consider it from the perspective of the purchasing firm rather than the selling company. The sale of a minority position which is the purchase of a small stake in another firm that can be later exchanged for control of a subsidiary of that firm. It often transpires that the desire to gain control of the subsidiary was the purchasing company's main objective all along and the minority position was simply a manner of circumventing any opposition to the divestiture.

Employee Stock Ownership Plans (ESOP's)

An employee stock ownership plan (ESOP) is also a form of corporate restructuring although it has already been briefly discussed as a method of funding an acquisition. The funds held within the company pension scheme are a source of available finance for the firm whilst control of the company is retained in the hands of those individuals who have a vested interest in the future of that particular firm, namely

the employees. There have been a number of recent scandals involving the misuse of employee pension schemes, of which an ESOP, is just one kind, which emphasise the advantages of this type of option. By exchanging shares for funds the company can increase the level of available resources for investment and the employees will not loose out.

Leveraged Buy-Outs (LBO's)

Lastly, there are leveraged buy-outs (LBO's). An LBO is a form of buy-out usually organised by the managers of the firm. The funds needed to purchase the company are raised by securing loans against the assets of the firm. This means that when the transaction is completed the funds can be repaid fairly easily from the reserves of the firm. Provided that the company does not run into any serious problems before it has replenished its reserves this is a safe investment for all parties concerned. As with Sikora's article the authors made no recommendations about which of these options is the best one to use or include any empirical work about these techniques. They merely stated that all of these techniques have different strengths and weaknesses that should be examined in light of the conditions in the corporations under examination.

Thompson, Wright and Robbie (1992) started with the observation that it had recently become fashionable to view the corporate acquisition as a sort of universal cure for all the problems that companies can face. Instead, to gain a complete picture of the uses of corporate acquisitions, it is more sensible to regard the takeover as just one corporate restructuring option. In particular this article examines buy-outs, divestments and the relationship these have with acquisitions. The authors maintained that all of these alternative techniques have distinct similarities which prevent their becoming substitutes for each other and strongly suggest their use in combination. The first of these similarities is that buy-outs and buy-ins result in a split in company ownership between the managers and the shareholders. This differs from an acquisition but all three have the effect of removing the agency problems that are believed to exist in many firms. Secondly, all of these restructuring deals result in

financial incentives for the managers, shareholders and employees. These are necessary to smooth the transition to the new firm structure. Finally, restructuring deals frequently result in a high level of debt in the new firm irrespective of which method is used. It has been suggested that there is a free market for company assets that should result in the efficient allocation of these assets to prevent them changing hands to the detriment of the current managers. This theory implies that the managers of a firm will do everything in their power to ensure that the company prospers under their control as this is directly related to their future. Thompson *et al* pointed out the problems with this theory. Shareholders would sell their shares if a large enough premium were offered irrespective of the current value of their investment but managers are not likely to want an acquisition to go ahead without any form of defence, especially if their jobs are at risk. This prevents a completely free market in corporate control from developing. Consequently, the potential buyers cannot make completely accurate estimations of the value of the asset that they are trying to purchase. Lastly, the offer to buy shares may be motivated by some reason other than the removal of an inefficient management. Thompson *et al* believed that the weaknesses in the current capital market create the need for several corporate restructuring techniques. The authors claimed that their results are supported by research conducted in several other papers and that there is enough evidence to support their claim that acquisitions should be treated as part of a much wider group of actions rather than being viewed as a separate activity.

Divestments and Spin-Offs

One of the few articles in this area to incorporate new empirical work was the paper by Wright, Chiplin and Thompson (1993) which started with authors research on the trends in the use of divestments in the late 1980's. They studied ownership alterations using the data provided by their own database (CMBOR, University of Nottingham). Their research showed that only the value of independent acquisitions exceeded divestments in this period. From the perspective of merger policy, the direction of the divestiture relative to the main activities of the seller and the acquirer is important. Wright, Chiplin and Thompson refer to research by Ravenscraft and

Scherer (1991) in which is was stated that it is unusual for divested units to have a vertically integrated relationship with the parent company. In fact, the available evidence suggested that divested units are often originally acquired in horizontal mergers and the recent growth in leveraged buy-outs has resulted in an increased dumping of the unwanted parts of the firms. Wright, Chiplin and Thompson went on to examine the results of this type of activity by referring to other papers instead of undertaking their own analysis. The data on voluntary sell-offs is predominantly American and the main results are that divested units are usually poor performers and peripheral to the parent company's main activities. Furthermore, there are positive announcement effects in divestitures when it is perceived that the parent is selling the unit to improve overall corporate strategy and there are also significant positive returns for the firms buying units under these circumstances. All the research about voluntary spin-offs concludes that there are positive gains to shareholders through increased efficiency and the creation of an extended opportunity set for investment. Wright *et al* claimed that the development in the market for divestitures and spin-offs indicates a new flexibility in the structure of the firm. It also suggests that firms are continually attempting to find their optimal set of assets and responding to changing circumstances.

Restructuring alternatives can also have different financial consequences for a company. This was discussed by Weston (1994). Weston's data came from an amalgamation of the results of other studies and he compared the returns generated by these different approaches. Weston found that the gains generated by acquisition activity clearly exceeded the returns generated by almost all the other types of restructuring. The only exception to this is the case of leveraged buy outs where the returns generated by the event can be as much as forty or fifty percent. Weston pointed of that the level of returns is not, of course, a good reason for selecting one method of restructuring over another as there will be other circumstances that may make one type of restructuring preferable to another. The level of fit between the firms objectives and the results of restructuring is the most important factor when selecting a restructuring technique. The figures he quoted in this paper are merely

illustrations of the sort of level of returns that can follow if the restructuring to carried out using the appropriate method.

It is important to examine these potential alternatives to acquisitions, as they should help to clarify the true importance of the acquisition in the current business environment. In some of the papers in the previous sections corporate acquisitions are treated as if they are the only way in which a company can alter its structure. This is clearly untrue and the more realistic picture presented here is preferable.

1.13 The Prediction of Acquisition Targets

Before this section begins it should be noted that any econometric methodologies in these articles will be reviewed in greater detail in the discussion of methodological issues in the empirical chapters that will follow. This part of the review will concentrate on the general approaches instead. The first article to consider here is by Hughes (1993). In this article, Hughes outlined the characteristics that are believed to differentiate potential acquisition targets from the rest of the companies in the market place. The characteristics of the groups of acquiring and acquired firms have been examined by many other authors and Hughes collated their work in this part of the paper. The acquired companies are believed to have all or some of the following features. They are below average size and profitability for their industry and have below average growth rates. Acquired firms may also have differing market-to-book values implying some degree of under-valuation by the stock market. Finally, there are a few other suggested indicators, such as the value of P/E ratios, but these do not appear in many of the papers and there is no consensus of opinion concerning their importance.

The acquiring companies are dealt with rather more briefly. They are generally agreed to be larger than their targets. The evidence on their profitability is less definite. Many authors agree that they are more profitable, but some studies have had inconclusive results. Whilst this article did not include any attempt to predict likely

acquisition targets it is one of the few papers to incorporate such a complete list of features pertaining to the companies that are involved in acquisition activity.

Dietrich and Sorensen (1984) suggested that any factor which increases the future net present value of a firm will enhance the probability of that company becoming the target of an acquisition attempt. This is the basis of the authors choice of explanatory variables. They limited their sources to accounting variables only. All other possible explanatory variables are assumed to be randomly distributed across the potential target firms. It is also possible that the characteristics motivating mergers vary in magnitude across industries and so Dietrich and Sorensen limited their data to four pre-selected industries and represented the variables in terms of the relative deviations from the industry average. The models in this paper are estimated using just ten accounting variables. They believed that the factors motivating the acquisition are the same irrespective of the method of exchange used in each individual case. The results were estimated using twenty-four companies that merged between 1969 and 1973 and forty-seven non-merged companies which were selected at random for use in the estimations. Dietrich and Sorensen found that the probability of a company becoming an acquisition target increases when the company has a low asset turnover, low payout ratio, low trading volume and low leverage. This probability is also increased when the firms are below average size for the industry. These results indicate that the bidding companies view a target as a source of cash and confirm the popular view of a target firm as a struggling business. The methodology that was used in this paper, logit models, will be explained in Chapter 4.

Soon after Dietrich and Sorensen produced their paper a similar approach was taken by Palepu (1986). Much of this paper is concerned with methodological issues, as Palepu addressed issues of sampling and model construction. The model Palepu used is the same as Dietrich and Sorensen The variables for this model were selected on the basis of several popular hypotheses. These include the inefficient managers hypothesis, the size hypothesis, the market-to-book hypothesis and the price-earnings hypothesis. Palepu's sample was composed of one hundred and sixty-four companies that were acquired between 1971 and 1979, and two hundred and fifty-six firms that

were non-targets as of 1979. The individuals in both groups of companies had to belong to either the mining or manufacturing sectors, be quoted on either the New York Stock Exchange or the American Stock Exchange and have data available on the COMPUSTAT tapes. The estimation results indicate that likely targets are small companies with ample resources and plenty of investment opportunities, which is very much as would be expected given the previous literature.

Palepu's paper was used as a starting point for Ambrose and Megginson (1992). These authors claimed that the likelihood of a firm being acquired is not determined by accountancy factors alone and that the level of insider (managerial) and institutional shareholdings is important, as is the type of defence mechanism and the proportion of fixed assets in the total asset structure. The firms used in this study were randomly selected from the New York Stock Exchange and the American Stock Exchange on the 1st January 1981 and had data available on the COMPUSTAT tapes. The sample involved one hundred and sixty-seven target firms, two hundred and sixty-seven non-targets and thirty-nine liquidated or otherwise delisted firms, that never became targets. The logit model computed by Ambrose and Megginson involves three sets of explanatory variables. The first set of variables are the accountancy variables that Palepu used, the second group of variables are the ownership structure variables which measure the levels of managerial and institutional ownership of the targets. Finally, eight different types of take-over defence techniques were incorporated in the model. This results of these tests suggested that targets are significantly smaller than non-targets and in the quarter before the take-over bid is announced the targets have a smaller net increase in institutional shareholdings than the non-targets. The only significant asset structure term was a dummy variable representing the proportion of tangible assets to total assets which suggests that takeovers are not motivated by the desire to acquire firms with many growth options or a noticeable growth / resource mismatch. The authors suggested that this result could be a proxy for the greater debt capacity of target firms. However, this theory is contradicted by the lack of any appreciable difference between the leverage of the targets and non-targets in this sample. The idea that acquirers look for targets with a high proportion of fixed assets is consistent with the "operating synergy" argument,

suggesting that economies of scale in production are a primary factor in selecting acquisition targets. The presence of some type of voting rights defence appears to increase the probability that a firm will become a target. These are generally considered to be weak forms of take-over defence and cannot withstand a determined acquisition attempt, as discussed previously. Preferred stock authorisations, on the other hand, reduce the probability of becoming a take-over target as they could make in impossible for an acquisition attempt to be successful.

In these articles there are some results that appear consistently. This will be of particular relevance in the later chapters when analysis of the firms that take part in takeovers is carried out. The methodologies that are used in some of these papers will also be applied here although there are some improvements that can be made which will be introduced in Chapter 4.

Conclusion

This chapter was designed to present a thorough examination of the wide variety of the topics examined in the merger and acquisitions literature. It should also highlight the major issues within each of these sections and some potential areas for future research. There are too many areas for research to be contained in a single thesis as the market for corporate control is such a diverse area as this chapter has illustrated. The literature on this subject covers a wide range of areas and includes topics that stretch from the motives for acquisitions to the legal aspects of the disclosure of share holdings. It is also a most complex subject as it is possible for a single factor to appear in several different and seemingly incompatible areas. For example, it is possible for an acquisition defence to increase the probability of a takeover occurring in certain circumstances. It is the diversity of topics and issues that makes this area ideal for research.

Previous literature covers a great many subjects but there are some areas which are incomplete. Several of these stand out from the literature. Firstly, the issue of merger waves and the level of acquisition activity remains a puzzle. Research has

suggested that there is a link between acquisitions and the economy but has failed to produce a coherent model that can be applied in many different time periods. Furthermore, this issue has been neglected in the UK in recent years which is a lamentable gap in the existing research. Secondly, a great many of the suggested motives for takeovers do not have empirical backing and there has been no clear analysis that determines which of these factors are really important in practice and which are not. Given the high number of different motives that exist in the literature it is essential that some sort of discrimination should be applied.

A third important shortfall in the previous literature exists in the papers concerning the identification of firms that are likely to become involved in acquisitions. This research has been limited in the past to examining the acquired firms and has neglected the acquiring. A far more complete picture of takeover activity could be created if such analysis could be extended to incorporate these companies as well. In addition, these articles ignore the links between acquisition activity and the economy that almost certainly exist although, as discussed above, a coherent theory for acquisition activity does not yet exist.

Finally, a similar bias exists in the articles concerning the benefits of acquisition activity. Once again, the majority of research concentrates on the acquired companies and ignores the acquiring. There is also no comparison between these firms and similar companies that are not involved in takeovers. Such a comparison would make the true benefits of acquisition activity clearer than they have been in the past. For example, it may appear that the returns to acquired firms increase considerably when an acquisition bid is launched but this does not include information about the behaviour of other firms at the same time. A sudden shock to the stock market could produce a general increase in share values which would have nothing to do with the takeover bid. To include this perspective in the analysis of takeovers would make the calculation of the benefits considerably more accurate.

These areas are not the only ones within the study of mergers and acquisitions that required more work but they are some of the most obvious ones. The following

chapters of this thesis will attempt to tackles these issues and provide a more comprehensive analysis of the current condition of the market for corporate control.

Chapter 2. Merger Waves and Macro-Economics

Introduction

The corporate control market operates continually as companies grow and evolve. It appears to move in a cyclical manner with levels of increasing and decreasing activity. Every so often there is a period during which the level of activity rises to an unprecedented degree that is unmatched by the surrounding economic conditions. Such phenomena are known as merger waves. This chapter is designed to analyse the behaviour of the corporate control market in the UK during a period that incorporates the last period of excessive acquisition activity to take place in this country.

The uses of such a study are wide-spread. There are several different groups involved in the acquisition process who would find this sort of information useful. Firstly, there are the banks and venture capitalists. These individuals have a finite amount of money to lend and knowing the approximate number of acquisitions that will take place in the future would enable them to plan their business strategy with more accuracy. It is impossible to evaluate how each of these individuals would view the prospect of lending money for a takeover, but it is likely that their willingness to lend would be based upon the expected outcome of that deal. If the predicted number of takeovers for the next few periods is higher than previously, these lenders may wish to refrain from lending money for the riskier purchases in order to invest funds in the safer takeovers that are also likely to occur. Alternatively, the merchant banks may wish to start preparing themselves to manage the greater number of deals that are expected to take place in the near future. If the banks know that their work level is likely to increase sharply in the future, then they can start preparing in advance and be better placed to cope with the increased volume of business.

The second group of interested parties are the firms that are considering undertaking an acquisition in the near future. If the number of acquisitions is due to

rise sharply this is likely to have an impact on the issue of funding, which may affect the probability of such a company attempting to purchase another firm. Furthermore, if the number of acquisitions is expected to rise significantly there may be more competition for the more choice target companies. Under these circumstances, a potential bidding firm may wish to pre-empt the rest of the market and accelerate its plans for the purchase accordingly.

Finally, there are the companies who may be considering instituting some form of acquisition defence. If a company has come to the conclusion that it is vulnerable to a takeover then knowing how many acquisitions are likely to transpire in the future may provide them with more information about whether or not they wish to develop a defensive strategy. Acquisition defences are often expensive to set up and the cost may be unnecessary if the expected level of future takeovers is low. However, if the expected number of acquisitions is high, the risk of becoming a target will also be greater and the firm may decide to institute a takeover defence as soon as possible.

Previous research in this area has focused on two issues. Firstly, there is still some debate about whether or not the level of activity in this market can be predicted at all. Some authors, for example Shugart and Tollison (1984), have claimed that the market for corporate control moves randomly and, therefore, it is completely unpredictable. However, the majority of articles, as typified by Golbe and White's paper (1988), have been based on the assumption that the market is driven by the economic conditions that surround it and, as a result, have attempted to predict the level of takeover activity in these terms. This leads to the main issue in this area of study; so far it has proved impossible to find a single theory that can precisely explain the behaviour of this market at any time. The problem is further exacerbated by the existence of merger waves. These occasional periods of excessive activity have also defied prediction whilst simultaneously increasing the difficulty inherent in the successful prediction of the manner in which this market behaves.

The structure of this chapter is as follows. Section 2.1 examines the current theories concerning the behaviour of the corporate control market and reviews the

existing empirical evidence about these ideas, presenting a brief review of the material covered in Chapter 1. Section 2.2 presents the methodology and data used in this chapter before presenting and analysing the empirical results. Finally, there is the conclusion.

2.1 Theories and Evidence

The first article to consider supports the hypothesis that the market for corporate control behaves in a random manner. Shugart and Tollison (1984) found that the behaviour of the market for corporate control defied analysis. They examined the number of acquisitions that occurred in America in each of two periods, 1895 to 1920 and 1947 to 1979. The conclusion of their study was that the behaviour of the corporate control market is best described by a white noise process and cannot be linked to the behaviour of the economy. This result provides the first hypothesis that will be tested in the empirical section of this chapter, that acquisition numbers are random. If this hypothesis is rejected then the level of acquisition activity can be deemed to be predictable as the majority of articles on this subject found. In particular, these papers linked the number of acquisitions to the economic environment.

The "economic cycle" theory of merger activity suggests that the behaviour of the corporate control market is directly related to the economic situation in the country under examination. One of the first papers to examine this link was by Gort (1969). He proposed that changes in the economic cycle would alter the manner in which companies were viewed by the stock market. Specifically, Gort was interested in the way that changes in economic conditions could alter the expected value of a firm. He considered roughly 600 American acquisitions that occurred between 1951 and 1959 and attempted to show that these acquisitions took place because the economic conditions changed in such a manner that the values of the firms were significantly altered. He demonstrated, in general terms, that there does seem to be a link between the level of acquisition activity and the behaviour of the economy.

Following this idea, there have been many other papers that attempted to link the level of activity in the corporate control market to specific macro-economic factors. In 1975 Steiner used multivariate regression to model the number of acquisitions that occurred between 1949 and 1971 using economic cycle variables. His results suggested that a positive link existed between both stock prices and GNP and the number of takeovers. This study incorporated other terms such as the interest rate, but none of these proved to be significant. Melicher, Ledolter and D'Antonio (1983) examined acquisitions that took place in the mining and manufacturing industries in the USA between 1947 and 1977. They call their hypothesis the "merger activity - economic prosperity" theory. (Melicher, Ledolter and D'Antonio, 1983, page 424). This theory states that changes in the expected level of economic growth and the capital market conditions can generate conditions where the financing of an acquisition is far simpler than in other periods. Consequently, these factors can be linked to the level of acquisition activity and the authors attempted to demonstrate this result using multivariate regression models. Their results supported the supposition concerning the link between capital markets and acquisition numbers but was inconclusive on the relationship between the level of expected economic growth and the number of takeovers.

More recently Golbe and White (1988) demonstrated that the behaviour of the acquisition market is not random and then proceeded to use regression models to analyse the link between the level of takeovers in America and the economic situation. The data used in this article covers mergers and acquisitions during a period from the middle of the 1940's to 1985. The results suggested that there is a positive link between GDP and acquisition levels whilst a negative relationship exists between the number of takeovers and interest rates.

Another paper on this topic was written by Rock (1994). This article contained no empirical evidence but presented a discussion of the factors that can have an impact on the market for corporate control. These factors are presented as six points. The first of these is the economic outlook which Rock claimed affects public attitudes and, consequently, can have an impact on the ease with which shares change

hands. The second and third points are the financing alternatives for both the purchasers and the sellers in the takeover. If either of these individuals can see promising alternatives elsewhere acquisitions will reduce in number as lower risk options will be more attractive. Rock's next factor was price expectations which again has an impact on the ease with which the shares will be transferred. The penultimate point refers the strategic challenges and opportunities faced by the purchasing companies and centres on the position that these firms occupy, which makes the proposed acquisition appear to be an appropriate next step. Finally, Rock discussed the reputation of acquisitions in the public eye which can also have an impact on the level of acquisition activity. Although these factors were not clearly specified in this paper, it is clear that Rock believed that the economy has a considerable influence on the number and type of acquisitions that take place.

In addition to the articles mentioned above, which specifically referred to the corporate control market, there are other papers that have examined the sorts of variables that have an impact on the stock market and the economic cycle. Chen, Roll and Ross (1986) tested innovations in economic conditions between 1953 and 1983 and attempted to determine whether these factors generate a response in the stock market. The factors that they used included measures of the interest rates, industrial production and oil prices and these terms may provide a guide to the types of variables that could be used here to represent the economic conditions surrounding acquisitions.

Finally, Beenstock and Chan (1988) attempted to test the Arbitrage Pricing Theory (APT) using returns on two hundred and twenty securities in the period from 1961 to 1981. Again they selected economic factors to measure the economic condition in the UK. Similarly, Priestley (1994) offered another list of factors that seem appropriate to the testing of the APT for the UK market.

The majority of work concerned with the prediction of the behaviour of the market for corporate control has come to the same conclusion that there is a link between the economic cycle and the number of acquisitions. However, the problem with the empirical analysis of the acquisition market to date is that, whilst many of the

results exhibit some resemblance to each other, none of the proposed models works particularly well over more than one time period. Each of these results contains variables that do not appear to be important during other times, which reduces the explanatory power of the models considerably. The number of economic factors that appear in these papers is somewhat limited and it may be possible to generate an effective model by combining these variables with the economic factors that are used in the testing of the APT. These factors that can generate a response from the stock market and might, therefore, be reasonably used to represent the economic condition in the testing of the hypothesis that the number of acquisitions is related to the behaviour of the economy.

Even using macro-economic variables it may transpire that it might not be possible to produce a good model for the number of acquisitions when the behaviour of the market for corporate control deviates from the economic cycle. None of the results that appear in the literature to date are able to model the number of acquisitions over all time periods for some reason that remains a mystery. One possible reason could be the presence of merger waves. For example, consider the number of acquisitions in the UK. During the last merger wave the level of takeover activity grew to a height that was unprecedented given the level to which the economic cycle rose at that time. It may be that these peaks of activity are not predictable using the economic cycle and may be due to another factor. Specifically, they could be some sort of bubble. During a period of higher acquisition activity it may become easier for companies to complete takeovers as the banks and stock market become accustomed to the idea of frequent changes in the control of a company. Under these circumstances, the managers of the acquiring firm may decide that the potential gains associated with the acquisition outweigh the possibility that the bubble will burst and the acquisition become harder, or even impossible, to complete. With this rationale, it is possible to see how the acquisitions market may start to behave as a bubble and this could provide a reason why it has been impossible to produce a model that can accurately predict levels of acquisition activity. If merger waves are a bubble, this will not facilitate their prediction but it could offer an explanation for the absence of one model that can predict all acquisition activity.

2.2 *Methodology and Empirical Results*

2.2.1 Methodology

Testing for Random Behaviour in a Sequence of Numbers

The first hypothesis that needs to be tested in this chapter is the notion that the behaviour of the acquisition market is random. There are two ways that this can be tested. Random behaviour in a sequence of numbers is easily identified by the absence of any link between consecutive terms in that series. The first test for random behaviour in the acquisition market to be undertaken is the Run Test [1]. This test involves the regression of the number of acquisitions against a simple time trend. The residuals of this estimation are the important feature. If the residuals come in runs of positive and negative terms then this means that the behaviour of the acquisitions market is cyclic and not random.

Based on the same premise, a simple Box-Jenkins procedure will provide a second way to test this hypothesis. The methodology for time series identification that Box and Jenkins devised uses four steps to identify the nature of the data under examination. The first step is to make the series stationary, usually by taking differences of the series. Then the autocorrelation and partial autocorrelation functions for the stationary series can be used to make a tentative identification of the nature of the sequence of numbers. The basic premise is that the number of significant terms in these functions will give the order of the moving average and autoregressive parts of the equation, respectively. Once the provisional identification has been made it is possible to simulate the procedure using the data under examination and see whether or not the selected time series is genuinely suitable by checking that the ensuing model is well-specified. To ascertain this fact, Q statistics are used to establish that the residuals from the chosen model are random. Randomly distributed residuals are a prerequisite of a well-specified model. Applying this methodology to the number of

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[1] This test appears in the paper by Golbe and White (1988)

acquisitions it should be possible to determine whether the series of acquisition numbers is random or not.

Rejection of the random activity hypothesis will mean that the activity of the acquisitions market is predictable. To this end, macro-economic variables will be used and their accuracy investigated. The selection of these variables is based on the articles that have already approached this issue, such as Golbe and White (1988) and Melicher, Ledolter and D'Antonio (1983). In addition to these factors there are also the macro-economic variables that are known to have an impact on the stock market as Chen, Roll and Ross (1986) found. The variables that will be used in the creation of this model will be discussed in section 2.2.2 below.

The Construction of Regression Models Using the General to Specific Methodology

The models will be created using the Ordinary Least Squares (OLS) methodology in conjunction with the general to specific methodology popularised by the work of the London School of Economics.

General to specific modelling can be defined as "the formulation of a fairly unrestricted dynamic model which is subsequently tested, transformed and reduced in size by performing a number of tests for restrictions." (Charemza and Deadman, 1997, Page 58) This process begins with the estimation of the general model which must satisfy the following four criteria, which can be found in Hendry (1995).

·1 The general model does not need to be generalised further as it already contains all of the relevant variables.
·2 The parameters of the general model can be estimated from the available data
·3 The general model must be identifiable so that the variables of interest can be identified
·4 The general model must characterise the joint distribution of all of the variables

The general model can be represented by an autoregressive distributed lag (ADL) model. Equation 2.1 represents the general form of this model.

$$y_t = \alpha + \sum_{i=1}^{p} \beta_i y_{t-i} + \sum_{j=0}^{q} \gamma_j x_{t-j} + u_t \qquad (2.1)$$

where, in the empirical work that follows in this chapter,
y_t represents the dependent variable in the regression model, here the acquisition series,
y_{t-i} represents previous values of the dependent variable, here these are previous values of the acquisition series and
x_{t-j} represents the independent variables, the macro-economic variables that are thought to lead acquisition activity

The desired form of the specific model must be known before the reduction process can be started to ensure that the correct restrictions are imposed and the appropriate statistical tests are performed to check the validity of the restrictions. In this case, the specific model should be a "dead start" model where all of the included variables are lagged, as equation 2.2 shows. The purpose of this model is to predict acquisition numbers ahead of these takeovers occurring and, as a consequence, the dead start model is the appropriate form for the specific model as it contains no contemporaneous terms.

$$y_t = \alpha + \sum_{i=1}^{p} \beta_i y_{t-i} + \sum_{j=1}^{q} \gamma_j x_{t-j} + u_t \qquad (2.2)$$

The general model is then reduced to the specific model by repeatedly restricting the model and testing each time that the restriction is valid. For the creation of a dead start model the restrictions are fairly simple to impose and test. According to both Cuthbertson, Hall and Taylor (1992) and Charemza and Deadman (1997) either the Students t-test or the F-test will suffice for the restrictions that are imposed upon the ADL model. The F-test will be used in the empirical work that follows. The null and alternative hypotheses for this test are :

$\mathbf{H_0}$: the coefficient of the variable under consideration is equal to zero

$\mathbf{H_A}$: the coefficient of the variable under consideration is not equal to zero

The F-test is calculated using the formulae given in equation 2.3.

$$F_{(q,n-k)} \sim \frac{\left(\frac{RRSS - URSS}{q}\right)}{\left(\frac{URSS}{n-k}\right)} \qquad (2.3)$$

where
q is the number of restrictions that are being tested,
n is the number of observations,
k is the number of independent regressors in the model,
RRSS is the residual sum of squares from the unrestricted model and
URSS is the residual sum of squares from the restricted model.

The general model should be systematically restricted until it has the desired specific form and the last valid restriction has been reached. This is the point at which a specific model has been created that has the desired, pre-defined, form and represents all of the relevant information held in the more general forms of the model. This model must be correctly specified and satisfy the standard misspecification tests for an OLS regression model. Once this model has been defined it is sufficient to report this model instead of the general one. The general to specific methodology has several advantages over other modelling approaches most importantly "...that model construction proceeds form a very general model in a structured, orderly (statistically valid) fashion" (Charemza and Deadman, 1997, Page 78) and that it is "a flexible tool which allows a complex interaction of theory and time series data so that both theory coherence and data coherence can be achieved." (Cuthbertson, Hall and Taylor, 1992, Page 127) This approach is particularly useful when modelling variables where the previous research has failed to clarify the important independent variables and, instead, offers a large number of potential regressors. This is the case when examining levels of acquisition activity as Table 2.1, below, will demonstrate. Under these circumstances the general to specific methodology allows for the identification, in a

scientific manner, of the important terms from a large list of potential explanatory variables.

Testing for a Bubble in a Sequence of Numbers

Lastly, there remains the question of merger waves. Merger waves are seemingly unpredictable even using macro-economic factors. In the event that the random activity hypothesis is rejected the economic factors above will be used in an attempt to predict the behaviour of the acquisition market. If these terms cannot predict the level of acquisition activity that occurs during the merger wave period, then a third hypothesis will need to be tested. This suggests that the merger waves are a form of bubble that grows from the economic cycle at certain times possibly prompted by the fact that takeover numbers are increasing. When acquisition activity increases some managers may feel that they must attempt a takeover simply because so many other firms are doing the same. This may be to protect the firm or simply to join in with a currently popular and, potentially, profitable investment. If this is the case, then merger waves may be a sort of bubble created by insecurity.

The theory associated with rational bubbles can be expressed in the following simple form. The fundamental value of any series is the expected value for that term given the underlying factors that drive the market under consideration. However, if the value of the series in question differs from the fundamental value then this inconsistency could be due to a bubble factor which promotes the value of the series above the fundamental level for some time. In order to explain the behaviour of the series it is necessary to examine the bubble factor.

There are two possible outcomes for a rational bubble, either the bubble effect ends and the series reverts to its fundamental value or the bubble continues for another period. The equations below represent the bubble factor in each of these cases and the probabilities associated with these two outcomes are $1-\pi$ and π respectively.

$$b_{t+1} = a_0 \qquad (2.4)$$

$$b_{t+1} = \frac{(1+r_{t+1})b_t}{\pi} - \frac{1-\pi}{\pi}a_0 \qquad (2.5)$$

where

b_{t+1} is the bubble factor
a_0 is the initial value of the bubble factor
r_{t+1} is the expected value of the series in the period under examination

Under equation 2.5 the bubble grows by the amount necessary to compensate the involved parties for the risk inherent in the probability that the bubble might burst. In other words, the probability of the bubble continuing must exceed one half. The probability of a negative change in the growth of the bubble decreases as the duration of the bubble increases. In other words, the probability of the bubble bursting decreases with the length of time over which it has already existed. The bubble continues to grow until an abnormally large negative innovation occurs and it bursts. The rational nature of these bubbles allows for them to restart, which fits neatly with the idea that merger waves repeat.

There is a traditional test for a bubble that is very simple as there are three criteria, which are discussed in the papers by McQueen and Thorley (1994) and in Blanchard and Watson (1982). The first of these criteria refers to the original series, whilst the other criteria refer to the series of innovations which are the differences between the fundamental and actual values of the series in question. These are :

·1 The process should be autoregressive
·2 The innovations should have excessive kurtosis
·3 The innovations should be skewed and contain runs of positive valued terms

The autoregressive condition refers to the fact that a bubble is a feature in which the consecutive terms are related to each other and the behaviour is non-random. It also fits with the rational expectations theory that underpins the speculative bubble. The skewness and kurtosis features are characteristics that always occur in rational speculative bubbles. These criteria refer to the innovations in the series rather than to the series itself. The innovation is the part of the series' behaviour

that cannot be predicted by examining the fundamental value of the item under consideration.

A rational speculative bubble is a string of positive innovations followed by a crash as the bubble bursts. The Runs Test should identify the string of positive innovations and the crash should have a distinctive impact on the distribution of the innovations. In precise terms, the crash should produce large outliers which should give the distribution fat tails, the kurtosis listed as one of the characteristics of a bubble. It is easy to visualise how the distribution of the innovations tails off sharply after the bubble bursts thus producing this characteristic. The presence of skewness will not help identify a potential bubble alone, but it is essential for the occurrence of runs which are always present in a speculative bubble. Runs, as explained by Blanchard and Watson, are sequences of innovations with the same sign and a sequence of positive innovations could indicate the presence of a bubble in the data.

2.2.2 Data

The total number of acquisitions is recorded by the Central Statistical Office and quarterly figures can be found in the HMSO publication "Financial Statistics". Acquisition numbers were analysed for a twenty year period from the beginning of 1974 to the end of 1994. All of the macro-economic factors were collected from Datastream for the same twenty year period and with the same quarterly frequency.

In the previous research concerned with the analysis of acquisition activity as a whole a great many different macro-economic variables have been used. This section is designed to discuss the potential links between these variables and the various theories that exist to explain total acquisition activity and to decide which variables should be used in the following empirical work. Table 2.1 lists the variables used in previous papers that have attempted to predict the level of acquisition activity. This table also references the authors of each paper and gives a brief explanation of the rational that each author gave for using that variable.

Table 2.1 Variables Used in the Analysis of Acquisition Numbers and Assets Pricing Models in the Previous Literature

Variable Name and Definition (if given)	Author(s) of Paper	Reason for Use In Paper
Previous Levels of Acquisition Activity		
Acquisition Numbers	Shugart and Tollison (1984)	
	Golbe and White (1988)	Acquisition activity is autoregressive and non-random
	Hughes (1993)	Acquisition levels in consecutive periods are linked
Stock Market Prices		
Securities Prices	Steiner (1975)	Stock market prices alter acquisition numbers
Stock Market Movements	Melicher, Ledolter and D'Antonio(1983)	Mergers respond to previous movements in the stock market
Changes in Prices	Golbe and White (1988)	Changes in economic circumstances alter the number of takeovers
Return on the Stock Market	Chen, Roll and Ross (1986) *	Previous stock market levels will influence current levels
Market Value of the Firm		
Market value to replacement cost	Golbe and White (1988)	Takeovers must represent some sort of a bargain for the buyer
Analysts Opinions		
Divergences of Opinion	Golbe and White (1988)	Many different opinions of share value create takeover opportunities
International Markets		
World Markets	Rock (1994)	Strategic challenges can alter the probability of takeovers
Return on the S&P500 and the FTA	Priestley (1994) *	Market Portfolio may alter share prices
Exports and Exchange Rates		
Export Volume	Beenstock and Chan (1988) *	Competitiveness overseas will impact on share prices
Relative Export Price	Beenstock and Chan (1988) *	Competitiveness overseas will impact on share prices
Exchange Rate	Priestley (1994) *	International markets have an impact on UK share prices

Retail Price Index, Volume and Sales		
Retail Price Index	Beenstock and Chan (1988) *	Retail sales will impact on share prices
Retail Volume	Beenstock and Chan (1988) *	Retail sales will impact on share prices
Retail Sales	Priestley (1994) *	Sales can be related to the share price of a firm.
Interest Rates		
Prime Interest Rate	Steiner (1975)	The ease with which funds ca be raised will alter takeover activity
Real Interest Rate	Golbe and White (1988)	Cost of capital will alter the level of acquisition activity
Interest Rates	Rock (1994)	Future economic expectations can alter takeover numbers
Term Structure of Interest Rates	Priestley (1994) *	This factor is believed to have an impact on share prices
Term Structure	Chen, Roll and Ross (1986) *	Interest rates will alter share prices
Inflation		
Inflation	Rock (1994)	Economic expectation will alter the number of acquisitions
Change in Expected Inflation	Chen, Roll and Ross (1986) *	Unexpected alterations in inflation will alter the level of stock prices
Inflation	Priestley (1994) *	This factor is believed to have an impact on share prices
Industrial Production		
Productivity	Gort (1969)	Productivity alters profitability which affects acquisitions
Gross Domestic Product	Steiner (1975)	Productivity alter profitability which alters takeover funding
Production	Melicher, Ledolter and D'Antonio(1983)	Changes in production can make acquisition inevitable
Gross National Production	Golbe and White (1988)	Economy size reflects firm numbers and acquisition opportunities
Gross Domestic Product	Rock (1994)	The economic outlook will alter the number of acquisitions
Gross Domestic Product	Beenstock and Chan (1988) *	GDP is linked to profits and assets prices
OECD Production	Beenstock and Chan (1988) *	Productivity is linked to profits and assets prices
Industrial Production	Priestley (1994) *	This factor is believed to have an impact on share prices
Production Costs		
Manufacturing Costs	Beenstock and Chan (1988) *	Increased production cost reduce profits which lowers asset prices

Labour Issues		
Unemployment	Rock (1994)	Unemployment alters expectations and changes takeover levels
Wages	Beenstock and Chan (1988) *	Labour problems reduce the value of asset prices
Number of Days Lost in Strikes	Beenstock and Chan (1988) *	Labour problems reduce the value of asset prices
Market Concentration		
Concentration	Gort (1969)	Market concentration can make acquisitions essential
Change in Concentration	Gort (1969)	Market concentration can make acquisitions essential
Market concentration	Fairburn and Geroski (1993)	Changes in market concentration can make takeovers essential
Firm Size and Number		
Change in Average Firm Size	Gort (1969)	Market concentration can make acquisitions essential
Change in Number of Firms and Managers	Gort (1969)	Market concentration can make acquisitions essential
Taxes		
Tax regime	Golbe and White (1988)	Tax laws alter takeover benefits which changes the level of activity
Technological Change		
Technical Personnel Ratio	Gort (1969)	Technological change alters competitiveness creating takeovers
Risk Premia		
Risk premium	Weston, Chung and Hoag (1990)	Financial market conditions alter takeover levels
Risk Premia	Chen, Roll and Ross (1986) *	Changes in risk levels will alter asset prices
Default Risk	Priestley (1994) *	This factor is believed to have an impact on share prices
Money Supply		
Money Supply	Beenstock and Chan (1988) *	Money supply alters share prices
Money Supply	Priestley (1994) *	This factor is believed to have an impact on share prices
Treasury Bills		
Treasury Bills	Beenstock and Chan (1988) *	This factor is believed to have an impact on share prices

Oil Prices		
Oil Prices	Chen, Roll and Ross (1986) *	Oil prices should be included in any list of factors that alter returns
Commodity Prices		
Commodity Prices	Priestley (1994) *	Other financial markets can have an impact on the Stock Market
Bonds		
Bond Yields	Melicher, Ledolter and D'Antonio(1983)	Capital market conditions affect acquisition activity
Returns on Bonds	Weston, Chung and Hoag (1990)	Increased returns should increase takeover activity
* Indicates an article that refers to asset pricing models		

The first variable is the number of takeovers in the previous period. This term is included in the previous research as it appears that the current level of acquisition activity is linked to takeover numbers in the previous periods. A typical paper including this variable was by Golbe and White (1988) who found that takeover numbers were autoregressive and important in the prediction of future levels of takeover activity.

The behaviour of the stock market is also frequently seen in empirical work concerning the level of acquisition activity. The rationale given for using these terms is, generally, that increases in share prices tend to be followed by an increase in acquisition activity presumably due to the increased value of the acquiring firms which enables them to afford to attempt the purchase of another company. Steiner (1975), Melicher, Ledolter and D'Antonio (1983) and Golbe and White (1988) all featured this variable in their empirical work. Golbe and White also used a measure of the disparity between the market value of a firm and the replacement cost of that firms assets as a measure of the accuracy with which the stock market values companies. They claimed that that the target firm must be a bargain or there would be little point in the bidding company attempting the purchase. Golbe and White also attempted to include a measure of the level of variety of analysts opinions in their model for takeover numbers. They argued that when there are more opinions about the value of firms in the market place there will be more takeovers as companies will attempt to take advantage of this divergence of opinion and acquire a firm that they consider to be undervalued which also agrees with their thoughts on the bargain aspect of target selection.

There are several variables in the previous literature that refer to the impact of overseas markets and exchange rates on asset prices. Rock (1994) believed that opportunities in international markets could provide an alternative to acquisition activity whilst Beenstock and Chan (1988) and Priestley (1994) both contended that overseas competitiveness will have an impact on domestic share prices. Retail prices and the volume of retail sales are also important factors in determining the level of share prices, as Beenstock and Chan (1988) and Priestley (1994) stated. Any factor

that can alter asset prices could also have an impact on acquisition activity as the value of the involved firms alters.

A very popular variable in previous analysis of acquisition numbers is the interest rate. This term was used by Steiner (1975), Golbe and White (1988) and Rock (1994) as well as appearing in several articles related to asset pricing. It is thought that the interest rate will influence the amount of money that firms can borrow which will influence their ability to purchase another firm. In all of the previous empirical work on the level of takeover activity interest rates have been negatively linked to acquisition numbers and it is expected to be the same here. The rate of inflation appears in papers by both Chen, Roll and Ross (1986) and Priestley (1994) as a factor that may alter asset prices and it was also referred to by Rock (1994) as a potential indicator of future expectations for economic performance which, he argued, can have an impact on takeover levels in the future.

Industrial production appears in every paper reviewed here. Gort (1969), Steiner (1975), Melicher, Ledolter and D'Antonio (1983), Golbe and White (1988) and Rock (1994) all found that this factor was positively linked to takeover numbers whilst Beenstock and Chan (1988) and Priestley (1994) both found that it influenced asset prices as high levels of industrial production are linked to higher sales which, in turn, produce high profits and increase share prices. Increased profits means that funding an acquisition may be easier and increased share prices will assist the purchasing firms if they need to borrow the remainder of the money to pay for the purchase. There are also some related terms that represent issues connected with production such as manufacturing and labour costs which appear in the previous empirical work on asset pricing and takeover levels. These factors could have a detrimental affect on acquisition numbers as they will reduce the available funds that could be used to pay for takeovers and they can also influence market expectations for the future, as Rock (1994) claimed. If the stock market expects circumstances to improve then individuals will be less likely to sell their shares at the current time as they will expect the value of their stock to rise in the future. Such an assumption will reduce the level of future takeover activity.

In some situations acquisitions are essential if a firm is to continue to grow and develop or even, in more drastic situations, to survive. Fairburn and Geroski (1993) used their "structure - conduct - performance" theory to explain just such a situation. They argued that when the composition of an industry changes this will have an impact on the performance of all the other firms in that industry which will, ultimately, alter the behaviour of those firms. Changes in industry composition can, therefore, create situations were it is necessary for firms to attempt an acquisition for their own continued well-being. Fairburn and Geroski also pointed out that one of the most radical ways that the structure of an industry can be altered is due to an acquisition creating a situation in which past acquisition activity will be the direct cause of future takeovers. Fairburn and Geroski (1993) and Gort (1969) both used measures of industry concentration to examine acquisition levels in previous empirical work and both expected that increased concentration would increase the number of takeovers as firms attempt to retain their market share and maintain a strong position for the future.

Golbe and White (1988) attempted to include dummy variables in their model of acquisition activity that measured tax laws. Their dummy variables indicated changes in the tax laws that took place within the period that their sample dealt with. The rationale for including this term was that tax laws could alter the benefits created by acquisition activity and would, therefore, alter the number of takeovers in the following months. Golbe and White were not able, however, to predict the signs that these dummy variables would have, nor did they appear significant in the authors empirical results. Another unusual variable was used by Gort (1969) in his disturbance theory of merger activity. Gort argued that technical change would influence the number of takeovers that took place in the following months as it would alter firms competitiveness in their chosen markets. In order to represent this factor in his empirical work Gort used the ratio of technical to non-technical personnel as one of his independent variables.

Changes in risk premia can alter the value of asset prices, according to Chen, Roll and Ross (1986) and Priestley (1994) who included a measure of this factor in

their empirical analysis of asset prices. Weston, Chung and Hoag (1990) also claimed that any factor which alters the condition of the capital markets would influence levels of acquisition activity. For the same reasons Beenstock and Chan (1988) and Priestley (1994) both examined the impact of money supply on asset prices. Beenstock and Chan also used treasury bills in their empirical analysis for exactly the same reason. If any of these factors can alter asset prices then it is possible that they could also influence takeovers by altering funding opportunities for companies wishing to buy another firm.

The next term to consider is the price of oil. Chen, Roll and Ross (1986) stated that this term should be included in any list of factors that influenced share prices although they went on to note that oil prices only become significant in their empirical results after the 1970's and the rise of OPEC. If, as these authors claimed, the price of oil can have an impact on share prices then it may also have an affect on the level of acquisition activity as it is possible that some firms will not be able to pass on the full cost of any increase in oil prices to their customers and, as a result, this would leave them will less money to spend on the purchase of another company and vice versa.

Finally, the previous research on acquisition numbers also considered other markets that are thought to influence the behaviour of the stock market. Melicher, Ledolter and D'Antonio (1983) and Weston, Chung and Hoag (1990) investigated the influence of bonds on the level of acquisition activity. The rational for this was the same in both of these papers; changes in other capital markets will have an impact on the funding opportunities necessary for the successful acquisition of another company. Priestley (1994) examined the influence of commodities markets on the stock market for exactly the same reason and found that the behaviour of these two markets were linked and that they each responded to alterations in the others value.

Table 2.2 demonstrates the wide variety of variables that have been used in the past to examine acquisition activity and asset prices. There is little consistency between previous papers which means that there are few precedents to follow.

Table 2.2 Theories for Levels of Acquisition Activity that Appear in the Previous Literature

Theory	Author(s) of Paper	Rationale Given in Paper
Informational Difference Theories		
Economic Disturbance Theory	*Gort (1969)*	*Economic shocks alter expectations. Discrepancies in valuations occur in periods of economic disturbance and these differences of opinion increase takeover levels.*
Divergent Opinions Theory	Golbe and White (1988)	If analysts cannot agree on share value then differing opinions lead to increased acquisitions as firms attempt to purchase an undervalued company
Reputation of M & A	Rock (1994)	If M&A has a poor reputation takeover numbers drop as firms cannot raise funds.
Economic Outlook	Rock (1994)	The expectations that individuals have for the future performance of the market and their firm will influence whether they are willing to either buy or sell shares
Economic Prosperity Theories		
Economic Conditions Theory	Steiner (1975)	Economic factors can increase funding and make more acquisitions possible
Merger Activity - General Prosperity Theory	Melicher, Ledolter and D'Antonio (1983)	Acquisition activity reflects changes in business activity and changes in the capital markets
Changes in Economic Circumstances Theory	Golbe and White (1988)	Unexpected economic changes make different skills and opportunities essential for firm growth. Acquisition numbers rise as firms attempt to reach this new situation
Economic Influences on Share Price Theories		
Bargain Theory of Acquisitions	Golbe and White (1988)	Economic alterations can change asset prices so that some firms become undervalued and, as a result, become "bargains" to other purchasers
Financing Alternatives for Sellers	Rock (1994)	If firm owners feel future share value will increase they will not sell at this time
Market Change Theories		
Acquisitions Prompt Other Acquisitions	Palepu (1986)	If takeovers increase other firms join in to prevent their firm becoming a target
Structure - Conduct - Performance Theory	Fairburn and Geroski (1993)	Changes in industry structure alter firm performance which alters their behaviour. This makes more acquisitions essential if other firms in that industry are to survive
Financing Alternatives for Buyers	Rock (1994)	The condition of the capital markets can have an impact on the number of takeovers by altering the availability of funds for the purchase
Strategic Challenges and Opportunities	Rock (1994)	Strategic challenges and opportunities in domestic and international markets alter takeover numbers. If there are many alternatives the number of takeovers will drop

The theories for acquisition levels are all related to the economic conditions in some way. All of these theories are based on the belief that the condition of the economy alters firm behaviour which, in turn, alters the level of acquisition activity. The theories can be split into several broad groups. The first group represents theories that relate economic changes to the expectations held by both shareholders and the market as a whole. Changes in expectations can lead to differing opinions concerning the value of shares and this disparity can increase the number of acquisitions as potential bidding firms believe that they can identify suitable firms for acquisition that the market has currently undervalued. This theory was used by Gort (1969) in his economic disturbance theory, Golbe and White (1988) as part of their idea that different opinions create acquisition opportunities and Rock (1994) who used it as part of his theory that expectations for future economic performance will alter takeover levels in the immediate future.

The second group of theories are the economic prosperity theories. These theories suggest that economic prosperity increases the available funds that firms have for investment which will lead to an increase in takeovers as companies use these funds for the purchase of another firm. Melicher, Ledolter and D'Antonio (1983) and Golbe and White (1988) both believed that this explanation represented a potential link between economic conditions and the number of takeovers in the following periods, although neither of the models that they created proved particularly good at predicting takeover levels. The third group of theories refer to the influence that economic conditions can have on the value of shares. It is believed that the price of shares will dictate the number of acquisitions and, as a result, the economic factors that alter asset prices will ultimately control the number of takeovers. Golbe and White (1988) used this theory, amongst others, in their investigation of acquisition numbers and Rock (1994) claimed that economic expectations could be represented by the value of the stock market and that this factor would alter takeover levels depending on whether the market was expected to rise or fall in the future. If the stock market was expected to rise then acquisition numbers would decrease as shareholders would hold on to their shares in the hope that future share prices would elevate the value of their investment beyond the value of the current bid. Finally there are the market change theories that

state that alterations in market structure can alter acquisition levels. This can apply to the capital markets, as Rock (1994) suggested, where changes will alter the value of shares and will also change the number of financing opportunities available to potential bidding companies which will change the level of acquisition activity in the future. Alternatively these changes could be within industrial groups as Fairburn and Geroski (1993) discussed in their "structure - conduct - performance" theory. Here is was argued that alterations in industry composition will affect the performance of all of the firms within that industry. This change will, in turn, alter the future behaviour of these firms as they react to the changed circumstances. These changes in behaviour could lead to an increase in takeover activity as firms attempt to secure their position and strengthen their future situation. Fairburn and Geroski also pointed out that one of the most radical ways that the composition of an industry can be changed is through an acquisition so this theory introduces the idea that an increase in the number of acquisitions in the past can prompt an increase in the number of acquisitions taking place in the future. Allied to this theory, there is also the idea that an increase in acquisition activity may lead to a further increase in the future as managers start to copy each others behaviour. It is possible that managers may feel that, if other firms in their industry are involved in takeovers, that they must attempt an acquisition to protect themselves and prevent their firm becoming a target, as Palepu (1986) suggested.

These theories represent the current ideas about the level of takeover activity and the economic factors that may be appropriate leading indicators to consider in the empirical work that follows. The table below, Table 2.3, lists the variables that will be used in the empirical section of this chapter and relates them to both the terms that have been used in previous papers and the theories discussed above. This should demonstrate that each of the variables has been used previously or is directly linked to one of the theoretical papers that exists on this subject.

Table 2.3 Variables Used in the Following Empirical Work and their Links to Previous Research and the Theories for the Level of Acquisitior Activity

Variable Name	Author(s) of Papers Using the Same Variable	Theory(ies) Supporting the Use of Such Variables and Selected References
See Tables 2.1 and 2.2 for Further Description of the Variables and Theories Appearing in the Previous Literature and Further References		
Acquisition numbers in the previous period	Shugart and Tollison (1984)	• Previous acquisition activity can change the composition of markets and make further takeover activity inevitable. Fairburn and Geroski (1993), Golbe and White (1988) • The reputation of M & A can alter the level of acquisition activity. Rock (1994) • An increase in acquisition numbers can lead other firms into attempt a purchase either to protect themselves from becoming a target or to follow other firms in their industry. Palepu (1986)
	Palepu (1986)	
	Golbe and White (1988)	
	Hughes (1993)	
	Fairburn and Geroski (1993)	
CBI Business Confidence		• The reputation of M & A can have an impact on the level of future activity. Rock (1994) • Future expectation for economic performance will alter the level of acquisition activity. Gort (1969), Rock (1994)
Effective Exchange Rate	Priestley (1994)	• The number of strategic challenges in both domestic and international markets will alter the level of acquisition activity is businesses may find they are occupied in other ways. Rock (1994) • Economic changes can alter the availability of funds for takeovers. Rock (1994) • Economic conditions can alter assets prices and acquisition numbers. Gort (1969), Golbe and White (1988)
Industrial Production (GDP) (Continued over page)	Gort (1969)	• Economic conditions can alter funding opportunities . Steiner (1975)
	Steiner (1975)	• Changes in business activity can alter the number of acquisitions Melicher, Ledolter and D'Antonio (1983)
	Melicher, Ledolter and D'Antonio (1983)	• Unexpected changes in economic conditions may make new factors important for continued firm development. Golbe and White (1988)
	Golbe and White (1988)	• Economic changes can alter expectations . Gort (1969) Expectations for the future will alter the level of acquisition activity Rock (1994)

Industrial Production (continued)	Rock (1994)	
	Beenstock and Chan (1988)	
	Priestley (1994)	
Interest Rate (1 Year Interbank lending rate)	Steiner (1975)	• Economic factors can alter funding opportunities. Steiner (1975), Rock (1994) • Changes in capital markets can alter acquisition levels. Melicher, Ledolter and D'Antonio (1983) • Unexpected changes in economic conditions alter takeover numbers Golbe and White (1988)
	Golbe and White (1988)	
	Rock (1994)	
	Priestley (1994)	
	Chen, Roll and Ross (1986)	
Price of North Sea Oil	Chen, Roll and Ross (1986)	• Oil prices can alter asset prices. Chen, Roll and Ross (1988)
Treasury Bills (Three month T-bills)	Beenstock and Chan (1988)	• Changes in capital markets can alter funding opportunities for takeovers . Steiner (1975), Rock (1994)
Return on the FTA	Steiner (1975)	• Differing opinions of share value can lead in an increase in takeovers. Golbe and White (1988). • Future expectations for share prices will alter the level of acquisition activity. Rock (1994) • Economic prosperity increases the number of takeovers. Steiner (1975), Melicher, Ledolter and D'Antonio (1983)
	Melicher, Ledolter and D'Antonio (1983)	
	Golbe and White (1988)	
	Chen, Roll and Ross (1986)	
UK Economic Cycle (CSO Coincident Indicator Series)		• Economic conditions are linked to takeover levels. Steiner (1975), Melicher, Ledolter and D'Antonio (1983), Golbe and White (1988), Rock (1994)
International Markets (OECD World Markets Series)	Rock (1994) Priestley (1994)	• Positive economic conditions are linked to takeover levels. Steiner (1975), Melicher, Ledolter and D'Antonio (1983), Golbe and White (1988), Rock (1994) • Strategic challenges and opportunities on overseas markets can alter the level of acquisition activity
* Indicates an article that refers to asset pricing		

The first term to consider is the number of acquisitions which has been used in previous empirical work by Shugart and Tollison (1984), Golbe and White (1988) and Fairburn and Geroski (1993). The reasons for including this term are varied. Golbe and White simply declared that the acquisition numbers they investigated were clearly autoregressive, whilst Hughes (1993) discussed the clear patterns in takeover numbers that exist in the UK. This term can also be linked to several different aspects of the theory concerning the level of acquisition activity. Fairburn and Geroski's "structure - conduct - performance" theory (1993) stated that acquisitions can alter the composition of an industry which can make it essential for other firms within that industry to attempt further takeovers in the near future. This is similar to an argument in Palepu (1986) in which the author claimed that increased takeover activity may prompt other firms to acquire as a way of defending themselves against unwanted takeover bids.

The second variable is the level of business confidence, constructed from the results of the CBI surveys in the UK. This term will be used to represent to expectations that exist for the future performance of the economy. Rock (1994) argued that high expectations for the future should lead to a decrease in acquisition numbers as shareholders will be less willing to sell their shares at the current price if they feel that this could be exceeded by the future performance of their stock. Alternatively, Melicher, Ledolter and D'Antonio (1983) argued that increased confidence will lead to an increase in acquisitions as managers feel that the economic conditions are good enough for them to attempt risky investments such as the purchase of another firm. It remains to see which of these theories is supported by the empirical evidence.

The effective exchange rate was used by Priestley (1994) as one of the factors that can alter the value of asset prices. This variable is also referred to in several of the theoretical papers on acquisition numbers. Rock (1994) claimed that the relative competitiveness of firms internationally will influence acquisition activity and could also alter the level of funding available for takeovers. If the exchange rate is such that UK firms are highly competitive internationally then there may be a decrease in

takeover activity as firms concentrate on international markets rather than domestic takeovers. To this end the exchange rate is expected to be negatively related to the future level of takeovers. The converse is true of the industrial production variable, here gross domestic product. This appears in every paper that has attempted to model acquisition numbers using economic indicators and in almost all of the papers that examined factors that can change asset prices. In every case there is a positive link between increased industrial production and increased acquisition activity in the periods that follow. This relationship relates to the theory that economic prosperity increases the funding opportunities that are essential for takeovers and also to the theory that an increase in expectations for future economic performance will herald an increase in takeover numbers as firms feel that greater prosperity means that they can attempt riskier projects such as the purchase of another firm.

Another popular term in the previous papers is the interest rate. Here the one year Interbank rate is used following results in the previous papers that suggest that terms referring to longer time periods are better indicators of takeover activity. In all of these papers this term is found to be negatively related to the level of acquisition activity although it is not always significantly in the final models. The importance of this term is the close link between interest rates and funding opportunities, as Steiner (1975), Melicher, Ledolter and D'Antonio (1983) and Rock (1994) all observed. Successfully raising the necessary finding is a pre-requisite for acquisition activity and many firms need to turn to commercial lenders to manage this. When interest rates increase some companies may find that they simply cannot afford to purchase another firm and the overall level of takeover activity will decrease.

The next term in the data set is the price of North Sea oil. According to Chen, Roll and Ross (1986) this term should be included as an important economic factor that can influence share prices. They observed that oil prices have only become important since the 1970's when OPEC become a major force in the world economy. Changes in oil prices may affect acquisition numbers by reducing the level of funds that firms have available for investing. Increases in oil prices may be passed along to the customers but this can take time and, until these extra expenses can be recouped, firms

may find that they have to halt some of their planned investments. To this end oil prices are expected to be negatively linked to acquisition numbers.

Treasury bills are represented by the return on three month t-bills. Beenstock and Chan (1988) used this as an alternative measure of changes in the capital markets, which could alter future asset prices. This corresponds to the theories for acquisition activity used by both Steiner (1975) and Rock (1994) who both claimed that capital market changes can influence acquisition numbers by altering the potential funding opportunities that exist. If the available funding is reduced then acquisition numbers will decrease as companies can no longer raise the necessary funds for a proposed takeover and vice versa.

The next term is the level of the stock market. This is another term that was very popular in the previous papers that attempted to link economic factors to acquisition numbers and it was often significant in the previous empirical work. There is some disagreement, however, as to the sign that this term should have. Authors such as Steiner (1975) and Melicher, Ledolter and D'Antonio (1983) expected this term to be positive as this would represent economic prosperity and business confidence which should be linked to increase funding which would lead to an increase in the level of acquisition activity in the future. Alternatively, in the empirical work by Golbe and White (1988) and the theory of economic expectations propounded by Rock (1994) this term should be negatively related to acquisition numbers. According the Golbe and White, when share prices are relatively low some firms will be undervalued by a significant margin and will represent a bargain for potential acquirers which should be followed by an increase in takeover activity. Rock argued that stock prices are indicative of the markets expectations for future economic performance and, if market expectations are high, takeovers will decrease as shareholders are advised not to sell as the value of their stock is expected to increase considerably in the future.

The last two terms in the data sets represent economic indicators series. The first of these is the CSO short run indicator series which represents the expected level of the UK economic cycle in the next quarter of the year. This can be simply linked to

the economic prosperity theory for takeovers that was advocated by, amongst others, Steiner (1975), Melicher, Ledolter and D'Antonio (1983) and Golbe and White (1988). Last of all there is the OECD world markets series that represents the conditions of the international markets as advocated by both Rock (1994) and Priestley (1994). Priestley claimed that international conditions would influence asset prices in the UK which, in turn, could alters the level takeovers. This is supported by the theory that positive economic conditions lead to increased takeover activity as was used by Steiner (1975), Melicher, Ledolter and D'Antonio (1983) and Golbe and White (1988). Conversely, Rock argued that such terms are important in the examination of acquisition activity as the level of alternative strategic challenges open to firms will be negatively related to the level of takeover activity. When there are many possible other projects to consider then takeover numbers will decrease and when there are few alternative investments then acquisitions will increase. Again this means that there is no clear precedent to indicate the sign that this term should have in the following empirical work.

Correlation Coefficients Between the Number of Acquisitions and the Macro-Economic Variables

It is possible that some of these terms will be highly correlated and including such variables in an econometric model could create problems with multicollinearity. The following two tables, Tables 2.4 and 2.5, represent the correlation matrices for these variables. Table 2.4 represents the data in its original form and Table 2.5 represents the stationary terms that will be used in the modelling procedure. Where the terms are highly correlated in this second table only one of the correlated variables will be included to prevent the issue of multicollinearity arising in the results.

Table 2.4 Correlation Coefficients between the Number of Acquisitions and the Macro-Economic Variables (Actual Values)

	Acquisition Numbers	Confidence	Foreign exchange	Industrial production	Interest rate	Oil price	Stock market	Treasury bills	UK market
Business confidence	0.08	1							
Foreign exchange	-0.07	0.09	1						
Industrial production	0.44	-0.32	-0.7	1					
Interest rate	0.22	-0.63	0.44	-0.02	1				
Oil price	-0.47	-0.07	0.58	-0.62	0.24	1			
Stock market	0.13	-0.18	-0.88	0.85	-0.35	-0.56	1		
Treasury bills	0.32	-0.58	0.42	0.01	0.94	0.17	-0.36	1	
UK market	0.59	0.58	0.03	0.16	-0.28	-0.27	0.04	-0.19	1
International markets	0.29	-0.21	-0.82	0.95	-0.25	-0.65	0.95	-0.23	0.12

Table 2.5 Correlation Coefficients between the Number of Acquisitions and the Macro-Economic Variables (Differenced Values)

	Acquisition Numbers	Confidence	Foreign exchange	Industrial production	Interest rate	Oil price	Stock market	Treasury bills	UK market
Business confidence	0.25	1							
Foreign exchange	-0.03	0.09	1						
Industrial production	0.05	0.07	-0.03	1					
Interest rate	-0.21	-0.22	0.13	0.27	1				
Oil price	-0.17	-0.14	-0.06	-0.09	0.21	1			
Stock market	@0	-0.11	-0.27	0.05	-0.1	0.14	1		
Treasury bills	-0.1	-0.07	-0.14	0.22	0.3	0.12	-0.07	1	
UK market	0.22	0.13	-0.11	0.6	-0.02	-0.16	-0.08	0.13	1
International markets	0.23	0.29	-0.08	0.48	-0.17	-0.35	0.23	0.09	0.56

2.2.3 Empirical Results

There are several hypotheses that require testing in this section each depending on the results of the previous one. The first hypothesis to be tested will determine whether acquisition activity is random or not. If the random hypothesis is rejected then it will be possible to attempt to model takeover numbers against macro-economic factors. In the event that a suitable model cannot be found then a third hypothesis, investigating the nature of the merger wave, will be investigated. Each of these hypotheses will be explained in detail in the appropriate part of the empirical results that follow.

Testing for the Random Nature of the Market for Corporate Control

This is the first hypothesis that requires testing. The null and alternative hypotheses can be expressed in the following manner.

$\mathbf{H_0^1}$: the behaviour of the acquisition market is random

$\mathbf{H_A^1}$: the behaviour of the acquisition market is not random

Testing the first hypothesis can be done it two ways as way explained previously. The first test is the regression of the number of acquisitions against a time trend as suggested by Golbe and White (1988). Table 2.6, below, contains the residuals for this regression equation and the pattern of positive and negative runs is clear. As Golbe and White observed, if the behaviour of the acquisitions market was truly random then the residuals would not appear in runs. There are eighty four observations in the acquisitions data used here but the residuals generated by this process form just twelve runs of positive and negative numbers. This result suggests that the random activity hypothesis could be rejected for the number of acquisitions that occur in the UK.

Table 2.6 Runs of Positive and Negative Residuals of the Regression of Acquisition Numbers Against a Time Trend

Run length	Number of positive	Number of negative	Total	Expected total for random sequence
84 Observations				
1	2	2	4	21
2	2	0	2	10.5
3	0	0	0	5.25
4	0	0	0	2.63
5	0	0	0	1.3
6	0	1	1	0.66
7	0	0	0	0.34
8	1	0	1	0.16
9	0	0	0	0.08
10	0	0	0	0.04
11	0	0	0	0.02
12	0	1	1	0.01
13	0	0	0	0.0005
14	0	0	0	0.003
15	1	0	1	0.001
16	0	0	0	0.0006
17	0	1	1	0.0003
18	0	1	1	0
Total	6	6	12	@42

The second test for the validity of this hypothesis is a Box-Jenkins procedure on the series of acquisition numbers. This should facilitate the identification of the time series process that best fits the number of acquisitions and further confirm whether or not there is a link between the terms in this series. The series representing the number of acquisitions is non-stationary until a first difference is taken. Now that the degree of integration is known, examining the graphs of the autocorrelation function and the partial autocorrelation function yields a tentative identification of the series that best represents the data. In the graph of the autocorrelation function none of the lags are significant, suggesting that the data does not incorporate a moving

average component. The partial autocorrelation function has just one significant lag suggesting that there is just one likely option for this data, an ARIMA(1,1,0) process. The Q-statistics associated with this model verify this supposition, as the model is correctly specified. In simple terms that means that the best predictor of the number of acquisitions that will take place in any period is the number of takeovers that occurred in the previous period. Given this result it is possible to reject the null hypothesis that the behaviour of the acquisition market is random. Furthermore, these results suggest a cyclic pattern of behaviour in the activity of the corporate control market which corresponds to the results in Golbe and White (1988). This leads on to the second hypothesis in this chapter.

Testing for a Relationship Between Macro-Economic Conditions and the Market for Corporate Control

As with the section immediately above, it is possible to state a null and alternative hypothesis that defines the empirical work in this section. Here they are as follows :

$\mathbf{H_0^2}$: acquisition numbers can be predicted using macro-economic terms

$\mathbf{H_A^2}$: acquisition numbers cannot be predicted using macro-economic terms

To test this supposition an OLS regression models can be created to model the relationship between the number of acquisitions and the macro-economic factors that were introduced earlier. Each of the variables has been made stationary and any highly correlated terms have been identified in Table 2.5 above. There are very few highly correlated terms when the variables are stationary but, when such relationships do exist only one of the terms will be included in the model. As was explained in Section 2.2.1, this model will be created using the general to specific methodology.

Melicher, Ledolter and D'Antonio (1983) observed that acquisitions are normally planned in the two quarters immediately before the launch of the bid. Using this to limit the number of lags, the general model is created using the first and second

lags of each of the independent variables. The resulting model is well-specified although several terms are not statistically significant. Applying the general to specific methodology, as explained in the methodology section, these terms can be removed to create the specific model which represents all of the important information in the model in a more concise and coherent manner. The specific model appears in Table 2.7, below. It contains only statistically significant terms and is well-specified.

Table 2.7 OLS Regression Result, Specific Model

Variable [1]	Coefficient [2]
Constant	-0.04 (-1.01)
Acquisition Numbers (-1)	0.41 (3.19) *
Effective foreign exchange rate (-1)	-1.74 (-1.72) ***
Total industrial production (-1)	4.34 (2) ***
Interest rate (-2)	-0.64 (-1.69) ***
North Sea oil price (-1)	-0.39 (-2.58) **
FT-All share index (-1)	0.68 (1.7) ***
Adjusted $R^2 = 0.48$	
Durbin-Watson Statistic = 2.004	
Diagnostic Tests	
Serial Correlation (Godfrey's LM Test)	
$\chi^2(4) = 3.76$	$F(4,36) = 0.78$
Functional Form (Ramsey's RESET Test)	
$\chi^2(1) = 0.25$	$F(1,39) = 0.21$
Normality (Jarque - Bera's Test)	
$\chi^2(2) = 0.96$	F-test is inapplicable
Heteroscedasticity (Koenker's Test)	
$\chi^2(1) = 0.93$	$F(1,45) = 0.91$
Denotes term is significant at 1% *, 5% **, 10% ***	
[1] Lags are given in parentheses	
[2] T statistics are in parentheses	

The first term to consider in this specific model is the acquisition numbers series which is positively related to the dependent variable. This terms was included in this model following the previous work by authors such as Golbe and White (1988) and Fairburn and Geroski (1993). The previous papers that examined this term nearly all concluded that acquisition numbers are strongly autoregressive and, as a result, this term would be highly informative when predicting acquisition numbers in the future. The autoregressive nature of takeover numbers was confirmed in the first empirical section here where the random activity theory was rejected after it was demonstrated that there is a clear link between consecutive terms in the series of acquisition numbers. The importance of this term also supports the theory that an increase in acquisition numbers can lead to a further increase in takeover activity in the following periods. Palepu (1986) suggested that when takeover numbers increase other firms may also attempt an acquisition as a means of protecting themselves from unwanted takeover bids by quickly increasing the size of the company. Fairburn and Geroski (1993) used a similar argument in their "structure - conduct - performance" theory. Here it was argued that changes in industry composition will alter the performance of all of the firms operating within that industry and this change can force these firms to change their behaviour in the future. Specifically, Fairburn and Geroski claimed that the remaining firms would be forced to attempt acquisitions in order to defend their market share and protect themselves from any potential difficulties that might have been created by the alterations in their industry. The authors noted that the most radical changes in industry composition are invariably brought about by takeovers which can drastically alter the composition of an industry by changing the number and construction of the firms in that industry. As a result, Fairburn and Geroski were able to demonstrate how it is possible that previous acquisition activity will prompt further acquisition activity in the future, as the result in this model shows.

The effective exchange rate is negatively related to the level of takeover activity and this finding corresponds with the idea that acquisitions may increase if the value of Sterling decreases as this change in the exchange rate may make it inadvisable to invest overseas. If firms are forced to change their plans and look for an alternative

investment within the UK then this could well lead to an increase in takeover numbers. This supports Rock's theory that the level of alternative strategic challenges will alter takeover numbers. Rock (1994) claimed that takeover activity will increase if there are few alternative opportunities for investment and he suggested that examining the competitiveness of firms in overseas markets would be one possible way of determining whether other projects exist. Gort (1969) and Golbe and White (1988) both suggested that exchange rates would be appropriate indicators of economic changes that could alter acquisition numbers by changing expectations for future performance and forcing firms to look for alternative investment opportunities, such as takeovers.

A positive sign is allocated to the industrial production term which corresponds to the findings in all of the papers reviewed previously where the authors attempted to identify economic factors that have an impact on the level of takeover activity. Steiner (1975), Melicher, Ledolter and D'Antonio (1983), Golbe and White (1988) and Rock (1994) all agreed that increased industrial production would be followed by an increase in takeover numbers. An increase in industrial production leads to an increase in the profits of the involved companies. This increase in profits means that firms will be able to invest more and, as a result, an increase in industrial production could be expected to herald an increase in the overall level of activity in the corporate control market. This is the economic prosperity theory for acquisition numbers that can be seen in Table 2.2, above.

Interest rates are negatively related to acquisition numbers. The negative result is consistent with the articles by Steiner (1975), Melicher, Ledolter and D'Antonio (1983) and Golbe and White (1988) and reflects the fact that low interest rates will make it easier for the bidding companies to borrow the funds that they will require to purchase another firm and the two period lag suggests that this is one of the first issues to be considered when companies start to consider an acquisition. Since relatively few companies exist that can finance an acquisition without borrowing at least some of the funds necessary for the purchase it is clear how important low interest rates can be. If the cost of borrowing funds for the acquisitions is too high then the takeover is

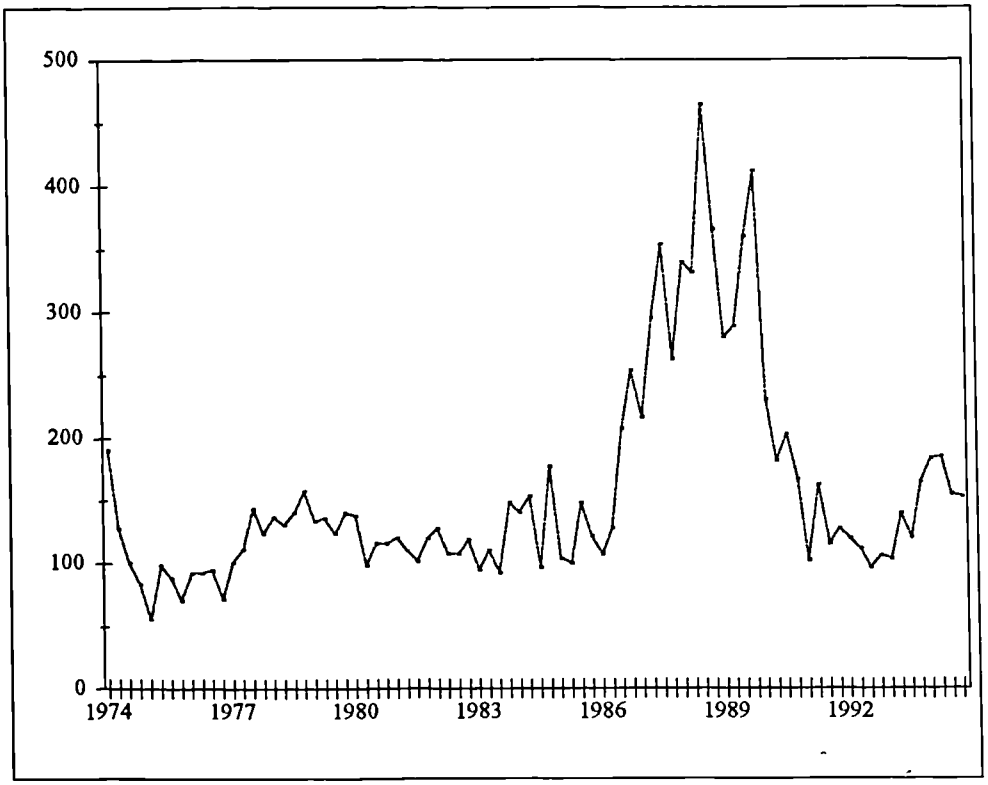
unlikely to proceed and the converse is true in periods of low interest rates. Oil prices are also negatively linked to the number of acquisitions as was predicted earlier. Chen, Roll and Ross (1986) used oil prices in their study as a factor that could elicit a response from the stock market and it is clear from these results that an increase in the price of oil can also reduce the number of acquisitions that follow. When oil prices increase most companies would simply pass the increase on to their customers and, presumably, this would limit the impact of such an alteration. However for some companies, for example those that use oil and oil derivatives as raw materials, an increase in the price of oil could dramatically increase the firms production costs and, consequently, reduce the profits that that company can generate. This appears to be the case here as an increase in the price of oil is negatively linked to the number of takeovers. Again, this result emphasises the great importance of funding in acquisition planning, as did the term referring to interest rates. If a potential bidder firm cannot afford the takeover then, irrespective of how important it may be for that firm to attempt the purchase, the acquisition will not go ahead.

Finally, there is the stock price variable which is positively linked to the number of acquisitions. This mirrors the findings of Gort (1969), Steiner (1975), Melicher, Ledolter and D'Antonio (1983) and Golbe and White (1988) who all found that terms representing the stock market were positively related to the number of acquisitions in their studies. Again this can be linked to the economic prosperity theory for takeovers which suggests that periods of economic well-being will prompt an increase on takeover activity. In the previous literature on this subject high share prices are linked to higher profitability, greater funding opportunities and increased confidence in the economy. All of these factors can induce an increase in acquisition numbers.

This model is well-specified and the variables included in the model behave exactly as they are expected to which corresponds to the finding of previous research in many ways. It is surprising then that the model has such a low R^2 value. The R^2 value measures the accuracy of the model and suggests that the model can only predict forty-eight percent of the changes in acquisition numbers correctly. To understand why this is the case, the period that the model covers needs to be examined. The total

number of acquisitions in the years covered by this data set changes greatly. In particular, the years 1986 to 1990 represent the last merger wave to take place in the UK and the takeover numbers are very high in this period. Figure 2.1, below, represent the total number of acquisitions in the years covered by this data set.

Figure 2.1 Total Acquisition Numbers in the UK For the Years 1974 to 1994



It seems likely that the great increase in acquisition numbers that occurred during the years 1986 to 1990 is the reason why the model created here is relatively inaccurate. None of the macro-economic terms that were used in the model behaved in the same extreme manner as the level of acquisition activity and this could be the reason for the disappointing performance of an otherwise very well-specified model. To see if this supposition is correct the residuals of the model need to be examined. Table 2.8, below, contains summary statistics for the residuals over the total period, which are then subdivided into the merger wave years and the remaining years. The final column contains the ratio of the values for the merger wave years and the non-wave years.

Table 2.8 Summary Statistics for the Residuals of the Specific OLS Model

Statistic	**All Years**	**Merger Wave Years**	**Non-Wave Years**	**Ratio of Merger Wave to Non-Wave Years**
Mean	5.5E-08	0.014	-0.0073	-1.9286
Standard Error	0.0331	0.0587	0.0271	2.1675
Standard Deviation	0.2268	0.2625	0.1682	1.8655
Variance	0.0514	0.0689	0.0283	2.431
Range	0.9951	0.9951	0.6557	1.5176
Minimum Value	-0.4539	-0.4539	-0.3072	1.4776
Maximum Value	0.5413	0.5413	0.3485	1.5529
Sum	2.6E-06	0.2809	-0.1967	-1.4286

These summary statistics demonstrate that the residuals in the merger wave years are much larger than in the other years covered by the sample period. This suggests that the merger wave is a feature that cannot be predicted by the macro-economic factors that were used in the model, although those terms are sufficient to create a well-specified model that appears to be fairly accurate in the other years covered by the data. The phenomena of the merger wave cannot, it seems, be predicted by using the same economic factors that are related to acquisition levels at other times. During these years the level of acquisition activity rises to unprecedented heights and the macro-economic factors cannot determine these numbers. This could be an extreme form of Fairburn and Geroski's (1993) theory that high levels of acquisition activity can prompt even higher takeover numbers in the future. This may represent a period of irrational behaviour amongst managers of bidding firms as it seems to be highly unlikely that all of the firms who became acquirers during the merger wave would have needed to attempt an acquisition to counteract some changes that have occurred in their industry. A certain proportion of these acquisitions must be prompted by the fact that there were, at that time, a great many takeovers occurring. Managers may feel that, if so many other firms are involved in the corporate control market, they should be doing the same to prevent themselves looking inactive, vulnerable or simply inefficient. This means that acquisition numbers in a merger wave will be unpredictable to a certain degree as there is no suitable independent variable

that could be used to reflect how the current level of activity will influence managers and whether they will feel that they must enter the corporate control market because so many other firms are already involved in takeovers. This means that periods of excessive acquisition activity seem to incorporate a unpredictable element that could require further investigation. The last section of this empirical work will investigate the merger wave feature and, in particular, will investigate the possibility that it is a speculative bubble created by the influence that high levels of acquisition activity can have on the managers of uninvolved firms.

Testing for a Speculative Bubble in the Market for Corporate Control

The null and alternative hypotheses in this section are :

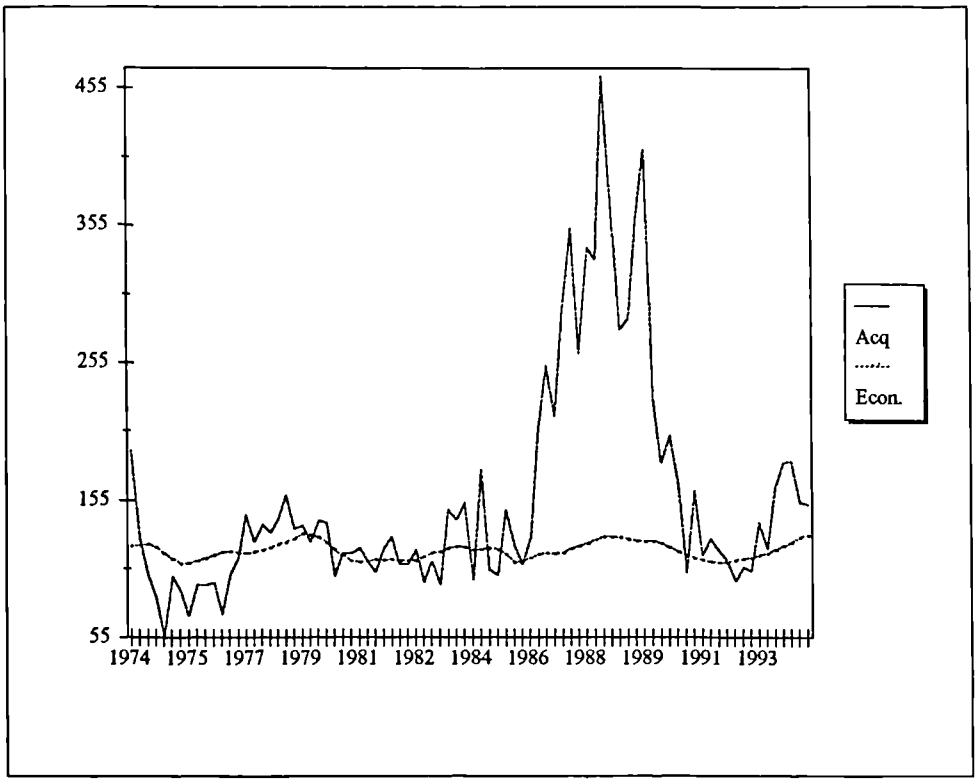
$\mathbf{H_0^3}$: merger waves are speculative bubbles

$\mathbf{H_A^3}$: mergers waves are not speculative bubbles

A bubble is created by the presence in a series of a sequence of positive abnormal innovations that move the series away from its fundamental value. The first step in testing for a bubble is to determine the value of these innovations. To do this it is essential to identify the fundamental series that drives the behaviour of the acquisition market under normal circumstances. Usually, this sort of test is carried out on data where there is some form of equation that will enable the calculation of the expected value of the series. Once this term has been estimated, the innovations can be created by subtracting this calculated value from the actual value of the series. In the case of acquisition numbers this type of equation is missing and another term needs to be identified instead. The fundamental series will need to behave in the way that the acquisition numbers are expected to act in the absence of any bubbles or other unexpected tendencies in the data. It has been possible to identify a link between the behaviour of the economic cycle and the number of acquisitions in the previous sections. The earlier results suggest that, with the exception of the merger wave that occurred between 1986 and the end of 1990, the macro-economic variables that appear in the OLS result represent the fundamental series that drives the activity in the

corporate control market. Unfortunately, some of the terms that appear in that model are not available as far back as would be needed to use this model as the fundamental series. However, this result makes it clear that there is a link between the level of acquisition activity and the economic cycle. Consequently, an economic cycle indicator can be used to provide the fundamental series in this case. The Central Statistical Office produce several series that are designed to replicate the behaviour of the economic cycle in the UK. For simplicity the short indicator series, that has already been used in this chapter, can be used to represent the economic cycle. The terms used to create this series include virtually all of the variables that appeared in the specific model reported earlier in this chapter which enhances the suitability of this series. The problem with using this series is that it has been smoothed which will reduce its accuracy somewhat and that it is designed to have a mean value of one hundred whilst the number of acquisitions has no such constraints placed upon it. This second issue can be rectified fairly simply. It is easy enough to scale the CSO series so that it has the same mean value as the acquisition series, but this would still be wrong. If the mean value of the acquisition series is calculated using all of the data the resulting value would be artificially inflated by the presence of the merger wave and the re-scaled indicator series would be too high, again creating erroneous innovations. What is required is a series that represents the activity of the acquisitions market without the presence of any unusual features. Consequently, it is necessary to identify the mean value of the acquisitions series in the absence of the merger wave and scale the CSO indicator series to match this value. The merger wave occurred between 1986 and 1990. If this period is eliminated the mean of the remaining values is 117.11 as opposed to 157.14 over the whole sample. The CSO indicator is scaled to match this mean value and it is an acceptable proxy for the behaviour of the acquisition market in the absence of unusual features. Figure 2.2 represents the total acquisition numbers for the years 1974 to 1994. Superimposed on this figure is the CSO short indicator series scaled to represent the fundamental series used in the following bubble tests.

Figure 2.2 Acquisition Numbers and the Economic Cycle as the Fundamental Series



By calculating the differences between these two series the innovations can be calculated and the remaining tests for a bubble can be completed. The first criteria is the autoregressive nature of the series. In the investigation of the first hypothesis, it was clearly suggested that there was a link between the consecutive numbers of acquisitions, in other words that it is autoregressive. The remaining tests for a bubble refer to the innovations series.

The first factor is the presence of kurtosis. The following equation should be equal to zero if there is no kurtosis in the series.

$$Kurtosis = \frac{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^4}{n}}{\left[\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}\right]^2} - 3 \qquad (2.6)$$

where x_t is the variable under investigation and n represents the number of observations

In this case the value of the statistic is 2.83 which confirms that there are large outliers in the data as would be expected in the event that a bubble was present. The presence of skewness also needs to be identified so that a test can be done to identify the presence of runs in this series. The statistic for skewness, equation 2.7, should be zero if this feature is absent from the series of innovations.

$$Skewness = \frac{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^3}{n}}{\left[\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}\right]^{\frac{3}{2}}} \qquad (2.7)$$

where the components of the equation are the same as in equation 2.6.

The calculated value of this equation is 1.82 confirming that the series is not symmetrical. This means that it is now possible to test for the presence of runs in the data. The runs test uses exactly the same methodology as appears in the article by Blanchard and Watson. The innovations series is split into two sections representing the positive and negative innovations. The length of the runs in both of these sections are then examined to see if they are substantially different from a random spread. If the acquisitions series does not vary significantly from the underlying fundamental series, then the innovations should be random and split approximately equally between the positive and negative signs. However, "the runs for the bubble innovation will [then] tend to be longer than for a purely random sequence, making the total number of runs over the sample smaller." (Blanchard and Watson, 1982, page 310). Table 2.6 holds the results of this analysis, including the expected totals for each of the run lengths.

Table 2.9 Runs of Positive and Negative Innovations in the Acquisitions Series

Run Length	Number of positive	Number of negative	Total	Expected total for random sequence
84 Observations				
1	2	5	7	21
2	4	3	7	10.5
3	2	2	4	5.25
4	0	0	0	2.63
5	1	0	1	1.31
6	0	0	0	0.66
7	1	0	1	0.33
8	1	0	1	0.16
9	0	0	0	0.08
10	0	0	0	0.04
11	0	0	0	0.02
12	0	1	1	0.01
13	0	0	0	0.005
14	0	0	0	0.003
15	0	0	0	0.0013
16	0	0	0	0.0006
17	0	0	0	0.00032
18	0	0	0	0.00016
19	1	0	1	0.00008
Total	12	11	23	@42

This result strongly suggests that there are runs in the innovations series for the number of acquisitions. This implies that acquisition activity follows a cyclical pattern capped, periodically, by a rational bubble. The economic cycle drives the level of takeover activity most of the time and provides the fundamental series from which the bubble grows. If this theory is correct, it also explains why it has proved impossible to accurately predict the timing of merger waves in the past. Any model that can accurately follow the cyclic behaviour of the usual pattern of behaviour will fail to predict the bubble effect, however accurately it models acquisitions in other periods. However, it is important to note that these tests do not prove definitively that there is a

bubble in the number of acquisitions as each of these features, whilst always present in a bubble, are not created exclusively by speculative bubbles and could be due to other factors. Consequently the null hypothesis in this section cannot be conclusively accepted at this point although there are strong indications that it is correct.

Conclusion

This chapter aimed to investigate the behaviour of the market for corporate control in the UK. Specifically it was concerned with the testing of three hypotheses. The first of these was that the level of acquisition activity is random. If this notion is correct it could explain the absence of a single theory capable of predicting the number of acquisitions over more than one time period. This supposition was tested by examining the link between consecutive terms in the series and determining whether or not any link existed and was more than just coincidental. By examining the number of acquisitions against a time trend and then subjecting the series to a Box-Jenkins procedure it became clear that there was a distinct relationship that linked these items and so the hypothesis of random behaviour could be rejected.

Once the first hypothesis was eliminated, it became necessary to test the second one. This is the idea that the level of acquisition activity can be predicted by examining the economic conditions. Several articles exist on this subject and these studies, together with other papers concerning the behaviour of the economy, suggest a set of variables that are capable of representing many of the important aspects of the UK economic system. By applying the general to specific methodology to this data it was possible to devise an OLS model representing the level of acquisition activity in terms of some of these macro-economic factors. The most important ones are the previous number of acquisitions, exchange rates, industrial production, interest rates, oil prices and the stock market indices. These terms are all significantly related to the number of acquisitions that occur within the next quarter and, on the whole, these findings correspond to the results in the articles that already exist on this topic.

There is, however, the issue of the low R^2 value associated with this result. This problem seems to be caused by the excessive acquisition activity of the period 1986 to 1990, the last UK merger wave. Here the OLS model cannot predict the extreme levels of activity that take place in the corporate control market. Instead there is some suggestion that this phenomena may be a speculative bubble that diverges from the usual acquisition activity at this time. Although it is not possible to definitely accept this hypothesis on the strength of the tests given here it does imply that such a result is possible for the number of acquisitions in the UK. This is a possible area for further research if more data could be found concerning the level of acquisition activity in the UK.

The implications of this study are clear. The level of acquisition activity can be linked to the economic situation in the months preceding it and this result lends weight to the idea that economic variables may prove to be important in the identification of companies that are likely to become involved in the takeover process. In the other empirical chapters that follow this one the emphasis will be upon the identification of firms that have a high probability of being involved in the takeover process in the near future and in one of those chapters macro-economic terms will be included since it seems to be clear that there is a relationship between the number of acquisitions and the condition of the economy.

Chapter 3. Sampling Theory and Data Collection

Introduction

This chapter has two purposes both connected with the data sets used in Chapters 4 and 5. The first of these is to analyse the various approaches to sample construction whilst the second intention is to introduce the data. In particular, the second section of the chapter will explain the links between the theories for acquisition activity and the variables that are chosen for inclusion in the data sets and provide a simple preliminary analysis of the information that is contained in the data sets.

Previous research in this area can be split into two categories. There are the papers that have attempted to explain the motives that generate acquisition activity and the articles that have investigated the characteristics of the firms that become involved in these takeovers. In many cases the articles concerning the motives for acquisition activity did not attempt to relate these ideas to specific variables whilst the second area of previous research tends to relate the characteristics to a very limited number of motives. This means that there are a limited number of precedents in this area and some of the theories that will be examined here have not been previously incorporated in an empirical investigation of the characteristics of companies that take part in acquisitions.

The rest of this chapter is organised as follows. Section 3.1 is divided into two sections. Section 3.1.1 is concerned with sampling theory as it relates to the analysis of acquisitions and the types of empirical models that will be used in the later chapters. Section 3.2 goes on to consider the selection of the variables and their links to both previous empirical work and the motives for acquisition activity before examining the data used and, employing some simple statistical tests, to demonstrate that there are some significant differences between both the acquired and acquiring firms and the two sets of companies that are not involved in acquisition activity. This section also

includes correlation matrices for the data sets that will be used in the following two chapters and, finally, there is the conclusion.

3.1 Theories and Evidence

3.1.1. Sampling Theory

The construction of the data sets is of considerable importance as the factor of interest in this thesis, acquisitions activity, does not apply to all of the individual firms in the population. If every firm in the UK was involved in acquisition activity the design of the sample would be far simpler than it is here. Furthermore, the number of companies that become involved in the acquisition process is relatively low compared to the total number of firms. Since this small group of firms is of particular interest it seems logical to construct the data sets in such a manner so that the maximum quantity of information can be gained about these firms. Consequently, there are certain issues that arise concerning the construction of the sample that need to be dealt with. To tackle these issues requires some consideration of the fundamentals of sampling theory. In particular there are some methods of selecting a sample that will deal appropriately with this situation whilst other approaches are less effective.

The central concept in sampling theory is the construction of a data set that enables the examination of some characteristic of the population from which the sample is drawn. The analysis of this characteristic should be, preferably, unbiased, efficient and encompass an acceptable degree of accuracy. The only way to guarantee that there is absolutely no bias in the sample selection would be to use the entire population of interest as the sample. Since this is almost certainly impossible due to the excessive size of most populations and the difficulty in finding complete information about all of the individuals, the only practical response is to gather the most representative and accurate sample possible accounting for the costs of gathering this data. This is done, fundamentally, by carefully defining the population of interest and drawing the data in a manner appropriate to the analysis that will follow. The cost of gathering a sample is almost irrelevant here as the only cost is in time. Instead, this

section will concentrate in the advantages and disadvantages in each of the sampling methods.

Simple Random Sampling

The most frequently used method of constructing a sample is the technique known as simple random sampling. This technique also forms the basis of several of the more complicated sampling methodologies that can be used. As the name suggests it is the idea of drawing the sample elements from the population without any endogenous selection process. It is usual to undertake the selection process without replacement and the individual elements are assumed to have the same probability of being chosen. Furthermore, each of the possible combinations of elements has the same probability of being selected as any other combination. This means there are a total number of combinations of ${}^{N}C_{n}$ in which a sample of n can be selected from population of N.

A sample created in this way would be representative of a population in which all the individuals have the same fundamental characteristics and there are no divisions that split the sample into distinct sub-populations. In the event, however, that some partition does exist that can be applied to the entire population then this type of sample may prove to be inappropriate. If the distinctions between these sub-populations are important in the analysis then there is a very serious potential problem, as it would be possible to select a sample randomly that did not include any individuals from one of the sub-populations. This is particularly likely if one of the sub-populations is small compared to the rest of the population or other sub-populations. This would make any ensuing analysis difficult or, at the very least, dubious. Such a situation is likely to arise when examining company acquisitions. The number of acquired and acquiring companies is much smaller than the number of firms that do not enter the acquisition process yet these are the firms that are of most interest and so they must be included in the sample. Under these circumstances, the use of a randomly selected sample is clearly inappropriate and another approach must be used.

Stratified Random Sampling

In the situation where the population is divided and the nature of the partition is important, it is often sensible to use a stratified random sampling approach. This technique is based on several assumptions. Firstly, that it is possible to split the entire population into several groups without any exceptions. Secondly, that these sub-populations, or strata, are completely distinct meaning that it is not possible for any individual to be placed in more than one of these groups at any one time. Lastly, it is assumed that the individuals within each of these strata are homogeneous and heterogeneous with the elements in the other strata with respect to the dividing variable. According to Barnett (1991), if the sample is stratified to enable a certain population characteristic to be modelled more accurately, the necessary homogeneity should follow naturally from the selection of a sensible set of strata.

Once the strata have been defined it should be possible to select a sample that involves elements from each of these strata. The process of stratified simple random sampling works by selecting a given number of observations from each of the individual strata and then pooling these terms to create the total sample for use in the estimations. This approach has the advantage that it facilitates the modelling of subdivisions within the data which may be analytically important and this added detail can often result in an overall increase in the precision of the resulting estimations. It is often the case that there is far less variation within the strata than across the population as a whole, which also increases the accuracy of any estimations.

These arguments seem to lead to the conclusion that a sample collected using the stratified random sampling technique will be more appropriate for the data on companies involved in acquisitions than will the simple random sampling methodology. In order to successfully model acquisition activity, it will be necessary to acknowledge the fact that the population of companies is split into sub-populations based on whether or not a company is involved in the acquisition process. When examining company takeovers it is important to distinguish between those firms that have been

acquired and those that have not and so it seems sensible to partition the population in this way.

The next step in the stratified random sampling technique involves deciding how much of the sample is to be drawn from each of the sub-populations. There are two popular approaches to this issue based on the concepts of proportional and optimum sampling. Proportional sampling is the simpler of these two concepts and requires little information about the individual strata. Weights are assigned to each of the strata depending on the percentage of the total population that each one represents. The weights are calculated by dividing the size of the relevant stratum by the size of the population as a whole. This relationship, that the sample sizes are directly related to the stratum sizes across the entire population, leads to the proportional name given to this method of selection. The technique is very simple provided that the weights can be calculated and that there are no other hindrances to the collection of data. In the event that there are practical problems in collecting the data, then the technique of optimum allocation should be used. This methodology calculates the best way in which the sample should be allocated across the strata, taking into consideration any costs inherent in the data gathering and any differences in the variances between the strata. The basic approach in the optimum sampling technique is to minimise the variance for a given cost or, conversely, to minimise the cost of the collection process whilst gathering a sample that remains within a pre-determined range of variances. In this study, the costs of collecting the data are not important and so this technique has little importance in this context.

In seems, then, that proportional stratified sampling is a better approach to take when examining corporate control, than is the approach based on the concept of simple random sampling. It ensures that the sample will involve terms from all of the strata which cannot be guaranteed with completely random sampling. However, the impact of a stratified sample on the efficiency of the following estimations needs to be addressed. This potential problem is examined in some detail by Barnett (1991) who compared the efficiency of the estimators for the mean value of the population as

computed using both the proportional stratified and simple random methods of data selection.

The variances of the two estimators indicate the relative efficiency of the respective approaches. The variances of these two types of sample can be simply expressed. Equations 3.1 and 3.2 represent the variances of the simple random sample and the stratified sample respectively.

$$Var(\bar{y}) = \frac{(1-f)S^2}{n} \qquad (3.1)$$

$$Var(\bar{y}_{st}) = \frac{(1-f)}{n}\sum_{i=1}^{k}\frac{N_i}{N}S^2 \qquad (3.2)$$

where
N represents the total number of items in the population from which the sample has been drawn
N_i represents the number if items in the i th stratum in the population ($i = 1, 2, ..., k$), which is involved in the sampling methodology
S^2 represents the variance of the entire population from which the sample has been drawn
f represents the sampling fraction which can otherwise be expressed in the form n/N and
n represents the sample size.

To determine which of these estimators is the more efficient Barnett suggests subtracting one from the other, as in equation 3.3. It is then necessary to examine the circumstances under which the result is either positive or negative.

$$Var(\bar{y}) - Var(\bar{y}_{st}) = \frac{(1-f)}{n}\left(S^2 - \frac{1}{N}\sum_{i=1}^{k}N_iS_i^2\right) \qquad (3.3)$$

The first step in this process requires the substitution of an alternative way of expressing the population variance into equation 3.3. This alternative expression is given as equation 3.4, below.

$$S^2 = \frac{1}{N-1}\left[\sum_{i=1}^{k}(N_i - 1)S_i^2 + \sum_{i=1}^{k} N_i\left(\bar{Y}_i - \bar{Y}\right)^2\right] \qquad (3.4)$$

where $\bar{Y}_i$ and $\bar{Y}$ respectively denote the estimates of the population mean in the i th stratum and in total.

There are now two cases to consider, depending on the sizes of the sub-populations. If the following expression, equation 3.5, is true then the stratum sizes can be called large.

$$\frac{N_i - 1}{N-1} \cong \frac{N_i}{N-1} \qquad (3.5)$$

In this case the variance of the population can be re-expressed in the form of equation 3.6.

$$S^2 \cong \frac{1}{N}\left[\sum_{i=1}^{k} N_i S_i^2 + \sum_{i=1}^{k} N_i\left(\bar{Y}_i - \bar{Y}\right)^2\right] \qquad (3.6)$$

This substitution means that the difference between the variances can be written in the form of the following equation.

$$Var(\bar{y}) - Var(\bar{y}_{st}) = \frac{(1-f)}{nN}\sum_{i=1}^{k} N_i\left(\bar{Y}_i - \bar{Y}\right)^2 \qquad (3.7)$$

From this result Barnett inferred that the stratified sample mean is more efficient that the simple random sample mean, as this equation is consistently positive, unless all the mean values within each of the strata are the same. Furthermore, he concluded that the difference between these two terms is related to the variation in the stratum mean values. This result, however, only applies to the case of large sample sizes.

When the stratum sizes are small the subtraction equation, number 3.3 above, takes the following form

$$Var(\bar{y}) - Var(\bar{y}_{st}) = \frac{(1-f)}{n(N-1)}\left[\sum_{i=1}^{k} N_i\left(\bar{Y}_i - \bar{Y}\right)^2 - \frac{1}{N}\sum_{i=1}^{k}(N-N_i)S_i^2\right] \qquad (3.8)$$

which, as Barnett observed, is not necessarily positive. For the stratified estimator to be more effective that the equivalent simple random term the following inequality must hold.

$$\sum_{i=1}^{k} N_i\left(\bar{Y}_i - \bar{Y}\right)^2 > \frac{1}{N}\sum_{i=1}^{k}(N-N_i)S_i^2 \qquad (3.9)$$

When equation 3.9 is rearranged to find an expression for the variance Barnett claimed that it is possible to draw the same conclusion as in the large stratum case; the stratified estimator will be more efficient if the variance within the stratum is small compared to the variance between the strata although he does not specify why this result holds. This result means that the stratified sampling approach is preferable to the purely random sampling technique provided that the strata are carefully and appropriately selected.

However, there is still a problem with this type of sampling technique when examining acquisition activity. The number of acquisitions is so small compared to the total population, in this case the number of companies in the UK, that any sample gathered from this section of the population, using the proportional technique advocated here, could prove to be too small to provide any meaningful information. Under these circumstances the stratified sampling technique needs to be refined still further, removing virtually all traces of random selection from the process.

Choice-based Sampling

The last type of sampling approach to be considered is the choice-based sampling technique. Here the probability of an individual being selected for inclusion in the sample is subject to which stratum it occupies at that particular point in time. This allows one or more of the strata to be deliberately over-sampled at the discretion of the person drawing the sample, to greatly increase the quantity of information that

can be gathered from the members of that particular section of the population. This is particularly relevant in the case of acquisitions where the number of acquired companies is very small compared to the total number of firms. This technique makes it possible to select terms for inclusion in the data sets that are paired, should this be desirable. For example, a sample could be selected that included all the companies that were acquired in a certain period and these could all be paired with the firms that acquired them which would be ideal for the purposes of the study of takeover activity.

This does, however, result in a sample that is a significantly distorted version of the population and it is essential to make sure that any methods of estimation applied are either capable of coping with this feature or that the degree if error is quantifiable and correctable. In particular many methods of estimation, for example the usual form of the maximum likelihood estimator, assume that the sample has been gathered randomly and as such any results will be heavily biased. It would seem most appropriate, then, to examine the applicability of choice-based samples against the fundamental types of models that will be used later on, logit models and Cox's proportional hazard function models.

Palepu (1986) examined this potential problem for logit models. He considered a choice-based sample which is created by pairing together the acquired firms with the non-involved companies that he was considering. Considering an individual company, Palepu assigned two probabilities to this firm; firstly the probability that the firm is a target and secondly the probability that this same individual is selected from the sample and correctly identified as a target. It is possible to express the second of these probabilities as a conditional expression, equation 3.10 below.

$$p' = \frac{p\left(\frac{n_1}{N_1}\right)}{p\left(\frac{n_1}{N_1}\right) + (1-p)\left(\frac{n_2}{N_2}\right)} \qquad (3.10)$$

where

p is the probability that the firm under examination is a target in the population of all companies

p' is the probability that the firm under examination is a target in the sample that has been created using choice-based sampling
n_1 is the total number of targets in the sample of firms that has been created using choice-based sampling
n_2 is the total number of non-targets in the sample of firms that has been created using choice-based sampling
N_1 is the total number of target firms in the population of all companies from which the sample is drawn
N_2 is the total number of non-target firms in the population of all companies from which the sample is drawn

It is clear that p' is clearly not the same as p. The normal version of the maximum likelihood method implicitly assumes that the sample has been selected randomly, in other words that these probabilities are the same. This immediately creates a bias which can be expressed in terms of the difference between these two probabilities. After a little simplification, this can be written in the form of equation 3.11, below.

$$p'-p=\frac{p(1-p)\left[\left(\frac{n_1}{N_1}\right)-\left(\frac{n_2}{N_2}\right)\right]}{p\left(\frac{n_1}{N_1}\right)+(1-p)\left(\frac{n_2}{N_2}\right)} \qquad (3.11)$$

When considering acquisition activity it is normal to select a sample in which the strata are of very similar, if not identical, sizes as this enables acquired and acquiring companies to be examined together. In the population of all companies the strata containing both the acquired and acquiring firms are both considerably smaller than the stratum containing the firms that are not involved in acquisition activity. Applying these factors to the expression above it soon becomes apparent that it will always be positive. In other words, a logit model calculated using the usual maximum likelihood methodology over a choice-based sample will significantly overestimate the probability of firm being acquired, for example. This bias has a very distinctive effect on the outcomes produced by this type of estimation, as Palepu explained. Consider a sample involving acquired firms and companies that were not involved in acquisition activity. If the sample were created using the random sampling technique and a logit

model estimated using the usual maximum likelihood estimator the four possible results would be as follows.

·1 A target firm is correctly classified
·2 A non-target is wrongly classified as a target (A Type II Error)
·3 A non-target firm is correctly classified
·4 A target is wrongly classified as a non-target (A Type I Error)

When the sample is choice-based and the same methodology is used to estimate the models, the bias inherent in this estimation method means that the four outcomes are now.

·1 As Previously
·2 As Previously
·3 As outcome 2, increasing the number of type II errors
·4 As outcome 1, eliminating some of the type I errors

This clearly illustrates the problem that can be created when using a sample and estimation method that are incompatible. It is clear that this bias cannot be left uncorrected. There are several ways of dealing with this problem. The simplest solution is to calculate the size of the bias, using Palepu's formula, and adjust the predicted values accordingly. This is the manner in which this problem will be dealt with in the later chapters.

It is now important to find out whether the same problem exists for the hazard function models that will also be estimated. This question was dealt with by Cosslett (1993) who concentrated on semi-parametric discrete choice models that have binary outcomes. Cox's proportional hazard function model is a semi-parametric discrete choice model and the binary version of this equation will be used in Chapters 4 and 5, which makes Cosslett's scenario precisely the situation that will arise in the empirical work that follows. Cosslett examined the relative effectiveness of the maximum likelihood estimator for a semi-parametric discrete choice model on both a randomly

selected sample and a choice-based sample. This enabled Cosslett to state that "a likelihood-based semi-parametric estimator that works for random sampling can be used without modification when the sample is choice based." (Cosslett, 1993, page 39) This means that the selection of a choice-based sample, essential to maximise the information gained from a relatively small section of the population, can be used without bias in a normally estimated proportional hazard model. It appears, then, that there is little loss of efficiency or precision in using a choice based sample compared to a randomly selected one and the facility to deliberately over-sample one small section of the population will almost certainly improve the results gained in the study of acquisitions when compared to a random sample.

Finally, all that remains to discuss on the subject of sampling theory are the types of errors that can arise via poor sampling. Some of these can apply in the creation of samples that consider acquisition activity and these issues can be summarised in the following points.

·1 *Coverage Errors.* It is rarely possible to sample the entire population and so there may be some features of the population that are not represented in the sample. In the case of acquisition activity this error may well be present in the sample. However, it is very difficult to detect and so it is equally difficult to determine how much of a problem this actually is .

·2 *Non-response Errors.* Some of the individuals in the sample may not reveal all the required pieces of information about themselves and these gaps reduce the effectiveness of the sample.

·3 *Intrinsic Errors.* As in point 1, it is highly unlikely that the sample and the population will be the same. There may be variations and trends in the population that the sample fails to replicate because it does not include the relevant observations. This error is virtually impossible to avoid to some degree although, as with the coverage error, it is difficult to detect or quantify.

·4 *Processing Errors.* It is possible that initial manipulation of the data may result in the creation of minor errors. For example, values might be rounded rather than used in the original and more accurate form.

These flaws are present in virtually every sample irrespective of how carefully the sample is drawn and irrespective of the technique that is used to create the sample. Careful selection and manipulation can minimise them to a considerable extent but it is virtually impossible to remove them entirely.

This concludes this discussion of the basics of sampling theory. It is quite acceptable to use a choice-based sample for the analysis of takeovers. Using this sampling technique it is possible to create a data set that maximises the quantity of information that can be gathered on a relatively small section of the population of companies, namely the firms that become involved in acquisition activity. Whilst there is a potential problem if this type of sample is used for the estimation of the logit models, the resulting bias is quantifiable and the predicted values can be adjusted to rectify this flaw. In the case of the hazard function models no such problem arises.

3.2 Methodology and Summary Statistics

3.2.1 Methodology

The sampling methodology that will be used in the creation of these data sets is the choice-based approach that was explained in the previous section. This technique enables the samples to be created using a large number of firms that have been involved in acquisition activity, despite the fact that these companies make up a small proportion of the entire population of companies. Any other sampling approach would result in data sets that contained, at most, just enough of these firms to represent the proportion of the population that these companies represent. In the UK case that would be approximately fifteen percent. This low proportion would result in the creation of uninformative data sets and, accordingly, poor results. To avoid this outcome the choice-based approach will be used.

3.2.2 Data

In the Chapter 1, the literature review, it became clear that there are a great many motives for acquisition activity. Before collecting the data sets it is important to decide which of the available pieces of information concerning the firms are relevant and which of the prevailing theories each of these terms represents. It may transpire that some of the theories for acquisition activity can be reflected by more than one of the variables or it may not be possible to link all of the theories to the available information in a convincing and informative manner. This section is designed to discuss these potential links and decide which variables should be used in the following chapters. It is also important to ensure that the characteristics of involved firms, as they appear in some of the recent articles, are also included in these data sets. Table 3.1 lists the variables used in previous papers that have attempted to predict acquisition activity. This table also references the authors of each paper and gives a brief explanation of the rational that each author gave for using that variable.

Table 3.1 Variables Used in the Analysis of Acquisition Activity in the Previous Literature

Variable Name and Definition (if given)	Author(s) of Paper	Reason for Use In Paper
Efficiency Variables		
Asset Turnover		
Ratio of Sales to Fixed Assets	Dietrich & Sorensen (1984)	Indicates efficient use of assets and / or represents cash flows
Asset Turnover	Spindt, Tarhan & Sung (1996)	Measures changes in performance
Ratio of Sales to Total Assets	Altman (1984) *	Decreasing sales can indicate financial distress
Operating Efficiency		
Operating Efficiency	Kim (1994)	Poor Management creates operating inefficiency and financial slack
Profitability Variables		
Profitability		
Profitability	Cosh, Hughes, Lee & Singh (1989)	Acquired firms may be less profitable than average
Pre-tax Return on Net Assets	Hughes (1993)	Acquired firms may be below average profitability
Return on Shareholders Equity		
Return on Shareholders Equity	Palepu (1986)	Measures managerial efficiency and profitability
Return on Shareholders Equity	Agrawal & Walkling (1994)	Profitability distinguishes targets from other firms
Returns on equity over Three and Ten Year Periods	Sawyer & Shrieves (1994)	Profitability trends can distinguish acquired and acquiring firms
Cash Flow Return on Equity	Spindt, Tarhan & Sung (1996)	Operating performance can distinguish targets and bidders
Return on Assets		
Return on Assets Employed	Cosh & Hughes (1995)	Acquired firms may be less profitable than average
Ratio of Net Income to Total Assets	Sridharan & Reinganum (1995)	Targets and bidders in hostile takeovers have differing returns
Cash Flow Return on Assets Employed	Spindt, Tarhan & Sung (1996)	Operating performance can distinguish targets and bidders
Pre-tax Profit Margin		
Ratio of EBIT to Sales	Dietrich & Sorensen (1984)	Indicates the future cash flows of the target firm
Ratio of EBIT to Total Sales	Cosh, Hughes, Lee & Singh (1989)	Acquired firms are less profitable than average

Ratio of EBIT to Sales	Altman (1984) *	Decreasing levels of profit can indicate a firm in financial distress
Net Profit Margin		
Ratio of Net Profit to Total Sales	Cosh & Hughes (1995)	Profitability can distinguish bidders and targets
Investment Variables		
Payout		
Ratio of Dividends to Earnings	Dietrich & Sorensen (1984)	Signals the lack of investment opportunities for the target firm
Dividends		
Percentage Increase in Dividend per Share	Bagwell & Shoven (1988)	Shareholder contentment can be measured in dividend value
EPS		
Ratio of Total Earnings to Number of Shares	Levine & Aaronovitch (1981)	May distinguish bidders and targets
Dividend Yield		
Dividend Yield	Sawyer & Shrieves (1994)	Payouts to shareholders alter acquisition funding opportunities
P/E ratio		
Ratio of Stock Price to Earnings	Levine & Aaronovitch (1981)	Share prices influence the value of the takeover
Ratio of Stock Price to Earnings	Dietrich & Sorensen (1984)	Reflects the expected cost of the acquisition
Ratio of Stock Price per Share to Earnings per Share	Palepu (1986)	Low p/e ratio firms may be attractive to high p/e ratio acquirers
Ratio of Stock Price per Share to Earnings per Share	Ambrose & Megginson (1992)	Low p/e ratios may keep the price of the takeover down
Gearing Measures		
Capital Gearing		
Ratio of Debentures to Capital Employed	Levine & Aaronovitch (1981)	Gearing may distinguish bidders and targets
Ratio of Long Term Debt to Total Assets	Dietrich & Sorensen (1984)	Signals the presence of unused debt capacity in a target firm
Ratio of Long Term Debt to Equity	Palepu (1986)	Provides an alternative proxy for the available financial resources
Ratio of Long Term Debt to Equity	Ambrose & Megginson (1992)	Another measure of available funds
Ratio of Total Debt to Total Assets	Sawyer & Shrieves (1994)	Targets and bidders can be separated by their leverage ratios
Long or Short Term Loans to Total Assets	Cosh & Hughes (1995)	Gearing measures can help separate targets and bidders

Times Interest Earnt		
Ratio of EBIT to Interest Payments	Dietrich & Sorensen (1984)	An alternative measure of unused debt capacity
Long and Short Term Liquidity Measures		
Liquidity		
Ratio of Net Working Capital to Total Assets	Sawyer & Shrieves (1994)	Bidders and targets can be distinguished by their liquidity
Ratio of Operating Income To Assets	Kim (1994)	Financial slack alters takeover benefits
Current Ratio		
Ratio of Current Assets to Current Liabilities	Levine & Aaronovitch (1981)	May distinguish bidders and targets
Ratio of Current Assets to Current Liabilities	Dietrich & Sorensen (1984)	Signals excess liquidity, inefficiency and / or excess debt capacity
Ratio of Current Assets to Current Liabilities	Auerbach & Reishus (1988)	Indicates the potential for increased future savings
Ratio of Current Assets to Current Liabilities	Cosh & Hughes (1995)	Liquidity ratios may distinguish targets and bidders
Ratio of Current Assets to Current Liabilities	Altman, Haldeman & Narayanan (84)*	Liquidity can help in distinguishing financial difficulty
Acid Test Ratio		
Ratio of Liquid Assets to Total Assets	Levine & Aaronovitch (1981)	An alternative way to distinguish bidders and targets
Ratio of Liquid Assets to Total Assets	Palepu (1986)	Provides a proxy for the available financial resources
Three Year Average Ratio of Liquid to Total Assets	Ambrose & Megginson (1992)	Liquidity indicates the potential for future investment
Net Liquid Assets to Total Assets	Cosh & Hughes (1995)	An alternative liquidity ratio to distinguish bidders and targets
Creditor Days		
Ratio of Creditors to Sales	Higson & Elliot (1994)	Takeovers may influence financial restructuring
Debtor Days		
Ratio of Debtors to Sales	Higson & Elliot (1994)	Takeovers may influence financial restructuring
Debt		
Ratio of Debt to the Total Market Value of the Firm	Morck, Schliefer & Vishny (1988)	Targets of hostile takeovers have more debt than most other firms
Long Term Debt Ratio	Datta & Iskandar-Datta (1995)	Debt can influence the financing options in an acquisition

Size and Growth Measures		
Size		
Market Value of Equity	Dietrich & Sorensen (1984)	Smaller firms are cheaper to acquire
Net Book Value of Assets	Palepu (1986)	Larger firms may be safe from acquisition attempts
Logarithm of Net Assets	Cosh, Hughes, Lee & Singh (1989)	Target firms are thought to be smaller than other companies
Net Book Value of Assets	Ambrose & Megginson (1992)	Smaller firms are more likely to be targets
Net Assets	Hughes (1993)	Acquired firms are below median size
Market Value of Equity	Agrawal & Walkling (1994)	Size may distinguish targets from other firms
Value of Total Sales	Sawyer & Shrieves (1994)	Large targets will influence the bidders share price
Total Sales	Sridharan & Reinganum (1995)	Acquired and acquiring firms in hostile takeovers differ in size
Logarithm of Total Assets	Cosh & Hughes (1995)	Acquired firms may be smaller than the industry average
Total Sales	Altman, Haldeman & Narayanan (84)*	Smaller firms are more likely to run into financial trouble
Growth		
Annual Rate of Change in Sales	Palepu (1986)	Acquired firms are growing more slowly than average
Change in Net Assets per Annum	Cosh, Hughes. Lee & Singh (1989)	Target firms are thought to grow more slowly than other companies
Annual Rate of Change in Sales	Ambrose & Megginson (1992)	Targets grow more slowly than average
Change in Net Assets Over Three Years	Hughes (1993)	Acquired firms grow more slowly than average
Diversification Measures		
Managers / Employee Ratio		
Ratio of Number of Managers to Employees	Lecraw (1984) *	Managers will seek to diversify to secure their own positions
Tax Variable		
Tax		
Estimated Tax Gain After the Takeover	Auerbach & Reishus (1988)	Indicates whether the acquisition will improve the acquiring firm
* Indicates an article that does not refer directly to the acquisition activity but deals with a similar or related area		

The first group of variables are the efficiency terms. These have been featured in previous papers to represent the manner in which the target firms assets are used and to monitor the performance of the managers of the acquired firms prior to the takeover. It is expected that the acquired firms will be less efficiently run than other companies whilst bidding companies are more effectively managed than the average firm in their industry. The second group of variables are the profitability terms. Once again it has been observed in previous studies that the target firms are less profitable than the average firm in their industry, whilst the acquiring companies are thought to be more profitable. Dietrich and Sorensen (1984) observed that the analysis of a firms profits to provide some indicators about the future cash flows of that firm, which can have an impact on the desirability of that company as a target. This can also be linked to the notion of managerial efficiency as Palepu (1986) observed.

The third group of variables are the investment terms which are used for a variety of different reasons. Terms such as dividend per share and dividend yield have been used to indicate the level of investment that the current managers can find for their firm. If the level of dividends is high, then the shareholders will be content but the managers may be relatively ineffective as they are failing to utilise the firms earnings to fund new projects. Variables such as the p/e ratio reflect the value of the firm on the stock market which can have a strong bearing on the probability that the company will be acquired. Firms that are relative undervalued will be more suitable acquisition targets that correctly or overvalued companies as authors such as Dietrich and Sorensen (1984) and Ambrose and Megginson (1992) observed. Conversely, the bidding firms may be relatively overvalued which would allow them access to a greater variety of funding opportunities which would also increase the likelihood that they would become involved in acquisition activity.

Some measure of gearing appears in nearly all of the previous papers that have attempted to analyse the characteristics of firms that take part in acquisitions. This term is usually included to denoting the unutilised debt capacity of the firm but it can also act as a proxy for the level of available financial resources as Palepu (1986) observed. Liquidity variables are a very widely used group of term in the previous

empirical papers on this subject. The reasons given for including some measures of liquidity in these previous papers are not linked to specific motives for acquisition activity but instead are used to indicate the financial health of the firms and the prospects that they have for future investments. Next there are the variables referring to the size and rate of growth in the companies that take part in takeovers. Target firms are thought to be smaller than their industry average whilst the bidding firms are thought to be larger. This difference enables the acquiring firm to minimise the cost of the acquisition as firm size is often directly related to the value of its shares. Finally, there are two terms that appear in a great many theoretical papers but rarely feature in empirical estimations. The first of these is the idea that an acquiring firm may purchase another company in order to expand and diversify often appears in the previous literature. Lecraw (1984) wrote a paper concerning the probability that a firm will diversify and analysed this phenomena empirically. The second of these rarely seen empirical variables is some measure of the potential tax gains that may be created by an acquisition. This is a frequently mentioned motives but again it has not been the subject of empirical analysis in the past. Auerbach and Reishus (1988) estimated the expected tax gain in an acquisition and, although their variable cannot be duplicated exactly here owing to differences in the data that is available some measure of tax should be included in the empirical examination of takeovers.

It is interesting to note the very diverse collection of variables that occur in these previous papers and the differing definitions that they have. There is no consensus of opinion about which variables should be used or how many of them are important instead each paper uses its own mix of terms. By analysing several of these options, as will be done here, it may be possible to determine which of the various possibilities is the most effective indicator in each section. The next table, Table 3.2, draws together all of the motives for acquisition activity that are given on the previous literature. The motives are grouped together based on the broad subject areas that they refer to. In each case, the authors name is given and a brief rationale of the motive is given as presented in each of their papers.

Table 3.2 Motives for Acquisition Activity that Appear in the Previous Literature

Theory	Author(s) of Paper	Rationale Given in Paper
Managerial Theories		
Managerial Ambition (Agency Problem)	Jensen and Ruback (1983)	Managers compete for the right to control firm assets and increase their influence
	Schliefer and Vishny (1988)	An acquisition expands a firms interests and the scope of the managers influence
	Jensen (1988, 1992)	Free Cash Flow Theory : Bidders prefer to invest in takeovers than pay dividends
	Larcker (1992)	Agency problems allow managers to attempt takeovers for their own ends
	Lev (1992)	Increased firm size increases managerial compensation
	Parkinson and Dobbins (1993)	Managers will pursue their own interests irrespective of shareholders wishes
	Berkovitch and Narayanan (1993)	Target firms are selected to increase the welfare of the bidding firms managers
Managerial and Market Myopia	Jensen (1988, 1992)	Fear of takeover makes managers increase short term profits to protect themselves
	Jarrell, Brickley and Netter (1988)	Stock markets like short term performance and so takeovers raise bidder profiles
Positive NPV Projects	Dietrich and Sorensen (1984)	Managers will attempt projects that increase the expected NPV of the firm
	Parkinson and Dobbins (1993)	Takeovers should only be attempted if they increase shareholder wealth
Acquiring Managerial Error (Hubris)	Roll (1986)	There are no takeover gains except when the bidding firm over pays for the target
	Berkovitch and Khanna (1993)	Takeovers are prompted by bidding firms managers, creating no shareholder gains
Correcting Target Managerial Inefficiency	Palepu (1986)	Managers failing to maximise shareholders gains will be replaced in an acquisition
	Giammarino and Heinkel (1986)	Takeovers are a mechanism of correcting and disciplining inefficient managers
	Schliefer and Vishny (1988)	Hostile takeovers remove managers who ignore the shareholders interests
	Jensen (1988, 1992)	Bad managers will be punished as the market makes their company a target
	Cosh, Hughes, Lee and Singh (1989)	Threatening a takeover may improve managerial efficiency in the target firm
	Franks and Harris (1993)	Acquisitions ensure more effective allocation of the target firms assets
	Jenkinson and Mayer (1994)	Takeovers serve to transfer control from inefficient to efficient managers
	Boisi and Essig (1994)	Disciplinary takeovers occur as shareholders seek to control the managers

Informational Theories		
Asymmetric Information	Hart (1977)	Value maximising behaviour is possible only with informational asymmetry
	Giammarino and Heinkel (1986)	The bidder must hold some informational advantage to start the acquisition process
	Parkinson and Dobbins (1993)	The bidder has information about the target that is not publicly available
	Franks and Harris (1993)	The bidder knows more than the market but delays can remove this advantage
Market Efficiency	Scherer (1986)	In a fully efficient market, poor managers would be eliminated. In the absence of full efficiency, takeovers are needed to remove ineffective managers
	Jensen (1988, 1992)	Takeovers increase total economic welfare by allowing firms to combine and alter
	Lev (1992)	Eliminating an ineffective management improves the firm and the whole market
Undervalued Target	Palepu (1986)	Low value firms are more attractive targets than expensive companies
	Jarrell, Brickley and Netter (1988)	If the market incorrectly values a target, the bidding firm can gain in a takeover
	Weston, Chung and Hoag (1990)	Markets ignore long term investing and undervalues such firms, making targets
New Markets, Diversification and Expansion Theories		
Entry to New Markets	McCardle and Viswanathan (1994)	Sometimes it is only possible to enter a markets by purchasing a firm in that field
Diversification and Risk Reduction	Levy and Sarnat (1970)	Diversification can stabilise a firms and allow it access to new areas
	Amihud and Lev (1981)	Significant risk reduction may follow a carefully selected diversifying acquisition
	Lev (1992)	Product or market extension can lead to reduced risk
	Hughes (1993)	High market concentration forces firms to diversify to grow and develop
Market Share and Competitive Position	Weston, Chung and Hoag (1990)	Market power can be gained through expansion or diversification
	Creehan and Leger (1994)	Competitive advantage can be gained through acquisition
Increasing Size for Defence	Palepu (1986)	Larger firms are less likely to be acquired
Synergistic Theories		
Synergy (Economies of Scale)	Bradley, Desai and Kim (1988)	Takeovers exist to exploit an opportunity created by the combination of two firms
(continued over page)	Morck, Schliefer and Vishny (1988)	A motivate for takeovers is the desire to combine firms and benefit synergistically
	Weston, Chung and Hoag (1990)	Financial and operating synergies result from a takeover increasing firm potential

Synergy (Economies of Scale)	Lev (1992)	Earnings can be stabilised and financial performance improved by a takeover
	Berkovitch and Narayanan (1993)	Combining the target and bidder firms maximises the shareholders wealth
	Berkovitch and Khanna (1993)	Acquisitions are only viable if they lead to a some form of synergistic increase
	Achtmeyer (1994)	Synergistic gains are possible in most acquisitions but only last for a short time
	Limmack (1994)	Synergy is the main cause of wealth in takeovers
	Harris (1994)	Takeovers are prompted by synergy gains from the combining of two firms
	Jenkinson and Mayer (1994)	Companies benefit from economies of scale created by takeovers
Restructuring Theories		
Restructuring	Weston, Chung and Hoag (1990)	Restructuring operating processes can cause considerable efficiency gains
	Thompson, Wright and Robbie (1992)	Restructuring can solve many weaknesses and improve a firms prospects
	Holderness and Sheehan (1992)	Corporate raiders often restructure after an acquisition which is good for the target
	Franks and Mayer (1993)	Hostile takeovers are often followed by considerable corporate restructuring
Tax Theories		
Tax benefits	Auerbach and Reishus (1988)	Tax gains are lesser motives as they are rarely very large
	Jarrell, Brickley and Netter (1988)	The advantages that may exist for corporation tax could prompt takeovers
	Weston, Chung and Hoag (1990)	Capital Gains tax can be deferred after an acquisition which can be beneficial
	Higson (1991)	There may be advantages with capital gains tax in a takeover
	Lev (1992)	In the short term there may be tax advantages created by an acquisition

The managerial motives cover a diverse set of theories. The managerial ambition motive is very popular in previous literature and is concerned with the notion that in most firms the shareholders cannot control the managers who attempt acquisitions to increase their own prestige and their financial remuneration irrespective of the best interests of the company's owners. The majority of theories state that the shareholders are powerless to prevent the managers from doing whatever they want. A slight variation on this theme is provided by Jensen (1988, 1992) in his "Free Cash Flow" theory. Here he suggested that companies could pay debt to the shareholders in place of dividends and use the retained funds for a takeover. The issuing of debt would pacify the shareholders as they would know that the firm would ultimately have to pay them. A second very popular theory concerning the managers is the theory that acquisitions correct for managerial inefficiency by eliminating poor managers. A badly managed company will have a low share price and the firm then becomes a takeover target. If this attempt is successful, then the managers of the acquired company will probably be fired thus removing them from the market. This is very similar to one of the informational motives. This group of theories are al concerned with the idea that the are informational disparities between firms and the market. This can lead to inaccurate pricing which can make some firms likely targets. For example, if the bidding company believe that they know something about the target firm that the market does not know then they may consider the target to be undervalued and launch a takeover attempt. All of the theories in this section assume that the Efficient Markets Hypothesis does not hold and that share prices are based on incomplete information. This failure makes the acquisitions market essential as a mechanism is needed to allow firms to increase efficiency and to grow and develop, as both Scherer (1988) and Jensen (1988, 1992) claimed. Companies can also use acquisitions are a method of entering a new market or diversifying as in the next group of theories. McCardle and Viswanathan (1994) observed that it is sometimes not possible to enter certain markets because of the barriers that exist around it. These barriers can be legal, as is often the case with industries that are important for national security, or practical, as in cases where research and development is highly expensive or the market is close to saturation point. Under these circumstances the barriers to market entry can sometimes be circumvented by purchasing a firm within that field. Similarly, an

acquisition can allow the bidding firm to diversify or expand in order to reduce risk and its exposure to one market area or country. A takeover is an expensive way of attaining these goals but it is much faster than internal development which explains the continuing popularity of such motives.

One of the most popular motives of all is the synergy theory. Here it is suggested that there can be benefit resulting from the combination of two or more firms. Economies of scale can increase profits and efficiency on many different areas of the firm such as production, marketing and research and development and, according to Berkovitch and Narayanan (1993), synergy is responsible for almost seventy-five percent of all acquisitions. Another way in which a firm can improve profits and efficiency is through restructuring and the motives dealing with this issue are the penultimate group in Table 3.2. Restructuring can take many different forms and occur in many different parts of a firm and is often in the best interests of the target firm as Holderness and Sheehan (1992) observed. If these firms are performing poorly it may be due to some inefficiency in their structure and altering the composition of that firm could eliminate the problem and create significant benefits. Finally, there are the tax motives. It is often mentioned that there may be tax gains in an acquisition but papers rarely specify exactly how these benefits will manifest themselves. This is almost certainly due to the different tax laws that exist in each country. In the UK it is possible to make gains in Corporation Tax, as Jarrell, Brickley and Netter observed, and in Capital Gains Tax after selling shares, as Higson (1991) noted. These gains are rarely very large, as Auerbach and Reishus (1988) commented, and so they may be a secondary motive for acquisition activity rather than the primary cause for a bid. Table 3.3, below, listed the variables that will be used in Chapters 4 and 5 and links them to the contents of the previous two tables to demonstrate that all of the terms have a clear link to the previous empirical work and the theories concerning the motives for acquisition activity. As in the previous empirical papers there is often more than one term in a given section and, by analysing several terms, it is possible that the empirical work in the following chapters will provide a clearer definition of which of the variables in each of these sections are the most informative ones to use in this context.

Table 3.3 Variables Used in the Following Empirical Chapters and their Links to Previous Research and the Theories for Acquisition Activity

Variable Name	Author(s) of Papers Using the Same Variable	Author(s) Using a Similar or Undefined [1] Variable	Theory(ies) Supporting the Use of Such Variables and Selected References
See Tables 3.1 and 3.2 for Further Description of the Variables and Motives Appearing in the Previous Literature and Further References			
Efficiency Variables			**Motives Related to Efficiency Variables**
Ratio of Turnover to Assets Employed	Spindt Tarhan and Sung (1996)		• Ambitious bidder managers will seek to expand their influence through takeovers. Jensen & Ruback (1983), Schliefer & Vishny (1988), Parkinson & Dobbins (1993)
	Altman (1984) *		• Takeovers increase total market efficiency. Scherer (86), Jensen (88, 92), Lev (82)
Ratio of Turnover to Fixed Assets	Dietrich and Sorensen (1984)		• Acquisitions correct for managerial inefficiency by removing ineffective managers. Palepu (1986), Jensen (1988), Franks & Harris (1993), Boisi & Essig (1994)
Sales per Employee		Kim (1994)	• Synergy gains increase efficiency. Bradley, Desai & Kim (1988), Morck, Schliefer & Vishny (1988), Berkovitch & Khanna (1993), Jenkinson & Mayer (1994)
Stock Ratio		Kim (1994)	• Operational efficiency is increased by a takeover. Lev (1992), Achtmeyer (1994)
Profitability Variables			**Motives Related to Profitability Variables**
Return on Capital Employed	Cosh and Hughes (1995)	Cosh, Hughes, Lee and Singh (1989)	• Ambitious bidder managers with high profits will use those funds to benefit themselves. Jensen (1988, 1992), Lev (1992), Berkovitch & Narayanan (1993)
		Spindt, Tarhan & Sung (96)	• Market myopia may force managers to increase short term profits via an acquisition. Jensen (1988, 1992), Jarrell, Brickley & Netter (1988)
Return on Shareholders Equity	Palepu (1986)		• Managers should select acquisitions if they will increase the future NPV of the firm. Dietrich & Sorensen (1984), Parkinson & Dobbins (1993)
	Agrawal & Walkling (1994)		• Managerial inefficiency results in low profits. Giammarino & Heinkel (1986), Cosh, Hughes, Lee & Singh (1989), Jenkinson & Mayer (1994)
	Sawyer and Shrieves (1994)		• Low profitability targets have low value shares making a cheap purchase. Jensen (1988, 1992), Franks & Harris (1993), Jenkinson & Mayer (1994)
	Spindt, Tarhan & Sung (96)		• Large market increases profits. Creehan & Leger (1994)
Pre-tax Profit Margin	Dietrich & Sorensen (1984)		• Synergistic gains can increase profitability. Weston, Chung & Hoag (1990), Lev (1992), Limmack (1994)
	Cosh, Hughes, Lee and Singh (1996)		
Net Profit Margin	Cosh and Hughes (1895)		

Investment Ratios			Motives Related to Investment Variables
Dividends per Share	Bagwall and Shoven (1988)	Dietrich & Sorensen (1984)	• Ambitious bidder managers choose to invest in takeovers rather than a less impressive project. Jensen (88, 92), Larcker (92), Berkovitch & Narayanan (93) • Managers attempt to increase future NPV. Dietrich & Sorensen (1984), Parkinson and Dobbins (1993) • Acquisitions correct managerial inefficiency leading to more suitable investments. Giammarino & Heinkel (1986), Cosh, Hughes, Lee & Singh (1989), Franks and Harris (1993) • Low value firms are cheaper to acquire and can be attractive targets. Palepu (1986), Jarrell, Brickley & Netter (1988), Weston, Chung & Hoag (1990) • Synergistic gains lead to efficient investment. Berkovitch and Narayanan (1993), Jenkinson and Mayer (1994)
Earnings per Share	Levine and Aaronovitch (1981)		
Dividend Yield	Sawyer and Shrieves (1994)		
P/E ratio	Levine and Aaronovitch (1981)		
	Dietrich & Sorensen (1984)		
	Palepu (1986)		
	Ambrose & Megginson (92)		
Gearing			**Motives Related to Gearing Variables**
Capital Gearing	Levine & Aaronovitch (81)	Dietrich & Sorensen (1984)	• Financial restructuring occurs in a takeover. Franks and Meyer (93) • Financial restructuring can solve firm problems. Thompson, Wright and Robbie (1992)
	Dietrich & Sorensen (1984)		
	Palepu (1986)		
	Ambrose & Megginson (92)		
	Sawyer and Shrieves (1994)		
	Cosh and Hughes (1995)		
Liquidity Ratios			**Motives Related to Liquidity Variables**
Current Ratio	Levine and Aaronovitch (1981)	Sawyer and Shrieves (1994)	• Acquisitions correct for managerial inefficiency leading to the more appropriate use of firm funds. Giammarino & Heinkel (1986), Jensen (1988, 1992), Franks and Harris (1993) • Economies of scale can improve the financial condition of a company. Weston, Chung and Hoag (1990), Lev (1992), Limmack (1994) • Ambitious managers select targets with potential. Lev (1992), Larcker (1992)
	Dietrich & Sorensen (1984)		
	Auerbach & Reishus (1988)		
	Cosh and Hughes (1995)		

Acid Test Ratio	Levine & Aaronovitch (81)	Kim (1994)	
	Palepu (1986)		
	Ambrose & Megginson (92)		
	Cosh and Hughes (1995)		
Debtor Days	Higson and Elliot (1994)	Datta & Iskandar-Datta (95)	
Creditor Days	Higson and Elliot (1994)	Datta & Iskandar-Datta (95)	
Size Variable			**Motives Related to Size Variables**
Total Sales	Sawyer and Shrieves (1994)		• Size is linked to managers bonuses so purchasing another firm benefits the managers. Jensen and Ruback (1983), Larcker (1992), Lev (1992), Berkovitch and Narayanan (93)
	Sridharan & Reinganum(95)		• Smaller firms are cheaper to purchase. Palepu (1986), Jarrell, Brickley and Netter (1988) • Larger firms are less likely to be acquired. Palepu (1986)
Measures of Propensity of Diversify			**Motives Related to Diversification**
Ratio of Managers to Employees	Lecraw (1984) *		• Entry to some markets is only possible via a takeover. McCardle and Viswanathan (1994), Hughes (1993) • Diversification is a fast way of increasing firm size and managers influence. Lev (1992) • Managers with little to do diversify to secure their jobs. Lecraw (1984) • Market power can be increased via a takeover. Levy & Sarnat (70), Hughes (93) Competitive position can be gained in a takeover. Creehan and Leger (1994)
Tax Variable			**Motives Related to Tax Variables**
Total Tax Charge		Auerbach & Reishus (1988)	Tax gains can be created in an acquisition. Jarrell, Brickley & Netter (88), Higson(91)
* Indicates an article that does not refer directly to the acquisition activity but deals with a similar or related area			
[1] Undefined variables occur when there is no precise meaning. For example, Datta & Iskandar-Datta (1995) use long term debt ratios but never define this term.			

The first four variables in the data sets refer to firm efficiency. The ratio of turnover to assets employed was used by Spindt, Tarhan and Sung (1996) to measure changes in firm performance whilst Altman (1984) used the same term to indicate financial distress, which may sometimes be the condition of an acquired firm. This term represents the effectiveness with which the firm is handling it business and the link between performance in the market place and efficiency. The second variable is the ratio of turnover to fixed assets which Dietrich and Sorensen (1984) used to measure the efficiency with which the firms assets are being used and to represent the potential cash flows of the firm. The efficient use of fixed assets are very important in the analysis of acquisitions as they are a constant source of funds for the bidding firm who can always sell off any unutilised factory space or other buildings after the takeover. The remaining two variables in this section both represent the operational efficiency of the firm. Kim (1994) declared that poor operating efficiency leads to financial slack which can ultimately alter the financing of a takeover bid. The ratio of sales per employee measures the effectiveness of the firms manufacturing processes whilst the stock ratio measures the companies ability to balance supply and demand for its product. These terms can be linked to five aspects of the theory concerning the motives for acquisition activity. These motives deal with the ambitions of the bidding firms managers, the influence that takeovers can have on total market efficiency, the correction of poor managerial performance, the expected synergy gains resulting form a takeover and the impact that takeover bids can have on the performance of a firm irrespective of the outcome of the acquisition attempt. These four terms each represent efficiency in slightly different ways and analysing all of these terms will, hopefully, determine which aspect of efficiency is the most informative.

The second group of terms are the profitability terms. The first term is the return on capital employed which was used previously by Cosh and Hughes (1995) and referred to, although undefined, by Cosh, Hughes, Lee and Singh (1989). In these papers this variable was used to investigate the supposition that acquired firms are less profitable than average whilst bidding companies are more profitable than average. This term also represents the efficiency with which the firms managers are using its assets to produce profits and this measure of operating efficiency can be directly linked

to the inefficient managers theory for acquisition activity. The second term in this set is the return on shareholders equity which appeared in papers by Palepu (1986), Agrawal and Walkling (1994), Sawyer and Shrieves (1994) and Spindt, Tarhan and Sung (1996). This term measures the different profitability levels that the acquired and acquiring firms display but can also be an indicator of the ability with which the target company's managers are investing the funds at their disposal. In papers concerning the motives for takeovers it is often noted that the target firms may have available funds but the managers cannot find appropriate projects for the company to invest in. This variable should reveal information about this particular aspect of the theory. The remaining two terms are both profit margins. The pre-tax profit margin was used previously by Dietrich and Sorensen (1984) as an indictor of future cash flows and by Cosh, Hughes, Lee and Singh (1989) as a measure of profitability. The net profit margin was used by Cosh and Hughes (1995) to represent firm profitability. These two terms are very similar but they should both be examined to help investigate the importance of tax in the decision making processes used by the bidding firms in the selection of an acquisition target. The creation of tax benefits is a popular motive in recent literature but has not been subjected to a great deal of empirical analysis. The creation of any such gains will rely on the target and bidding firms having tax positions that complement each other. If the bidding firm is interested in this issue then the pre-tax profit margin should be more informative than the net profit margin and vice versa. These terms can be linked to a large number of the motives for acquisition activity as Table 3.3 demonstrates. These motives range from the ambition of the acquiring firms managers and the removal of the ineffective target company managers to the issue of market myopia and the potential synergy gains that could be created in a takeover. These profitability terms, although superficially quite similar in definition, all reveal slightly different aspects of the firms profits and, as with the efficiency terms, examining several of them should clarify which of these terms are the most informative as there is not clear precedent for their selection in the previous empirical work on this subject.

The investment ratios represent two different aspects of the firms composition. Firstly, these terms can reveal information about the potential that a company has for

investment in the future and secondly they can represent the value of the firm on the stock market. The first term to do this is the dividends per share which was used by Bagwall and Shoven (1988) to indicate shareholders contentment with the policies adopted by the firms managers. These authors argued that as long as dividends appear to be reasonable generous the shareholders would not concern themselves with trying to control the managers of their firm. This can be directly related to the agency problem and the idea that managers would prefer to increase their remuneration and bonuses via an acquisition than increase the dividends. This can also be linked to Jensen's (1988, 1992) "free cash flow" theory for takeovers as well as the disciplinary motive for acquisition activity. The second term in this group is the value of earnings per share. This term was used by Levine and Aaronovitch (1981) to distinguish between bidders and targets in one of the first papers to attempt this sort of analysis. The remaining two variables in this section can be used to represent the value of the firm on the stock market which can be an important influence on acquisition activity as it dictates the cost of the takeover. The dividend yield term was used by Sawyer and Shrieves (1994) as an indicator of the types of financing options that are available to the bidding firm in a takeover. They observed that larger firm dividends make it harder for a company to afford a takeover as this can limit the financing options that are available. The final variable in this set is the p/e ratio. This appears in several previous papers by such authors as Levine and Aaronovitch (1981), Dietrich and Sorensen (1984), Palepu (1986) and Ambrose and Megginson (1992). In these papers this term is used to represent the value of the target firm which is important in the takeover decision as no company will attempt to purchase a firm that it cannot afford. Equally, high value bidders may be able to take advantage of financing that is not available to lower value companies. These terms can be associated with a wide group of theories of acquisition activity. Ambitious managers will select a target firm with the potential to perform well in the future if they can find such a target, as Jensen (1988, 1992) and Berkovitch and Narayanan (1993) pointed out. Giammarino and Heinkel (1986) and Cosh, Hughes, Lee and Singh (1989) claimed that low market value would identify firms with ineffective managers whilst Palepu (1986), Jarrell, Brickley and Netter (1988) and Weston, Chung and Hoag (1990) all noted that cheaper firm are more likely to be purchased than the more expensive alternatives. Finally Berkovitch and

Narayanan (1993) and Jenkinson and Mayer (1994) suggested that the synergistic gains created by a takeover could lead to the more effective allocation of funds and assets in the future. The number of theories connected with these terms males it clear that such variables must be include but ,a gain, there is no precedent to indicate which of these terms will be the most important and so analysing several within the general to specific framework should identify the most important one.

The gearing ratio appears in a great many of the previous empirical studies on this subject and for a great many different reasons. Levine and Aaronovitch (1981), Sawyer and Shrieves (1994) and Cosh and Hughes (1995) all simply stated that the level of gearing could distinguish bidding and target firms, whilst Dietrich and Sorensen (1984) viewed this item as a proxy for unused debt capacity in an acquired firm. Palepu (1986) and Ambrose and Megginson (1992) viewed gearing as a measure of the available funds in the firms under examination. This is very clearly linked to the financial restructuring motive for acquisition activity which Franks and Mayer (1993) claimed was an acquisition motive in its own right and Thompson, Wright and Robbie (1992) said could be used to correct other problems within the firm. It is also possible to connect gearing with the idea of managerial efficiency and managerial ambition. If the firm has unused debt capacity then this may be an indicator that the managers are not using the firms assets in the best possible manner and deserve to be replaced in a takeover. Alternatively, the managers of the bidding firm may look for a target with unused debt capacity as this suggests that the acquired firm could invest more actively in the future which would enhance their standing. Next there are the liquidity terms. These variables also appear in a great many previous papers concerning the characteristics of firms that take part in acquisitions. The first term is the current ratio which was used by Levine and Aaronovitch (1981) who said that this term could be used to distinguish target and bidders, Dietrich and Sorensen (1984) who claimed that excess liquidity indicates potential for future investment, managerial inefficiency and unused debt capacity. Auerbach and Reishus (1988) used the current ratio to indicate a firm potential for the future whilst Cosh and Hughes (1995) believed this value would be distinctly different for acquired and acquiring firms. In addition Sawyer and Shrieves (1994) referred to the importance of liquidity but did not clarify which

variable they used in their analysis. A second measure of short term liquidity is the acid test ratio which also appears in a great many papers. Levine and Aaronovitch (1981) used this term as an alternative way of separating bidders and targets, Palepu (1986) and Ambrose and Megginson (1992) claimed it was a proxy for financial resources whilst Cosh and Hughes (1995) used it as one of several liquidity measures that they considered. Cosh and Hughes (1995) used more than one liquidity measure for the same reason that is applied here; since no precedent exists in the previous work to suggest which term is more informative analysing more than one of these terms may indicate which is the most useful. There are relatively few measures of long term liquidity in the previous literature although Higson and Elliot (1994) used measures of debt and credit to indicate investigate financial restructuring via a takeover. Furthermore, Datta and Iskandar-Datta (1995) felt that long term debt ratios were important but failed to indicate exactly which ones they meant. These financial ratios can be linked to the managerial inefficiency motive for takeovers if it is presumed that poor liquidity is indicative of ineffective managers as Giammarino and Heinkel (1986), Jensen (1988, 1992) and Franks and Harris (1993) all thought. Equally, Weston, Chung and Hoag (1990), Lev (1992) and Limmack (1994) all thought that economies of scale could improve the financial prospects for a firm which are often represented empirically by liquidity ratios. Finally, Lev (1992) and Larcker (1992) both observed that target firms are often thought to have potential to invest more heavily and effectively in the future and liquidity, as Palepu (1986) noted can be used as a proxy for financial resources.

The issue of size is used in virtually every paper that attempts some empirical analysis of the characteristics of firms that take part in takeover activity as Table 3.1 demonstrates. In virtually all of these papers the same rationale is given for including these terms. Target companies are thought to be smaller than the industry average whilst acquiring firms are larger which would have a direct impact on the price of the target and determine whether the bidder could afford to attempt the purchase. There are three motives for takeover activity that are related to this variable. Firstly, increasing the size of the bidding firm is likely to have a positive impact on the wages and bonuses of its managers and a takeover, whilst expensive and risky, is the fastest

way to achieve this goal as Jensen and Ruback (1985), Larcker (1992), Lev (1992) and Berkovitch and Narayanan (1993) all observed. Secondly smaller firms are cheaper to purchase which echoes the reasons given in the empirical articles and, finally, Palepu (1986) noted that increasing firm size is also a way of securing a company against becoming the target of an unwelcome takeover attempt itself. All of these reasons make some measure of size, here the value of total sales, an important variable to include in the empirical chapters that follow.

The penultimate term in these data sets represent the probability that a firm will diversify in the near future. Lecraw (1984) stated that firms with a high number of managers will diversify. Some of the managers will feel that their positions are not secure if they do not have a great deal to do and so these individuals will elect to purchase another firm in order to provide themselves with something to do. Lecraw used the ratio of managers to employees to measure this probability and this is the term that is used here. Diversification is a frequently mentioned motive in the theoretical papers where it is used for a variety of reasons. McCardle and Viswanathan (1994) observed that a takeover is sometimes the only way to gain entry to a certain market if there are barriers to prevent new firms entering that field for some reason. Lev (1992) observed that the managers influence is increased if their firm diversifies into different markets or geographical areas which is clearly linked to the managerial ambition motive. Levy and Sarnat (1970) and Creehan and Leger (1994) claimed that diversifying via a takeover can increase market power and give a firm a clear competitive edge of its competitors if the acquisition is appropriately selected. It is difficult to create a measure of the probability that a firm will diversify via an acquisition so the variable given by Lecraw (1984) will be used as the only workable alternative. Lastly, there is the tax term which is also difficult to represent empirically. There is little doubt that the potential for tax benefits is a popular motive for acquisition activity as it is discussed by Jarrell, Brickley and Netter (1988) and Higson (1991) amongst many others. The effective management of tax can also be used as an indicator of managerial efficiency in the target firms and could be linked to the financial restructuring motives in addition to its other uses. It is clearly an important factor to consider and must be included in the data sets. On the basis of these various factors

that are thought to influence acquisition activity and the manner in which they can be linked to the accounting data that is discussed above and represented in Table 3.1 to 3.3 it is now possible to create the data sets ensuring that all of these important factors are reflected in the information that is gathered.

The data used in the following empirical chapters is split into three sets. The first of these involves firms that were acquired in the period from January 1987 to December 1994 and the companies that acquired them. It is hoped that the analysis of these companies will shed some light on the motives that exist in the corporate control market, by analysing the decisions that are taken in the selection of an acquisition target. The second combination of firms pairs companies that did not take part in takeovers with the targets of acquisitions activity. Lastly, the third combination pairs companies that were not involved in the corporate control market with the acquiring firms. In both the second and third combinations the companies are paired according to their market value. The analysis of these three sets of data should reveal whether the firms that are active in the corporate control market are really substantially different from the rest of these industries, as popular theory suggests. Each of these combinations of firms are considered in each of the five years before the date of the acquisition resulting in a total of fifteen data sets.

The firms that are included in the data sets must all conform to the following criteria.

- 1 The required data for the firm must be available on Datastream for five years before the acquisition took place.
- 2 The equivalent values for the industry average must also be available via Datastream for the same periods.
- 3 The date at which the firm was floated on the Stock Exchange can be found in one of the Stock Exchange Year books.

In total it was possible to gather data on two hundred and seventy-seven acquisitions subject to these conditions and form control samples of the same dimensions. The data in all of these samples is paired, on consecutive rows, so that the

data on the companies can be compared in the most straightforward manner. It has been suggested that the manner in which a company behaves in the market for corporate control is closely related to the industry in which it operates and, more precisely, the performance of the firm relative to the average for that specific industry is particularly important. This means that it is necessary to have access to the industry averages for all of the terms that have been chosen for inclusion in the data set, so that the terms can be represented as percentage deviations from the industry average as in Dietrich and Sorensen (1984). A complete list of the companies that are included in these data sets can be found in Appendix I.

3.2.3 Summary Statistics

Once the data has been gathered and the data sets constructed it is possible to create some summary statistics for the items that have been gathered. A simple examination of these terms may reveal some interesting features of the data sets.

The first step in composing descriptive statistics associated with the data sets is to subdivide them depending on the value of the binary term associated with each one. This means that the acquiring firms are separated from the acquired companies and both sets of firms are separated from the control samples where appropriate. These sub-samples can then be used to provide some summary statistics for each of the groups of companies that they represent. The examination of these subgroups will provide some indication of whether or not there are significant differences between the batches of companies which is an essential pre-requisite if well-specified logit and hazard function models are to be created for these firms. As there are five data sets for each of the combinations of firms there are fifteen data sets to consider, each one corresponding to one of the three combinations of firms in one of the five years before the acquisition. The following T-statistics are based on the mean values of each of the variables in the data sets and, at this point, it is sufficient to begin with to demonstrate that there are significant differences between the data for the various types of firms that appear in the data sets. In the three tables that follow the null and alternative hypothesis are always as below :

H_0^1 : the two groups of firms are drawn from the same population and there is no difference between the mean values

H_A^1 : the two groups of firms are not drawn from the same population and the mean values are different

Table 3.4, below, gives the calculated values for the acquired and acquiring firms and denotes, by means of asterisks when the null hypothesis can be rejected and an what level for each of the variables. The results confirm that there are significant differences between the acquired and acquiring firms as the null hypothesis is generally rejected in favour of the alternative implying that it should be possible to create well-specified logit and hazard function models for these data sets.

Table 3.4 T-Statistics for the Differences Between Acquired and Acquiring Firms

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	3.2*	6.48*	2.78*	7.19*	4.84*
Turnover to fixed assets	2.25**	2.02**	2.89*	7.39*	3.19*
Sales per employee	1.68***	1.62	2.56**	2.95*	2.61*
Stock ratio	2.72*	4.75*	7.76*	7.21*	2.92*
Return on capital employed	3.32*	6.63*	8.38*	5.08*	3.18*
Return on s'holders equity	1.98**	4.26*	3.32*	3.18*	3.16*
Pre-tax profit margin	1.73***	6.17*	6.86*	4.66*	3.9*
Net profit margin	1.98**	9.28*	9.51*	3.58*	8.34*
Dividends per share	3.17*	5.25*	5.22*	6.87*	3.81*
Earnings per share	1.57	6.74*	8.33*	1.68***	3.18*
Dividend yield	2.39**	2.53**	1.02	4.79*	1.97**
P/e ratio	3.08*	5.1*	4.56*	2.65*	1.55
Capital gearing	6.39*	3.96*	4.67*	3.41*	3.51*
Current ratio	2.84*	3.59*	4.16*	9.16*	6.5*
Acid test ratio	2.64*	2.52**	2.89*	7.46*	2.2**
Debtor days	4.24*	3.62*	3.25*	4.24*	4.29*
Creditor days	8.32*	5.37*	6.26*	5.11*	3.84*
Total sales	1.41	1.65***	1.86***	1.88***	1.99**
Manager/employee ratio	1.88***	3*	2.36**	1.49	2.14**
Total tax charge	3.03*	1.25	1.44	1.68***	1.22
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***					

The second table, Table 3.5, represents the same statistics for the acquired firms and the non-involved companies with which they are paired. As before, the results represent the calculated values for the T-tests and whether or not the null hypothesis can be rejected and at what level is indicated for each term in the table. The result here is the same as in the previous table and suggests that there are clear differences between the acquired firms and the companies in the control sample which means that it should be possible to analyse this data using the logit and hazard function methodologies.

Table 3.5 T-Statistics for the Differences Between Acquired and Non-involved Firms

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	1.26	1.84***	5.64*	6.12*	9.14*
Turnover to fixed assets	1.13	1.06	3.64*	8.98*	3.77*
Sales per employee	2.17**	4.03*	5.97*	7.5*	2.71*
Stock ratio	3.18*	3.19*	3.16*	3.2*	3.14*
Return on capital employed	8.79*	5.61*	1.28	7.26*	5.24*
Return on s'holders equity	3.25*	2.23**	6.72*	3.18*	7.06*
Pre-tax profit margin	7.53*	6.06*	5.57*	3.71*	8.77*
Net profit margin	9.37*	1.65***	8.99*	4.04*	5.45*
Dividends per share	2.07**	9.6*	3.48*	3.36*	3.91*
Earnings per share	4.95*	9.98*	1.9***	4.57*	3.63*
Dividend yield	1.29	6.1*	8.38*	9.61*	2.26**
P/e ratio	2.57*	1.66***	7.6*	3.41*	6.34*
Capital gearing	9.55*	3.27*	2.44**	5.24*	7.93*
Current ratio	4.21*	5.43*	1.1	1.1	1.7***
Acid test ratio	5.54*	2.88*	6.38*	1.41	1.86***
Debtor days	1.51	5.47*	7.77*	3.84*	1.17
Creditor days	9.13*	9.27*	5.43*	4.79*	8.19*
Total sales	1.5	1.66***	1.7***	2.17**	3.12*
Manager/employee ratio	1.03	5.02*	1.2	1.45	1.34
Total tax charge	4.41*	7.03*	9.81*	1.86***	2.64*
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***					

The third table tests the mean values for the acquiring firms and the non-involved companies with which they are paired. The null and alternative hypotheses are the same as in the previous two tables. Once again the results suggest that the bidding firms are distinctly different from companies of a similar size with which they are paired indicating that it will be possible to model these firms using the two methodologies that will be introduced in Chapter 4.

Table 3.6 T-Statistics for the Differences Between Acquiring and Non-involved Firms

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	3.17*	3.7*	3.46*	7.92*	4.81*
Turnover to fixed assets	3.2*	1.79***	3.36*	4.03*	3.2*
Sales per employee	3.32*	1.82***	1.46	0.88	1.28
Stock ratio	2.46**	2.27**	1.92***	1.93***	1.29
Return on capital employed	2.46**	1.07	5.67*	8.39*	3.18*
Return on s'holders equity	1.66***	3.85*	8.14*	9.69*	3.15*
Pre-tax profit margin	1.77***	1.65***	9.7*	1.11	3.75*
Net profit margin	3.16*	6.72*	6.74*	8.24*	7.19*
Dividends per share	5.33*	6.49*	7.35*	6.4*	3.05*
Earnings per share	8.33*	3.59*	2.53**	6.45*	8.26*
Dividend yield	1.34	3.49*	3.11*	3.36*	1.45
P/e ratio	2.83*	7.8*	3.71*	6.26*	5.21*
Capital gearing	1.94***	1.66***	1.42	3*	1.76***
Current ratio	1.06	1.4	1.2	1.24	1.81***
Acid test ratio	1.45	1.61	1.75***	9.52*	2.2**
Debtor days	2.54**	4.61*	7.23*	4.37*	3.67*
Creditor days	9.81*	9.08*	5.51*	8.81*	4.33*
Total sales	1.7***	1.9***	2**	1.8**	2.4**
Manager/employee ratio	1.16	1.12	1.14	1.84***	1.36
Total tax charge	7.47*	7.77*	8.6*	1.97**	1.3
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***					

The results given in these three table strongly suggests that the firms in the data sets are drawn from distinctly different sub-populations. In the theory concerning the logit and hazard function models there is a fundamental assumption that the firms in the samples should demonstrate clear differences between themselves. This is

definitely the case in these data sets which removes a potential cause of difficulty in the estimation of the empirical models that will take place in Chapters 4 and 5.

Correlation Matrices for the Variables in the Data Sets

The next issue to consider is any relationships that may exist between the variables in each of the data sets. The variables that have been chosen all have firm empirical and theoretical backing for their inclusion and, by examining several terms in each area, should clarify precisely which terms are the most informative when examining the companies that take part in acquisition activity. This section includes the correlation matrices for each of the fifteen data sets which will be used in Chapter 4 and the six data sets that will feature in Chapter 6. If there are high correlation coefficients between any of the variables in these data sets then the potential problems caused by multicollinearity will be avoided by using just one of the group of closely linked variables.

Table 3.7 Correlation Coefficients For Acquired and Acquiring Firms One Year Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.47	1																	
Sales per Employee	-0.02	-0.02	1																
Stock Ratio	-0.01	-0.01	0.05	1															
Roce	0.38	0.4	-0.01	0.03	1														
Rose	@0	@0	0.01	-0.05	@0	1													
Pretax Profit Margin	0.21	0.21	0.09	0.14	0.24	@0	1												
Net Profit Margin	-0.01	-0.02	0.1	0.17	@0	0.08	0.66	1											
Dividends per Share	0.07	0.05	0.16	0.29	0.15	-0.03	0.35	0.29	1										
Earnings per Share	-0.01	-0.02	0.01	-0.02	0.09	0.02	0.19	0.16	0.35	1									
Dividend Yield	-0.03	-0.03	0.03	0.01	-0.01	-0.04	0.14	0.1	0.25	0.64	1								
P/E ratio	-0.04	-0.03	0.11	0.1	-0.03	0.01	0.14	0.15	0.11	-0.03	-0.03	1							
Capital Gearing	-0.01	-0.01	@0	-0.02	@0	@0	-0.03	-0.02	0.03	-0.02	-0.01	0.15	1						
Current Ratio	-0.04	-0.04	0.14	0.12	-0.03	0.02	-0.12	-0.22	0.17	0.15	0.12	0.19	-0.06	1					
Acid Test Ratio	-0.01	-0.01	0.02	0.02	-0.01	@0	-0.04	-0.07	0.23	0.16	0.38	0.02	-0.02	0.36	1				
Debtor Days	0.01	@0	0.02	@0	0.01	@0	0.38	0.2	0.08	0.15	0.05	0.2	-0.02	0.25	0.07	1			
Creditor Days	0.01	0.01	0.11	@0	0.01	0.01	0.41	0.34	0.04	0.06	0.1	0.14	-0.02	0.12	@0	0.31	1		
Total Sales	@0	@0	0.02	0.05	@0	0.02	-0.01	-0.01	0.23	-0.03	@0	0.07	@0	-0.01	-0.01	-0.01	-0.02	1	
Manager / Employee	@0	@0	0.02	@0	0.01	@0	0.03	0.02	@0	-0.07	-0.15	-0.1	@0	-0.03	-0.82	0.01	0.01	0.01	1
Total Tax Charge	-0.01	@0	0.06	0.17	@0	-0.02	0.03	0.02	0.28	@0	-0.01	0.11	@0	0.04	0.01	0.03	0.03	0.29	@0

Table 3.8 Correlation Coefficients For Acquired and Acquiring Firms Two Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.28	1																	
Sales per Employee	0.13	0.04	1																
Stock Ratio	0.03	0.01	-0.02	1															
Roce	0.44	0.26	0.02	0.04	1														
Rose	-0.09	-0.06	0.05	-0.03	-0.11	1													
Pretax Profit Margin	-0.1	-0.06	0.16	-0.01	0.06	0.08	1												
Net Profit Margin	-0.08	-0.04	0.09	@0	0.03	0.04	0.83	1											
Dividends per Share	0.08	0.04	0.12	0.2	0.1	-0.02	0.16	0.13	1										
Earnings per Share	0.02	@0	0.07	0.03	0.05	-0.01	0.4	0.23	0.48	1									
Dividend Yield	0.06	-0.04	0.08	0.02	0.05	0.11	0.07	0.03	0.23	0.1	1								
P/E ratio	-0.01	-0.03	0.02	@0	-0.01	@0	0.4	0.56	0.06	0.02	0.18	1							
Capital Gearing	0.01	-0.01	0.01	@0	@0	0.02	-0.02	-0.02	0.06	0.01	0.01	@0	1						
Current Ratio	-0.02	-0.01	0.01	@0	-0.01	0.01	0.44	0.82	-0.01	@0	0.01	0.69	-0.02	1					
Acid Test Ratio	-0.03	-0.01	-0.02	@0	-0.02	@0	0.42	0.8	-0.02	-0.01	0.12	0.75	-0.01	0.97	1				
Debtor Days	-0.01	@0	0.01	@0	0.04	@0	0.47	0.83	-0.01	-0.01	-0.02	0.69	@0	0.99	0.97	1			
Creditor Days	-0.02	-0.05	0.22	-0.01	0.05	0.06	0.4	0.24	0.03	0.03	0.09	0.1	0.03	0.01	-0.02	0.05	1		
Total Sales	0.04	0.02	0.01	0.01	-0.01	-0.01	-0.02	-0.02	0.29	@0	0.01	0.11	0.01	@0	@0	@0	-0.01	1	
Manager / Employee	0.01	@0	@0	@0	0.01	@0	@0	0.01	0.07	0.52	0.01	0.02	@0	-0.01	-0.01	@0	0.02	@0	1
Total Tax Charge	0.06	0.02	0.13	0.02	0.09	-0.04	0.05	0.06	0.45	0.04	0.04	0.08	0.02	@0	-0.01	@0	0.03	0.48	0.05

Table 3.9 Correlation Coefficients For Acquired and Acquiring Firms Three Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.05	1																	
Sales per Employee	0.34	0.03	1																
Stock Ratio	@0	-0.01	0.05	1															
Roce	0.44	-0.01	0.23	0.01	1														
Rose	0.02	@0	0.01	@0	0.1	1													
Pretax Profit Margin	-0.06	-0.03	0.05	0.02	0.28	0.02	1												
Net Profit Margin	-0.07	-0.03	0.04	0.03	0.3	0.02	0.95	1											
Dividends per Share	0.06	@0	0.02	0.11	0.12	@0	0.03	0.04	1										
Earnings per Share	0.03	-0.01	0.04	0.01	0.1	-0.01	0.02	0.02	0.4	1									
Dividend Yield	0.23	-0.03	0.12	0.07	0.24	0.02	0.13	0.14	0.1	0.13	1								
P/E ratio	0.02	0.01	0.16	-0.01	0.07	@0	0.04	0.05	0.06	0.04	0.15	1							
Capital Gearing	0.05	-0.01	0.03	@0	0.01	0.03	-0.03	-0.03	0.03	-0.01	0.05	0.01	1						
Current Ratio	0.2	-0.04	0.24	0.1	0.32	0.01	0.17	0.19	0.11	0.05	0.43	0.26	@0	1					
Acid Test Ratio	@0	-0.01	0.03	@0	0.03	@0	0.02	0.02	@0	-0.01	0.42	0.26	-0.01	0.36	1				
Debtor Days	-0.01	-0.02	0.03	0.01	0.05	@0	0.12	0.18	0.01	0.02	0.03	0.02	0.01	0.4	0.07	1			
Creditor Days	0.01	-0.03	0.06	@0	0.12	0.01	0.86	0.81	0.1	0.01	0.13	0.05	0.01	0.16	0.01	0.18	1		
Total Sales	0.07	0.01	0.01	0.01	-0.01	@0	-0.01	-0.02	0.15	-0.01	0.03	0.05	0.01	0.03	@0	@0	@0	1	
Manager / Employee	-0.02	@0	0.01	@0	-0.03	@0	0.01	0.01	@0	0.47	-0.07	-0.07	@0	0.01	-0.06	@0	-0.02	@0	1
Total Tax Charge	@0	-0.01	0.22	0.15	0.03	@0	0.06	0.06	0.07	0.02	0.02	0.03	0.01	0.1	0.01	@0	0.02	0.43	@0

Table 3.10 Correlation Coefficients For Acquired and Acquiring Firms Four Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.46	1																	
Sales per Employee	0.09	0.04	1																
Stock Ratio	0.06	0.02	0.05	1															
Roce	0.47	0.2	0.05	0.05	1														
Rose	-0.01	0.01	0.02	-0.01	0.08	1													
Pretax Profit Margin	0.03	0.02	0.36	0.03	0.3	0.01	1												
Net Profit Margin	0.03	0.02	0.33	0.02	0.28	-0.04	0.99	1											
Dividends per Share	0.06	0.01	0.02	0.02	0.18	0.02	0.02	0.02	1										
Earnings per Share	0.02	@0	@0	@0	0.13	0.1	0.02	0.02	0.45	1									
Dividend Yield	0.26	0.09	0.16	0.1	0.38	0.15	0.06	0.06	0.15	0.07	1								
P/E ratio	0.01	-0.01	0.02	@0	-0.01	0.02	0.01	0.01	-0.01	-0.01	-0.02	1							
Capital Gearing	0.04	0.01	0.05	0.01	0.01	-0.01	@0	0.01	0.08	@0	0.08	@0	1						
Current Ratio	0.24	0.32	0.41	0.11	0.3	-0.03	-0.04	-0.04	0.12	0.04	0.37	0.17	-0.01	1					
Acid Test Ratio	0.25	0.25	0.49	0.08	0.35	-0.01	-0.05	-0.05	0.1	0.04	0.29	0.23	@0	0.78	1				
Debtor Days	0.14	-0.06	0.22	0.05	0.42	0.01	-0.71	-0.7	0.2	0.22	0.34	0.46	0.47	0.48	0.49	1			
Creditor Days	0.07	-0.06	0.12	-0.02	0.21	-0.05	0.09	0.03	0.07	0.15	0.12	0.25	0.4	0.36	0.36	0.43	1		
Total Sales	0.32	0.04	-0.02	0.32	0.19	-0.1	-0.02	0.15	-0.01	-0.05	0.23	0.01	0.24	0.38	0.23	0.13	0.06	1	
Manager / Employee	-0.12	-0.09	@0	@0	-0.03	@0	@0	@0	-0.01	-0.15	-0.09	@0	@0	-0.01	0.07	-0.48	-0.38	-0.35	1
Total Tax Charge	0.04	0.03	0.05	0.01	0.04	@0	@0	@0	0.01	-0.02	0.05	@0	0.01	-0.01	0.02	0.02	0.06	0.03	@0

Table 3.11 Correlation Coefficients For Acquired and Acquiring Firms Five Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.7	1																	
Sales per Employee	0.01	@0	1																
Stock Ratio	@0	-0.01	@0	1															
Roce	-0.03	0.49	@0	-0.01	1														
Rose	-0.02	0.44	@0	-0.02	0.28	1													
Pretax Profit Margin	-0.03	0.34	@0	0.01	0.16	0.98	1												
Net Profit Margin	-0.01	0.19	-0.01	0.11	0.2	0.2	0.31	1											
Dividends per Share	0.06	0.07	-0.01	@0	0.07	0.08	0.08	0.09	1										
Earnings per Share	0.05	0.02	-0.01	@0	0.02	0.03	0.03	0.09	0.37	1									
Dividend Yield	0.24	0.11	0.07	0.16	0.11	0.1	0.13	0.2	0.19	0.05	1								
P/E ratio	0.12	0.13	-0.01	0.04	0.13	0.13	0.14	0.15	0.1	0.02	0.13	1							
Capital Gearing	0.04	-0.01	-0.01	@0	-0.01	-0.01	-0.01	-0.02	0.07	@0	0.08	0.01	1						
Current Ratio	0.22	-0.04	0.03	0.4	-0.04	-0.03	-0.01	0.18	0.16	0.1	0.44	0.22	-0.01	1					
Acid Test Ratio	@0	0.26	@0	-0.01	0.26	0.26	0.26	0.07	0.07	0.02	0.07	0.04	@0	-0.05	1				
Debtor Days	0.17	-0.04	@0	0.13	-0.04	-0.04	-0.01	0.22	0.09	0.1	0.29	0.25	0.06	0.44	-0.05	1			
Creditor Days	0.09	-0.02	@0	0.09	-0.02	-0.01	0.06	0.2	0.05	0.07	0.2	0.17	0.02	0.2	-0.03	0.43	1		
Total Sales	0.06	@0	@0	0.01	@0	@0	@0	-0.01	0.02	-0.01	0.07	-0.01	0.01	0.03	@0	0.03	0.02	1	
Manager / Employee	-0.03	@0	@0	0.01	@0	@0	@0	-0.03	@0	0.02	-0.04	0.01	@0	-0.02	0.03	0.02	0.01	0.01	1
Total Tax Charge	0.04	0.13	@0	-0.03	0.03	0.02	0.01	0.01	@0	-0.02	0.05	0.01	0.01	-0.05	0.01	0.06	0.03	0.77	@0

Table 3.12 Correlation Coefficients For Acquired and Non-Involved Firms One Year Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.48	1																	
Sales per Employee	0.2	0.23	1																
Stock Ratio	0.2	0.19	-0.02	1															
Roce	0.44	0.23	0.05	-0.02	1														
Rose	0.01	-0.02	@0	-0.01	@0	1													
Pretax Profit Margin	-0.08	-0.06	0.05	-0.01	0.09	0.09	1												
Net Profit Margin	-0.06	-0.05	0.04	-0.01	0.19	0.07	0.9	1											
Dividends per Share	0.01	0.05	0.03	-0.02	0.13	-0.03	-0.16	-0.03	1										
Earnings per Share	-0.04	0.04	-0.05	-0.03	0.01	0.02	0.03	0.03	0.39	1									
Dividend Yield	-0.02	0.01	-0.02	@0	0.01	-0.04	0.06	0.01	0.09	0.48	1								
P/E ratio	-0.06	0.17	0.02	0.06	-0.21	-0.06	-0.23	-0.28	-0.09	-0.11	-0.21	1							
Capital Gearing	0.03	0.05	-0.01	0.01	-0.04	@0	-0.02	-0.02	0.07	-0.01	-0.01	-0.04	1						
Current Ratio	-0.22	0.08	0.13	-0.05	-0.07	-0.04	-0.19	-0.28	0.02	0.03	0.07	0.35	-0.17	1					
Acid Test Ratio	-0.2	0.03	0.06	-0.05	-0.07	-0.02	-0.16	-0.24	0.02	0.15	0.45	0.34	-0.04	0.35	1				
Debtor Days	-0.1	-0.04	-0.05	0.6	-0.08	-0.01	-0.4	-0.48	-0.03	-0.01	@0	0.04	0.01	0.09	0.12	1			
Creditor Days	-0.15	-0.11	-0.03	0.48	-0.05	0.02	0.08	0.05	-0.05	0.01	0.05	0.03	-0.03	-0.1	-0.07	0.33	1		
Total Sales	0.12	0.01	-0.01	0.98	@0	@0	-0.01	-0.01	-0.01	-0.02	@0	@0	0.01	-0.05	-0.05	0.2	0.0.8	1	
Manager / Employee	-0.03	0.01	0.04	@0	-0.03	-0.01	-0.03	-0.05	-0.01	-0.08	-0.18	0.05	-0.01	0.08	0.06	0.04	0.02	-0.01	1
Total Tax Charge	0.02	0.05	-0.02	0.96	0.04	-0.03	-0.05	-0.01	0.02	-0.01	-0.04	-0.01	@0	-0.05	-0.05	0.13	-0.2	0.97	-0.02

Table 3.13 Correlation Coefficients For Acquired and Non-Involved Firms Two Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.44	1																	
Sales per Employee	0.07	0.17	1																
Stock Ratio	0.05	0.04	-0.02	1															
Roce	0.3	0.29	0.02	-0.02	1														
Rose	-0.09	-0.12	0.03	@0	-0.11	1													
Pretax Profit Margin	-0.15	-0.09	0.08	-0.02	0.13	0.07	1												
Net Profit Margin	-0.07	-0.03	0.08	-0.01	0.09	0.11	0.82	1											
Dividends per Share	0.02	0.03	0.05	-0.02	0.03	-0.02	-0.03	0.05	1										
Earnings per Share	-0.02	-0.02	-0.04	-0.01	@0	@0	0.01	-0.01	0.11	1									
Dividend Yield	-0.07	0.05	-0.05	0.02	@0	0.02	0.05	0.06	0.04	0.46	1								
P/E ratio	-0.07	-0.06	0.02	-0.01	-0.14	-0.02	0.38	0.47	-0.04	-0.01	0.2	1							
Capital Gearing	-0.04	-0.03	-0.02	@0	-0.02	@0	-0.03	-0.01	0.06	-0.01	-0.04	-0.01	1						
Current Ratio	-0.06	-0.01	0.09	-0.01	-0.03	@0	0.36	0.44	-0.06	-0.02	0.11	0.76	-0.2	1					
Acid Test Ratio	-0.05	-0.02	@0	-0.01	-0.03	@0	0.36	0.44	-0.03	-0.01	0.2	0.82	-0.04	0.97	1				
Debtor Days	-0.07	-0.03	-@0	0.23	-0.04	@0	0.35	0.42	-0.04	-0.01	0.04	0.73	0.04	0.96	0.94	1			
Creditor Days	-0.16	-0.14	0.05	0.69	-0.04	-0.02	0.22	0.1	-0.07	@0	@0	-0.02	@0	-0.05	-0.04	0.16	1		
Total Sales	0.06	-0.03	-0.02	0.99	-0.01	@0	-0.01	-0.01	-0.01	-0.01	0.02	-0.04	@0	-0.01	-0.01	0.22	0.69	1	
Manager / Employee	@0	-0.01	@0	@0	@0	0.01	-0.01	@0	0.04	0.16	-0.01	0.02	-0.01	-0.01	-0.11	@0	0.01	@0	1
Total Tax Charge	0.14	0.1	-0.01	0.99	0.12	-0.03	0.01	0.02	0.26	0.01	-0.01	-0.03	-0.01	-0.02	-0.01	0.18	0.42	0.82	0.04

Table 3.14 Correlation Coefficients For Acquired and Non-Involved Firms Three Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.46	1																	
Sales per Employee	0.17	0.23	1																
Stock Ratio	-0.02	-0.01	-0.02	1															
Roce	0.15	0.28	0.09	-0.04	1														
Rose	0.01	0.01	@0	@0	0.07	1													
Pretax Profit Margin	-0.16	0.2	-0.02	-0.01	0.34	@0	1												
Net Profit Margin	-0.14	0.19	-0.01	-0.01	0.48	-0.01	0.92	1											
Dividends per Share	0.01	@0	@0	-0.01	-0.08	0.48	-0.04	-0.09	1										
Earnings per Share	0.01	-0.02	-0.01	-0.01	0.05	-0.01	-0.01	-0.01	0.28	1									
Dividend Yield	0.06	0.03	-0.02	-0.01	-0.04	0.02	-0.01	-0.01	0.04	0.03	1								
P/E ratio	-0.09	0.09	0.06	-0.04	-0.26	-0.01	-0.14	-0.16	0.01	0.06	-0.05	1							
Capital Gearing	-0.04	-0.03	@0	@0	-0.01	@0	-0.01	@0	0.07	-0.02	-0.03	-0.02	1						
Current Ratio	-0.17	0.07	0.04	-0.08	-0.08	-0.06	0.01	-0.01	-0.07	-0.07	0.07	0.18	-0.17	1					
Acid Test Ratio	-0.14	0.01	-0.01	-0.07	-0.05	-0.04	@0	-0.03	-0.02	-0.01	0.3	0.21	-0.03	0.36	1				
Debtor Days	-0.21	-0.08	-0.05	0.4	-0.08	-0.01	0.04	0.07	-0.03	-0.02	-0.04	0.16	0.03	0.18	0.18	1			
Creditor Days	-0.11	-0.08	-0.01	0.36	-0.04	-0.01	0.65	0.12	-0.03	@0	-0.02	-0.02	@0	-0.11	-0.08	0.28	1		
Total Sales	0.03	-0.04	-0.01	0.87	-0.02	@0	-0.01	-0.01	-0.02	-0.01	-0.01	-0.06	@0	-0.08	-0.06	0.36	0.42	1	
Manager / Employee	-0.01	@0	0.03	@0	-0.05	@0	@0	@0	@0	-0.94	-0.04	-0.04	@0	0.1	-0.18	0.01	0.01	@0	1
Total Tax Charge	-0.05	-0.06	-0.04	0.88	-0.03	-0.01	0.02	0.01	-0.01	0.03	-0.02	-0.03	-0.01	-0.09	-0.08	0.47	0.33	0.87	-0.01

Table 3.15 Correlation Coefficients For Acquired and Non-Involved Firms Four Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.43	1																	
Sales per Employee	0.19	0.23	1																
Stock Ratio	-0.02	-0.03	-0.01	1															
Roce	0.22	0.17	0.09	-0.03	1														
Rose	@0	0.01	0.02	@0	0.1	1													
Pretax Profit Margin	0.02	0.02	0.03	@0	0.34	0.01	1												
Net Profit Margin	0.03	0.02	0.03	@0	0.34	-0.04	0.99	1											
Dividends per Share	-0.01	-0.01	-0.01	-0.01	-0.05	-0.03	-0.02	-0.02	1										
Earnings per Share	-0.02	-0.02	-0.01	-0.01	-0.02	-0.01	@0	-0.01	0.78	1									
Dividend Yield	-0.03	-0.04	-0.04	0.12	-0.04	-0.12	-0.03	-0.01	0.05	@0	1								
P/E ratio	-0.01	-0.02	-0.01	-0.01	-0.08	@0	-0.03	-0.03	-0.04	-0.02	-0.22	1							
Capital Gearing	-0.02	-0.02	-0.01	@0	@0	@0	0.01	0.01	@0	-0.02	0.04	-0.03	1						
Current Ratio	-0.1	0.25	-0.02	-0.09	-0.16	@0	-0.05	-0.06	-0.05	-0.07	@0	0.18	-0.2	1					
Acid Test Ratio	-0.1	0.12	-0.03	-0.09	-0.12	0.02	-0.07	-0.08	-0.03	-0.05	-0.05	0.24	-0.16	0.83	1				
Debtor Days	-0.16	-0.07	-0.07	0.81	-0.17	0.02	-0.4	-0.41	@0	-0.02	-0.03	-0.03	0.01	@0	0.08	1			
Creditor Days	-0.09	-0.08	-0.03	0.35	0.05	-0.01	0.1	0.06	-0.01	-0.02	@0	-0.03	0.01	-0.15	-0.11	0.34	1		
Total Sales	0.02	-0.04	-0.01	0.99	-0.03	@0	@0	@0	-0.01	-0.01	0.05	-0.01	@0	-0.08	-0.07	0.81	0.49	1	
Manager / Employee	@0	0.02	0.07	-0.01	-0.03	0.01	@0	@0	-0.01	-0.1	-0.05	@0	-0.01	0.11	0.06	0.05	@0	-0.01	1
Total Tax Charge	-0.06	-0.07	-0.02	0.99	-0.03	-0.01	-0.01	-0.02	-0.01	-0.01	-0.02	-0.05	0.01	-0.06	-0.03	0.8	0.35	0.99	@0

Table 3.16 Correlation Coefficients For Acquired and Non-Involved Firms Five Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.37	1																	
Sales per Employee	-0.01	0.02	1																
Stock Ratio	-0.08	-0.03	-0.01	1															
Roce	0.18	0.34	@0	-0.03	1														
Rose	0.05	0.09	@0	-0.01	0.2	1													
Pretax Profit Margin	-0.09	0.1	-0.01	-0.02	0.4	0.05	1												
Net Profit Margin	-0.04	0.12	-0.02	-0.02	0.32	0.12	0.49	1											
Dividends per Share	0.01	@0	-0.01	-0.01	0.02	0.01	-0.02	-0.01	1										
Earnings per Share	0.01	@0	-0.02	-0.01	0.02	0.02	-0.02	-0.02	0.47	1									
Dividend Yield	-0.05	@0	0.01	0.72	-0.07	-0.04	-0.02	-0.02	-0.02	-0.02	1								
P/E ratio	-0.01	-0.01	-0.02	0.72	-0.06	@0	-0.04	-0.04	-0.01	-0.01	0.85	1							
Capital Gearing	-0.03	-0.03	@0	@0	-0.05	-0.02	-0.03	-0.03	-0.01	-0.01	-0.01	-0.01	1						
Current Ratio	-0.14	0.07	0.02	-0.08	-0.09	-0.02	-0.24	0.32	-0.04	-0.04	-0.1	-0.12	-0.12	1					
Acid Test Ratio	-0.1	0.03	-0.01	-0.1	-0.07	-0.02	-0.26	0.35	-0.03	-0.03	-0.1	-0.12	-0.13	0.85	1				
Debtor Days	-0.24	-0.12	-0.02	0.69	-0.09	-0.02	-0.05	-0.09	-0.01	-0.01	0.9	0.85	0.01	0.04	0.08	1			
Creditor Days	-0.13	-0.1	-0.02	0.47	-0.02	@0	0.31	0.26	-0.01	-0.01	0.44	0.47	0.01	-0.11	-0.06	0.33	1		
Total Sales	0.02	-0.02	@0	0.74	-0.03	-0.01	-0.01	-0.01	-0.01	-0.01	0.96	0.9	@0	-0.08	-0.06	0.94	0.15	1	
Manager / Employee	-0.02	@0	@0	-0.01	0.01	@0	-0.01	-0.01	-0.03	-0.04	-0.03	@0	-0.01	0.09	0.07	0.05	0.03	@0	1
Total Tax Charge	-0.07	-0.04	-0.01	0.39	-0.05	@0	-0.01	-0.03	-0.05	-0.04	0.46	0.48	@0	-0.19	-0.18	0.4	@0	0.2	-0.01

Table 3.17 Correlation Coefficients For Acquiring and Non-Involved Firms One Year Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.47	1																	
Sales per Employee	0.23	0.09	1																
Stock Ratio	-0.04	0.01	0.79	1															
Roce	0.3	0.35	0.05	-0.02	1														
Rose	@0	@0	-0.02	-0.01	-0.02	1													
Pretax Profit Margin	0.22	0.22	-0.02	-0.01	0.27	-0.06	1												
Net Profit Margin	-0.04	-0.02	-0.02	@0	0.02	0.23	-0.17	1											
Dividends per Share	0.07	0.09	0.02	-0.02	0.02	-0.03	0.17	0.02	1										
Earnings per Share	0.03	0.01	@0	-0.02	0.03	0.01	@0	-0.01	0.41	1									
Dividend Yield	-0.03	-0.03	-0.08	-0.07	0.02	-0.08	0.03	-0.02	0.01	0.45	1								
P/E ratio	-0.08	-0.04	0.32	0.4	-0.12	0.01	0.11	0.09	-0.05	-0.08	-0.25	1							
Capital Gearing	0.05	@0	0.01	0.12	0.01	@0	-0.06	-0.02	-0.01	-0.02	-0.04	0.3	1						
Current Ratio	-0.15	0.12	0.01	-0.03	-0.01	0.03	0.13	0.03	0.01	-0.04	-0.04	0.05	-0.09	1					
Acid Test Ratio	-0.24	-0.08	-0.02	-0.09	0.04	0.04	0.31	0.07	0.03	-0.02	-0.06	0.12	-0.14	0.61	1				
Debtor Days	@0	@0	0.03	-0.09	-0.01	-0.01	0.4	0.07	-0.06	@0	-0.01	0.25	-0.02	0.06	0.25	1			
Creditor Days	@0	@0	0.9	0.74	-0.01	@0	0.08	0.01	-0.02	-0.01	-0.05	0.38	@0	-0.04	-0.09	0.34	1		
Total Sales	@0	@0	0.35	0.4	@0	0.01	-0.03	-0.01	0.05	-0.02	-0.04	0.22	@0	-0.06	-0.08	-0.02	0.36	1	
Manager / Employee	-0.01	-0.01	0.05	-0.02	-0.03	0.02	-0.02	-0.02	-0.05	-0.04	-0.05	0.16	-0.01	0.21	0.15	0.09	@0	-0.02	1
Total Tax Charge	-0.17	@0	0.3	0.47	-0.05	0.02	0.02	@0	0.04	-0.03	-0.05	0.32	0.01	-0.01	0.02	0.02	0.47	-0.01	-0.02

Table 3.18 Correlation Coefficients For Acquiring and Non-Involved Firms Two Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.45	1																	
Sales per Employee	0.26	0.43	1																
Stock Ratio	0.01	0.01	0.12	1															
Roce	0.32	0.22	0.07	-0.03	1														
Rose	0.23	0.09	0.09	-0.03	0.04	1													
Pretax Profit Margin	-0.12	-0.08	@0	-0.03	0.19	-0.02	1												
Net Profit Margin	-0.11	-0.1	-0.01	-0.02	0.33	0.01	0.68	1											
Dividends per Share	0.03	0.04	0.02	0.17	@0	0.22	0.21	0.12	1										
Earnings per Share	0.02	0.01	0.06	-0.01	0.07	0.03	0.21	0.37	0.34	1									
Dividend Yield	0.02	0.02	-0.08	-0.03	0.02	-0.02	-0.07	-0.09	0.03	0.29	1								
P/E ratio	@0	0.04	0.15	0.04	-0.18	-0.01	-0.04	-0.03	@0	-0.04	-0.23	1							
Capital Gearing	0.05	0.04	0.2	0.04	-0.34	0.04	-0.22	-0.22	-0.02	0.03	-0.01	0.2	1						
Current Ratio	-0.2	0.06	@0	0.02	-0.06	-0.04	-0.09	0.01	-0.05	-0.02	-0.04	@0	-0.23	1					
Acid Test Ratio	-0.15	0.06	-0.02	-0.02	-0.04	-0.02	-0.13	0.01	0.02	0.06	-0.08	0.01	-0.22	0.8	1				
Debtor Days	0.01	0.31	-0.02	-0.01	0.36	-0.02	0.11	0.05	-0.07	-0.03	@0	0.14	0.04	0.17	0.2	1			
Creditor Days	-0.1	-0.09	0.68	0.16	-0.02	@0	0.07	0.04	-0.03	-0.01	-0.08	0.22	0.22	-0.1	-0.1	0.28	1		
Total Sales	0.04	0.11	0.48	0.23	-0.02	-0.01	-0.04	-0.02	0.28	@0	-0.05	0.17	0.12	-0.05	-0.04	-0.03	0.43	1	
Manager / Employee	0.05	0.03	0.07	-0.02	-0.15	@0	-0.06	-0.07	-0.07	-0.06	-0.1	0.15	0.13	0.26	0.12	0.28	-0.01	-0.03	1
Total Tax Charge	-0.01	0.1	0.59	0.12	-0.05	-0.01	0.14	0.07	0.17	@0	-0.05	0.17	0.18	-0.09	-0.09	-0.04	0.6	0.79	-0.02

Table 3.19 Correlation Coefficients For Acquiring and Non-Involved Firms Three Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.44	1																	
Sales per Employee	0.26	0.41	1																
Stock Ratio	@0	@0	0.43	1															
Roce	0.01	0.05	0.05	-0.02	1														
Rose	0.02	0.04	0.03	@0	0.62	1													
Pretax Profit Margin	-0.14	-0.12	-0.02	-0.02	0.6	0.41	1												
Net Profit Margin	-0.11	-0.09	-0.01	-0.02	0.23	0.38	0.95	1											
Dividends per Share	0.02	0.02	-0.03	0.04	-0.01	-0.02	-0.04	-0.02	1										
Earnings per Share	@0	-0.01	0.02	-0.02	0.03	-0.01	-0.01	-0.02	0.33	1									
Dividend Yield	@0	0.05	-0.07	-0.06	-0.07	-0.09	-0.05	-0.06	0.02	0.19	1								
P/E ratio	0.02	0.22	0.06	0.08	-0.02	0.02	-0.03	-0.02	0.03	-0.03	-0.16	1							
Capital Gearing	0.22	0.19	0.37	0.35	-0.21	0.02	-0.25	-0.25	-0.02	-0.01	-0.04	0.29	1						
Current Ratio	-0.15	0.02	@0	-0.03	-0.01	0.05	-0.04	-0.09	-0.1	-0.04	-0.02	-0.01	-0.23	1					
Acid Test Ratio	-0.12	0.03	@0	-0.08	0.05	0.04	-0.06	-0.13	-0.05	-0.01	-0.07	-0.03	-0.24	0.79	1				
Debtor Days	-0.26	-0.17	-0.03	-0.03	-0.07	-0.05	0.04	0.01	-0.05	-0.09	0.04	-0.02	@0	0.16	0.31	1			
Creditor Days	-0.2	-0.22	0.7	0.72	-0.03	-0.01	0.05	0.04	0.02	-0.03	-0.05	0.11	0.42	-0.08	-0.09	0.44	1		
Total Sales	0.05	0.15	0.44	0.47	-0.03	@0	-0.03	-0.02	0.09	-0.01	-0.04	0.08	0.26	-0.05	-0.05	-0.05	0.43	1	
Manager / Employee	-0.02	0.02	0.03	-0.02	-0.11	-0.08	-0.02	-0.04	-0.06	-0.02	@0	0.03	@0	0.24	0.23	0.28	-0.02	-0.03	1
Total Tax Charge	-0.03	0.05	0.23	0.44	-0.02	0.02	0.01	0.02	0.03	-0.02	-0.07	0.05	0.27	-0.04	-0.03	-0.03	0.45	0.65	-0.04

Table 3.20 Correlation Coefficients For Acquiring and Non-Involved Firms Four Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear- ing	Curr- ent Ratio	Acid Test Ratio	Debt- or Days	Cred- itor Days	Total Sales	Man- ager / Empl.
Fixed Asset T'over	0.43	1																	
Sales per Employee	0.21	0.33	1																
Stock Ratio	0.02	0.01	0.12	1															
Roce	0.14	0.08	-0.01	-0.04	1														
Rose	0.08	0.05	@0	-0.01	0.69	1													
Pretax Profit Margin	-0.11	-0.09	-0.03	-0.02	0.16	-0.05	1												
Net Profit Margin	-0.08	-0.05	-0.02	-0.02	0.05	-0.06	0.26	1											
Dividends per Share	-0.02	-0.01	-0.06	0.09	-0.01	-0.02	-0.04	-0.03	1										
Earnings per Share	0.05	0.03	-0.02	-0.02	@0	-0.01	-0.05	-0.05	0.35	1									
Dividend Yield	-0.01	0.03	-0.13	-0.07	@0	0.01	0.02	@0	0.05	0.04	1								
P/E ratio	-0.04	-0.07	-0.05	-0.08	0.08	0.08	0.08	0.06	-0.08	-0.1	-0.28	1							
Capital Gearing	-0.03	0.02	-0.03	-0.01	-0.08	-0.09	-0.19	-0.16	-0.02	0.09	0.08	0.01	1						
Current Ratio	-0.19	0.03	-0.05	0.02	0.01	0.04	-0.1	-0.04	-0.04	-0.1	0.1	0.03	-0.27	1					
Acid Test Ratio	-0.09	0.02	-0.02	-0.02	0.8	0.44	-0.05	-0.04	-0.01	-0.04	0.01	0.09	-0.03	0.41	1				
Debtor Days	-0.12	-0.05	@0	0.38	0.83	@0	0.05	0.04	-0.05	-0.05	@0	0.13	0.08	0.07	0.85	1			
Creditor Days	-0.1	-0.08	0.23	0.16	0.47	0.38	0.01	-0.01	-0.03	-0.04	-0.06	0.15	0.1	-0.06	@0	0.65	1		
Total Sales	0.07	0.13	0.25	0.23	-0.03	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	0.01	0.02	-0.04	-0.02	-0.02	0.35	1	
Manager / Employee	-0.04	@0	0.06	-0.02	0.07	0.05	0.04	0.01	-0.06	-0.07	-0.04	0.18	@0	0.18	0.1	0.18	0.05	-0.02	1
Total Tax Charge	0.03	0.03	0.05	-0.01	-0.03	0.08	0.38	0.42	-0.01	-0.01	-0.03	0.01	0.06	-0.2	-0.07	0.01	0.02	0.05	0.01

Table 3.21 Correlation Coefficients For Acquiring and Non-Involved Firms Five Years Before the Acquisition as Used in Chapter 4

	T/O / Asset Empl.	Fixed Asset T/O	Sales per Empl.	Stock Ratio	Roce	Rose	Pr'tax Profit M'gin	Net Profit M'gin	Divid -end / Share	EPS	Divid -end Yield	P/E Ratio	Cap'l Gear-ing	Curr-ent Ratio	Acid Test Ratio	Debt-or Days	Cred-itor Days	Total Sales	Man-ager / Empl.
Fixed Asset T'over	0.61	1																	
Sales per Employee	0.25	-0.03	1																
Stock Ratio	0.01	@0	0.47	1															
Roce	0.29	0.43	-0.03	-0.07	1														
Rose	0.02	0.45	-0.02	-0.01	0.45	1													
Pretax Profit Margin	-0.12	0.06	-0.03	-0.03	0.42	0.99	1												
Net Profit Margin	-0.06	0.11	@0	-0.02	0.11	0.14	0.16	1											
Dividends per Share	@0	0.04	-0.06	0.01	0.04	0.04	0.04	0.02	1										
Earnings per Share	0.06	0.01	-0.03	-0.02	0.01	0.01	0.01	-0.03	0.48	1									
Dividend Yield	-0.04	0.11	-0.08	-0.07	0.11	0.11	0.11	-0.02	0.05	0.01	1								
P/E ratio	-0.03	0.27	-0.06	-0.14	0.27	0.26	0.27	0.18	-0.01	-0.02	-0.25	1							
Capital Gearing	-0.03	-0.06	-0.02	0.01	-0.06	-0.08	-0.08	-0.21	-0.03	-0.03	0.02	0.1	1						
Current Ratio	0.06	0.2	0.06	-0.05	-0.1	-0.01	-0.14	0.07	-0.02	-0.07	0.03	0.08	-0.23	1					
Acid Test Ratio	-0.01	0.26	-0.02	-0.05	0.26	0.26	0.26	0.03	0.04	0.01	0.07	0.06	-0.04	0.69	1				
Debtor Days	-0.22	-0.1	-0.03	-0.03	-0.09	-0.03	0.08	-0.08	-0.06	-0.06	-0.02	0.14	0.05	0.06	-0.06	1			
Creditor Days	-0.19	-0.08	0.64	0.8	-0.02	-0.02	-0.02	-0.02	-0.03	-0.01	-0.08	0.01	0.04	-0.1	-0.03	0.49	1		
Total Sales	0.03	-0.01	0.43	0.44	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02	-0.01	-0.06	0.05	-0.04	-0.01	-0.03	0.18	1	
Manager / Employee	-0.02	-0.01	0.04	-0.02	-0.01	-0.01	-0.01	-0.01	-0.05	-0.04	-0.09	0.15	0.01	0.15	0.02	0.28	@0	-0.02	1
Total Tax Charge	-0.01	0.08	0.19	@0	-0.05	0.02	-0.08	-0.08	-0.01	-0.03	-0.01	-0.06	0.16	-0.03	@0	-0.03	-0.01	0.49	-0.03

Table 3.22 Correlation Coefficients For Acquired and Acquiring Firms In the Boom Period Two Years Before the Acquisition as Used in Chapter 5

	T/O / Asset	Fixed Asset	Sales /Fmp	Stock Ratio	Roce	Rose	Pr'tax Profit	Net Profit	Divid Share	EPS	Divid Yield	P/E Ratio	Cap'l Gr'g	Curr Ratio	Acid Test	Debt. Days	Cred. Days	Total Sales	Man Emp	Total Tax	M'cro 1	M'cro 2	M'cro 3	M'cro 4	M'cro 5
Fix'd Asset T/o	0.16	1																							
Sales / Empl'ee	0.06	@0	1																						
Stock Ratio	0.02	-0.01	-0.01	1																					
Roce	0.16	0.47	-0.01	-0.01	1																				
Rose	-0.01	0.02	0.01	@0	0.02	1																			
Pretax P'fit M'gin	-0.06	@0	-0.02	@0	0.43	0.03	1																		
Net Profit M'gin	-0.16	0.01	-0.02	@0	0.01	-0.03	0.81	1																	
Dividend / Share	0.05	0.04	-0.03	0.12	0.04	0.02	0.04	0.02	1																
Earnings / Share	-0.03	0.01	-0.06	-0.01	0.01	0.02	0.04	0.03	0.76	1															
Dividend Yield	0.04	0.12	-0.08	0.03	0.12	0.08	0.1	0.02	0.18	0.22	1														
P/E ratio	0.06	@0	-0.02	-0.02	@0	-0.01	@0	@0	-0.05	-0.06	-0.04	1													
Capital Gearing	0.02	@0	0.01	-0.01	@0	-0.04	-0.02	-0.01	-0.05	-0.03	-0.07	@0	1												
Current Ratio	-0.06	-0.01	-0.03	0.01	-0.01	@0	@0	0.05	-0.03	-0.03	0.05	0.15	-0.04	1											
Acid Test Ratio	0.04	0.26	-0.01	@0	0.26	0.01	0.15	@0	0.04	-0.02	0.03	-0.01	-0.01	@0	1										
Debtor Days	-0.11	-0.01	-0.01	-0.01	-0.01	0.02	-0.04	0.02	-0.03	-0.04	-0.03	0.09	-0.04	0.93	-0.01	1									
Creditor Days	-0.19	-0.03	@0	-0.03	-0.03	-0.01	0.22	0.2	-0.03	-0.04	-0.01	-0.03	-0.04	-0.02	-0.02	0.05	1								
Total Sales	0.2	@0	-0.01	0.02	@0	@0	-0.01	@0	0.09	-0.01	0.06	-0.03	-0.01	-0.01	@0	-0.02	-0.04	1							
Manager/ Empl	-0.04	@0	0.01	0.01	@0	@0	0.01	0.01	0.06	-0.03	-0.29	-0.05	0.01	-0.04	0.02	0.01	0.01	0.01	1						
Total Tax Charge	-0.13	-0.01	0.06	0.04	-0.01	0.02	0.03	0.05	0.03	0.11	-0.09	-0.03	-0.02	-0.02	@0	@0	0.02	-0.28	0.17	1					
Macro 1	-0.05	-0.01	@0	-0.01	@0	-0.01	0.28	0.25	-0.01	0.01	0.02	-0.05	0.01	-0.45	@0	-0.51	0.77	@0	@0	-0.01	1				
Macro 2	-0.06	-0.01	-0.03	0.01	-0.01	@0	@0	0.05	-0.03	-0.03	0.05	0.15	-0.05	0.99	@0	0.93	-0.02	-0.01	-0.04	-0.02	-0.46	1			
Macro 3	0.02	@0	0.01	-0.01	@0	-0.04	-0.01	-0.01	-0.04	-0.03	-0.07	@0	0.98	-0.04	-0.01	-0.04	-0.04	-0.01	0.01	-0.02	0.01	-0.04	1		
Macro 4	0.18	@0	-0.01	0.02	@0	@0	-0.01	@0	0.09	-0.01	0.06	-0.03	-0.01	-0.01	@0	-0.02	-0.04	0.99	0.01	-0.28	@0	-0.01	-0.01	1	
Macro 5	0.02	0.72	0.02	0.01	0.44	-0.04	0.97	0.67	-0.05	-0.04	-0.1	0.01	0.02	@0	-0.19	0.03	-0.19	0.01	-0.01	-0.04	-0.24	@0	0.02	0.01	1
Macro 6	0.92	0.19	0.04	0.04	0.2	-0.01	0.1	@0	0.08	-0.02	0.03	0.09	0.03	-0.06	0.05	-0.11	-0.16	0.25	-0.03	-0.15	@0	-0.05	0.03	0.22	-0.1

Table 3.23 Correlation Coefficients For Acquired and Acquiring Firms In the Recession Period Two Years Before the Acquisition as Used in Chapter 5

	T/O / Asset	Fixed Asset	Sales /Emp	Stock Ratio	Roce	Rose	Pr'tax Profit	Net Profit	Divid Share	EPS	Divid Yield	P/E Ratio	Cap'l Gr'g	Curr Ratio	Acid Test	Debt. Days	Cred. Days	Total Sales	Man Emp	Total Tax	M'cro 1	M'cro 2	M'cro 3	M'cro 4	M'cro 5
Fix'd Asset T/o	0.97	1																							
Sales / Empl'ee	-0.01	-0.01	1																						
Stock Ratio	0.2	0.18	-0.02	1																					
Roce	0.95	0.96	-0.01	0.53	1																				
Rose	-0.01	-0.01	-0.01	-0.11	@0	1																			
Pretax P'fit M'gin	0.19	0.19	-0.03	0.37	0.2	@0	1																		
Net Profit M'gin	-0.21	-0.15	-0.02	0.4	0.04	0.02	0.48	1																	
Dividend / Share	0.08	0.12	-0.03	0.18	0.09	-0.02	0.31	0.31	1																
Earnings / Share	@0	0.01	-0.01	0.01	0.04	-0.03	0.4	0.35	0.47	1															
Dividend Yield	0.18	0.15	0.41	-0.06	0.03	0.15	-0.19	-0.18	@0	0.12	1														
P/E ratio	-0.13	-0.01	-0.13	@0	-0.12	-0.05	0.04	0.06	0.18	0.22	-0.38	1													
Capital Gearing	-0.02	-0.01	-0.01	-0.04	-0.04	@0	-0.06	-0.04	-0.04	-0.03	0.06	-0.05	1												
Current Ratio	0.15	0.25	0.02	0.47	0.44	-0.11	0.3	0.32	0.07	-0.02	-0.04	-0.01	-0.28	1											
Acid Test Ratio	0.05	0.2	-0.03	0.33	0.28	-0.06	0.43	0.41	0.18	0.18	0.01	0.03	-0.26	0.77	1										
Debtor Days	0.32	0.32	-0.09	0.06	0.28	-0.02	0.24	0.13	-0.15	0.01	-0.17	0.03	-0.06	0.14	0.27	1									
Creditor Days	0.02	0.01	-0.05	0.08	@0	0.06	0.11	0.1	-0.11	-0.02	-0.09	0.09	-0.05	-0.14	-0.22	0.41	1								
Total Sales	-0.01	-0.01	-0.01	-0.01	-0.03	-0.01	-0.08	@0	0.43	-0.02	-0.12	0.44	-0.01	-0.04	0.09	-0.01	0.02	1							
Manager/ Empl	-0.04	-0.05	-0.01	@0	0.01	@0	-0.01	0.01	-0.05	0.47	0.11	0.26	-0.02	-0.14	0.01	0.03	0.11	-0.01	1						
Total Tax Charge	-0.26	-0.08	-0.01	-0.25	-0.44	0.01	0.01	0.04	0.31	-0.03	-0.09	0.33	-0.01	-0.24	-0.01	0.03	0.03	0.37	@0	1					
Macro 1	-0.33	-0.33	0.05	0.01	-0.3	0.06	-0.15	-0.05	0.05	-0.03	0.1	0.04	0.02	-0.25	-0.44	-0.7	0.6	0.02	0.06	-0.01	1				
Macro 2	@0	@0	0.02	0.65	0.12	-0.11	0.29	0.33	0.07	-0.02	-0.04	-0.01	-0.28	0.99	0.77	0.14	-0.14	-0.05	-0.14	-0.24	-0.24	1			
Macro 3	-0.01	-0.01	-0.01	-0.04	-0.02	@0	-0.06	-0.04	-0.03	-0.03	0.06	-0.05	0.98	-0.29	-0.26	-0.06	-0.05	-0.01	-0.02	@0	0.01	-0.28	1		
Macro 4	0.39	0.38	-0.04	0.19	0.4	0.1	0.44	0.45	-0.01	0.06	-0.1	-0.03	-0.03	0.31	0.35	0.33	0.19	-0.11	0.01	-0.05	-0.2	0.3	-0.04	1	
Macro 5	-0.27	-0.26	0.04	-0.33	-0.28	-0.04	0.34	0.3	-0.24	-0.33	0.17	-0.02	0.05	-0.33	-0.44	-0.29	-0.15	0.09	@0	0.01	0.18	-0.32	0.05	0.82	1
Macro 6	0.99	0.92	0.01	-0.16	0.95	0.01	-0.19	0.18	-0.07	-0.01	-0.16	0.1	0.01	-0.16	-0.09	-0.32	-0.02	0.01	0.04	0.24	0.33	@0	0.01	-0.39	0.28

Table 3.24 Correlation Coefficients For Acquired and Non-Involved Firms In the Boom Period Two Years Before the Acquisition as Used in Chapter 5

	T/O / Asset	Fixed Asset	Sales /Emp	Stock Ratio	Roce	Rose	Pr'tax Profit	Net Profit	Divid Share	EPS	Divid Yield	P/E Ratio	Cap'l Gr'g	Curr Ratio	Acid Test	Debt. Days	Cred. Days	Total Sales	Man Emp	Total Tax	M'cro 1	M'cro 2	M'cro 3	M'cro 4	M'cr 5
Fix'd Asset T/o	0.73	1																							
Sales / Empl'ee	0.06	0.12	1																						
Stock Ratio	0.02	0.02	-0.02	1																					
Roce	0.25	0.11	-0.04	-0.05	1																				
Rose	@0	0.02	0.02	@0	-0.13	1																			
Pretax P'fit M'gin	-0.14	-0.21	-0.02	@0	0.22	0.02	1																		
Net Profit M'gin	-0.11	-0.19	-0.03	@0	0.21	-0.03	0.98	1																	
Dividend / Share	@0	-0.02	-0.01	-0.01	-0.05	0.02	-0.01	-0.01	1																
Earnings / Share	-0.01	-0.02	-0.03	-0.01	-0.05	0.02	@0	@0	0.94	1															
Dividend Yield	-0.04	-0.03	-0.05	0.9	-0.06	-0.02	@0	0.01	@0	0.02	1														
P/E ratio	0.05	0.07	-0.03	0.62	-0.13	-0.02	-0.01	@0	-0.02	-0.02	0.55	1													
Capital Gearing	-0.03	@0	0.03	0.02	@0	-0.03	0.01	0.01	@0	@0	@0	@0	1												
Current Ratio	-0.08	0.05	-0.02	-0.05	-0.11	0.01	-0.02	@0	-0.03	-0.03	-0.02	0.11	-0.04	1											
Acid Test Ratio	-0.04	@0	-0.02	-0.02	-0.08	0.01	-0.01	0.02	-0.02	-0.01	0.1	0.13	-0.02	0.84	1										
Debtor Days	-0.08	-0.02	-0.03	0.47	-0.1	0.01	-0.04	-0.01	-0.02	-0.02	0.38	0.46	0.06	0.48	0.49	1									
Creditor Days	-0.15	-0.12	-0.02	0.43	-0.02	-0.01	0.24	0.17	-0.01	-0.02	0.49	0.31	@0	-0.06	-0.01	0.35	1								
Total Sales	0.1	-0.01	-0.01	0.99	-0.05	@0	@0	@0	-0.01	-0.01	0.9	0.62	0.02	-0.05	-0.02	0.32	0.27	1							
Manager/ Empl	0.01	0.09	0.03	-0.01	0.01	0.01	0.04	0.04	0.01	-0.01	-0.08	-0.05	-0.02	0.04	-0.25	@0	-0.03	-0.01	1						
Total Tax Charge	-0.08	-0.08	-0.02	0.98	-0.05	0.01	0.01	0.01	@0	@0	0.89	0.92	0.01	-0.06	-0.02	0.27	0.23	0.98	0.01	1					
Macro 1	-0.05	-0.08	0.01	-0.47	0.07	-0.01	0.31	0.24	0.01	0.01	-0.42	-0.33	-0.15	-0.36	-0.31	0.47	0.34	-0.47	-0.03	-0.46	1				
Macro 2	-0.08	0.06	-0.02	-0.05	-0.11	0.01	-0.02	@0	-0.03	-0.03	-0.03	0.1	-0.04	0.99	0.77	0.41	-0.06	-0.05	0.04	-0.06	-0.35	1			
Macro 3	-0.03	0.01	0.04	0.01	@0	-0.03	@0	0.01	@0	@0	-0.01	@0	0.99	-0.04	-0.02	0.06	@0	0.01	-0.01	0.01	-0.15	-0.04	1		
Macro 4	0.07	-0.02	-0.01	0.99	-0.05	@0	@0	@0	-0.01	-0.01	0.9	0.62	0.02	-0.05	-0.02	0.3	0.28	0.99	-0.01	0.98	-0.47	-0.05	0.01	1	
Macro 5	0.15	0.2	0.03	0.01	-0.28	-0.03	0.99	0.96	0.01	@0	@0	0.01	@0	0.03	0.01	0.04	-0.25	@0	-0.05	-0.01	-0.3	0.03	@0	@0	1
Macro 6	0.99	0.48	0.03	-0.02	0.21	-0.01	-0.02	0.01	0.01	@0	-0.02	0.05	@0	-0.08	-0.05	-0.08	-0.12	-0.01	-0.01	-0.03	@0	-0.07	@0	-0.01	0.04

Table 3.25 Correlation Coefficients For Acquired and Non-Involved Firms In the Recession Period Two Years Before the Acquisition as Used in Chapter 5

	T/O / Asset	Fixed Asset	Sales /Emp	Stock Ratio	Roce	Rose	Pr'tax Profit	Net Profit	Divid Share	EPS	Divid Yield	P/E Ratio	Cap'l Gr'g	Curr Ratio	Acid Test	Debt. Days	Cred. Days	Total Sales	Man Emp	Total Tax	M'cro 1	M'cro 2	M'cro 3	M'cro 4	M'cro 5
Fix'd Asset T/o	0.13	1																							
Sales / Empl'ee	0.01	0.02	1																						
Stock Ratio	0.41	0.28	@0	1																					
Roce	0.41	0.43	-0.01	0.7	1																				
Rose	-0.05	-0.03	@0	-0.07	0.07	1																			
Pretax P'fit M'gin	-0.12	0.24	-0.01	0.02	0.33	0.09	1																		
Net Profit M'gin	-0.06	0.2	@0	0.02	0.32	0.08	0.49	1																	
Dividend / Share	0.01	0.06	-0.03	0.11	0.09	0.01	-0.05	-0.02	1																
Earnings / Share	-0.01	0.04	-0.02	0.04	0.04	-0.01	-0.01	0.02	0.01	1															
Dividend Yield	-0.11	0.07	0.41	0.05	0.1	0.13	0.12	0.11	0.04	0.09	1														
P/E ratio	-0.07	-0.11	-0.11	-0.07	-0.22	-0.06	-0.2	-0.25	-0.09	0.18	-0.37	1													
Capital Gearing	-0.06	-0.05	-0.02	0.05	-0.06	-0.01	-0.05	-0.04	-0.03	-0.03	-0.02	-0.06	1												
Current Ratio	-0.12	0.1	@0	0.32	0.2	-0.06	-0.07	-0.15	0.02	-0.09	0.01	0.23	-0.29	1											
Acid Test Ratio	-0.23	-0.01	-0.04	0.09	0.04	-0.04	-0.08	-0.17	-0.05	-0.01	0.01	0.21	-0.26	0.89	1										
Debtor Days	-0.22	-0.03	-0.05	@0	-0.21	-0.03	0.34	-0.66	-0.01	0.06	-0.06	0.09	0.06	0.39	0.46	1									
Creditor Days	-0.18	-0.1	-0.04	0.03	-0.16	0.03	-0.19	-0.25	@0	0.09	@0	0.13	0.03	0.08	0.17	0.64	1								
Total Sales	0.05	-0.03	-0.01	0.01	0.1	0.02	-0.01	@0	0.09	-0.01	-0.04	-0.02	0.02	-0.1	-0.12	-0.05	-0.01	1							
Manager/ Empl	-0.09	-0.03	-0.02	-0.02	-0.04	-0.01	-0.03	-0.04	-0.07	0.79	@0	0.42	-0.04	0.17	0.23	0.13	0.23	-0.03	1						
Total Tax Charge	-0.5	-0.33	@0	-0.79	-0.77	0.05	0.08	0.05	-0.11	-0.01	@0	-0.01	0.02	-0.3	-0.12	0.02	0.02	0.03	0.03	1					
Macro 1	0.17	0.01	0.03	0.03	0.17	0.05	0.21	0.7	0.02	-0.01	0.08	@0	-0.04	-0.44	0.31	-0.91	-0.25	0.03	-0.05	-0.01	1				
Macro 2	-0.12	0.01	@0	0.32	0.19	-0.07	-0.07	-0.15	0.01	-0.09	-0.01	0.23	-0.28	0.96	0.89	0.4	0.09	-0.04	0.18	-0.29	-0.46	1			
Macro 3	-0.06	-0.03	-0.02	0.05	-0.05	-0.01	-0.02	-0.01	-0.03	-0.03	-0.02	-0.07	0.49	-0.27	-0.24	0.02	0.03	0.02	-0.04	0.02	-0.01	-0.26	1		
Macro 4	0.05	-0.01	-0.01	@0	0.1	0.02	-0.01	@0	0.09	-0.01	-0.02	-0.01	@0	-0.06	-0.08	-0.06	-0.01	0.99	-0.02	0.03	0.03	-0.02	@0	1	
Macro 5	0.09	-0.08	0.01	-0.04	-0.32	-0.08	0.48	0.37	0.06	0.01	-0.07	0.14	0.05	0.08	0.1	0.47	0.19	0.01	0.01	-0.06	0.37	0.08	0.02	0.01	1
Macro 6	0.97	-0.14	@0	-0.33	-0.34	0.06	0.13	0.07	0.01	0.01	0.11	0.05	0.07	0.13	0.23	0.21	0.2	0.02	0.07	0.42	-0.14	0.12	0.06	0.02	-0.09

Table 3.26 Correlation Coefficients For Acquiring and Non-Involved Firms In the Boom Period Two Years Before the Acquisition as Used in Chapter 5

	T/O / Asset	Fixed Asset	Sales /Emp	Stock Ratio	Roce	Rose	P'tax Profit	Net Profit	Divid Share	EPS	Divid Yield	P/E Ratio	Cap'l Gr'g	Curr Ratio	Acid Test	Debt. Days	Cred. Days	Total Sales	Man Emp	Total Tax	M'cro 1	M'cro 2	M'cro 3	M'cro 4	M'cro 5
Fix'd Asset T/o	0.11	1																							
Sales / Empl'ee	0.32	0.01	1																						
Stock Ratio	0.1	-0.01	0.45	1																					
Roce	0.11	0.98	@0	-0.01	1																				
Rose	0.33	0.77	0.07	@0	0.77	1																			
Pretax P'fit M'gin	0.03	0.91	-0.02	-0.02	0.92	0.76	1																		
Net Profit M'gin	-0.13	0.02	-0.02	-0.02	0.03	0.16	0.32	1																	
Dividend / Share	0.07	0.03	-0.03	0.05	0.03	0.08	0.02	@0	1																
Earnings / Share	0.06	0.01	-0.03	-0.02	0.01	0.05	0.02	@0	0.7	1															
Dividend Yield	-0.06	0.12	-0.14	-0.07	0.12	0.01	0.13	-0.01	0.11	0.19	1														
P/E ratio	0.04	0.01	0.32	0.2	0.01	-0.02	@0	-0.01	-0.05	-0.07	-0.14	1													
Capital Gearing	0.04	@0	0.11	0.07	@0	-0.02	-0.06	-0.18	-0.04	-0.04	-0.07	0.19	1												
Current Ratio	-0.22	-0.04	-0.1	-0.05	-0.04	-0.03	-0.08	@0	0.02	-0.08	0.03	-0.01	-0.17	1											
Acid Test Ratio	0.02	0.26	-0.01	-0.01	0.26	0.2	0.24	@0	0.03	-0.02	0.04	-0.01	-0.01	-0.02	1										
Debtor Days	-0.21	-0.02	-0.01	-0.03	-0.02	-0.02	0.01	0.12	-0.04	-0.08	-0.01	0.05	-0.08	0.26	-0.03	1									
Creditor Days	-0.15	-0.05	0.82	0.46	-0.02	-0.01	@0	0.01	-0.03	-0.03	-0.1	0.38	0.11	-0.1	-0.01	0.44	1								
Total Sales	0.16	@0	0.55	0.41	-0.01	@0	-0.02	-0.02	0.04	-0.02	-0.02	0.23	0.07	-0.08	@0	-0.04	0.62	1							
Manager/ Empl	-0.05	-0.01	0.04	-0.02	-0.01	-0.06	-0.03	-0.06	-0.06	-0.08	-0.01	0.09	@0	0.19	@0	0.34	@0	-0.02	1						
Total Tax Charge	0.02	@0	0.19	0.09	@0	0.01	0.04	0.01	-0.03	0.01	-0.15	0.31	0.04	-0.12	@0	0.02	0.19	0.08	0.01	1					
Macro 1	0.08	@0	0.55	0.33	@0	@0	@0	-0.04	-0.01	0.01	-0.07	0.22	0.1	-0.22	@0	-0.65	0.65	0.4	-0.31	0.12	1				
Macro 2	-0.22	-0.03	-0.09	-0.05	-0.03	-0.03	-0.08	-0.03	0.02	-0.07	0.03	-0.01	-0.17	0.99	-0.02	0.27	-0.09	-0.07	0.17	-0.13	-0.22	1			
Macro 3	0.03	@0	0.1	0.06	@0	-0.02	-0.05	-0.12	-0.04	-0.04	-0.06	0.19	0.99	-0.14	-0.01	-0.08	0.11	0.07	@0	0.03	0.09	-0.13	1		
Macro 4	0.13	-0.01	0.54	0.42	-0.01	@0	-0.02	-0.02	0.04	-0.02	-0.02	0.22	0.07	-0.08	@0	-0.04	0.62	0.99	-0.02	0.07	0.4	-0.07	0.07	1	
Macro 5	-0.04	-0.93	0.02	0.02	-0.94	-0.77	-0.99	-0.24	-0.02	-0.02	-0.14	@0	0.05	0.07	-0.24	-0.01	0.01	0.02	0.02	-0.03	@0	0.06	0.04	0.02	1
Macro 6	0.92	0.14	0.18	0.05	0.14	0.42	0.06	-0.11	0.08	0.06	-0.06	0.03	0.04	-0.19	0.03	-0.18	-0.06	0.13	-0.04	0.01	0.01	-0.17	0.04	0.11	-0.07

Table 3.27 Correlation Coefficients For Acquiring and Non-Involved Firms In the Recession Period Two Years Before the Acquisition as Used in Chapter 5

	T/O / Asset	Fixed Asset	Sales /Emp	Stock Ratio	Roce	Rose	Pr'tax Profit	Net Profit	Divid Share	EPS	Divid Yield	P/E Ratio	Cap'l Gr'g	Curr Ratio	Acid Test	Debt. Days	Cred. Days	Total Sales	Man Emp	Total Tax	M'cro 1	M'cro 2	M'cro 3	M'cro 4	M'cro 5
Fix'd Asset T/o	0.99	1																							
Sales / Empl'ee	-0.03	-0.02	1																						
Stock Ratio	-0.12	0.03	0.36	1																					
Roce	0.99	0.99	@0	0.04	1																				
Rose	-0.04	-0.03	-0.02	-0.09	-0.01	1																			
Pretax P'fit M'gin	0.17	0.16	0.18	0.3	0.2	-0.24	1																		
Net Profit M'gin	-0.1	-0.05	-0.09	0.16	-0.03	0.29	0.08	1																	
Dividend / Share	-0.02	0.04	0.04	0.03	0.01	-0.09	0.19	0.04	1																
Earnings / Share	@0	0.02	0.2	0.01	0.07	-0.11	0.49	0.17	0.49	1															
Dividend Yield	0.13	0.02	0.21	0.06	0.01	0.01	-0.2	-0.12	-0.03	-0.05	1														
P/E ratio	-0.12	-0.08	-0.09	-0.09	-0.18	@0	0.02	0.05	0.01	0.01	-0.35	1													
Capital Gearing	0.11	-0.06	0.13	-0.03	0.1	@0	-0.22	-0.12	-0.05	0.05	-0.01	0.21	1												
Current Ratio	0.03	0.27	0.21	0.17	-0.1	0.02	0.12	0.07	-0.07	-0.01	0.05	0.04	-0.22	1											
Acid Test Ratio	0.12	-0.04	0.23	0.08	-0.05	0.07	0.25	0.11	-0.02	0.08	0.05	0.07	-0.19	0.62	1										
Debtor Days	0.28	0.26	-0.01	0.09	0.27	-0.07	0.21	-0.04	-0.14	-0.06	-0.19	0.2	0.13	0.05	0.3	1									
Creditor Days	0.01	@0	-0.04	0.05	0.01	0.02	0.19	-0.03	-0.04	-0.1	-0.22	0.19	0.16	-0.23	-0.1	0.47	1								
Total Sales	-0.01	-0.01	0.07	0.01	-0.03	-0.03	-0.07	-0.01	0.31	-0.02	-0.11	0.26	0.09	-0.04	0.03	-0.01	0.01	1							
Manager/ Empl	-0.02	-0.02	0.05	-0.09	-0.06	@0	-0.04	-0.04	-0.09	-0.05	-0.14	0.24	0.07	0.34	0.28	0.27	0.08	-0.04	1						
Total Tax Charge	-0.06	0.02	0.22	0.08	-0.09	0.01	-0.03	-0.01	0.25	-0.04	-0.03	0.18	0.14	-0.05	0.03	0.01	0.01	0.89	-0.06	1					
Macro 1	-0.31	-0.3	-0.02	-0.03	-0.29	0.09	-0.07	0.01	0.11	-0.02	0.04	-0.08	0.01	-0.26	-0.42	-0.68	0.32	0.02	-0.24	@0	1				
Macro 2	-0.02	@0	0.21	0.16	-0.04	0.02	0.11	0.07	-0.07	-0.01	0.05	0.05	-0.22	0.99	0.63	0.05	-0.23	-0.04	0.34	-0.05	-0.25	1			
Macro 3	@0	@0	0.11	-0.03	0.02	@0	-0.21	-0.11	-0.04	0.06	-0.03	0.22	0.99	-0.22	-0.19	0.11	0.16	0.08	0.08	0.13	0.02	-0.22	1		
Macro 4	-0.01	@0	-0.02	-0.01	-0.02	-0.04	-0.07	-0.02	0.28	-0.02	-0.14	0.28	0.04	-0.04	0.03	-0.02	@0	0.98	-0.03	0.82	0.02	-0.04	0.04	1	
Macro 5	-0.27	-0.26	-0.14	-0.29	-0.29	0.21	0.22	-0.1	-0.16	-0.43	0.19	-0.01	0.26	-0.15	-0.29	-0.27	-0.2	0.09	0.02	0.04	0.14	-0.15	0.25	0.08	1
Macro 6	-0.99	-0.99	0.02	0.11	-0.99	0.04	-0.17	0.09	0.01	-0.02	-0.15	0.12	-0.06	-0.06	-0.11	-0.28	-0.01	0.01	0.02	0.07	0.31	0.02	@0	0.01	0.27

Conclusion

This chapter had two purposes. Firstly, it was necessary to discuss the various different sampling techniques that could be used in the construction of the data sets and explain the final selection of a choice-based sample and secondly, this chapter introduced the variable that will be included in the data sets and contained summary statistics to give a brief overview of the nature of the data.

There are three possible sampling techniques that appeared, at least superficially, to be suitable for the construction of the data sets. The random sampling technique is ineffective as it could result in a sample that does not contain any of the acquired or acquiring firms. This may sound implausible, but it is possible as the number of these companies is relatively low compared to the total number of companies in the stock market. The logical alternative approach is to create a proportionally stratified sample. This is done by dividing the entire population into strata based on some factor that can be applied to all of the firms. In this case, the divisions could be based on whether the firm had been acquired, had acquired another company or had never been involved in acquisition activity during the period under examination. Once this has been done, the sample is then drawn randomly from these sub-populations. However, the number of firms that can be taken from each of these sub-populations is set so that is replicates the proportion of the total population that each of the strata represent. This would ensure that there would be both acquired and acquiring companies in the data sets, but the number of these firms would be relatively low as the number of firms that take part in acquisition activity represent approximately fifteen percent of the total population of firms. The study of companies that take part in acquisition activity is the main part of this thesis and as a result it is desirable to maximise the quantity of information that these firms can contribute to the data sets, which means that the stratified sampling technique is not the best approach.

An alternative approach is the choice-based sampling technique. This approach removes all elements of random selection from the construction of the data sets and makes it possible to create data sets that ignore the proportions of different types of

firms that exist in reality. This allows the firms to be picked in such a manner that the acquired and acquiring firms can be deliberately over-sampled to a large degree which maximises the amount of information that can be gathered from their study. This results in the construction of data sets that have very little resemblance to the population from which they are drawn, but makes it much easier to investigate phenomena that apply to only a small percentage of the firms in the UK. Since the resulting data sets are a considerable distortion of reality, it is important to ensure that any estimations based on this information sets will produce acceptable results. The use of a maximum likelihood estimator with such a data set generates biased results as this approach is based on the assumption that the proportions in the data sets mirror the proportions in the original population. In this case the resulting bias in the estimated models will over-state the possibility that a firm comes from the over-sampled section of the population. It is possible, however, to calculate the size of this bias and alter the predicted values accordingly. This is likely to be a problem with the logit models in the later chapters as these estimations are generally produced using this particular method of iteration, but the bias can be quantified and the predicted values adjusted accordingly. In the case of the hazard function models, however, this problem does not arise. Cox's proportional hazard function is estimated using a form of likelihood function that is specific to this type of model. This function is not based on any assumptions concerning the construction of the sample, the cause of the problem with the maximum likelihood estimator, and is unaffected by the nature of the sample.

There are many theories concerning acquisition activity and the nature of the firms that become involved in this sort of behaviour. It is important to select variables for inclusion in the data sets that can be related to these theories before attempting to collect the data. There are a great many theories and it is necessary to select enough variables to be sure of representing them all in the estimated models. Tables 3.1 to 3.3 demonstrate this wealth of information and how the twenty variables that will be included in the data sets have been chosen. In the previous literature there is consensus of opinion concerning which terms are the most informative and so, following Cosh and Hughes (1995) the data sets sometimes contains more than one variables representing a given area. By analysing these terms together it may be

possible to determine which ones are the most informative. These terms can be grouped, broadly, into efficiency terms, profitability terms, investment ratios, leverage terms, liquidity terms and a group of three miscellaneous terms that represent size, diversification and the tax situation of the firms in the data set. The selection of these terms means that the data sets can be gathered at this point and once the data sets have been constructed it is possible to analyse the information that they contain. It is important to determine that there are substantial differences between the data as it is applied to the different groups of firms. There is a fundamental assumption in the construction of binary choice models that states that the data should fall into distinct groups before the models are estimated. If this is not the case then it could prove impossible to create these models with any degree of accuracy or to ensure that they are well-specified. By considering the mean values of the data in the samples that have been drawn, it is possible to determine that there are significant differences between the various groups of firms that are used in the data sets. This means that there is no hindrance to the estimation of these models, as the data sets have now been created so that they represent the prevailing theories concerning the firms that take part in acquisition activity. Furthermore, the data satisfies the important assumption that there should be significant differences between the firms which is of vital importance.

Finally, this chapter included correlation matrices for the data sets that will be used in the following two chapters. Where the terms are highly correlated only one will be used to avoid any potential multicollinearity problems. It is now possible to begin the empirical work that makes up the main contribution that this thesis makes to the current knowledge concerning acquisition activity in the UK and, specifically, to the current understanding of the characteristics of the firms that become involved in takeovers and their motives for doing so.

Chapter 4. Logit Models and Cox's Proportional Hazard Function in the Prediction of Acquisitions [1]

Introduction

This chapter has two distinct purposes. The first of these serves to utilise a methodology that has not been used previously in the analysis of companies that become either bidders or targets in acquisition activity. The hazard function has some advantages over the alternative methodology, that of binary choice models such as logit and probit. Specifically, the hazard function looks at the timing of the event and incorporates this factor into the estimation of a conditional probability. This adds an element of timing into an essentially cross-sectional procedure which enables the age of companies to be taken into account in the modelling procedure.

The second intention in this chapter is to try to provide a superior definition of the motives that prompt acquisition activity and the characteristics of the involved companies. To do this the acquisitions are modelled three times. Firstly, using the acquired and acquiring companies to infer the characteristics that prompted the selection of these targets and the motives behind the instigation of the takeover process in the first place. Once this has been completed both the bidders and targets will be modelled against companies that were not involved in takeovers during the sample period. These last two sets of results may help to clarify the characteristics of the firms that take part in the acquisition process and distinguish them from the rest of the population of companies.

This sort of information would have a wide range of uses. Many companies would be interested to know whether they have a high risk of becoming an acquisition target as this could influence their future behaviour. Alternatively, other firms may wish to use this type of technique to determine how appropriate it would be for them

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[1] The results in this chapter were presented at the BAA-ICAEW Doctoral Colloquium held at Lancaster University, 9 - 11 July 1996.

to attempt a takeover in the near future. Lastly, banks might wish to know the chances of a company becoming an acquisition target before they consider lending funds to that company for other projects.

The recent empirical work in the literature on this subject centres on the use of binary choice approaches and are, therefore, unable to incorporate an element of timing in the analysis. For example, Dietrich and Sorensen (1984) used logit models to examine the types of companies that become acquisition targets compared to firms that were not involved in the takeover process.

The rest of this chapter is organised as follows. Section 4.1 examines the current theories and literature concerning the nature of companies that become involved in acquisitions activity and the methods of analysing this process that have been used in the recent papers. Section 4.2 contains the methodology used in this chapter as well discussing the data and the empirical results. Finally there is the conclusion.

4.1 Theories and Evidence

There are many articles that aim to identify either the motives for acquisition activity or the characteristics of the firms that take part in this process. These papers employ a wide variety of techniques ranging from simple observation to empirical examination. These articles and the points that they raise have been discussed at length in an earlier chapter so it is only necessary to recall, briefly, the important points. One of the most frequently mentioned motives for acquisitions is synergy. This is the idea that the combined firm which results from the acquisition will be able to achieve objectives that neither of the original firms could have managed separately. These synergistic gains can appear in virtually any area of the business and this variety makes it a popular motive in the literature. This theory was discussed in papers by Lev (1992) and Berkovitch and Khanna (1991) amongst many others.

The next motive is managerial ambition. The financial rewards and the prestige attached to managing a large company usually exceeds that given to the managers of smaller firms. One of the fastest ways in which a firm can increase in size is via a takeover. Consequently, it is possible that an acquisition could be prompted solely by the managers desires to advance themselves as Jensen suggested (1988, 1992). Another issue that relates to the managers' behaviour is managerial inefficiency. If the managers of a certain firm are viewed as being inefficient and are not utilising the firms assets in the best possible way, then that firm could well be the target for a takeover attempt. The management of the bidding firm could view this as an ideal opportunity to acquire control of another set of assets which could then be used more effectively. Similarly if one firm is considered to be significantly undervalued by the market then it could be acquired by a company whose managers consider themselves to have a more realistic picture of that firms true value. There is a clear link with managerial inefficiency; if the market considers that the firm's managers are inefficient then the share price will often drop and the company may become seriously undervalued.

The tax issue is another popular motive in the recent literature. Firms may find themselves in the situation where they will loose beneficial tax conditions unless they acquire a firm with a different tax position. For example, a firm may be too small to qualify for a certain tax level but by acquiring another company could qualify. This motive appeared in the article by Jarrell, Brickley and Netter (1988) amongst others. The tax motive is really a sub-set of the restructuring idea. Here it is suggested that the bidding firm wishes to undertake some form of radical restructuring and an acquisition can sometimes be the fastest and most convenient manner in which to do this. For example, a company may find it has reached its maximum possible debt capacity and yet it may wish to further increase this. It may transpire that this change is not possible or may take too long by internal means. By acquiring a company with an excess of debt capacity this goal may be achieved.

Finally, there is the diversification motive, mentioned by Hughes (1993). A firm will purchase another company that operates in a different geographical area or market to facilitate a swift entry into that specific market. In particular, this approach

saves the acquiring company both the time and expense of developing a new product as the acquired firm will have already completed this task. Furthermore a takeover is sometimes the only way to enter a particular market as there are insurmountable barriers to entry by any other route.

Whilst the previous points have been supported as possible motives for acquisition the recent literature has also provided a list of characteristics that could be used to identify companies that are involved in acquisition activity compared to the rest of the firms in their industries. The first of these features is the size factor as discussed by Lev (1992) and Dietrich and Sorensen (1984). It is often claimed that the target firms are smaller than the average company in their industry. Conversely, the bidding firms are held to be larger. The small size of a target firm is, presumably, designed to reduce the cost of purchasing it as far as is possible, whilst the large size of the bidding company is supposedly indicative of its ability to raise the sort of money that a takeover requires. It is also possible that the smaller firms find it harder to defend themselves against a concerted acquisition attempt than larger companies. This concept may be valid in general but it seems to ignore the possibility that a small firm would want to acquire a larger one and equally ignores the effect of differing economic conditions on the probability of a firm raising the necessary funds.

A similar characteristic concerns the profits of the involved companies. The target firms are thought to be less profitable than the industry average whilst the acquiring firms are more profitable. There can be little doubt that a company has to be in a stable financial position before they can embark upon an acquisition as such an activity can impose considerable monetary strains on the firm and there is always the possibility that the integration of the acquired firm will cost more than was originally planned. This does not necessarily mean that the target firms are less profitable than the average company in their industry, however. Nevertheless, a less profitable company may have a lower share price which would reduce the cost of the takeover but this is a separate point and has already been discussed.

The motives and characteristics that have been discussed here are summarised in table 4.1, below. However, it is important to remember that a firm does not acquire another company simply because that company is undervalued, for example, as this factor represents no guarantee that the target company could be effectively integrated into the purchasing firm which is essential in the completion of a profitable takeover. There has to be another clear advantage for the acquirer. In other words, the selection process for a target is a two stage process. First, the bidder selects firms that meet the requirements specified by the particular acquisition motive that has prompted the takeover. Once these firms have been identified then the acquiring firm can consider such factors as minimising the cost of the acquisition by finding the smallest of the potential targets or one that is undervalued for some reason.

Table 4.1 *The Characteristics of Companies Involved in Acquisition Activity* Based on the Recent Literature

Acquiring Companies	**Acquired Companies**
Ambitious management	Inefficient management
Diversifying / Expanding	Occupying a complementary position
Requiring to restructure	
Possessing unused tax advantages	
Possibly overvalued	Undervalued
Performing better than average	Under-performing
Larger than average	Smaller than average
Above averagely profitable	Less than averagely profitable
	Possessing potential

The literature on the subject of takeovers also includes articles that consider the identification of the companies that are involved in the market for corporate control from a practical perspective and attempt to identify the features that distinguish companies that are involved in the acquisition process from the firms that remain uninvolved. The first of these papers to consider was by Dietrich and Sorensen (1984). Here the authors used the logit methodology on a sample of merged and non-merged American firms. This paper considered acquisitions as investments that

would increase the total net present value of the bidding company, which is one of the more popular ways of viewing the takeover process. Later Palepu (1986) also used the logit methodology to identify the basic characteristics of the companies that are purchased in acquisitions. Similarly, Ambrose and Megginson (1992) extended Palepu's paper to include information on the ownership structure of the target firms and the nature of any defence mechanism that these companies might use to protect themselves against an unwanted takeover attempt. Their results demonstrated that the majority of acquisition defences do not work against a determined takeover attempt and the ownership structure, particularly with respect to institutional investors, makes no difference to the probability that a company will become involved in takeover activity.

More recently the hazard function methodology has started to appear in papers of this sort. To date it does not appear that anyone has attempted to apply this approach to acquisitions but it has been used for the analysis of some similar events. Ravenscraft and Scherer (1991) used this technique to evaluate the probability of a company divesting parts of itself. The authors chose this methodology as they considered that the logit approach, with its lack of a time element, was inferior to the hazard function technique. Lastly, Audretsch and Mahmood (1995) used hazard functions to examine the survival rates of companies within the first ten years of their existence. Again, the importance of the timing element makes this approach superior to the logit model for the analysis of this phenomenon.

The motives and characteristics that define the companies that become involved in acquisition activity drive the selection of the variables that will appear in the model estimated in this chapter. Combining these with the methodologies that appear in the papers mentioned above sets the framework for the empirical analysis that constitutes the rest of this chapter.

4.2 Methodology and Empirical Results

4.2.1 Methodology

The first type of probability model to consider is a simple binary response model, of which the logit model is a good example. Once these models have been examined it is relatively simple to extend the methodology to Hazard function models.

Binary Responses and Logit Models

The derivation of the binary logit model starts with the assumption that there can only be two possible outcomes for the event under consideration to which are assigned appropriate probabilities. The outcomes are usually denoted 0 and 1 and given the following probabilities.

$$P(Y_i = 0) = 1 - \pi_i \qquad (4.1)$$

$$P(Y_i = 1) = \pi_i \qquad (4.2)$$

In most investigations there are several observed variables that are deemed to alter the condition of the response variable. These are usually represented as a vector of covariates $\mathbf{x}$. It is possible to state that "the principle objective of statistical analysis, therefore, is to investigate the relationship between the response probability $\pi = \pi(\mathbf{x})$ and the explanatory variables $\mathbf{x} = (x_1, ..., x_p)$." (McCullagh and Nelder, 1983, page 98)

A linear regression model is a convenient, albeit simple, first order approximation for any phenomena under investigation, as Hastie and Tibshirani (1994) noted. To produce better results an additive model can be derived that generalises the linear estimation into something rather more meaningful by replacing the single explanatory variable with a vector of several terms. An example is given in equation 4.3

$$\eta = \alpha_0 + \sum_{j=1}^{p} \mathbf{x}_{ij}\boldsymbol{\beta}_j \qquad (4.3)$$

where

η represents the alteration in the probability π generated by a change in the vector $\mathbf{x}_{ij}$, the explanatory variables, and

$\boldsymbol{\beta}_j$ represents a vector of coefficients

The problem with this expression is that it can take any value on the whole real line unless the coefficient terms are restricted in some manner. Since all probabilities must lie between zero and one this expression is contrary to the most fundamental laws of probability and cannot be accepted.

This problem can be avoided by using a transformation $g(\pi)$, called the link function, that maps the output from this equation onto the unit interval, the range from zero to one without imposing any constraints on the coefficients. A wide range of link functions are available. The logistic link function is given in equation 4.4, below, and takes the form of the log odds ratio.

$$g(\pi) = \log\left\{\frac{\pi}{1-\pi}\right\} \qquad (4.4)$$

Combining the link function with the general linear model, gives the following equation for the logit model.

$$\log\left\{\frac{\pi}{1-\pi}\right\} = \alpha_0 + \sum_{j=1}^{p} x_{ij}\beta_j \qquad (4.5)$$

Equation 4.6 below, illustrates how the logit model relates a change in the explanatory variables on the probability of an firm having the outcome denoted 1.

$$\pi = \frac{\exp\left(\alpha_0 + \Sigma \mathbf{x}_{ij}\boldsymbol{\beta}_j\right)}{1 + \exp\left(\alpha_0 + \sum_{j=1}^{p} \mathbf{x}_{ij}\boldsymbol{\beta}_j\right)} \qquad (4.6)$$

With any methodology, however effective it may appear, there are likely to be some disadvantages. The first problem is that the logit model does not involve any terms that represent how long each firm occupies their first state before the event occurs, as can been seen from equations 4.5 and 4.6. For virtually every company the takeover occurs at a different time within their life cycle. The logit model is incapable of reflecting this difference and implicitly assumes that the sample is homogenous in this respect. Clearly this statement is not true and, in addition, each different time could be subject to a distinct set of circumstances, which should also be reflected in the analysis. Another problem linked to the absence of time is the fact that the probability of the event occurring may alter with time. As an illustration, consider the age of a company. It is often suggested that older companies have less chance of being acquired than young firms. It is reasonable, therefore, to want to include some measure of time in the model. There is also the problem of censoring. It is not possible to produce a sample that contains every company or covers all possible times; practicality ensures that the sample is of a finite size. This means that, without some measure of time, the calculations come to an abrupt end at the end of the sample period. This creates the impression that the entire life of the companies used in the estimations is contained within the sample period and that nothing can change beyond that time. This is obviously not true and is another problem associated with this methodology.

The last problem with this methodology is the choice of estimation process when used with certain types of data sets. This point has previously been discussed in the sampling section of Chapter 3. The logit model is usually estimated using the maximum likelihood approach. This approach is based on the assumption that the sample is randomly selected and is representative of the population. In other words, that the proportion of acquired companies in the sample, for example, is representative of the proportion of the total population that are also targets. If this assumption is violated the results of the estimation are biased. In the case of a choice based sample, such as the one here, this bias would result in the over-prediction of the part of the sample that was over-sampled and a corresponding under-prediction of the remaining companies. In all of the data sets that will be used in this chapter there is deliberate

over-sampling of one or both sets of firms and so this problem will continually arise. However, following Palepu's paper it is possible to evaluate the size of the sampling bias as was demonstrated in Chapter 3. However, this still leaves one problem with the logit model; the absence of any timing effects. It is not possible to add this term to the logit methodology so the obvious response is to identify a type of model that does involve an element of timing. This leads from binary response models to survival models.

Survival Models

After the binary choice models discussed above the simplest type of models that can incorporate a time feature are the survival models. The fundamental concept here is the notion of survival time. This is the length of time up to the point at which the event occurs. In early studies this methodology was predominantly used in clinical studies and the event was often the patient's death, hence the name.

The study of survival data centres on the individuals in a homogenous population each of which has a distinct failure time. In other words, this is the examination of "a single non-negative random variable, T" (Cox and Oakes, 1994, page 13) which represents the length of time up to that point. As the authors point out, it is essential to have a clearly defined origin and a consistent time increment for measuring this factor. The survivor function of T has the density function $f(t)$. The corresponding distribution function can be expressed in equation 4.8 and represents the fraction of the population that dies by time t.

$$F(t) = \int_{-\infty}^{t} f(s)ds \qquad (4.8)$$

Survival models are designed to measure the rates of failure for the firms within a given sample and concern themselves solely with the distribution of the survival time for each individual. In order to relate this change in state to other terms it is necessary to extend the survival methodology to form a probability model; one such type of model is the hazard function model which relates the conditional probability that a firm will be acquired to a given set of variables.

Hazard Function Models

The hazard function measures the probability that a firm will exit from the sample within the next small time interval, given that this firm has survived to the current time. In other words it represents the probability that a firm will be the subject of a takeover bid in the near future given the fact that the company in question has not yet been acquired. It can be represented as a conditional probability :

$$h(t) = \lim_{\delta t \to 0+} \frac{P(t \le T < t + \delta t | t \le T)}{\delta t} \qquad (4.9)$$

where T is the survival time.

Equation 4.9 can also be represented in terms of the survivor function. The expression above can be re-expressed in the form of several conditional probability statements which are then translated into terms of the survival time and the associated functions as stated by McCullagh and Nelder (1994) .

$$P(\text{Survival to } t+\delta t) = P(\text{Survival to } t).P(\text{Survival for } \delta t | \text{Survival to } t) \qquad (4.10)$$

$$1 - F(t+\delta t) = \{1 - F(t)\}.\{1 - h(t)\delta t\} \qquad (4.11)$$

$$1 - F(t+\delta t) = 1 - F(t) - h(t)\delta t + F(t)h(t)\delta t \qquad (4.12)$$

$$F(t) - F(t+\delta t) = h(t)\delta t[F(t) - 1] \qquad (4.13)$$

$$-\delta t F'(t) = h(t)\delta t[F(t) - 1] \qquad (4.14)$$

$$h(t) = \frac{f(t)}{1 - F(t)} \qquad (4.15)$$

where $1 - F(t)$ is the probability of survival to time t; the point in time which is of interest

$h(t)$ is the probability of a firm exiting, being acquired, during the next small time period

$f(t)$ is the density function for the survival time as introduced in the section considering survival models and
$F(t)$ is the distribution function also corresponding to the survival time

Expressing the hazard function in this form clearly illustrates the importance of both the survivor function and the timing element. It should be recalled that the absence of this factor was considered to be the main problem with the logit model, so this may imply that the hazard function is preferable when modelling phenomena in which timing is important.

It is easy to include the vector of explanatory terms, or covariates, into the probability expression for this function, equation 4.9. The hazard function is simply re-written so that it is conditional on the vector of explanatory variables $\mathbf{x}$.

$$h(t;\mathbf{x}) = \lim_{\delta t \to 0} \frac{P(t \leq T < t+\delta t \mid t \leq T, \mathbf{x})}{\delta t} \qquad (4.16)$$

There are, however, two difficulties inherent in the use of this model. The first problem deals with the data. The exiting and censored individuals, the acquired and non-involved firms, are assumed to lie in distinct groups. In addition, they are assumed to be subject to the same level of risk within each of the groups, but the groups themselves are held to be different. This assumption of homogeneity within the groups is fundamental in the estimation of the hazard function and the violation of such an assumption could result in a model that simply cannot differentiate effectively between the possible outcomes.

The second potential problem with the hazard model refers to the estimation of the likelihood function. The precise form of the likelihood function is the summation of two separate likelihood functions which reflect the contributions of both the exiting and the censored individuals in the sample. The functional forms of these two parts of the likelihood function are defined by the distribution of the data. It may not be possible to accurately identify this distribution, which could be a problem. If the wrong distribution is used, the results will be erroneous.

The alternative approach to this problem is to find a manner of estimating the model that does not require the distributions to be identified when estimating the likelihood function. This leads to the use of the proportional form of the hazard model devised by Cox (1972).

Cox's Proportional Hazard Function Model

As Cox (1972) observed it is usual to have additional information concerning the firms in the sample, the explanatory variables $\mathbf{x} = x_1, ..., x_p$ say, where some of the terms may be functions of time. In the ensuing hazard function the main issue is the relationship between the vector of explanatory terms and the distribution of the failure time. He suggested representing this relationship by a model in which the hazard is

$$h(t; \mathbf{x}) = \gamma(\mathbf{x}\boldsymbol{\beta})h_0(t) \qquad (4.17)$$

where $\boldsymbol{\beta}$ is a vector of unknown parameters and h_0 is an unknown function, called the "baseline hazard function" which represents the hazard function for the standard set of conditions $\mathbf{x} = \mathbf{0}$. Identifying the form of the data is the first step in estimating the values of the vector of coefficients. Cox claims that there are several ways to analyse this model and the simplest of these approaches is to assume that the underlying distribution, here denoted γ, is exponential. The resulting equation, 4.18, is the most usual form of Cox's proportional hazard function.

$$h(t; \mathbf{x}) = \exp(\mathbf{x}\boldsymbol{\beta})h_0(t) \qquad (4.18)$$

The real importance of Cox's model is that it is easy to use and circumvents the problems raised by the specification of the underlying distribution and the complexity of the likelihood expressions that are inherent in the first form of the hazard model, equation 4.16. In particular there are three good reasons for using this form of the model. Firstly, the most usual form of the model is the exponential equation, 4.18 above. The use of the exponential prevents the hazard function from ever taking a negative value which would be meaningless as there is no such thing as negative risk. Secondly, the addition of another covariate can be simply interpreted as the multiplication of the hazard rate by a constant factor. Lastly, the technical problems of statistical inference have a simple solution when $h_0(t)$ is arbitrary, as it is allowed to be

in this model. This means that the baseline hazard function does not need to be rigorously identified before the hazard function can be estimated. For an explanation of this last point, we need to explain how this model is estimated. This is the real strength of Cox's model compared to the other forms of hazard function. It is relatively simple to evaluate the proportional model using the partial likelihood function also devised by Cox. A concise explanation of this function appears in the article by Kiefer (1988). Assuming that the model takes the general form, equation 4.18 above, the contribution that each short duration makes to the total partial likelihood can be calculated independently. The total log-likelihood is generated as the product of these individual contributions, as follows :

$$\log L(\beta) = \sum_{i=1}^{n} \left\{ x_i \beta - \ln \left[\sum_{j=i}^{n} \exp(x_j \beta) \right] \right\} \qquad (4.19)$$

This means that Cox's version of the proportional hazards model is only semi parametric, as the baseline function is not modelled as a smooth function of the survival time. Instead this function is allowed to take arbitrary values and is irrelevant in the estimation of the process as it does not effect the evaluation of the partial likelihood expression, above. This is further clarified by the expression below.

Let $\mathbf{x}_j$ be the covariate vector for a firm that is acquired at a given time in the sample period. The probability that the firm selected as the acquired firm is the same as the firm which is observed to be the acquired firm is

$$\frac{h_0(t)\exp(x_j\beta)}{\Sigma h_0(t)\exp(x_j\beta)} = \frac{\exp(x_j\beta)}{\Sigma \exp(x_j\beta)} \qquad (4.20)$$

where the summation extends over the entire set of companies that have not been acquired. From this expression it is easy to see that the baseline function is not involved in these estimations and consequently Cox's model has circumvented the potential difficulty of correctly identifying the form of this function. Using Cox's model has the advantages that it is simple to estimate and interpret. However, it does require a considerable simplification of the hazard function in order to facilitate the easier estimation of the models. Efron (1977) examined whether it is really acceptable

to use Cox's models instead of more complex forms of the hazard function for just this reason. He examined Cox's model both theoretically and empirically and concluded that the proportional hazard model is as efficient an estimator of β as any of the parametric forms of the model. The relative efficiency of Cox's model was also examined by Oakes (1977). He examined the amount of information lost when the exact nature of the underlying hazard function is unknown, as in Cox's form of the Hazard function. Oakes found that, although Cox's model is fully efficient only in very precise circumstances, the informational loss is not great enough to justify the extra dimension of difficulty required in the estimation of a more precise form of the hazard function. Cox's model has achieved great popularity in recent years and, as Portugal and Addison (1995) observed, it is by far the most popular model of this type used in the analysis of life time data. It seems, then, that Cox's form of the Hazard function model is an acceptable next step after the use of the logit methodology.

Using Cox's Proportional Hazard Function in Practice

The theory behind the proportional hazard function is discussed above. This does not, however, explain how this model is used in practice. The theory uses the explanatory variables to identify the survival time for an individual whilst, in practice, the opposite is true. Here the survival time and the outcome are already known for each firm in the sample and this information is used to estimate the coefficients of the covariates.

Consider the equation below which is the usual form of Cox's Proportional Hazard function. This equation appears previously as 4.18 but is repeated here for convenience as equation 4.21.

$$h(t; \mathbf{x}) = \exp(\mathbf{x}\beta)h_0(t) \qquad (4.21)$$

The left hand side of this equation is the probability of a firm exiting, here being acquired, which is already known for every firm in the sample as this factor has already been observed. The right hand side of this equation represents the explanatory variables that are thought to distinguish the two sets of firms in the data set from each

other. These terms have already been picked by examining the empirical work and the theories concerning the motives for acquisition activity that appear in the previous literature. The only unknown in this equation is the vector of coefficients, β, and in the empirical work that follows the estimations are used to identify the value of this term. In the tables of results that follow, the significant coefficients are presented as these are the terms that can be used to characterise the two types of firms used in the samples.

The covariates selected for use in the model can be any set of terms thought to distinguish the two groups of firms in the data sets and these variables can be of any magnitude. The model is a cross-sectional one in which a single element of time is important; the duration variable. Furthermore, there is no reason why the time origin for the duration variable should match the point at which the sample period started as Cox and Oakes (1994) observed. It is often the case that the most sensible duration variable predates the collection of data which makes it impossible to match the duration variable to the data set. This is particularly the case when the age of the individual or firm is thought to be the most suitable duration variable, as in this thesis.

Since this is a cross-sectional model there is also no reason why the covariates should match the duration variable either. Covariates can be any terms that are thought to distinguish the groups of individuals in the sample and it is possible that some of these terms have no relationship to time at all. Equally, since the time of the observation is irrelevant the terms can be related to time but may not have the same time scale as the duration variable. There are many precedents and examples of this in previous literature. Lancaster (1979) examined the probability of an individual finding a job and used the length of time of unemployment, in weeks, the age of the individual, in years, and the current value of wages, undated, in his analysis. Ravenscraft and Scherer (1991) examined factors that make a company divest one of its divisions after an acquisitions by using accountancy data from the year after the divestiture and other factors that have no date attached to them such as changes in CEO's. More recently, Audretsch and Mahmood (1995) examined the failure of small firms and used a combination of variables that referred to the firms itself and the industry in which it operated. The data here demonstrates the cross-sectional nature of the proportional

hazard function model as it is drawn from several different years. For example, the rate of technological change is measured six years after the firm was started, but the size of the firm is measured in the year it began trading. In the same year, Portugal and Addison (1995) used a mixture of undated and dated variables in a proportional hazard function to examine the factors that relate to unemployment. Their covariates included the age and educational background of the individual, both measured in years, with the value of wages, gender, and reasons for unemployment, all of which have no date attached to them. These terms were used with the observed duration of employment to estimate the values of the coefficients attached to these variables.

In economics and financial papers it has recently become fashionable to use a panel of data when using lifetime data models. Again, there is no particular reason why this should be the case. In some situations it may be far more informative to consider the data in separate years rather than creating a panel. Barniv and Raveh (1989) investigated financial distress using accounting data from the years before the firm went bankrupt. They produced results for one and three years before bankruptcy to demonstrate that the significance of the terms can alter with the proximity of the firm's failure and also to determine which year is the most informative one when attempting to identify firms with a high probability of going bankrupt. If firms can be identified some years before they find themselves in financial distress then it would help potential investors to decide whether they really wish to put their funds in to this company.

A similar approach was used by Hendricks and Porter (1996) in their hazard function analysis of exploratory oil drilling in the Gulf of Mexico. Their study was designed to identify the factors that make firms start drilling once they have purchased the lease for a certain tract of land. The lease lasts for five years and ownership of the land reverts to the Government at the end of that time unless drilling has already been started. Drilling is expensive and there is no guarantee that oil will be found so firms will not automatically begin drilling once they have purchased the lease. Hendricks and Porter used factors concerned with the condition of the firm and the outcome of other drilling to determine why the firms decide to start drilling. They contended that

these factors would change as the lease matured and so they estimated the factors in each of the five years after the lease was bought. As they predicted the significant variables changed over the five years and they were able to produce results that described the changes in the firms in each of these years. The authors of this papers felt that this approach was very informative as it enabled them to see the way that the firms grew and developed over these five years and to observe the differing influences that became important as time passed.

In the analysis of companies that take part in takeovers it will also be more informative to observe how the firms change and develop in the years before an acquisition. Following a similar approach to Hendricks and Porter (1996) the data here will be arranged in five data sets each one representing one of the *five years* before the takeover took place. This will create results that show how the firm alters as the years pass and how it evolves from a company that is not likely to become involved in the acquisition process to a firm that does become involved in the *market* for corporate control. This approach will be considerably more informative, when considering the changing nature of companies involved in acquisition activity, than creating a panel of data.

Creating Empirical Models Using the General to Specific Methodology

The models features in the following empirical section are all created using the general to specific methodology introduced in Chapter 2. This is used because the previous literature and previous empirical studies suggest a great many potential explanatory variables that might be used in this empirical study. This results in the creation of a relatively large data set. This large number of variables is reduced to just the most important terms by examining the t-statistics of the individual terms and selecting the least significant term for removal. Using Likelihood ratio tests the validity of this restriction can be confirmed and this procedure is repeated until the specific model is derived.

There are also some precedents for the use of general to specific modelling with lifetime data models. Barniv and Raveh (1989) began their analysis of financial distress with twenty variables and reduced their models until just four terms were left. These remaining variables, they argued, represented all the important information that was required to analyse bankruptcy using their model.

Measures of Model Specification and Goodness of Fit

When estimating any empirical model it is important to know whether the model is correctly specified. In the previous empirical chapter, Chapter 2, OLS models were used in which it is relatively simple to check for correct specification. In the case of logit and proportional hazard function models it is not quite as straight forward. Simple specification tests such as the Gauss-Markov conditions do not apply in these cases and so other measures have to be used. The first of these is the likelihood ratio test which measures the joint significance of the variables within the models. As in Chapter 2, the general to specific methodology will be used to reduce the relatively large number of explanatory terms, all suggested by previous research and theory, to a more concise specific model which is easier and clearer to interpret. Once the specific model has been identified a likelihood ratio test will confirm that the variables within the model are all significant and the reduction that was used to create that model is justified. For this test the null and alternative hypotheses are :

$\mathbf{H_0}$: the coefficients of the variables left in the model are equal to zero

$\mathbf{H_A}$: the coefficients of the variables left in the model are not equal to zero

If the model has been correctly formed then the null hypothesis should be rejected implying that the model is well specified and contains only the important terms from the general model. Using this test was suggested by Kiefer (1988) and can be applied to both the logit and proportional hazard function estimations which makes it a very suitable test of specification in the following empirical work.

An alternative measure of the suitability of the model is a test of the goodness of fit. Maddala (1996) defines the goodness of fit as "a summary statistic indicating the accuracy with which a model approximates the observed data." (Maddala, 1996. Page 37) In an ordinary OLS regression model this would be the R^2 value. When it is not appropriate to calculate the conventional R^2 value, for example in a logit model or in the proportional hazard function model, it is possible to use the accuracy of prediction as a proxy for the R^2 value. In the empirical work that follows the values for the predictive accuracy of the logit and hazard function models will be given with respect to both the sets of firms in the data sets in the tables of results.

4.2.2 Data

The data used in this chapter is drawn from three sources. In the first instance it was necessary to identify the names of companies that were involved in acquisition activity and the dates of each of the takeovers. For this purpose the weekly publication the "Investors Chronicle" was used. This journal prints a table of current acquisitions every week. Once companies were identified the Stock Exchange yearbooks were used to identify the year when each firm was first quoted, so that the duration can be calculated, and the industry in which the majority of its business takes place. Once these details have been established for each of the companies, Datastream was used to access the appropriate accounting data. All of these variables are considered in detail in Chapter 3.

As has been previously mentioned, the data is used to form three groups. Initially, the analysis will centre on the companies that are directly involved in the takeover; the acquiring and acquired firm. Once this has been completed, the data on these two sets of companies are split apart and each is paired with a set of companies that were not involved in acquisition activity. These companies are paired with the bidders and target by matching the total market values of the firms as closely as possible. This leads to the construction of a further two sets of data. For each of the three sets of companies, the data is considered for five years before the acquisitions

took place. Each of these years are considered separately. This results in a total of fifteen different data sets that will be used in the empirical analysis.

For each of the companies twenty variables are examined. The selection of these terms is based on the prevailing theories on acquisition activity and the characteristics that are held to identify the companies that are involved in acquisitions, see Table 4.1 and Chapter 3 for more detail. As far as possible, variables have been selected for use in the empirical sections that are likely to be informative about one or more of these concepts. Some of the theories are more difficult to translate into accounting variables than others and, conversely, some of these ideas can be represented by more than one of the terms. The variables can be split into those representing the efficiency, profitability, investment and liquidity aspects of the firm. Added to these groups of variables there are also some terms that are included to measure certain other aspects of acquisition activity that are considered important in terms of takeovers but do not fit within one of the other groups of covariates.

Correlations within the Data Sets

In this chapter there are fifteen six data sets that represent the three groups of companies in each of the five years before the acquisition took place. Before beginning the empirical analysis it is important to know whether any of the variables are highly correlated. Any highly correlated terms need to be separated before attempting to create the empirical models. In the case of the hazard function methodology the misspecification caused by leaving highly correlated terms together could result in the estimation of standard errors for the parameters that are much greater than they should be (Cox and Oakes, 1994, pages 89-90) and the specification tests applicable to these types of models, likelihood ratio tests, cannot indicate the presence of this problem. To prevent this situation arising the correlations between the variables need to be calculated in advance and any highly correlated terms split up so that only one appears in the data set. The correlation matrices for these data sets appear as Tables 3.7 to 3.21 in Chapter 3.

Biases Created by the Use of Choice Based Samples

This is the last task that needs to be completed before the empirical work can begin. As was explained earlier, in section 3.1.1., there is a bias created by the use of a logit model on a choice based sample. It is possible to evaluate the magnitude of this bias with a simple calculation; the formula in equation 4.7. Using the numbers of companies involved in acquisitions, available on Datastream, the corresponding number of companies registered on the Stock Exchange and knowing the composition of the data sets, it is possible to calculate the size of this bias for each of the data sets that will be examined. For the acquired firms, when modelled against companies that were not involved in the takeover process, the value of this bias is 24.32%. During the period used in this sample, 1987 to 1994, there are more acquired firms than acquiring companies in the period that has been used here. As a result, the bias that is created by the over-sampling of these individuals is even larger. In fact the bias generated in this way is 29.82%. These biases are easy to deal with when the data refers to one of these over-sampled groups of companies, compared to the non-involved firms, but in the first instance they are combined to facilitate the examination of the acquired and acquiring companies. The biases created by these two sets of over-sampled individuals will each affect the results in the opposite manner leading to a certain degree of cancelling out. However, since the two biases are not equal in magnitude there will be a residual effect that remains. The difference between the sizes of the two biases is 5.5%. As the larger bias is generated by the acquiring firms, this 5.5% bias will be associated with that side of the data set. This means that the results will overestimate the probability of a chosen firm being a bidding firm by this amount.

4.2.3 Empirical Results

The empirical results can be split into three groups reflecting the three ways that the companies have been considered in the data sets. The first group of results are concerned with the modelling of the acquired firms against the acquiring companies. Secondly there are the acquired companies modelled against firms that were not involved in the market for corporate control during in the sample period and, lastly,

there are the results for the models involving the acquiring firms and an equivalent number of companies that were also not involved in acquisitions between January 1987 and December 1994.

Acquiring and Acquired Companies

In the data sets representing just the acquired and acquiring firms both types of companies have been deliberately over-sampled, as discussed previously. This will result in a 5.5% bias in the results of the logit models which will have the effect of over-estimating the probability of a firm being an acquirer in these samples. The selection of a choice-based sample does not create any sort of bias in the hazard function results as these are estimated using the partial likelihood estimator devised by Cox which makes no assumptions about the construction of the sample relative to the composition of the population of companies.

The first table of results, table 4.6, represent the logit models for these data sets. For each of the data sets several models were estimated to ensure that the highly correlated terms were separated, as explained in section 4.2.2. Each of the models in the table is representative of the results generated for that particular year as the significant variables tend to remain the same irrespective of which combination of variables is used in the estimation.

Table 4.2 Logit Results for Acquired and Acquiring Companies

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed					
Turnover to fixed assets	0.32*** (1.69)	0.28 (1.47)			
Sales per employee	0.49 (1.49)	1.45* (2.8)			
Stock ratio			0.13 (1.17)	0.23 (1.46)	
Return on capital employed					
Return on s'holders equity					
Pre-tax profit margin					
Net profit margin	-0.43 (-1.38)				
Dividends per share					
Earnings per share					-0.12 (-1.36)
Dividend yield	0.42 (1.38)	0.93* (3.6)	0.45** (1.97)		-0.83** (-2.45)
P/e ratio	-0.4 (-1.3)				0.84* (2.59)
Capital gearing				-0.47 (-1.16)	
Current ratio					
Acid test ratio				1.56* (3.1)	
Debtor days			0.7*** (1.79)		
Creditor days		-1.46* (-2.7)			
Total sales	-0.06*** (-1.92)	-1.09* (-3.43)	-1.26* (-3.29)	-1.26* (-3.04)	
Manager/employee ratio				-0.07 (-1.46)	
Total tax charge	-0.11** (-1.82)			-0.12 (-1.34)	-0.25** (-2.18)
Likelihood ratio test	16.78**	41.49*	21.33*	25.16*	21.3*
Predictive Accuracy (%).					
Acquired firms	42	40	42	42	30
Acquiring Firms	52	42	38	36	44
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

The first terms to consider are the efficiency variables. In the years closest to the takeover these terms are positively linked to the probability of a firm becoming a target, but in the periods further away from the acquisition these terms are not significantly different from the values for the rest of the firms in the sample. The positive sign is contrary to the motives in the current literature which suggest that a target firm will be less effectively run than the purchasing company, as Jensen (1988, 1992) and others suggested. A more typical result can be found in the investment ratios that appear in these models. These terms suggest that the target firms are in a sound financial position, as the positive dividend yield terms imply. This means that the acquired companies have the potential to invest in future projects should appropriate investments be found for them. The notion that a target company should have potential for the future is both a characteristic of acquired firms in the recent literature and a factor that provides support for some of the other motives. For example, if these firms have unused potential then they may be attractive to an ambitious management who are looking for companies that they can expand and improve in the future, as Jensen (1988, 1992) notes. This could also be linked to the inefficient managers motive for corporate acquisitions. If the firms that are acquired have the potential to do better in the future, then the incumbent managers are clearly not capable of finding projects for the company to invest in, hence the unused assets at the firms disposal.

It is possible to predict the value of the logit model for each of the firms in the sample. These values represent the probability of a given company being either a bidder or a target at the time of estimation. These logit models can predict somewhere around forty-five percent of the acquiring companies correctly but, after accounting for the 5.5% sampling bias, can only accurately identify forty percent of the acquired companies. On closer examination of these predicted values it is apparent that the majority of the terms lie close to the 0.5 cut-off point. This raises two interesting points about these predicted values. Firstly, it is usual to use 0.5 as a cut-off point when differentiating between companies that are predicted to be bidding firms and those that are thought to be the targets but there is no justification for selecting this

point. It is impossible to know at which value the decision to acquire another firm is taken, on a scale of zero to one, and it is quite likely that acquiring companies will not be concerned with more than one or two desirable features when selecting a target. The second point is the distribution of the predicted values; very few of the companies in the sample are clearly bidders or targets. The vast majority of the firms have the sort of characteristics that mean they could be either a bidder or a target. Given the somewhat unusual period that these takeovers are drawn from, when there was an economic boom, the deregulation of the financial markets and a merger wave, the uncertain nature of the firms in the sample is hardly surprising.

The next table, 4.7, represents the proportional hazard models for the acquiring and acquired companies. The models given here are, again, representative of the types of results that were estimated using these data sets. On first inspection it may appear that these results are very different from the logit results for the same data sets. Nevertheless, they are consistent with the earlier results as is demonstrated in Appendix II.

The first terms in these models represent the efficiency of the acquired companies when compared to the acquiring firms. The results here, for example the terms representing the ratio of turnover to fixed assets and the level of sales per employee, all suggest that the target companies are less effectively run than their purchasing counterparts as these terms are negatively linked to the probability of a company becoming an acquisition target. This holds for all of the data sets except the one representing the firms five years before the acquisition when the efficiency of the acquired firms is not significantly different from that of the purchasing companies. If the firm is producing relatively few sales, for example, compared to the number of people that it employs then it has more chance of becoming the target of an acquisition attempt. This is a clear indicator of reduced efficiency. The removal of an ineffective managerial team is one of the frequently mentioned motives for a takeover as Lev (1992) and Berkovitch and Narayanan (1993) both observed. In a fully efficient market these managers would be eliminated as their firms would go bankrupt. Since this clearly does not happen the corporate control market is necessary to redress the

balance and remove these ineffectual managers by making their companies acquisition targets. This means that the acquisition would increase the overall efficiency of the market according to Scherer (1988). This can also be linked to the managerial ambition theory. Managerial ambition in the acquiring company is another very frequently mentioned motive for initiating a takeover as Jensen (1988, 1992) noted. This is the notion that the managers of the purchasing company want to acquire another company to increase their own prestige and financial remuneration. These two managerial theories can be linked together fairly easily. If an ambitious management are looking for a potential takeover target they may well decide to choose a firm that appears to be ineffectively managed at the moment. By purchasing such a company the new managers may feel that they would be able to generate a swift improvement in the acquired company simply by correcting a few of the existing mistakes.

The profitability if these firms is both positively and negatively linked to the probability of the company becoming a takeover target. These terms only appear in two of the results suggesting that the profitability of acquired firms is not generally different from the profitability of the bidding companies. The theories concerning the motives for acquisition activity, for example see Lev (1992), state that the target companies are generally significantly less profitable than the purchasing firms, which is not the case here. This means that the acquired companies are not in financial difficulty despite displaying inefficiencies. It is possible for a company to be relatively inefficient and still be profitable, although long term ineptitude would eventually have an impact on the profitability of the firm. The inefficiencies displayed by these companies are either relatively unconnected to their main lines of business or, alternatively, the acquired firms are doing so well that their inefficiency has not yet had an effect on their profits.

The investment ratios are both positively and negatively linked to the probability of a firm becoming and acquisition target in the same way as the profitability terms although there are considerably more investment terms in the results. These terms represent both the potential that the firms have for future investment and the value of the shares on the market. The terms that are positively linked to the

probability of a company becoming an acquisition target are, on the whole, those items that refer to the company's dividends. A company that can pay high dividends compared to the purchasing firms has a greater chance of becoming an acquisition target than a company that does not. This is probably due to the fact that dividends can be retained to fund new investments in the future, thus implying that the target firms have the potential to perform better in the future with a new and more dynamic management. In contrast the p/e ratio is negatively linked to the probability of a firm becoming an acquisition target, whenever it appears in these results, suggesting that the target firms' shares may be undervalued relative to the earnings of that company. This links these results to one of the characteristics given for acquired firms in the recent literature, that these companies are relatively under-valued. This has the dual advantages of minimising the costs of the purchase as far as possible and ensuring that the acquiring firm makes a purchase that can be regarded as good value for money as Palepu (1986) noted. The p/e ratio does not appear in all of these results perhaps reflecting the fact that a firm may not be a good acquisition target just because it is relatively under-valued. This characteristic alone does not mean that the acquired firm will be easily incorporated into the purchasing company or that it will make a valuable contribution to the bidding firms overall business plan for the future. The fact that the target is relatively cheap is merely an added bonus in the event that a suitable target firm can be found for some other reason.

The capital structure variable only appears once in these results, four years before the acquisition. Here it is positively linked to the probability of a firm becoming the target of an acquisition attempt. This is an indicator of the firms' financial structure with respect to both debt and equity and gives some indication of the cost of capital for that company. This term can be linked to the restructuring motive for acquisitions which suggests that the purchasing firms are using the acquisition as a way to bring about some significant alteration to the financial composition of that company. However, the infrequency with which it occurs suggests that there is little difference between the leverage ratios for the acquired and acquiring companies which greatly reduces the weight that can be given to this motive at this juncture.

Table 4.3 Hazard Function Results for Acquired and Acquiring Companies

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	0.32 (1.47)				
Turnover to fixed assets	-0.19** (-2.23)	-0.06 (-1.45)	-0.04 (-1.25)		
Sales per employee	-0.36 (-1.54)		-0.57** (-2.57)	-0.41*** (-2.09)	
Stock ratio	0.35* (2.89)				
Return on capital employed			0.66*** (1.92)		
Return on s'holders equity			-0.22 (-1.6)		0.41*** (1.76)
Pre-tax profit margin					
Net profit margin					
Dividends per share	0.17 (1.35)			-0.12 (-1.12)	
Earnings per share	0.2** (2.07)	0.07 (1.23)			
Dividend yield		-0.03*** (-1.74)		0.22 (1.29)	0.87* (3.82)
P/e ratio			-0.24*** (-1.67)		-0.51** (-2.53)
Capital gearing				0.41 (1.58)	
Current ratio	-0.84** (-2.05)	-0.29*** (-1.89)		-0.81** (-2.39)	
Acid test ratio					
Debtor days	0.53 (1.43)		-0.62* (-2.97)		1.1*** (1.82)
Creditor days					-1.37** (-2.16)
Total sales		0.86* (5.02)	1.08* (4.01)	1.07* (4.04)	
Manager/employee ratio	0.4** (2.55)		0.06 (1.41)		
Total tax charge		-0.03 (-1.06)		0.08 (1.08)	0.24 (1.28)
Likelihood ratio test	33.51*	34.64*	42.36*	43.65*	56.19*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 72 66	 70 66	 66 62	 60 56	 52 48
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

The liquidity variables refer to the ease with which a firm can meet its financial commitments. In the short term this can be represented by factors such as the current and acid test ratios, whilst the debtor days and creditor days ratios are better indicators of the long term condition. Here it appears that acquired firms are less liquid than the acquiring companies in the short term as the negative signs on the current ratio terms imply. In contrast the long term indicators are positively linked to the acquisition probability. Again this implies that the target companies could have a problem with their liquidity as these terms represent the length of time that the companies need to collect payments due to them and to pay moneys that they owe in turn. A problem of this sort in the long term implies "slack management practises" (Helfert, 1994, page 140) and could also present the incoming management with an area where improvements could be made in a short period of time. Alternatively, these liquidity terms could be linked to the financial restructuring motive introduced above. If the target firm occupies a complementary position to the purchasing company then the combination of the two firms could result in the creation of a company with the desired structure.

The last group of variables refer to those features of acquired firms that cannot be placed in one of the other groups. The total sales variable can be used as a indicator of the size of the firms in the data set. Dietrich and Sorensen (1984) hold that the target firms should be smaller than the bidding ones but here this term is consistently positive, contrary to the theory. This could be a reflection of the period that these data sets cover. The years between 1987 and 1990, which make up more than half of this data set, are also the time of the last merger wave. During these years, takeovers took place that could not have been contemplated in a more typical time and this could be responsible for the unusual result that appears here. The second term in this group of variables is the ratio of managers to employees in the firms. This term is supposed to measure a given company's propensity to diversify, see Lecraw (1984), and as such is more likely to refer to the acquiring firms than the targets. In this context, however, it can also be viewed as an alternative measure of company efficiency. A positive value for this term, as here, means that the company has a larger

number of managers per employee than the purchasing firms. A large number of managers could be indicative of an inefficient firm as it may not be strictly necessary to have so many people controlling one company.

In the case of hazard function models it is possible to produce a value of the survival function for each of the firms in the sample. This term measures the probability of each company surviving for the next time period. These estimations can correctly identify almost seventy percent of the companies close to the takeover but this drops to approximately half as the number of years before the acquisition increases. As with the logit models, they seem to group the majority of the firms around the central point rather than in the tails of the distribution.

Overall the results of this section are informative. The logit models contain fewer variables than the proportional hazard function results and are correspondingly less informative. The latter type of models are able to produce results that correspond to both the motives for acquisitions and the characteristics of the companies that are involved in this process. In short, these findings are as follows. The acquired companies appear to be less effectively run than their acquiring counterparts. This is indicated by the continued presence of such terms as the ratio of sales per employee and the turnover to fixed assets ratio which are negatively linked to the probability of the firm being an acquisition target. This can be linked to the managerial inefficiently theory for corporate acquisitions as well as the ambitious managers motive. The profitability terms, like the capital gearing ratio are less important than the recent literature would suggest as there is little or no difference between these terms as they apply to the acquired and acquiring companies. The investment ratios measure the future potential for the target companies and consistently suggest that the firms have the potential to perform much better in the future, especially if more suitable projects could be identified for them. There is also a suggestion that the target firms may be undervalued compared to their performance and potential as the p/e ratio is negatively linked to the probability of the company becoming an acquisition target. Finally, the size variable implies that the purchased companies are large compared to the bidding firms. This is contrary to the characteristics of acquired firms as they have appeared in

recent papers. A small target is usually cheaper than a large one, although this is not always the case. In these results the targets appear to be larger firms that are undervalued relative to the purchasing companies.

Acquired and Non-involved Companies

In this section the data sets are composed of the acquired firms and companies that were not involved in the acquisition process during the sample period. It was not possible to create models using the data drawn from five years before the acquisition using either the logit or hazard function methodologies as there were too many missing observations in the data set to produce acceptable results. Using these data sets it is important to recall that the target companies are over-sampled producing a bias in the results of the logit models which will over-estimate the probability of a firm being the target of an acquisition attempt by 24.32%. The table below details the logit models estimated using the five data sets in this section.

Table 4.4 Logit Results for Acquired and Non-involved Companies

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	1.98* (4.57)	0.96 (1.53)	1.69* (2.82)		
Turnover to fixed assets		0.86** (1.99)		0.61** (2.0)	
Sales per employee			-0.99** (-2.33)		
Stock ratio					
Return on capital employed		-1.41* (2.93)	-1.72* (-2.61)	-1.45** (-2.0)	
Return on s'holders equity		0.27 (1.31)			
Pre-tax profit margin					
Net profit margin					
Dividends per share					
Earnings per share	-0.33** (2.2)				
Dividend yield	0.64*** (1.67)	0.43** (1.98)			
P/e ratio	-0.6 (-1.65)		0.34** (1.78)	0.28 (1.37)	
Capital gearing					
Current ratio					
Acid test ratio	-1.59** (-2.27)				
Debtor days			0.39 (1.27)		
Creditor days	0.7 (1.22)	-0.9*** (-1.87)		0.57 (0.89)	
Total sales					
Manager/employee ratio	-0.75* (-4.8)			-0.24* (-3.07)	
Total tax charge		0.06** (1.87)			
Constant		0.06*** (1.87)	-0.13 (-1.2)		
Likelihood ratio test	89.19*	25.48*	21.09*	30.86*	
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 30 66	 30 66	 27 66	 23 63	
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

As in the previous section the informational content of these results is limited by the relatively low number of variables that appear to be important in the results. Nevertheless there are some features in these models that are worth discussing. The first of these comes in the profitability terms. The majority of these variables are negatively linked to the probability of a company becoming an acquisition target, as the return on capital employed variable shows. This implies that the acquired companies are less profitable than the firms that did not become involved in takeovers during the sample period. Such a result corresponds to the characteristics of acquired companies as they appear in papers such as Lev's (1992). The investment ratios also provide some interesting information about the companies that become the targets of acquisition attempts. The positive investment terms, for example the dividend yield variable, imply that the target companies may have more potential for future investment than the companies that did not become involved in the corporate control market. The p/e ratio is another interesting term in this section which is negative immediately before the acquisition but is positive in the years further removed from the takeover. This could be indicative of the change in the value of the acquired firms as they become relatively under-valued compared to the rest of the companies on the stock market. An undervalued target is often mentioned in papers like Lev's (1992) and Dietrich and Sorensen's (1984) and it is held to be important as it enables the purchasing company to reduce the costs of the purchase as far as possible.

The last interesting characteristic of the target companies that can be seen in these results comes from the liquidity variables. As in the preceding hazard function models this result implies that the acquired firms may be less liquid than the companies that are not involved in the takeover process. This sort of finding can be most obviously linked to the managerial inefficiency motive. It is also possible to see how this feature might attract purchasing firms that have ambitious managers or companies that wish to attempt some form of financial restructuring via the takeover. It is not possible to infer which of these motives might be more important in this context as the rest of the logit model does not incorporate enough variables to enable any more inferences to be drawn about the driving impulses behind these purchases.

The predictive abilities of these logit models are rather poor when the sample bias is taken into account. They are only capable of identifying approximately thirty percent of the acquired firms and place all of the remainder in the non-involved category. The hazard function models, however, prove more interesting.

As in the previous data set these results offer much more information than the equivalent logit models. The first significant terms in these results refer to the efficiency variables. These ratios are consistently negatively linked to the probability that a firm will be the subject of an acquisition attempt. Once again this is strongly suggestive of the theory concerning the removal of a target company's inefficient managers as a motive for acquisition activity. The elimination of an inefficient managerial team may also have a positive impact on the level of efficiency in the entire market as Scherer (1988) suggested. In addition, these areas of relatively poor performance might also attract a potential bidding firm that has an ambitious management who are looking to advance their own standing by expanding their firm and have chosen a takeover as the best way of achieving this end. This motive is explained and discussed in detail by Jensen (1988, 1992).

The majority of the profitability terms that appear in these models imply that the target companies are less profitable than the firms in the population that are not involved in the market for corporate control. Again this is one of the characteristics of an acquired firm in the recent literature on the subject, as typified by Lev (1992). In the periods further away from the acquisition these terms become less statistically significant suggesting that the profitability of the acquired companies is no different to the profitability of the rest of the companies in the population. It may be that this progression from average profitability to lower than average profitability is one of the factors that makes certain companies into targets whilst others are never involved in the market for corporate control. Again, this finding can be linked to the possibility that the acquired firm has a managerial team that is under-performing and the company might benefit from the removal of these people and the arrival of another set of managers after the acquisition.

Table 4.5 Hazard Function Results for Acquired and Non-involved Companies

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	-0.36*** (-1.79)	-0.68* (-3.12)	-0.31 (-1.11)	-0.24 (-1.31)	
Turnover to fixed assets	-0.23* (-3.01)	-0.05 (-1.15)			
Sales per employee					
Stock ratio					
Return on capital employed			1.22* (2.96)		
Return on s'holders equity	-0.17 (-1.64)	-0.19 (-1.46)	-0.03*** (-1.74)		
Pre-tax profit margin					
Net profit margin		-0.29 (-1.52)		0.07* (3.88)	
Dividends per share	0.15 (1.28)	0.27* (2.98)	0.11 (1.35)		
Earnings per share	0.22*** (1.92)				
Dividend yield			0.23 (1.26)		
P/e ratio		-0.26 (-1.63)	-0.41* (-2.85)	-0.05 (-1.27)	
Capital gearing					
Current ratio					
Acid test ratio					
Debtor days	2.57* (3.55)		-0.58* (-2.76)	2.71* (6.06)	
Creditor days	-1.97* (-2.98)	1.62* (5.14)		-1.92* (-4.9)	
Total sales			0.33 (1.35)		
Manager/employee ratio	0.07* (5.7)				
Total tax charge	-0.05** (-2.5)	-0.09* (-4.09)			
Likelihood ratio test	49.39*	35.09*	37.19*	36.6*	
Predictive Accuracy (%).					
Acquired firms	72	75	66	58	
Non-Involved Firms	66	66	62	52	
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

The investment ratios support the supposition that acquired firms seem to have the potential to perform more effectively under new managers. With the exception of the p/e ratio, these variables are all positive. This means that the probability that of a company becoming an acquisition target increases as the level of dividends per share, for example, goes up. These terms imply that the acquired firms are in a better position to attempt extensive new investments in the future than the companies which remain uninvolved in the market for corporate control. Again, this corresponds to the characteristics of takeover targets as they are observed in papers such as Dietrich and Sorensen's (1984). Such a result also implies that the acquired companies are in a relatively secure financial position as they can afford to pay dividends that are higher than the average of the non-involved companies. The negative values for the p/e ratio also correspond to another of the observed characteristics of target companies, that they are relatively low in value. The p/e ratio indicates the value of a company on the market compared to the earnings generated by that firm is a good measure of whether or not the company is accurately valued. This terms appears in the predictive papers written by Dietrich and Sorensen (1984), Palepu (1986) and Ambrose and Megginson (1992) and is always expected to be negative, as here.

In these models it is interesting to note that the short term liquidity variables are inconsequential in the results. This suggests that the values of the current and acid test ratios are not significantly different from those of the companies that were not acquired during the sample period. The long term liquidity variables, however, are important in all of the results. It is particularly revealing to see these two terms appear together as they do in the results for both one year and four years before the acquisition. The values of both of these terms are very different from the equivalent values for the companies that were not acquired during the same period which makes this finding highly suggestive. This combination suggests that the long term liquidity of the acquired firms is very different to that of the non-involved companies and the combination of the two variables may imply that these firms have a potentially very severe liquidity problem. These results could mean that the acquired firms display a clear disparity between the length of time that they have to collect payments owed to

them and pay the debts that they owe in turn. Such a result can be clearly linked to the motive of managerial inefficiency and provide an area of easy improvement for the new managers after takeover.

Lastly, there are the variables that represent the size, tax position and managers to employees ratios for the acquired firms as compared to the companies that were not involved in the takeover process. Of these three terms the tax charge variable is the only one that appears in more than one instance. Here the total tax charge is negatively linked to the probability that a company will become an acquisition target suggesting that target firms have lower published tax commitments than the firms that do not become involved in the corporate control market. This result neither supports or opposes the tax motive for corporate takeovers. This motive, as Jarrell, Brickley and Netter (1988) explain, states that target firms are selected to enable to acquirer to take advantage of beneficial tax conditions that they are not otherwise able to use. The fact that the target companies have low tax commitments merely suggests that the purchasing companies do not want to buy a firm that is managing its tax ineffectively. This decision could be as much about company efficiency as it is about taxation and these results do not reveal any further facts about this issue.

These results are fairly good at correctly identifying which of the firms are acquisition targets and which are not involved in the takeover process. Using the data from the years closest to the acquisition somewhere between sixty-six and seventy-five percent of the firms are correctly allocated into these groups. In the data set representing four years before the takeover the accuracy of the models drops to around fifty percent and, it should be recalled, it was not possible to create models for the final year in this section as there are too many gaps in the available data.

Again, the hazard function results are highly informative concerning the nature and characteristics of the companies that become acquisition targets. The efficiency ratios show that these firms are consistently less effective than the rest of the companies in the sample which offers clear support for the inefficient managers motive for corporate takeovers. This concept, as authors such as Lev (1992) and Dodd

(1992) noted, states that the acquisition process exists to remove managerial teams that are under-performing and replace these people with more effective ones. This result is further supported by the liquidity ratios which imply that the acquired companies could have some problems meeting their financial obligations if the disparity that exists between their debtor days and creditor days is not resolved. This difference means that the companies have very different time scales to receive and pay their debts which could, if left uncorrected, create a situation where the firm cannot meet its financial requirements.

The investment terms in these results make two points about the differences between the acquired firms and the companies that were not involved in the acquisition market. The first point indicates that the acquired companies appear to have the potential to invest substantially in future investments as they are able to pay higher dividends than the rest of the firms in the sample, which are all companies of equivalent size to the targets. These funds could be retained to pay for new projects which would minimise the amounts that the companies would have to borrow to complete any such plans. This would make the acquired firms more attractive to potential bidders then companies that have lower pay-outs. The second informative point that can be drawn from the investment ratios is that the acquired firms appear to be under-valued on the stock market compared to the companies that did not enter into the corporate control market at the same time. This is one of the most frequently mentioned characteristics for companies that become the subject of acquisition attempts, as Dodd (1992) , Lev (1992) and Palepu (1986) all observed.

Finally, there is the total tax charge. In these results this term is negatively linked to the probability that a company will become a acquisition target. The only conclusion that can be drawn from this is that the acquired firms have lower tax commitments than the companies that were not involved in takeovers. This could be linked to the managerial efficiency motive, but it is impossible to draw any inferences about the tax motive from this single result. Overall, these results create the impression that the acquired firms are inefficiently managed companies that are relatively under-valued but have the potential to attempt new investment in the future.

Acquiring and Non-involved Companies

In this, the last section of empirical work in this chapter, the data sets are concerned with the modelling of the acquiring companies against firms of comparable size that were not involved in the market for corporate control during the sample period used here. As in the previous section, the use of a choice based sample means that the logit results will be biased in favour of the acquired firms. This bias has already been quantified and is equal to 29.82%. The table below contains the logit model results for this data set.

The efficiency variables are the first set of terms to be considered. These variables are split between those with positive links with the probability of a company becoming an acquisition bidder and those terms that are negatively linked to this likelihood. The positive terms are more consistent than the others as they are all associated with the same variable, the ratio of turnover to fixed assets, and appear in consecutive years of data. The continued presence of this term indicates that the bidding companies are more efficient than the firms that do not become involved in takeovers. The idea that bidding companies are more effective than other companies appears in articles such as Lev's (1992) and could be linked to several of the motives for acquisitions. For example, an efficient company could be looking for synergistic benefits in a takeover as Berkovitch and Khanna (1991) observed or it could be attempting to diversify into new markets as Hughes discussed (1993). Equally, such a firm could be looking to maximise its tax advantages through the purchase of another entity. The profitability variables in these models all suggest that there is no significant difference between profits for the bidding companies and the earnings of the firms that do not become involved in the corporate control market. The investment ratios in these logit results appear to suggest that the bidding companies have lower levels of funds available for investment than the firms that do not take part in the acquisition process. This is inconsistent with any of the theories concerning the nature of bidding companies which suggest that these companies are in the position to expand and advance when they decide to attempt the purchase of another firm.

Table 4.6 Logit Results for Acquiring and Non-involved Companies

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed					
Turnover to fixed assets		0.76* (3.06)	0.91** (2.1)	1.1* (2.86)	
Sales per employee				-1.09* (-2.79)	
Stock ratio	-0.15*** (-1.71)				-0.35* (-2.63)
Return on capital employed					
Return on s'holders equity	-0.19 (-1.33)				
Pre-tax profit margin					
Net profit margin					
Dividends per share		-0.45* (-2.63)			
Earnings per share				-0.19*** (-1.74)	
Dividend yield		-0.42*** (-1.85)			0.47 (1.31)
P/e ratio				-0.52** (-2.28)	-0.8** (-2.33)
Capital gearing					
Current ratio			-1.16** (-2.55)		
Acid test ratio	-3.83* (-2.76)				
Debtor days	4.28* (3.05)				
Creditor days					
Total sales					
Manager/employee ratio	-0.15* (-2.73)	-0.29* (-2.98)	-0.09*** (-1.82)	-0.11** (-2.02)	-0.14** (-2.12)
Total tax charge	0.06 (1.37)	0.05 (1.45)	0.07 (1.61)	0.13*** (1.72)	0.11 (1.54)
Constant					-0.2*** (-1.7)
Likelihood ratio test	37.11*	37.64*	29.63*	59.36*	35.99*
Predictive Accuracy (%).					
Acquiring firms	30	32	28	30	37
Non-Involved Firms	56	54	60	60	60
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

These logit models are poor predictors of the nature of the firm in the sample. After correcting for the bias in the results, which comes to almost thirty percent, it becomes apparent that they are very poor at identifying the companies that become bidders in the acquisition process but perform rather better when identifying the non-involved firms in the sample. This could be symptomatic of the weakness of this methodology and in particular of its inability to incorporate an element of timing into the estimations of these results.

The last table in this section contains the proportional hazard function results for the companies that become bidders when modelled against the firms that do not become involved in the market for corporate control. Here the efficiency variables in these results have both positive and negative links with the probability that a firm will become the bidder in an acquisition. The positive links suggest that the acquiring firms are more effectively run than the companies that do not take part in the takeover process. This is consistent with the idea of Dodd (1992) and Lev (1992) amongst others. This characteristic could also be linked to the ambitious managers theory for acquisitions which states that the managers of the acquiring company are looking for another firm to acquire as such a manoeuvre will enhance their own standing and financial position. The negative terms that also appear in these results create the converse impression but are not totally incompatible with the motives for acquisitions and the characteristics of involved companies as they appear in the recent literature. The synergy motive for corporate acquisitions is one of the most frequently mentioned motives for takeovers, as Lev (1992) and Berkovitch and Khanna (1991) explain. Here is it suggested that takeovers occur because the company that is created as the result of the combination of the bidding and target firms can achieve ends that neither of the original companies could have reached on its own. It is possible that the inefficiencies that still exist in the bidding companies cannot be removed by a process of internal alteration. As a result, the purchase of another company that occupies a complementary position could be the only way that this situation can be rectified. This reasoning could also be applied to the restructuring motive for takeovers. Again this may be the only way in which these inefficiencies can be removed from the bidding company.

Table 4.7 Hazard Function Results for Acquiring and Non-involved Companies

Variable	Number of Years before Acquisition				
	I	II	III	IV	V
Turnover to assets employed	-0.82*** (-1.73)	-0.16 (-0.68)			-0.45 (-1.37)
Turnover to fixed assets	0.44 (1.62)		-0.24 (-1.57)	-0.51* (-2.68)	
Sales per employee			0.53** (2.05)	0.46** (2.22)	0.18 (1.04)
Stock ratio	0.23* (2.79)				
Return on capital employed	0.1** (2.04)	0.5** (2.0)		0.92*** (1.88)	
Return on s'holders equity	0.09*** (1.77)				
Pre-tax profit margin	-0.72** (-2.28)	-0.94* (-2.85)		0.28 (1.2)	
Net profit margin			0.33 (1.04)		
Dividends per share	0.33* (2.7)	0.6* (4.68)			0.14 (1.61)
Earnings per share				0.17** (1.97)	
Dividend yield			0.39** (2.43)		
P/e ratio		0.24*** (1.7)		0.27 (1.65)	0.32** (2.02)
Capital gearing				0.62** (2.35)	0.41 (1.12)
Current ratio	0.83** (2.28)	0.69** (2.12)		-	0.58 (1.34)
Acid test ratio			0.93** (2.13)		
Debtor days	0.4*** (1.73)		-0.79 (-1.39)		
Creditor days				-1.01** (-2.37)	
Total sales	-0.01*** (-1.9)	-0.03** (-2.18)			
Manager/employee ratio		0.16** (2.04)	0.05 (1.11)	0.08** (2.33)	0.09** (2.04)
Total tax charge	-0.05* (-3.57)		-0.06** (-2.29)	-0.04 (-1.52)	-0.04** (-2.26)
Likelihood ratio test	57.49*	65.59*	63.45*	89.69*	77.68*
Predictive Accuracy (%). Acquiring firms	72	70	64	62	54
Non-Involved Firms	66	68	60	58	50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

In the group of profitability ratios the majority of the terms are positively related to the probability that the company will become the acquirer in a takeover. This corresponds to the idea that the acquiring companies are more profitable than the average company on the stock market as suggested in the literature. Such a result supports the idea that the purchasing companies in the market for corporate control are in a stable and successful financial position before they select to purchase another firm. It is interesting to note that these terms are not significantly different from the rest of the firms in the sample in the year furthest away from the takeover but gain importance as the acquisition gets closer. It may be that the bidding companies growth over time means that they progress from being average firms to occupy a position where they are able to consider entering the corporate control market. Such an idea can be linked to the ambitious management theory for acquisitions as well as the theory that some firms select an acquisition as a method of expanding and increasing market share, as has been discussed previously.

The investment ratios support the idea that the bidding companies have excessive dividends that can be retained and used for the purchase of other companies. This is Jensen's Control Hypothesis of Debt (1988, 1992) in which the author presents the idea that the managers of bidding companies should issue debts to their shareholders in place of dividends and then use the retained funds to purchase other firms. The issuing of debt in this scenario ensures that the shareholders will receive, at some time in the future, the dividends that have been withheld or they could sue the firm into bankruptcy. This enables the dividends to the diverted into other areas, notably the purchasing of another company. This scenario fits precisely with the positive signs allocated to all of the investment terms in these results which imply that the bidding companies are paying higher dividends than the companies that do not enter the market for corporate control. It is also interesting to note that, whilst these terms are important in the years further away from the acquisition most of them are not significantly different from the equivalent values for the rest of the sample in the year immediately before the takeover. It is possible that this is because these companies are retaining their dividends in that year for precisely this reason and this may be evidence of Jensen's theory in practice. Another interesting feature in this group of terms is the

presence of a positive p/e ratio in several of the years. This suggests that the bidding companies are relatively over-valued by the stock market which is an idea that also appears in some of the recent articles on the attributes of the companies that become acquirers.

The next group of terms to consider are the liquidity ratios. Here the majority of the terms are positively related to the probability that a company will become the bidder in a future acquisition attempt. This would seem to suggest that the bidding companies have no problems with liquidity and are, as a result, in a sound financial position. It is not possible to relate this result specifically to any of the motives for acquisition activity that appear in the literature on this subject. Neither is liquidity specifically mentioned as a characteristic of these companies. However, it is unlikely that any firm would attempt an acquisition if they were not in a sound fiscal position as the purchase of another company is an expensive investment and could inflict severe financial difficulty on the purchaser if it is not handled properly. Consequently, whilst good liquidity is not mentioned explicitly in the literature, this section of the results can be linked directly to the notion that the purchasing firms are held to be profitable.

The variable representing the managers to employees ratio appears in the results for virtually every year and is consistently positively related to the probability of a company becoming the bidder in an acquisition. Lecraw (1984) uses this term to measure a companies propensity to diversify. If a firm has a large number of managers compared to the number of other employees then it is possible that some of these managers will be under-utilised. In order to create more work for these people the company may attempt to create extra areas within the firm where they might be used. Notably diversification into a new geographical area or market is a popular choice under these circumstances. Thus, if the acquisitions in this data set were used as a method of diversification then this variable should be positively linked to the likelihood of a company becoming a bidder in a takeover, as it is here. Diversification is a motive for corporate acquisitions that has not featured prominently in the earlier tables of results but appears in the literature as typified by Hughes' paper (1993). A company may use an acquisition as a way of entering new markets or geographical area as this

has several advantages compared to internal growth. In the first place, this approach is far faster as the purchasing firm does not have to research the market and develop new products as the target will have already completed these tasks. Similarly, the bidding firm will be buying established factories and a known brand name which also reduces the costs of entering a new business area. Finally, there are some market areas where there are barriers to entry that would make it virtually impossible for a new company to start trading in this field. By acquiring a firm that already operates in the area of interest it is possible for the bidding firm to circumvent this issue and gain a place in the market of its choice.

Finally, there is the tax variable. This term is continually negatively related to the likelihood that a company becomes a bidder in the future and features prominently in four of the five results in the table. Such a result means that the bidding companies are managing their tax situation efficiently and are managing to minimise their charges in this manner. This could be linked to the tax motive the takeovers which states that the bidding firms use acquisitions to maintain or gain favourable tax conditions for the future. These firms may be attempting an acquisition in order to retain these low tax levels in the future, as Jarrell, Brickley and Netter (1988) hypothesised. Alternatively, these terms can be used to add extra emphasis to the facts that these firms are effectively managed and are in a secure financial position. These last two factors can be linked to the ambitious managers motive for takeovers as well as the tax motive.

The predictive abilities of these models are fairly good. They are capable of correctly allocating the survival functions of these two groups of firms between seventy and fifty percent of the time although the accuracy of the results decreases when the data is taken from years further away from the event.

In these results it is possible to distinguish some patterns that develop over time as can be seen in both the profitability and investment terms. As has been mentioned above this could be symptomatic of some form of change in the bidding companies that changes them from ordinary companies to firms that are able to attempt an acquisition. Furthermore, the changes that result from this stage in the bidding

companies life-span may also make the prospect of an acquisition not only a possible investment but also a sound one. Irrespective of whether this supposition is true or not there are some clear facts about the results in this section. Once again the proportional hazard function models are more informative than the logit models and correspond more closely with the theories and characteristics concerning companies that become acquirers in the literature. These firms appear to be profitable companies with great investment potential, especially when their dividends are retained. In addition to these features, the acquiring companies are in a secure financial position with respect to both their liquidity and tax charges.

Conclusion

This chapter had two clearly defined objectives; to compare the theoretically superior hazard function methodology to logit models which have already been used in the study of acquisitions and to identify the characteristics of the companies that become bidders and targets in the takeover process as compared to each other and to firms that do not enter this market. These uninvolved firms form two distinct data sets that are paired with the bidders and targets.

The hazard function models continually out-perform the logit results when the accuracy of the models is considered. In addition, they are always more closely linked with the theories for acquisition activity and the characteristics of the firms that become involved in the market for corporate control. The main findings of this chapter can be simply summarised. It is important to remember that these findings are all relative and represent the differences between the two sets of firms that are being examined at that time. The tables given here include one result from each year of data. There are more results for each year than just this one, although it is representative of all of the findings. A complete set of all of these results can be found in Appendix III.

The acquired firms were examined twice, firstly against the companies that attempted to acquired them and secondly against firms of a comparable size that were not involved in the takeover process during the sample period. On the whole, the

characteristics of the acquired companies were the same for these two sets of results. The efficiency variables show that these firms are less effectively managed than either the bidding companies or the firms that are not involved in the acquisition process. This clearly supports the managerial inefficiency theory for takeovers, as suggested by many authors including Dodd (1992) and Lev (1992), as these firms are displaying uncorrected flaws over several years. The managers of another firm could view this as an ideal opportunity for a takeover, which also links this finding to the managerial ambition motive for takeovers that applies to the acquiring companies. The acquiring firms have efficiency terms that are both positively and negatively linked to the probability that a company will become a bidder in the future. The positive terms correspond to the literature on this subject and suggest that the acquiring firms are effectively managed which may be an alternative link to the ambitious managers theory for takeovers. If the firm is doing well, managers may be looking for an acquisition to provide themselves with another challenge and, simultaneously, to increase their own standing and financial remuneration. However, some of these terms are also negatively linked to the probability that a company will become a bidder in the future which is contrary to the position taken in the recent literature. It may be that the correction of these flaws is not possible within the bidding firm before the takeover and that acquisition takes place to create conditions where it is possible for the company to rectify these problems. This brings the restructuring and synergy motives to importance as possible motivations for the takeovers. Sometimes acquisitions take place to generate synergistic benefits which result from the pooling of the resources available to two or more companies. On other occasions acquisitions serve to enable the bidding company to complete some form of radical restructuring that cannot be carried out internally. Either of these motives could be linked to the removal of inefficiencies in the bidding companies and can, therefore, be linked to the negative efficiency terms that appear in table 4.11.

The profitability variables when the acquired firms are modelled against the acquiring companies are generally insignificant suggesting that there is little of no difference between the values of these terms. This is contrary to the prevailing notions concerning the nature of target companies, which are held to be less profitable than the

average firm. However, when the acquired firms are modelled against the companies that were not involved in the takeover process the expected result appears. The terms here are nearly all negatively associated with the probability that a company will be acquired which is suggestive of poor managerial techniques and consequently poor profitability. Once again, these results can be linked to the motive concerned with the removal of an inefficient management via the acquisition process. The acquiring companies appear to be considerably more profitable than the firms that do not take part in the acquisition process. In this case it is possible to related the results to the ambitious management theory for acquisition activity and the idea that the acquiring companies may be using the purchase of another firm as a method of expansion.

The investment ratios for the acquired firms convey the same impression about these companies in both sets of results concerning the target companies. The terms that refer to the dividends paid by these companies are continually positively linked to the probability that the firms will be acquired whilst the p/e ratio is negatively linked to the likelihood of this event occurring. The positive terms imply that the target firms have the potential to perform well in the future and could afford to invest in new opportunities, should these openings arise, and that these investments could be paid for by retaining the firm's dividends. Having the potential to do well in the future is another of the characteristics that are ascribed to acquired companies in the recent literature. Equally, the targets of acquisition activity are often observed to be relatively under-valued compared to their true worth. The negatively signed p/e ratio that appears in these results is an indicator of this very fact and suggests that the market value of the acquired companies in an under-estimation. By purchasing an under-valued firm, the acquirer can reduce the costs of the takeover and be certain of getting a good deal. Even if the target firm cannot be effectively incorporated into the parent company, the acquirer can often make a profit by dismembering the acquired firm and selling the individual parts. Similarly, the investment ratios for the acquiring companies suggest that they are also in the position where they can finance investments by retaining dividends. In fact Jensen (1988, 1992) advocates this as a method of funding acquisition activity. The p/e ratios for these firms are higher than those of the companies that do not take part in the takeover process. According to

Dodd (1992) and Lev (1992) this means that the acquiring firms are relatively over-valued which may make it easier for them to raise the funding necessary for the purchase of another firm.

The liquidity of the acquired companies is poor in the results generated using both the acquiring and the non-involved companies. When the bidders are used in the models both the short term and long term liquidity variables suggest that the target companies have lower than average liquidity. This could be symptomatic of an inefficient management and suggests that the targets could have problems in meeting their financial obligations. When the results are created using the companies that were not involved in the takeover process the short term liquidity variables are no longer significant in the results but the long term variables remain important and convey the same impression about the financial condition of the targets. It may also be possible to relate this result to the financial restructuring motive where the acquiring company occupies a position that is complementary to that of the bidder so that the acquisition will enable the acquirer to achieve some form of alteration in its structure that cannot be accomplished through internal growth. The acquiring companies have good liquidity compared to the firms that are not involved in the market for corporate control which also implies that these firms are in a sound financial position. Such a result is difficult to relate directly to any of the motives for acquisition activity that appear in the literature or to any of the characteristics that are thought to identify the companies that become bidders but a secure financial position is a prerequisite for a company that wishes to successfully attempt a takeover in the future.

Finally there are the variables that describe those features of companies that are involved in acquisition activity that cannot be represented by the variables in any of the previous groups; the size, tax position and propensity for diversification of these firms. When the acquired firms are modelled against the acquiring companies, the size variable becomes significant. In the literature it is often observed that the targets of acquisition activity are smaller than the bidders. This is not the case here. The size of the acquired firms is not significant in all of the data sets, but when it does appear it is positive which implies that the larger companies have a high probability of becoming

the target of an acquisition. This unexpected result could be due to the period which the sample covers; 1987 to 1994. During these years there were several atypical factors that could make it possible for large companies to become the targets of acquisition activity when they would normally be safe from takeover attempts. For example, the UK economy was in a boom during part of this period which also coincided with the last merger wave to occur in this country. In addition to these features there was the de-regulation of the financial markets which made it easier for companies to raise finances should they wish to. The combination of these factors could well have made it possible for potential bidding companies to attempt to acquire firms that were larger than themselves by providing a situation where the appropriate level of funding could be raised.

When the acquired firms are modelled against the companies that did not enter the corporate control market, the tax variable becomes significant. Here this variable is continually negatively linked to the probability that a company will be the subject of an acquisition attempt. It is not possible to draw any clear inferences about the nature of the target companies or the motives that might initiate a takeover from this result although there are two possible links. The first of these is the tax advantages motive which states that acquisitions occur to preserve or create advantageous tax concessions for the purchasing company. The second notion is that the bidding companies are unlikely to select a takeover target that has a large tax burden as this could be expensive to deal with. When the acquirers are modelled a similar result appears. The tax charge for these terms is also negative. Again this could be related to the tax advantages motive as the bidders could be attempting the takeover in order to preserve their low tax payments in some way, or it could be symptomatic of the sound financial position that these firms appear to occupy before the acquisition and their effective dealing with such issues. The last variable to be considered is the managers to employees ratio which is continually positive in the models featuring the acquiring companies and the firms that were not involved in the takeovers. A positive sign here suggests that the acquiring companies have a higher ratio of managers to employees than other firms of the same size. According to Lecraw (1984) this is an indictor that these firms are likely to diversify in the near future as some of these

managers will be under-employed and the purchase of another company would give them something to do. Diversifying acquisitions are presently popular as the current policy position of the Mergers and Monopolies Commission means that such takeovers are unlikely to be referred or stopped by the Commission and the same holds for the sample period used here.

The last point that needs to be made here is a note of the improvements that will be made in the next chapter. Here no distinction is made between the different economic conditions that apply at the time of these acquisitions. The models estimated here are based on data from the entire period 1987 to 1994. If these models are estimated over the boom and recession data sets separately they produce very different results, as the last table in Appendix III shows. These differences suggest that splitting the data sets in this manner may produce more detailed results about acquisitions in different economic conditions. Furthermore, adding some macro-economic indicators the models should be able to incorporate information into the estimations concerning the precise conditions of the economy which may improve the overall abilities of these models and increase the level of information that they convey on the subject of acquisitions.

Chapter 5. The Prediction of Acquisitions Using Macro-Economic Data with Logit Models and Cox's Proportional Hazard Function

Introduction

This chapter will investigate the possibility of adding macro-economic variables in the estimation of the logit and proportional hazard models that were introduced previously. In Chapter 2 it was demonstrated that the condition of the economy can have an impact on the level of acquisition activity in the months that follow. Furthermore, in Chapter 4, the firms that are involved in takeovers were examined in order to discover which characteristics separate these firms from each other and from the companies that do not become involved in the corporate control market. As a result of the findings in these chapters it would be interesting to combine these two types of information and to examine whether or not the addition of macro-economic factors can enhance the quantity of information that can be gleaned about the firms that become involved in acquisition activity. In particular there may be distinct differences between the factors that drive acquisition activity under different economic conditions, for example in boom and bust periods. By including some form of macro-economic indicators and differentiating between periods it may be possible to determine whether or not acquisitions activity is propelled by different factors at different times at the firm level rather than considering the total activity in this field.

Previous research does not seem to have considered the combination of macro- and micro economic information in the analysis of acquisition activity. Earlier work on this subject is split between the papers that consider the corporate control market as a whole, for example Golbe and White (1988), and the articles that examine the individual companies that enter the market, as Palepu (1986) did. Consequently the precedents for this sort of examination are virtually non-existent and there is little available information on how this problem might be tackled.

If it can be shown that the companies that are involved in acquisition activity differ depending on the economic conditions, then companies that are considering attempting an acquisition might find this information very useful. It may be that the economic situation can alter conditions so that companies become potential acquirers when they would not otherwise be able to attempt to purchase another firm. Conversely, some firms may become targets during certain times when they are immune from acquisition attempts in other periods. This may be particularly true of large and powerful companies that should be safe from acquisition attempts most of the time. To this end it will be interesting to see whether or not it is possible to effectively add macro-economic information into logit and hazard function models and to ascertain the impact that these variables have on the analysis of the nature of the firms that take part in the takeover process.

This chapter is organised in the following manner. Section 5.1 will centre on the theories and evidence in previous research that are applicable to this topic. Section 5.2 contains three sub-sections. The first of these considers the methodologies that will be used, the second one deals with the data and the last one contains the empirical results of these estimations. Finally there is the conclusion.

5.1 Theories and Evidence

There does not appear to be any previous research that involves the use of macro-economic factors in combination with accounting data in the analysis of the types of companies that become involved in acquisition activity. Nevertheless, there are some areas of the previous work that can be applied to this issue. The literature concerning the motives that drive acquisition activity are still applicable here, as they were in the previous chapter. The fact that macro-economic considerations are also involved in these models will not alter the fundamental factors that impel companies to attempt to purchase another firm. Equally, the characteristics of the companies that become involved in takeovers are also relevant here, as they were in Chapter 4. The literature concerning these two areas of previous research can be seen in detail in both the literature review and, more briefly, in the preceding chapter. Equally, there is a

considerable body of research that has attempted to identify the link between the macro-economic conditions and the level of acquisition activity as a whole. The previous literature in this area has been reviewed in Chapter 2 and the same factors that were important there will be used in this chapter.

The only reference that is important in this chapter that has not been previously reviewed is the paper by Wadhwani (1986). This article investigated the possible link between firm bankruptcy and the level of inflation in the UK. This offers a precedent for the use of macro-economic variables in investigating factors that have an impact on company activities. In addition, Wadhwani multiplied inflation into his equations in the same way that macro-economic principal component terms will be multiplied by accounting terms in order to make it possible to apply these terms in logit and hazard function models. It is unfortunate that there are no more references that can be used to guide the development of this chapter, but this development is unique to this study and has not been applied previously.

5.2 Methodology and Empirical Results

5.2.1 Methodology

The methodology that will be used here is the same as in the previous chapter; logit models and proportional hazard function models. These models are both treated in their binary forms where they are concerned with the identification of characteristics that differentiate between just two possible outcomes. The methodology section of Chapter 4 discusses these two models in considerable detail and so it is unnecessary to re-examine them here in any depth. The logit and hazard function models can be represented in the following manner, equations 5.1 and 5.2, which reveals the fundamental differences between the two approaches, in particular the absence of a time element in the logit model and the conditional nature of the hazard function probability. The logit model, equation 5.1, is a generalisation of the ordinary least squares method that uses a link function, the log-odds ratio, to ensure that the outcome remains within the acceptable limits for a probability. In contrast the hazard

function, equation 5.2, estimates a conditional probability concerning the likelihood of an event happening given that it has not already taken place. This, albeit very brief, discussion illustrates the fundamental differences between these two approaches.

$$\log\left\{\frac{\pi}{1-\pi}\right\} = \alpha_0 + \sum_{j=1}^{n} x_{ij}\beta_j \qquad (5.1)$$

$$h(t;\mathbf{x}) = \lim_{\delta t \to 0} \frac{P(t \le T < t+\delta t \mid t \le T, \mathbf{x})}{\delta t} \qquad (5.2)$$

There is, however, one new methodological approach that will be used in this chapter. In the data sets there will be several new terms that are created using principal components analysis. This technique is used to reduce many items of data to a few terms or one variable that represents as much of the volatility displayed by the original terms as is possible.

Principal component analysis centres on identifying a single term that represents the behaviour of a much larger group of variables. There can be more than one of these principal component terms and they are created in such a manner that they are a linear combination of the original data and they are uncorrelated. The first principal component represents the maximum possible level of volatility in the original terms, whilst the second principal component represents the next highest possible level of volatility that is possible whilst being uncorrelated with the first component and so on. In the creation of principal components it is unnecessary to have any hypotheses referring to the original data as it is only necessary to have the means and variances of these terms. In the following empirical work the groups of terms will be reduced to single terms and so it is only necessary to consider the construction of the first principal component.

Suppose that the original data under examination is represented by a vector and that the covariance matrix associated with these terms is also known. Furthermore, suppose that the eigenvalues associated with the covariance matrix are known and are arranged in descending order of magnitude. In the equations that follow these three

terms are denoted $\mathbf{x} = x_1, ..., x_p$, $\mathbf{\Sigma}$ and $\delta_1, ..., \delta_p$ respectively. It is then possible to express the covariance matrix in the manner demonstrated in equation 5.3

$$\mathbf{\Sigma} = \mathbf{\Gamma}\mathbf{\Delta}\mathbf{\Gamma}' \qquad (5.3)$$

where $\mathbf{\Gamma}$ is an orthogonal matrix of order p and $\mathbf{\Delta}$ represents a diagonal matrix whose diagonal elements are the eigenvalues associated with the covariance matrix. A new set of variables, $\mathbf{y} = y_1, ..., y_p$, that represent the principal components are introduced and defined by equation 5.4, below.

$$\mathbf{y} = \mathbf{\Gamma}'\mathbf{x} \qquad (5.4)$$

When the covariance matrix relating to these new terms is estimated, below, it shows that these terms are uncorrelated as the covariance matrix is equal to the diagonal matrix of eigenvalues that was introduced earlier.

$$E(\mathbf{y}\mathbf{y}') = E(\mathbf{\Gamma}'\mathbf{x}\mathbf{x}'\mathbf{\Gamma}) = \mathbf{\Gamma}'(\mathbf{\Gamma}\mathbf{\Delta}\mathbf{\Gamma}')\mathbf{\Gamma} = \mathbf{\Delta} \qquad (5.5)$$

Finally, it remains to demonstrate that the first principal component is the linear combination of the original terms with the maximum variance. This linear combination can be expressed as $\mathbf{c}'\mathbf{y} = \mathbf{c}'\mathbf{\Gamma}'\mathbf{x}$ where $\mathbf{c}$, a vector of scalars, is such that $\mathbf{c}'\mathbf{c} = 1$. This means that it is possible to estimate the variance of the principal components. The variance can be expressed in the form of equation 5.6 which is maximised when $c_1 = 1$ and $c_2 = ...c_p$

$$\sum_{j=1}^{p} c_j^2 \delta_j = \delta_1 + \sum_{j=1}^{p} c_j^2 (\delta_j - \delta_1) \qquad (5.6)$$

This demonstrates that the first principal component represents the maximum variance for any data set. Since this is the only term that will be estimated in this chapter it is not necessary to investigate this methodology any further. The use of principal components will make it possible to incorporate a great deal of macro-economic information in the data sets without adding a lot of extra terms.

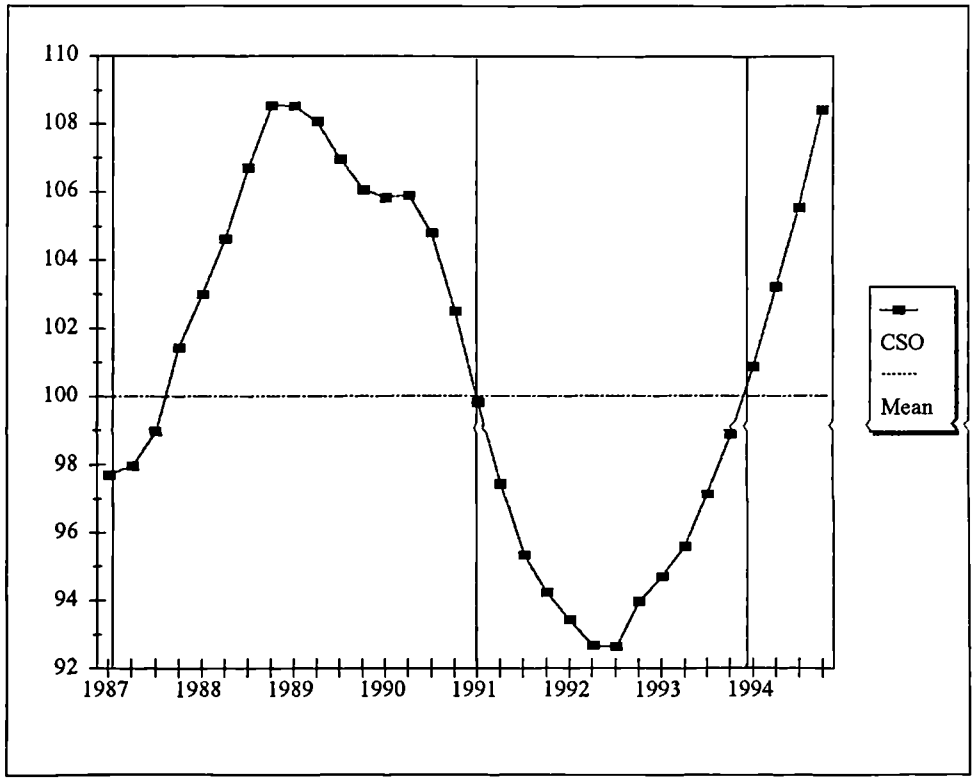
5.2.2 Data

Two innovations are made in this chapter. The first of these concerns the behaviour of the economic cycle within the sample period. The sample starts in an economic boom, coinciding with a merger wave, passes through a severe recession and ends in a period of slow recovery. It will be interesting to see whether or not these periods alter the characteristics of companies that become involved in acquisition activity. In Chapter 2 it was demonstrated that there is a strong link between the level of economic activity and the number of acquisitions that take place at any time, so it is not unreasonable to expect that the different economic periods will have a differing impact on the outcome of the estimation of either logit or hazard function models. To investigate this notion the sample period is split into three distinct parts. These sub-samples represent the boom, recession and recovery periods that can be seen within the sample period. The precise placing of the splits in the sample are based on the short run indicator series produced by the Central Statistical Office which was introduced in Chapter 2. The composition of this series matches the macro-economic data used in Chapter 2 far more closely than any of the other indicator terms and many of those same terms will feature in this chapter. The CSO series is designed to have a mean value of one hundred which makes it simple to distinguish when it moves from a boom period to a recession and vice versa. The graph below, Figure 5.1, shows this series with the mean marked upon it as a horizontal line and the divisions of the period denoted with vertical lines.

This means that the data sets will be split into three sub-samples of different sizes. The boom period, 1987 - 1990, accounts for three hundred and eighty of the original five hundred and fifty-four companies whilst the bust period, 1991 - 1993, involves one hundred and fifty companies from the original sample. Finally the recovery period, the year 1994, incorporates twenty-four firms. This last sub-section of the data is too small to use in the estimation of either logit or hazard function models and instead will be used to test the predictive abilities of the models created using the other data sub-periods. The data used here is drawn from two years before the acquisition occurred as this appeared to be the most informative period in the

results of the previous chapter. In the previous chapter this data set consistently gave the most informative results and so it seems appropriate to use it again here.

Figure 5.1 Divisions of the Sample Period Using the CSO Short Run Indicator Series



The second innovation is concerned with the data that will be used in the estimation of the empirical models. As before the data concerning the bidding and target companies will be used, as will information on those firms that were not involved in acquisition activity during the sample period. In this chapter, however, there will be more variables included in the data sets as a set of conditioning variables that combine macro-economic factors with accounting terms will be added. These are added in a two stage process. Firstly, the macro-economic factors are combined into six principal component terms representing different aspects of the economic cycle that might have an impact on acquisition activity. The second stage involves the combination of these terms with accounting variables. This is done in order to ensure that there is a difference between the macro-economic factors for the zeros and ones in the sample. This is essential as both of the methodologies used in this chapter are designed to investigate the differences between the firms in the sample. In particular, it is a fundamental assumption inherent in the construction of a hazard function model

that the firms must lie in homogenous groups. If the macro-economic factors were added to the data sets simply as stationary variables there would be no difference between the values of these terms, as they apply to the zeros and ones which breaches this condition and would make it impossible to estimate the models correctly. Consequently, it is essential to link the macro-economic factors to the accounting variables in order to maintain heterogeneity between the individuals in the sample.

Principal Components of Macro-Economic Factors

There is a considerable number of macro-economic factors that are going to be used in the models based on the findings of Chapter 2 and previous research. In order to simplify the process of adding these terms to the data sets, they are going to be grouped together according to the value of their correlation coefficients. Each of these groups will then be made into a single principal component. This results in the construction of six principal component variables. The macro-economic factors that go into each of these groups can be seen in the first column of the table below. In addition, Table 5.1 includes the weights that each of these terms has in the principal component and the cumulative R^2 value for that component. This last term measures how much of the total volatility demonstrated by the original terms is captured in each of the principal component series. As Table 5.1 demonstrated these principal component series are all reasonably good representations of the terms from which they are composed as illustrated by the R^2 values. The graphs below illustrate the extent to which the principal components are related to the underlying variables that were used in their creation. It is clear that the correspondence between these terms is close and, as a consequence, the principal components can be used as an adequate substitute for the macro-economic variables.

Table 5.1 Division of Macro-Economic Factors Based on Correlation Coefficients

Terms	Weights	Cumulative R^2
Inflation	0.33	0.69
Gilts	0.99	
Treasury bills	0.99	
M0	0.86	0.73
Term structure of interest rates	0.86	
Return on the FTA	0.85	0.72
Return on the S&P500	0.85	
GDP	0.94	0.74
Unemployment	-0.83	
Total retail sales	0.95	
Commodities	0.80	
Trade balance	-0.76	
Dollar : Sterling exchange rate	0.91	0.92
Effective exchange rate	0.97	
Volume of exports	-0.97	
CBI confidence survey	0.86	0.74
Number of house-building starts	0.86	

Figure 5.2 Principal Component 1

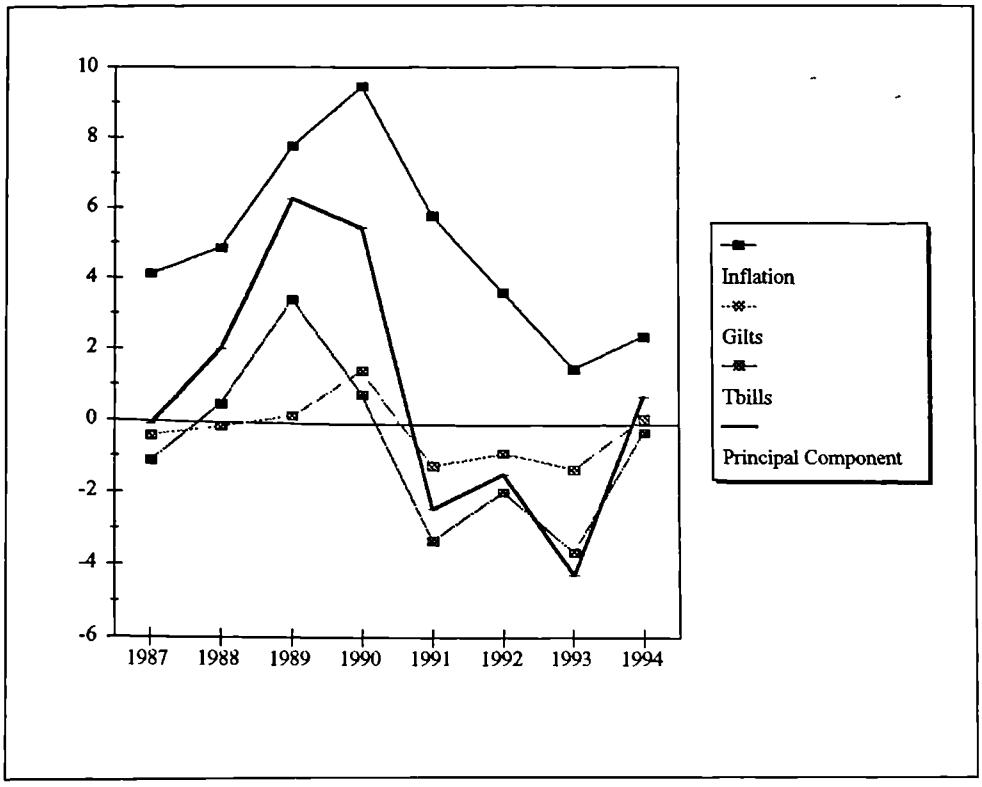


Figure 5.3 Principal Component 2

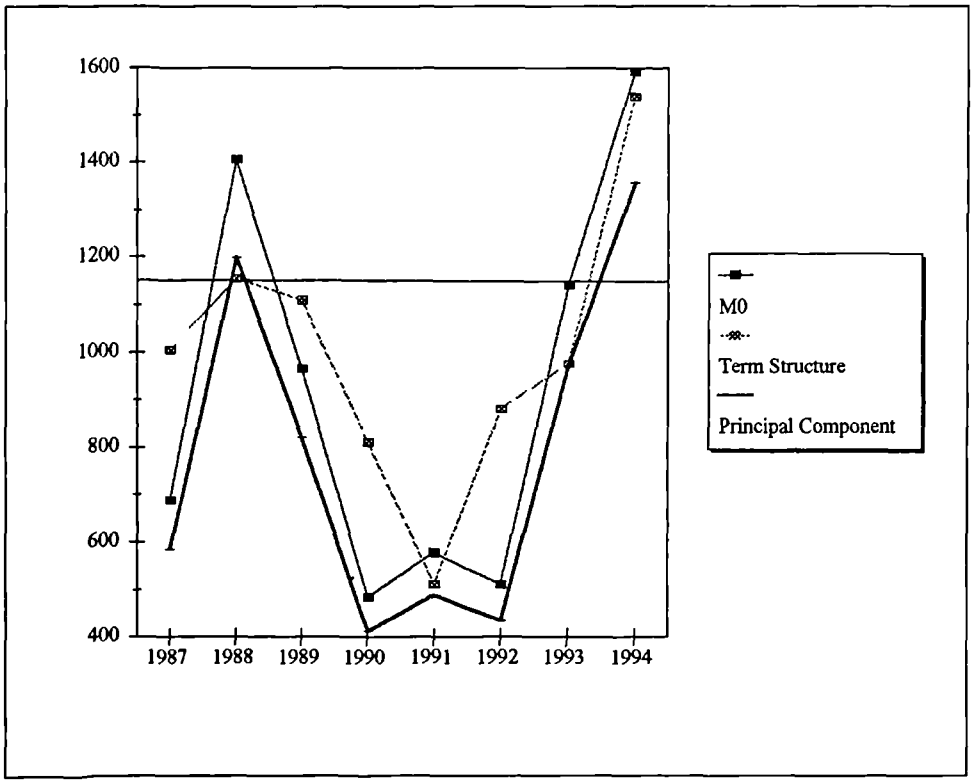


Figure 5.4 Principal Component 3

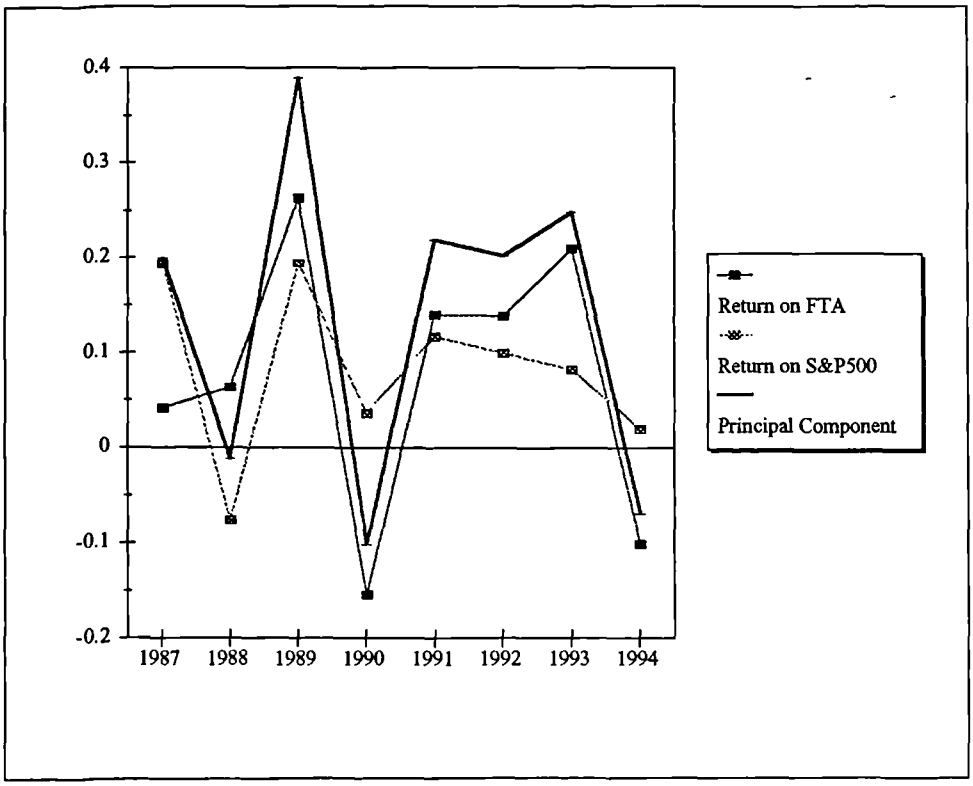


Figure 5.5 Principal Component 4

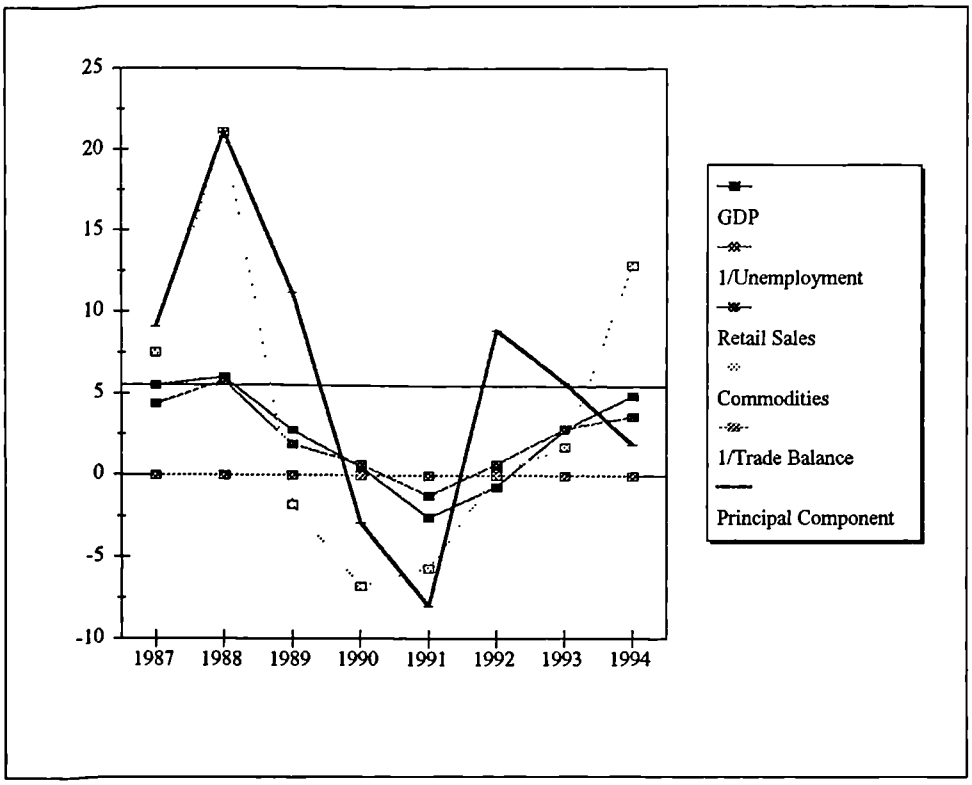


Figure 5.6 Principal Component 5

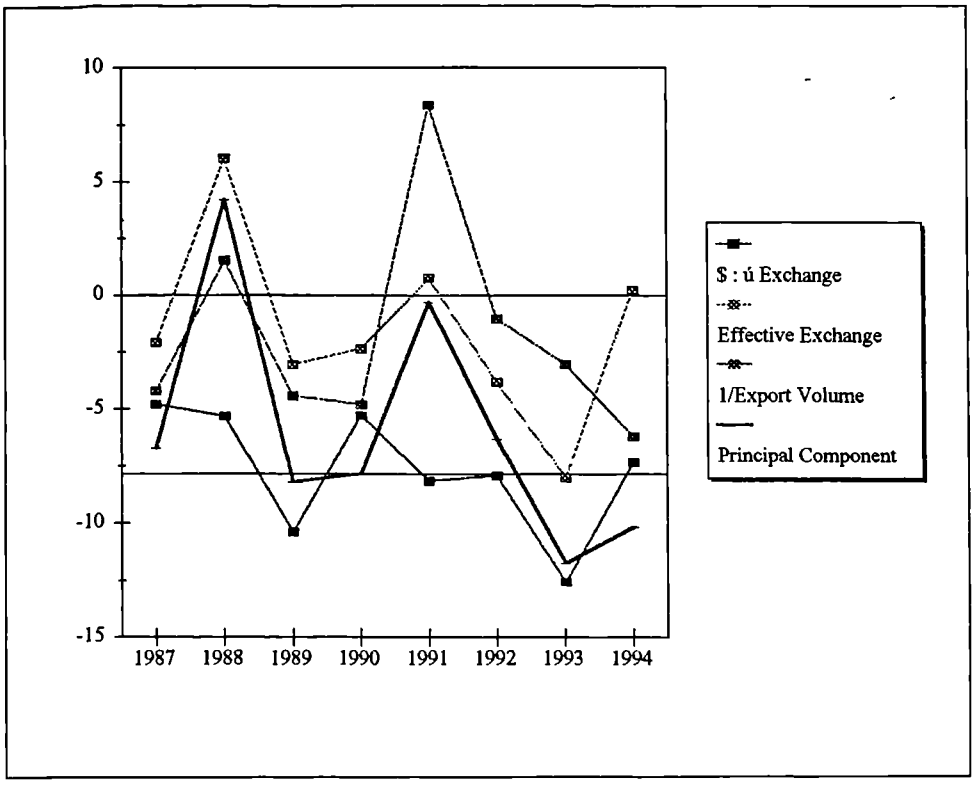
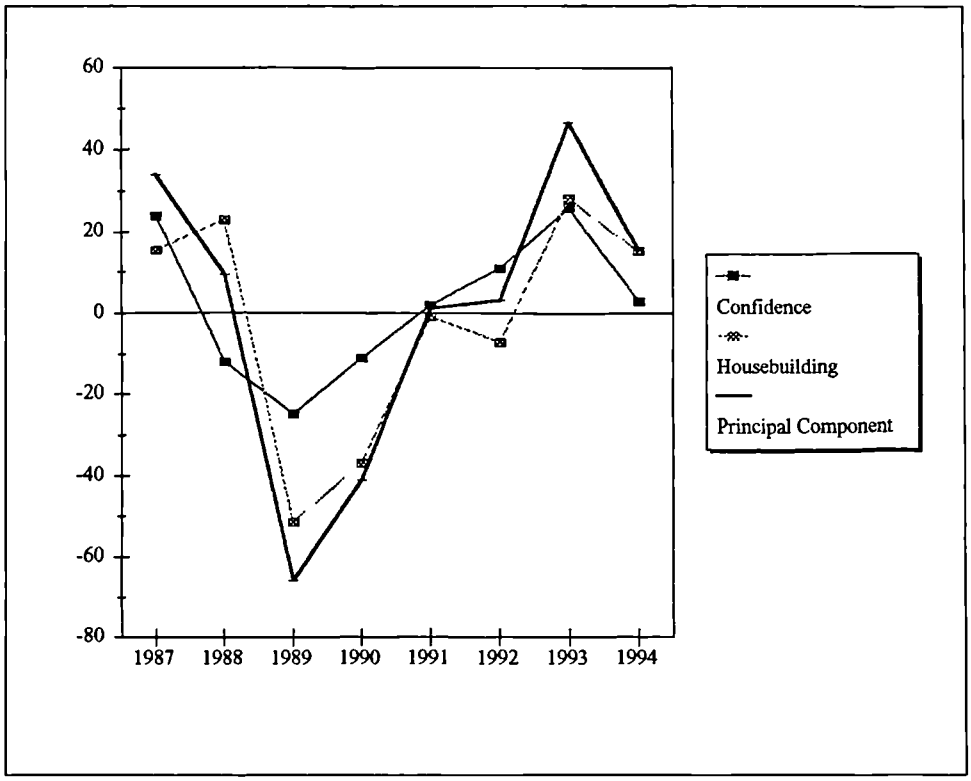


Figure 5.7 Principal Component 6



Creating Variables that Combine Macro-Economic Data with Accountancy Terms

At the beginning of this section it was explained that the macro-economic factors cannot be added to the data sets in their current form. The macro-economic data, now in the form of six principal components, needs to be treated in such a manner that will ensure that the macro-economic effect can be identified. This will be done by multiplying the macro-economic terms with accounting variables to create terms that are unique for each individual in the sample and make it possible for the models to be estimated. There are virtually no precedents in the literature concerning which accounting terms should be combined with the principal components and so the selection of these terms is based on analysing the variables that were important in the previous chapter and attempting to link these terms with the macro-economic variables in a logical manner.

The first principal component is composed of three terms. These are the rate of inflation and the rates for both gilts and three-month treasury bills. These terms refer to factors that have an impact on the value of a firms' funds. Wadhwani (1986)

investigated bankruptcy and linked this event to inflation. Furthermore, the inflation term was multiplied into Wadhwani's equations in the same way that the principal components are going to be multiplied with the accounting terms here. Wadhwani suggested that inflation has an impact on liquidity and, thus, on the likelihood of a firm going broke. Following this rationale it seems appropriate to link this principal component to some measure of liquidity in the firm. In the previous chapter, liquidity variables were often important in the empirical results and, more particularly, the terms representing the creditor and debtor days appear significant in nearly all of the results. To this end it appears that the most suitable variable to combine with the first principal component is related to these terms. However, neither of these variables represents the overall liquidity of the firm and in order to represent the total liquidity of a company it is more appropriate to consider the difference between these terms; the value of the creditor days less the debtor days. As a result the first macro-economic variable, named Macro1, is created by multiplying the first macro-economic principal component by the difference between the creditor days and the debtor days for each firm in the sample.

A similar rationale can be applied to the second of the macro-economic principal component series. This variable is constructed from the money supply variable, M0, and the term structure of interest rates. Again, these are factors that could have an impact on the liquidity of the company and, consequently, it may be appropriate to link this term to another measure of liquidity. The accounting terms used in the creation of the previous macro-economic variable refer to the longer-term liquidity of the firm and so it is sensible to consider the short-term condition in the construction of this variable. In Chapter 4 the short term liquidity of the company was represented by the current and acid test ratios. In the results, the current ratio appeared significant far more often than the acid test term and as a consequence it is appropriate to use this item here. Thus, the second macro-economic variable, Macro2, is constructed by multiplying the second principal component by the current ratio for the firm.

The third macro-economic principal component is constructed from two terms that represent the returns on the FT-All share index and the American Standard and Poor's 500 index. Such a term represents the value of equity on the national and international markets. It seems logical to combine such a term with an accounting item that also reflects the value of the firm, the p/e ratio for example. However, the data sets used here are constructed from quoted companies and so the value of the FTA index already incorporates some information concerning the value of each of the firms. Consequently, there would be an overlap between these two items which means that this choice of accounting ratio may be debatable. Instead, the term representing capital gearing will be used. The value of the leverage ratio for the firms in the data sets appears significant in several of the results given in the previous chapter and the resulting variable is called Macro3. The next new variable is Macro4. The principal component here involves more variables than any of the other terms. These items represent GDP, the level of unemployment, the volume of retail sales, the commodities index and the UK trade balance. These terms are all connected with production and the ability of each firm to meet demand. This suggests that the accounting term should be connected with this side of the firm's behaviour as well. Consequently, Macro4 is constructed by multiplying this principal component by the company's total sales.

The penultimate macro-economic term, Macro5, involves a principal component series that consists of the exchange rate between Sterling and the Dollar, the effective exchange rate and the volume of exports leaving the UK. These terms reflect the condition of overseas markets which will have an impact on any of the firms in the data set that deal internationally. Alterations in the state of these international factors could have an impact on the available funds that a company has for investments, including acquisition activity. Such factors will be most clearly shown in the early stages of a company's accounts and, as a result, the best variable to combine with this principal component is the gross profit margin term. Finally, there is the sixth macro-economic principal component. This is constructed from two series. The first of these refers to the findings of the CBI survey on business confidence and the second term reflects the number of house-building starts in the UK. The level of confidence, for both businesses and consumers, can be directly linked to the level of investment

that a company undertakes. Furthermore, the efficiency with which a company is managed can also have an impact on that firm's facility for future investment. This suggests that it is possible to link confidence and efficiency to the level of investment and, consequently, it may be appropriate to use one of the efficiency terms in this context. The term representing the ratio of turnover to assets employed appears in many of the empirical results given in the previous chapter and will be used here in the construction of the final macro-economic variable, Macro6.

Correlations within the Data Sets

In this chapter there are just six data sets that will be used in the construction of the empirical models that are dealt with. These represent the three groups of companies in this data set for both the boom and bust periods. As in the previous chapter, it is important to know the value of the correlation coefficients between the terms in each of these data sets. The correlation matrices for these data are included in Chapter 3 as Tables 3.22 to 3.27 and, as before, this will make it possible to avoid the potential problem of multicollinearity. If some of the terms in the data sets are very highly correlated then only one of these variables will be used in the empirical analysis. In the estimation of discrete choice and lifetime data models it is important to avoid highly correlated groups of terms as these can result in the creation of excessively large standard errors in the results.

Biases Created By the Use of Choice Based Samples

In the Chapter 3 it was explained that the use of logit models with a choice-based sample could create a bias if the usual maximum likelihood ratio estimator was employed. The equation for the bias was given, following Palepu (1986) and it was demonstrated that the bias is created because there is a difference between the probability of selecting an acquired firm in the sample and the probability of selecting an acquired firm in the population, which are assumed to be the same under the usual maximum likelihood estimator approach. Since the samples used here are paired, it is essential to know the impact that this bias will have. To start with, consider the data sets that refer to the acquired companies when they are modelled

against the firms that are not involved in acquisition activity. Here the bias will result in the over-estimation of the probability that a company will be acquired. In the boom period the bias is 20.39%. In the bust period the bias increases to 33.43%, but shrinks to just 18.53% in the test period that will be used to examine the predictive abilities of these results. Next, consider the three data sets that refer to the modelling of the acquiring companies against the non-involved firms. There are fewer acquiring companies than there are acquired firms and so the biases are larger as the degree of over-sampling becomes greater. In the boom period the bias is 27.79% which rises to 35.74% in the bust period. In the test period the bias is 23.35%. Finally there are the data sets that incorporate the acquired and acquiring firms together. Here both types of company are over-sampled and both will introduce biases into the estimations. However, the biases will affect the results in opposite directions which will lead to a certain degree of cancelling out. Since the biases are not equal in magnitude, however, there will be a residual effect that will still need to be taken into account. The biases associated with the acquiring companies are consistently larger in these data sets and so the remaining bias in the logit results will generate an over-estimation of the purchasing firms. In the boom period this bias is 7.4%. This is also the only time that the bias in the bust period is smaller than the other biases and here it is equal to 2.31%. The last data set of all is the test data set in which there is a bias of 4.82%. In order to gain accurate estimations of the abilities of these models it is necessary to adjust the predicted probabilities by the appropriate amount.

5.2.3 Empirical Results

As before, the empirical models are estimated using a two stage process, following the general to specific methodology that was explained in Chapter 4. The variables are eliminated one by one, starting with the least significant term, until the variables that remain are all individually significant. At each step a likelihood ratio test is estimated to confirm that the variable can be removed without impairing the overall significance of the model. Once all of the insignificant variables have been removed another likelihood ratio test is used to ensure that the remaining terms are jointly significant in the model. In the table of results that follow, a result will be given for

both the boom and bust periods for each of the types of model under examination. Naturally, each of the data sets generates more than one result, but in the majority of cases the significant variables that appear in the resulting model are unaffected when the combinations of highly correlated terms are changed and so the model given is representative of all of the results in that section. A complete set of the results that were created here can be found in Appendix IV. At the bottom of each table there are calculated values for the likelihood ratio tests that examine the joint significance of the remaining terms in the model. The null and alternative hypotheses here are :

$\mathbf{H_0^1}$: the coefficients of the remaining terms are equal to zero

$\mathbf{H_A^1}$: the coefficients of the remaining terms are not equal to zero

These tables also include the predictive accuracy figures for each of the model and for each type of firm within the data set. These values represent the percentage of firms in the data sets which the model correctly identified. This figure serves as a proxy for the R^2 value that is often seen in regression models. It is not possible to estimate a R^2 term here and so, following the rationale offered Maddala (1996) which was explained in detail in the methodology section of Chapter 4, this value is used instead. It is also important to recall that when a term is not included in the results, this means that there is no significant difference between the values of that variable as applied to the two groups of firms in that particular data set. Furthermore, all of these results are relative and reflect the differences between the two groups of companies that are under consideration in each section of the results.

Acquiring and Acquired Companies

The firms in these data sets have been deliberately over-sampled which will introduce a bias into any predictions generated using the logit methodology. The acquired firms are over-sampled to a greater degree than the acquiring companies in these samples and as a result the remaining bias will over-estimate the probability of a firm becoming a bidder rather than a target firm as was explained in Section 5.2.2 and, in greater detail in the previous chapter, Chapter 4, which introduced the

methodologies that will be used here. Table 5.2 below illustrates the results of the logit model estimations for both the boom and bust periods.

The first term in this result is one of the efficiency variables which appears in the boom period result. This term is positive which is contrary to the theories concerning the efficiency of acquired firms. Target companies are thought to be less effective than other firms. This applies to both their bidding counter-parts and the companies that do not become involved in acquisition activity. It is possible that more efficient firms are acquired in a boom when bidders can take advantage of more funding opportunities than at other times. The liquidity term representing the current ratio appears in both the boom and bust period models. In both of these cases this term is positively linked to the probability that a firm will become the target of an acquisition attempt. This term can be related to the general financial condition of a company and this result suggests that targets are in a reasonably secure financial position, which is again contrary to the theories concerning takeover activity. The first result in either of these models that corresponds with any of the theories concerning acquisition activity is the total sales term that appears in the boom period result. This term is negatively linked to the probability of a firm becoming an acquisition target, which suggests that acquired firms are smaller than the bidding companies. Lev (1992) and several other authors suggested that target firms are relatively small, which reduces the costs of the purchase. The last accounting term in these models is the tax charge variable which appears in the bust period model. This term is negatively linked to the probability that a firm will become the target of an acquisition attempt, which means that firms with low published tax charges are more likely to become the target of acquisition activity that companies with high tax charges. However it is difficult to link these results directly to the tax benefits motive for acquisition activity.

Table 5.2 Logit Model Results for Acquired and Acquiring Companies

Variable	Period	
	Boom	Bust
Turnover to assets employed		
Turnover to fixed assets		
Sales per employee	2.14* (2.6)	
Stock ratio		
Return on capital employed		
Return on s'holders equity		
Pre-tax profit margin		
Net profit margin		
Dividends per share		
Earnings per share		
Dividend yield		
P/e ratio		
Capital gearing		
Current ratio	2.93 (1.16)	2.47*** (1.74)
Acid test ratio		
Debtor days		
Creditor days		
Total sales	-0.51 (-1.62)	
Manager/employee ratio	-0.07 (-1.33)	-
Total tax charge		-0.24 (-1.55)
Macro1		-2.33 (-1.61)
Macro2		
Macro3	-4.26 (-1.59)	
Macro4		
Macro5		0.69*** (1.92)
Macro6		
Likelihood ratio test	22.24*	15.54*
Predictive Accuracy (%). Acquired firms Acquiring Firms	63 52	63 60
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

Three of the macro-economic terms appear in these logit model results. The first one, Macro1, represents the combination of the level of firm liquidity with terms that represent the rate of inflation and the level of gilts and treasury bills. These macro-economic variables can alter the value of a firm's funds. Wadhwani (1986) suggested that inflation can be linked to financial distress as it has an impact on the level of liquidity in the company. In turn this can have an impact on the potential that a firm has for future investment, which could reduce the probability that the firm will become the target of an acquisition attempt, as this result suggests. The first macro-economic term to appear in the boom period models is Macro3. This variable reflects the impact that the stock markets in the UK and America have on acquisition activity. If the return on the stock market drops, as the negative sign in this result implies, then the probability that a company becomes a target in a takeover will increase. This could be a reflection of the fact that target companies are supposed to be relatively under-valued before the acquisition, as Lev (1992) and Berkovitch and Narayanan (1993) supposed. The last term is Macro5 which appears in the bust period model. This variable relates the condition of the foreign exchange markets and overseas trade to the probability that a company will become the target of an acquisition attempt. It is possible that acquisitions activity is related to a devaluation of Sterling on the foreign exchange markets, as was suggested in Chapter 2, but this implies that this term would be negatively linked to the probability that a firm is acquired, which is contrary to the result here. This positive link is difficult to explain in the light of the previous results in this thesis. As might be expected these logit models are not particularly good predictors when used on the test period as the figures in the table suggest. Both of the models correctly identifies just over half of the firms in the sample.

The hazard function models given in Table 5.3 are more informative than the corresponding logit results. These results contain more terms, which makes it possible to infer considerably more about the nature of the companies that become involved in acquisitions activity. The first term in these results appears in the model referring to the boom period and the result for the bust period. It represents the efficiency of the target companies compared to the bidding firms. This term is negatively linked to the

probability that a company will become the target of an acquisition attempt, suggesting that the acquired firms are less efficient compared to the bidding companies. Low efficiency frequently appears in the literature concerning the characteristics of companies that are the subject of acquisition activity. This result can be linked to the idea that the managers of acquired firms are less effective than their counterparts in the bidding company as both Lev (1992) and Berkovitch and Narayanan (1993) suggested. It is possible that this trait could also make the company attractive to another company in which the managers are ambitious and are seeking to enhance their own standing by attempting to purchase another company, as Jensen (1988, 1992) suggested. The profitability terms do not appear in the boom period model, which suggests that there is no significant difference between the profitability of the acquired and acquiring companies during the boom period. Nevertheless, this is contrary to the previous literature which suggests that target firms should be less profitable than their bidding counter-parts. In the bust period result, however, there is a profitability variable. This term is negatively linked to the probability that a company will become the target of an acquisition attempt as the previous literature suggests that it should, see Lev (1992) for example. This can be linked to both the inefficient managers idea and the fact that acquired firms are thought to be relatively under-valued by the stock market. If a firm is under-performing then this is likely to be reflected in the share price which will make it a more attractive target than a highly valued firm. The profitability terms were also found to be negatively linked to the probability that a firm becomes the target of an acquisition attempt in Chapter 4.

Table 5.3 Hazard Function Results for Acquired and Acquiring Companies

Variable	Period	
	Boom	Bust
Turnover to assets employed		
Turnover to fixed assets		
Sales per employee	-0.31** (-2.2)	-0.31 (-1.23)
Stock ratio		
Return on capital employed		
Return on s'holders equity		-0.11 (-1.27)
Pre-tax profit margin		
Net profit margin		
Dividends per share		
Earnings per share	0.11 (1.25)	0.25 (1.47)
Dividend yield	0.46 (1.4)	
P e ratio	-0.2 (-1.24)	1.37 (1.86)
Capital gearing		
Current ratio	-0.4** (-2.35)	
Acid test ratio		-2.26** (-2.2)
Debtor days		
Creditor days		
Total sales	0.63** (2.38)	1.75 (1.63)
Manager employee ratio	0.05*** (1.8)	-0.04 (-1.26)
Total tax charge		
Macro1	-0.8** (-1.99)	
Macro2		
Macro3	1.49** (2.52)	
Macro4		-0.66 (-1.61)
Macro5		
Macro6		
Likelihood ratio test	27.59*	16.18**
Predictive Accuracy (%). Acquired Acquiring Firms	75 50	83 66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

The next group of terms represent the investment variables. The terms that refer to the ability that a firm has to invest in future projects, for example the level of earnings per share, are positive in both results, which corresponds to the idea that the target of an acquisition attempt should have the potential to perform more activity in the future when, it is presumed, the new managers will attempt a more dynamic program of investments and new projects. The p/e ratio is negatively linked to the probability that a company will become an acquisition target in the boom period result, which is the desired outcome as it is widely held in the literature for the target company to be relatively under-valued by the stock market. The p/e ratio in the bust period model, however, is positively linked to the probability that a firm will be the target of an acquisition attempt. In a bust period, the selection of acquisition targets may tend towards less risky firms as the companies must be successfully integrated. To this end, the selection of firms that are relatively over-valued may reflect this more cautious attitude. Rock, Rock and Sikora (1994) noted that there was a trend toward conservative acquisitions during the recession period and it is possible that this is the reason for this unexpected finding.

The liquidity of a company in not mentioned directly in any of the literature on this subject. Nevertheless, it likely that the condition of a company with respect to this factor will be an indicator of general financial well-being and the effectiveness with which it is run. In this case it is probable that the liquidity of an acquired firm will be lower than that of an acquiring company, as the current and acid test ratios suggest in these results. Such a finding can be linked, as above, with the idea that the managers of the acquisition targets are ineffective and failing to ensure that the company is in a sound financial position. The next groups of variables in this model represent those factors that are thought to be related to acquisition activity but do not come into one of the previous categories. For example, the size of a company may have an impact on the probability that the firm under examination will be acquired in the future. Both the boom and bust period models suggest that the purchased firms are large compared to the purchasing companies, which is contrary to the recent literature. It is held that the size of a firm is directly linked to the cost of purchasing it, as larger firms tend to have higher share prices than small companies, as Lev (1992) commented. However, the

first of these models is based on acquisitions that took place in the boom period in the UK economy, which also corresponded with a very large merger wave. During this time, acquisitions took place that did involve small bidders attempting to buy much larger target firms. This was made possible by the joint impact of financial deregulation and the buoyant stock market which conspired to make it possible for firms to raise very large sums of money for new investment. The positive sign allocated to this term in the bust model may be another indicator of cautious purchasing, as was mentioned above. The last accounting term to appear in these results is the ratio of the managers to employees. This term was included, following Lecraw (1984), to measure the likelihood that a firm will diversify. Lecraw suggested that a firm with a large number of managers compared to the total number of employees would be more likely to diversify because some of these managers would be looking to create more work for themselves in order to justify remaining in their current positions. However, in the context of this research, this variable can only determine the probability that a firm will diversify if the bidding firms are the group of companies under examination. Consequently, this variable could also be viewed as an alternative measure of managerial efficiency. If there are a great many managers it is quite likely that some of them will be surplus to requirements and could be eliminated without having any adverse impact on the company. This is certainly the impression that this term creates in the boom period model, when it is positively linked to the probability that a firm will be acquired in the near future. Conversely, this term is negatively linked to the acquisition likelihood in the bust period result. It is difficult to explain this result unless it can be linked, once again, to a period of more careful selection of takeover targets as the recession makes the bidders more cautious and, therefore, more selective.

The last group of terms are the macro-economic indicators. In the boom period result two of these terms demonstrate a significant difference between the acquired and acquiring companies. The first of these is Macro1 which is negatively linked to the probability that a company will become the subject of an acquisition. The macro-economic terms in this variable refer to inflation and the value of both gilts and treasury bills. These factors can have an impact on the value of funds held by a firm

which, in turn, can alter the potential that a company has for further investment as well as having an impact on the liquidity of the company, as Wadhwani (1986) suggested. These terms are negatively related to the probability that a company will become an acquisition target, so it appears that the impact of macro-economic factors on the value of money is related to a firms opportunities for future investment. Acquired firms are supposed to have the potential to invest in other projects after the takeover and as a result it is logical to presume that low inflation, for example, would enhance these prospects and, consequently increase the likelihood of an acquisition occurring. The last term in this model is Macro3 which is positively linked to the probability that a company will be acquired. This variable represents the impact of the stock markets, both national and international, on acquisitions activity. An acquisition is, simply, just a way of transferring shares from one set of shareholders to another. Consequently, it would be expected that this term would have considerable importance. In the boom period the stock market moves upwards which is reflected in a general increase in stock prices. This might be expected to result in a reduction in acquisitions activity as the cost of the purchase increases, but it appears that this is not the case. This increase in the value of equity will apply to the bidding firms as much as the targets and, as with the size factor, the conditions may make it possible for acquisitions to take place in which the target firm is valued highly. It has been noted already that the merger wave that took place during the time period that this data set represents encouraged small firms to purchase larger ones and the same is also true of firms with low market values. If the funding conditions make it possible to raise the necessary finance, then this will provide an ideal opportunity for bidding companies to attempt to purchase highly valued targets, as appears to be the case here.

In the bust period result there is just one macro-economic variable, Macro4. This term is negatively linked to the probability that a firm will be an acquisition target and it is the only one of these terms that demonstrates a significant difference between the bidding and target firms in this period. The economic parts of this term refer to the level of industrial production and trade in the UK. It suggests that, as industrial production and employment go down, relative to the acquiring company's industry, the likelihood of a firm becoming an acquisition target increases. This implies that the

bidding firms are examining the performance of the industry as a whole before selecting a target for an acquisition attempt. If these factors decrease this may also have the effect of reducing the cost of the purchase. This could mean that a recession period is the best time for a bidding firm to attempt to enter new markets if the relative performance of those markets is low or to take advantage of low performance in its own industry to depress prices before attempting a horizontal acquisition. The hazard function results given here are not much better predictors than the logit models in this section. The boom period model can accurately place between seventy-five percent of the acquired firms and fifty percent of the bidding firms in the data sets whilst the bust period model correctly identifies eighty-three percent of the target companies and sixty-six percent of the bidding firms. In using this sample, however, the predictive results may be somewhat misleading. The models are estimated using the boom and bust period in the data and then tested over the remaining year of data. The CSO indicator series suggests that this year is part of an upwards movement in the economic cycle but the economy is nowhere near the heights that it reached during the boom period. As a result, the test period is not really suited to either of the estimation periods that are used here; it is definitely not a recession period but it is a far less buoyant period than any part of the boom period. Consequently, the predictions may reflect unfairly on the estimated logit and hazard function models.

The fundamental characteristics that distinguish the acquired firms from their acquiring counter-parts remain, broadly, unchanged from boom to bust period, according to these results. The target firms are generally less effectively managed companies with liquidity problems, but retaining the potential to perform far better in the future. The main difference between the boom and recession period results lie in the macro-economic variables that are important in these models. In the boom period the factors are concerned with funding opportunities which will enable opportunistic firms to enter the market for corporate control and select targets that might otherwise be immune from takeover attempts. In a recession, however, the emphasis shifts to productivity and the relative levels of industrial production. This means that there is a distinct difference in the nature of takeover activity at different times and that these changes are related to economic conditions.

Acquired and Non-involved Companies

The models in this section reflect the differences between the acquired companies and the firms that are not involved in acquisition activity during the sample period. The acquired firms are considerably over-sampled in these data sets and the resulting bias in the logit results will over-estimate the probability that a company will be acquired. Table 5.4, below, contains the results of these logit models.

In both of these models there is a single efficiency term. In both cases this term is positively linked to the probability that a firm will become the subject of an acquisition attempt. Once again, the logit models have produced a result that opposes the theories concerning the nature of acquisition targets. In the theory concerning these firms it is suggested that the target companies are less efficient than other firms and, as Scherer (1988) suggested, the acquisition serves to increase the overall level of efficiency in the market as well as in the individual company. There is also one profitability term in each of these models. In the boom result it is negatively linked to the probability that a firm becomes the target of an acquisition attempt. In contrast, the variable in the bust period has a positive sign. The negative term, here the return on capital employed, corresponds to the theory in the previous literature where it is suggested that purchased firms are less profitable than the average company in their industry. The positive sign on the profitability variable in the bust period result, the pre-tax profit margin, does not agree with this theory and is difficult to explain. The liquidity variables are another group of terms that have different signs depending on which period the models refer to. The bust period liquidity ratio is negative which corresponds to the notion that target companies are less liquid than non-involved firms. However, the boom period model includes a positive liquidity variable. This is contrary to the expected result for this type of variable but it is possible that these firms have excess liquidity. Available resources of this type could be utilised in the future by a more dynamic management, particularly in a boom period when many firms are actively seeking to expand their interests.

Table 5.4 Logit Model Results for Acquired and Non-involved Companies

Variable	Period	
	Boom	Bust
Turnover to assets employed	2.2* (2.89)	
Turnover to fixed assets		0.84*** (1.71)
Sales per employee		
Stock ratio		1.11 (1.62)
Return on capital employed	-4.54* (-3.2)	
Return on s'holders equity		
Pre-tax profit margin		8.01** (2.17)
Net profit margin		
Dividends per share		
Earnings per share		
Dividend yield		
P/e ratio		
Capital gearing		-0.17 (-1.48)
Current ratio		
Acid test ratio		-11.45* (-2.72)
Debtor days		
Creditor days	1.25 (1.43)	
Total sales		
Manager/employee ratio		
Total tax charge		
Macro1		
Macro2		
Macro3	1.78** (1.97)	
Macro4		
Macro5		1.52** (2.41)
Macro6		
Likelihood ratio test	22.17*	21.11*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 66 42	 66 50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

In these logit models there are just two macro-economic variables. Macro3 appears in the boom period model with a positive sign. The influence of the stock markets on acquisition activity is well-known, as much of the previous literature incorporates the notion that acquired firms should be under-valued. However, this result suggests quite the opposite. Nevertheless, this factor could be a reflection of the increased stock prices in the boom period. An increase in the value of equity could bring with it easier financial options for the firms which could make it possible for more companies to attempt the purchase of another firm. The term Macro5 appears in the bust period model and this variable also has a positive sign associated with it. It would be expected that this relationship would be negative as acquisition activity seems to follow a devaluation of Sterling on the foreign exchange markets, as was demonstrated in Chapter 2. The predictive abilities of these models, when adjusted to remove the sampling bias, are fairly poor. Both the boom and bust models can identify sixty-five percent of the acquired firms but, they are incapable of correctly placing more than forty or fifty percent of the companies that were not involved in the acquisition process. Thus, the overall performance of these models is rather poor.

Table 5.5 contains the hazard function results concerning the acquired firms and the companies that were not involved in acquisition activity once again contain more information than the equivalent logit results. The first terms that appear in these results are the efficiency variables. In both the boom and bust period models these terms are negatively linked to the probability that a firm will become the subject of an acquisition attempt. This result corresponds to the previous research on this topic in which it was stated that targets of takeover attempts are less effectively managed than other companies and under-perform relative to the industry average, see Lev (1992) and Berkovitch and Narayanan (1993). The same is also said of the profitability of the acquired firms in the previous literature. In the bust model, the profitability terms behave exactly as would be expected. Again, this can be linked to the notion that acquired firms are less effectively run than other companies which relates to the idea that acquisitions can increase the efficiency of both a single firm and the market as a whole, as Lev (1992) and Scherer (1988) suggested. However, in the boom period

model the profitability terms appear considerably less frequently and are positive which is contrary to the previous literature. This implies that the profitability of acquired firms is higher than that of companies that do not become involved in the acquisition process during the boom period. It is possible that acquisitions in periods of considerable economic prosperity diverge away from the results in the literature, as the purchasing companies take advantage of the buoyant economic conditions to fund the acquisition of companies that would be immune to acquisition attempts at other times; companies that are larger than average and that are not under-performing in the manner that would be expected. These takeovers have a higher cost but the funding opportunities that exist in a boom enable the bidding firms to raise the money .

The majority of the investment ratios are insignificant in these models. The only one that appears is the dividends per share term, which is positively related to the probability that a firm will become the subject of an acquisition attempt in both the boom and bust period results. This corresponds to the prevailing theories in the literature on the subject of acquisition activity. In these articles it is suggested that the target companies have the potential to perform far better in the future. This can also be linked to the idea that the incumbent managers are ineffective and, when these people are sacked, the new managers will institute a more dynamic investment strategy that will make far better use of the company's resources. The next group of variables in these results are the liquidity variables. The only terms that appear in these results are the long-term liquidity variables, the debtor days and the creditor days ratios. In the boom model the debtor days term is negatively linked to the probability that a company will become the target of a takeover attempt. This corresponds to the notion that the acquired firms are ineffectively managed and are in a relatively poor financial position. Conversely, the creditor days variable appears in the bust period model and it is positively related to the probability that a firm will be the subject of an acquisition attempt which is contrary to the recent research in this area. It is difficult to say why this result should have occurred at this point unless it is a reflection of a shift to less risky takeovers in a recession, which would represent a sensible response to the less profitable economic conditions.

Table 5.5 Hazard Function Model Results for Acquired and Non-involved Companies

Variable	Period	
	Boom	Bust
Turnover to assets employed		
Turnover to fixed assets	-0.79* (-2.61)	
Sales per employee		-0.03 (-1.23)
Stock ratio		
Return on capital employed	3.01* (3.21)	-1.43** (-2.22)
Return on s'holders equity		-1.14 (-1.32)
Pre-tax profit margin		
Net profit margin		-2.78 (-1.41)
Dividends per share	0.16 (1.11)	0.39 (1.51)
Earnings per share		
Dividend yield		
P e ratio		
Capital gearing		
Current ratio		
Acid test ratio		
Debtor days	-1.44* (-3.16)	
Creditor days		4.9** (2.14)
Total sales		
Manager employee ratio	0.06* (3.12)	
Total tax charge		
Macro1	-1.32* (-2.99)	
Macro2	1.19 (1.28)	
Macro3	-0.89 (-1.13)	0.53 (1.11)
Macro4		
Macro5		-0.68*** (-1.78)
Macro6		
Likelihood ratio test	26.09*	19**
Predictive Accuracy (%). Acquired Non-Involved Firms	75 66	70 54
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

The ratio of managers to employees appears in the boom period model where it is positively linked to the acquisition probability. This suggests that the acquired firms are ineffectively managed as they have a greater ratio of managers to employees than the non-involved companies. If a firm has a large number of managers it is probable that some of them are unnecessary and the firm is unlikely to derive any benefit from their presence. This finding supports the inferences made about the efficiency variables that appear earlier in this model.

The first two macro-economic variables only appear in the boom period model. The first of these, Macro1, is negatively linked to the probability that a firm will become the target of an acquisition attempt, whilst the second variable is positively related to the same factor. The same comments about *Macro1 apply here as in the* previous section when this term appeared in the models involving the acquired and acquiring companies. In brief, the factors that constitute this variable can alter the value of funds held by the company under consideration. This alteration then has an impact on the potential that the firm has to invest in the future. There is a negative relationship between this and the probability that a company will be acquired in the near future. This suggests that the potential that a company has for investing in new projects after it has been acquired is of considerable importance and so any external factors that can reduce this potential will also reduce the probability that the firm will become a takeover target. The same is true of the term Macro2. This variable involves the term structure of interest rates and the money supply M0. If the supply of money is increasing, for example, firms may find that they have more available to invest in new projects including the purchase of another firm.

The term Macro3 appears in both the hazard function results in this section. In the boom period model it is negatively linked to the probability that a company will be acquired, whilst it is positively related to this probability in the bust period estimations. This term involves the return on both the FT-All share index and Standard and Poor's American index of the top 500 companies. The negative result in the first instance is surprising given the fact that the stock market is particularly buoyant during a boom. A lower stock price would reduce the cost of an acquisition and it may transpire that

the acquired firms may be under-valued compared to the companies that are not involved in the takeover process as previous research suggests. The positive sign for the bust period is also unexpected. An increase in the value of equity will make the acquisition more expensive but a more expensive company may be in a more stable financial position which could suggest that bust period acquisitions are designed in a more conservative manner than the boom period takeovers. The last term in these results appears in the bust period result. The variable Macro5 represents an amalgamation of terms that reflect the condition of the foreign exchange market and the conditions of international trade. In a recession it is not unreasonable for these terms to alter in such a manner as to make the prospect of foreign investment unappealing. If this is the case, then companies may elect to attempt an acquisition in the UK instead of investing in an international project. There are no references to these types of factors in the previous research, but in Chapter 2 the foreign exchange terms were consistently negatively related to acquisition activity in the same way as this variable is inversely linked to the probability that a company will become the target of an acquisition attempt. As with the equivalent logit models these hazard function results are capable of identifying the majority of the acquired firms, seventy-five percent with the boom period model and seventy percent with the recession result, but perform poorly on the non-involved companies. The best prediction for the non-involved companies is only correct in sixty-six percent of cases.

Once again these results imply that the basic characteristics of firms that become the targets of acquisition activity are unchanged across the boom and recession periods. As before, the targets are relatively inefficient, but possess the potential to perform better in the future. This can be directly linked to the inefficient managers motive for acquisition activity. The main differences between the boom and bust results are linked to the macro-economic factors. In the boom period the factors are all concerned with the funding aspects of investment suggesting that these factors can drive takeovers when there are beneficial financing options. In contrast, the bust period models are more concerned with the maintenance of markets and trade conditions. This could reflect a preoccupation with protecting the firm from poor economic conditions rather than aggressive investment strategies.

Acquiring and Non-involved Companies

The results in this section are based on modelling the acquired firms against companies that did not take part in takeovers during the years from 1987 to 1994. In these data sets the acquiring firms are deliberately over-sampled and this will create the bias in the logit models. The table below, Table 5.6, contains the logit model estimations for the acquiring and non-involved companies.

The first term that appears in these logit model results is a profitability variable that is negatively linked to the probability that a company will become a bidder in an acquisition attempt during the boom period. This suggests that acquiring firms are less profitable than the average firm that is not involved in acquisition activity. This is contrary to the theory concerning the characteristics of an acquiring company which is thought to be more profitable than other firms. Lev (1992) and Berkovitch and Narayanan (1993) both found that this was the case and it is difficult to see how an unprofitable firm could afford to attempt a takeover. The same is true for the dividend yield term which appears in the bust period results. Bidding firms need to be in a sound financial position if they are to attempt new investments, including the purchase of another firm. As a result these terms should be positively linked to the probability that a company will become the bidder in an acquisition, but in these results the investment term is negatively related to this likelihood which is inexplicable.

Table 5.6 Logit Model Results for Acquiring and Non-involved Companies

Variable	Period	
	Boom	Bust
Turnover to assets employed		
Turnover to fixed assets		
Sales per employee		
Stock ratio		
Return on capital employed		
Return on s'holders equity		
Pre-tax profit margin		
Net profit margin	-1.03 (-1.61)	
Dividends per share		
Earnings per share		
Dividend yield		-1.01 (-1.37)
P/e ratio		
Capital gearing		
Current ratio	-4.4** (-2.32)	-7.04*** (-1.9)
Acid test ratio		
Debtor days	2.03** (2.02)	
Creditor days		5.32*** (1.91)
Total sales		-
Manager/employee ratio	-0.37* (-2.66)	-1.03** (-2.52)
Total tax charge		
Macro1		
Macro2		
Macro3	3.68** (2.12)	
Macro4		
Macro5		
Macro6		2.16 (1.54)
Likelihood ratio test	24.58*	37.55*
Predictive Accuracy (%). Acquiring Firms Non-Involved Firms	66 51	42 25
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

The first terms that appear in both of these models refer to the liquidity of the firms. Once again, the short term liquidity variables in these logit model results are contrary to the theories in the literature. Although, liquidity is not specifically mentioned in any of these papers, it is associated with the financial stability of the firms. Consequently, it is expected that the liquidity of these firms would be better than the non-involved firms. The values of the debtor and creditor days variables in these models are positively linked to the probability that a firm will become the purchaser in an acquisition, which is the result that would be expected. The last accountancy term in these results is the ratio of managers to employees which appears negatively in both the boom and bust period results. A low number of managers could be indicative of higher efficiency which would correspond to the idea that acquiring companies are more effectively managed than other firms. This could be linked to the managerial ambition motive for acquisitions where the managers of an efficient and profitable company are seeking to use a takeover to increase their own standing by increasing the size of their firm.

The last term in the boom period model is the variable Macro3. This is positively linked to the probability that a firm will become the purchaser in an acquisition. This term represents the influence that the stock markets, both in the UK and in America, can have on acquisitions. In the boom period there is an increase in the value of most shares. This will also increase the value of the bidding firms and, as Scherer (1988) suggested, the stock market can create bidders by increasing the value of certain firms beyond their true worth making it possible for them to fund an acquisition. The last term in the bust model is Macro6. This links the level of business confidence to the probability that a firm will become a bidder in the future. When confidence is high, firms will invest more and may select riskier projects. This can be directly linked to the probability that a firm will acquire and can be related to the ambitious managers motive. The bidding companies can be correctly identified sixty-six percent of the time using the boom period model but only forty-two percent of the time using the recession results. In comparison the non-involved companies are placed in the right groups between fifty-one and twenty-five percent of the time. The hazard function results for the same data sets can be seen in the table below.

Table 5.7 Hazard Function Results for Acquiring and Non-involved Companies

Variable	Period	
	Boom	Bust
Turnover to assets employed		
Turnover to fixed assets		
Sales per employee		-0.77 (-1.26)
Stock ratio		0.22 (1.51)
Return on capital employed		
Return on s'holders equity		0.73 (1.4)
Pre-tax profit margin		
Net profit margin		
Dividends per share	0.16 (1.4)	0.89* (2.65)
Earnings per share		-0.17 (-1.65)
Dividend yield		
P/e ratio		
Capital gearing		
Current ratio		1.89** (2.37)
Acid test ratio		
Debtor days		
Creditor days	-0.42 (-1.51)	
Total sales		
Manager employee ratio	0.21* (2.71)	0.79* (2.76)
Total tax charge		
Macro1		
Macro2	1.9* (3.17)	
Macro3	-1.18** (-2.24)	-1.71** (-2.13)
Macro4		-0.02* (-2.96)
Macro5		
Macro6		-0.45 (-1.3)
Likelihood ratio test	30.74*	46.97*
Predictive Accuracy (%). Acquiring Firms Non-Involved Firms	 75 83	 75 66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

The last table of empirical results in this chapter contains two very different models. The efficiency variables are not significant in the boom period model, although they do appear in the bust model. Here the terms are both positive and negative, but a consistent inference can still be drawn. The term that refers to the turnover of these firms suggests that acquired firms have lower turnover than average, suggesting that the firms are producing more than they can sell when compared to firms that do not become involved in acquisitions. The same impression is created by the presence of a positive stock ratio variable. It may transpire that these bidding firms have reached a position where they cannot continue to expand and grow in their current areas of interest and are attempting to acquire another firm in order to expand their sales and enter new markets. This is consistent with the notion that some acquisitions are prompted by the desire to increase market share or to enter new markets, as Hughes (1993) suggested. It is also possible that these firms cannot remove these inefficiencies without restructuring themselves in some manner. Another possible motive for acquisition activity is the restructuring motive, which states that a firm may be in a position where it needs to alter itself radically to continue making a profit. The fastest way that a firm can change itself is to purchase another company that occupies a complementary position. The combination of these two firms should have the desired structure. The idea that the acquirers may need to find a new market or product is enhanced by the presence of a positive profitability variable in the same bust period model. This variable corresponds more closely with the type of feature that is held to denote an acquiring company in the recent literature. Bidding firms have higher than average profitability which enables them to fund the takeover with minimum recourse to one of the commercial lenders. This also corresponds with the notion that the bidding companies are capable of performing far better than the average firm in their industry.

The investment ratios provide additional support for this idea. This is the first time that there is a term in the boom period result. In both results the investment terms are positively linked to the probability that a company will become a bidder in a future acquisition. This factor can be linked, as the profitability term was, to the ability that a company has to fund the purchase without having to borrow the money. If the

acquisition can be funded internally this creates a better impression and reflects positively on both the managers and the firm as a whole. This could be linked to both the managerial ambition motive for acquisition activity and the idea that the managers are seeking to purchase another firm in order to increase their own standing and financial reward.

The next group of variables refers to the liquidity of the acquiring companies. In the boom period results this term is negatively linked to the likelihood that a firm will become an acquirer, whilst the converse appears to be true in the bust period estimations. The fact that the bidding firms are illiquid in the boom period could be another reference to the restructuring motive for takeovers and may reflect the fact that the bidders cannot alter their financial structure effectively without buying another company. The positive sign in the bust result is yet another reference to the idea that there are more ways of raising finance in a boom than in a bust period. In times of recession, it is far more likely that the bidding company will fund the purchase from its reserves or by retaining dividends. In the recession this may be the only way that the required funds can be raised, which results in the fact that the only companies that can afford to attempt an acquisition are those firms that are in a sound financial position and do not need to borrow the funds for this investment. Again this corresponds to the ideas of Lev (1992) and Jensen (1988, 1992) who stated that acquiring companies occupy a sound financial position and have more available funds for investment than their contemporaries who do not become involved in acquisition activity.

The last of the accounting terms is the ratio of managers to employees in the bidding companies. In both the boom and bust period models this term is significant and positively related to the probability that a company will become an acquirer in the future. This suggests that the bidding firms have a high probability of diversifying, as Lecraw (1984) suggested. If a company has a relatively high number of managers compared to the total number of employees then, Lecraw claimed, the managers will be under-employed and will want the firm to diversify in order to provide them with more to do, thus justifying their positions. One of the motives for acquisition activity

is the desire to expand and diversify the interests of the purchasing company and it is easy to see how these two factors could be related.

The remaining variables in these results are all concerned with the macro-economic factors. The first of these terms is the variable Macro2 which appears in the boom model. This term represents the money supply and the term structure of interest rates which can have an impact on the level of liquidity of a firm. The positive relationship that appears in this result implies that the probability of a firm attempting an acquisition increases as the value of this term rises. This may be related to the availability of funds for new investments, including the purchase of another company. The term Macro3 appears in both of these results and in both cases it is negatively related to the probability that a company will attempt an acquisition. Macro3 represents the influence of the return on the national and international stock markets on the probability that a firm will attempt a takeover. The negative link suggests that, when this item increases in value, the probability that a firm will attempt a takeover decreases. If the value of equity decreases, this may make the proposed acquisition a more affordable prospect. Lev (1992) and several other authors suggest that bidding firms will look for under-valued targets when selecting a company to purchase and so a general decrease in the value of equity could be related to this factor, although this is unexpected in a boom period.

The remaining two terms appear in the bust period model but neither of these appear in the boom result. Macro4 represents the level of industrial productivity whilst Macro6 is created by combining the level of business confidence and the number of house-building starts. Both of these terms are negatively related to the probability that a company will become a bidding firm in a bust period. These two terms could both be representative of similar factors in the determinants of acquisition activity. If the level of industrial production is reduced and business confidence is low then both of these factors are likely to have an impact on the future prosperity of companies. It is possible that the bidding firms decide to diversify into new markets in order to maintain a greater spread of business interests and reduce the impact that a single industry can have on their profitability. The fastest way that this could be done is

through an acquisition and so the link between these factors and the likelihood of a firm becoming the bidder in an acquisition is clear. Furthermore, this result corresponds with the previous findings which support the notion that bidding firms may be seeking a way to maintain their profitability through diversification and expansion. The predictive abilities of these models are a little better than the equivalent logit models. Both the boom and bust models can correctly identify the acquiring companies in the test sample seventy-five percent of the time. The non-involved companies are also correctly placed in between eighty-three and sixty-six percent of cases. The overall predictive abilities of the hazard models are better than the equivalent logit results. Nevertheless, the test sample is rather unsuited to either of the two data sets that are involved in the creation of the models which, doubtless, has the effect of making both the logit and hazard function models appear less effective than they really are.

The results created here display more variation between the boom and recession periods that the models in either of the earlier groups. Nevertheless, the fundamental characteristics remain consistent; acquiring companies are firms with available funds to invest in new projects and with a high probability of diversifying into new markets and areas. As in the earlier sections, the macro-economic terms are split between the funding terms, which appear in the boom results, and the industrial terms that are significant in the recession period models. The impression that these terms create is that potential bidding firms take advantage of the increased funding options that exist in a boom and use these factors to pay for the acquisitions which can be linked to the managerial ambition motive for takeovers. In the bust period, however, the acquiring firms are far more concerned with maintaining a secure position and diversifying to reduce risk and spread their product base. This links these findings to the diversification and restructuring motives as well as the managerial ambition motive for takeover activity.

Conclusion

This chapter had two distinct, although not unrelated, objectives. The first of these was to determine whether there are differences between the types of companies that are involved in takeovers in boom and recession periods. The second objective was to add macro-economic factors into the models to determine if these conditions can enhance the information that is revealed by the modelling procedures. There are difficulties in adding macro-economic variables into these models as it is essential that the terms relating to each of the groups of firms lie in distinct bands. This makes it impossible to add the macro-economic principal components to the data sets without combining them with accounting terms to ensure that this criterion is satisfied. The selection of the accounting terms is, doubtless, a controversial issue and there are no precedents in previous research that can be applied directly to this issue. More detailed investigation of these options would be an area for further research. Nevertheless, the results in this chapter are informative and the macro-economic variables appear as important factors in all of the results.

The logit and hazard function models given here often look quite different. The results included in this chapter, as in Chapter 4 are very stringent results and involve only those variables that are significant. Nevertheless, the results are consistent in the more general forms of the models. In the second appendix this point is explained and an example given. The first point that becomes apparent about these results is that the basic characteristics of acquired and acquiring firms remain the same irrespective of the economic conditions. The target companies are inefficiently run compared to the bidding firms and the companies that do not take part in takeovers. They are also generally illiquid, but possess the potential to invest heavily in the future if new projects and opportunities can be identified. All of these factors appear in the previous literature concerning the characteristics of acquired firms. Furthermore, these findings imply that the managerial inefficiency motive may be important in driving acquisition activity. Equally, the accounting terms in the models of the bidding firms create a familiar picture. These companies are more profitable than other firms, they have considerable funds available for investment and demonstrate a high probability of

diversifying via the purchase of another company. These models can be directly linked to the managerial ambition motive, the diversification motive and the company restructuring motive for acquisitions.

The new information in these results comes from the macro-economic variables. These fall into two groups depending on the period that the models refers to. In the boom period the important terms refer to the value of equity and other factors that can alter the value of money. This suggest that takeovers which take place in a boom period are of a more opportunistic nature than acquisitions that happen at other times. This is probably due to the wider variety of funding options that become available during a boom and, consequently, it is possible for companies to attempt acquisitions which they could not afford at a different time. Equally, these conditions make it possible for bidding companies to select targets that are larger, perhaps, or more profitable and the funding possibilities make it possible for acquirers to purchase these firms that they could not afford under other circumstances.

The macro-economic variables that are important in the bust period results are all connected with production, sales and business confidence. These terms seem to suggest that the acquiring firms, in a recession, use takeovers as a means of preserving their situation and diversifying into new areas as a method of reducing risk and developing new markets. It appears that the acquiring firms are selecting relatively low risk targets during this period. This could be another reference to the acquiring firms' desire to maintain their current strong position by purchasing a firm in good condition rather than a struggling and inefficient company as the literature would suggest. These results imply that the addition of macro-economic variables can add to the level of information that is revealed in the logit and hazard function model results. Furthermore, it is clear that there are some differences between firms that enter the market for corporate control during different phases of the economic cycle.

Chapter 6. The Benefits of Acquisition Activity

Introduction

This chapter is concerned with the benefits that are generated by the acquisition process. There must be significant benefits for the acquiring company in the purchase of another firm or there would be no point in attempting a takeover. It is generally believed that the gains in acquisitions are split between the managers of the acquiring company and the shareholders of the target firm. The shareholders of the acquiring firm and the managers of the target company are not thought to benefit and may even suffer in the aftermath of a takeover. This chapter is concerned with the impact that a takeover has on the share prices of the involved companies and, specifically, on the value of returns in those shares. Alterations on the returns on a share represent the benefits that accrue to the shareholders of that firm and by examining the changes created by a takeover should make it possible to determine whether an acquisition can benefit the owners of either of the involved firms.

This is important in this thesis for three reasons. Firstly, it is an area where there has been a lot of research in the past and to ignore it would be inappropriate and would leave this thesis incomplete. Secondly, this chapter, and the event study methodology that it incorporates, complete the progression of methodologies that runs throughout the empirical work. In the first empirical chapter, Chapter 2, time series methodologies were used to examine the behaviour of the acquisition market and to analyse its behaviour with respect to the economic conditions in the preceding months. The majority of the empirical work in this thesis comes in the analysis of the individual firms that take part in takeovers and here there is a clear progression in the types of methodologies that are used from cross-sectional approaches through cross-sectional models that incorporate information about time to time series . This begins in Chapter 4 where the approach in both the logit and hazard function models is cross-sectional. Chapter 5 augments the results of Chapter 4 with information from the findings of Chapter 2 and the involvement of macro-economic factors adds an element of time into

the estimations. Continuing this progression leads to the time series methodologies applied here. These event studies complete this examination of the individual companies that take part in takeovers and finally uses purely time-series techniques to examine the impact that takeovers can have on the share prices of the involved firms.

The third reason is, perhaps, the most important of all. This analysis of the benefits created by the takeover process offers empirical support for the results of the previous two chapters by clarifying exactly who benefits and to what extent. This will add further support to the motives that were identified in Chapters 4 and 5. In particular, it will examine the role played by managerial ambition in the takeover process. In Chapters 4 and 5 the results continuously suggested that the target firms were poorly managed companies that were purchased because the managers of the bidding companies wished to expand their sphere of influence and increase their own prestige. In principle, however, the managers of the bidding firm should be aiming to maximise the value of their shareholders investment and it is unusual for a risky project, such as the purchase of another firm, to be in the shareholders interests. The agency issue that arises as a result of this divergence of priorities is well documented in previous literature and is discussed in section 1.4.2 of Chapter 1. It is not possible to analyse the impact that a takeover has on the managers of the bidding company directly as most managers are very unwilling to make public the details of their compensation packages but it is possible to determine whether an acquisition is in their benefit or in the interests of the firm by examining the reaction of the market to the announcement of a takeover. If the market reacts adversely, then it is reasonable to assume that the acquisition is not in the best interests of the shareholders and to determine that the purchase is motivated by managerial ambition. Alternatively, if the takeover is a natural next step for the purchasing company then the stock market should appreciate this fact and will react positively to the news. It is possible, however, that the stock market will react erroneously to the announcement of a takeover bid in some cases but even partial market efficiency should ensure that the reaction is correct in the majority of cases. The empirical analysis here will confirm whether this motive is as influential as it appeared to be in the results of the previous

two chapters and will offer empirical support for this motive in recent acquisition activity.

The recent articles concerning the benefits of acquisition activity tend to consider the gains that accrue to the shareholders by examining the share prices. Franks and Harris (1993) studied the impact of acquisitions on shareholders in the UK in referred acquisitions whilst Bradley, Desai and Kim (1988) did the same for the USA. Nearly all of the papers on this subject employ the market model to estimate the risk adjusted return on a company's share price. This technique, in the most simple form, can produce erroneous results as it fails to account for any fundamental alterations in the level of risk that a company is subject to.

An additional omission from the previous work in this area is that there does not appear to be any comparison between the gains received by the firms that are involved in the acquisition process and the returns that companies of a similar size who are not involved in takeovers are receiving at the same time. This oversight means that the picture of acquisition benefits given in these articles is incomplete.

There are two distinct innovations in this chapter compared to the previous work in this area. In the first instance the market model will be used to estimate the benefits created by the acquisitions that were examined in the previous chapters. This provides a benchmark against which other results can be examined. The first innovation takes place when the estimations of the benefits created by the takeovers are recalculated using an extension of the market model. This time the market model will be estimated using a GARCH models to create a time varying coefficient which should improve the accuracy of the results as this will enable the model to account for variations in the level of risk that each company is subject to. Ferson, Kandel and Stambaugh (1987) used time-varying coefficients in the calculation of asset prices because, as the authors claim, there is evidence to suggest that the level of risk that a company is subject to can alter with time. The possibility that such a change will take place must be included in estimations of asset values with necessitates the estimation of a risk adjusted return. The next innovation is the comparison of the estimation of the

returns that are generated by the involved firms with the returns on the firms in the control samples. This will give a more complete picture of the effect that acquisition activity has on the firms that are involved as it will provide a contrast with the performance of other firms of a similar size.

The rest of this chapter is organised as follows. Section 6.1 reviews the theories and evidence in the recent articles. Section 6.2 deals with the methodology, data and empirical results. Finally, there is the conclusion.

6.1 Theories and Evidence

The literature concerning the benefits of acquisition activity is extensive although there are surprisingly few different methodologies employed in the empirical work. The literature considers the impact of acquisition activity on the managers of the involved firms, the shareholders of these companies and the market as a whole. The benefits of acquisition activity for each of these groups is quite different and is best dealt with in separate sections.

6.1.1 Benefits to Managers Resulting from Acquisition Activity

Benefits to the Managers of the Acquiring Companies

The managers of the bidding firm are believed to benefit greatly from the successful purchase of another company. Firstly, there is greater prestige attributed to managing a large company, rather than a small one, and the size of the firm is often linked to the remuneration that the managerial team receive. This provides an incentive for acquisition activity that could have considerable appeal for managerial teams seeking to expand their sphere of influence. The purchase of another firm is the fastest way that a company can restructure itself although it is not without risk. This could mean entering new markets or geographical areas or diversifying to reduce the risk faced by the firm. This could result in a profitable and secure future for the acquiring firm which would, again, benefit the managers of that firm. The evidence

concerning the benefits of acquisition activity for the managers of the acquiring company in the previous articles on this subject is mostly anecdotal. This is probably because the managers are unwilling to reveal the details of their remuneration packages and, without a change in the law, there is no way to gather data on managerial salaries in the UK.

Benefits to the Managers of the Acquired Companies

The benefits to the managers of the acquired firms in the recent research is also often anecdotal. Previous articles, such as Lev (1992) and Agrawal and Walkling (1994), suggest that there are no gains to these individuals in an acquisition as they are often dismissed after the completion of the deal. In many cases this happens because it is no longer necessary to retain two sets of managers when there is only, in very broad terms, one company. This is certainly true in a horizontal acquisition where both of the involved firms are in the same industry and this could also be true in a vertical takeover where the managers of the acquiring firm are at least familiar with the general industrial area in which the target firm operates if not with the precise market area. In a conglomerate takeover, however, it is quite likely that the managers of the bidding firm will have little or no knowledge of the field in which the target operates and so it is possible that some of the target managers may be retained. In the event that the target's managers are fired then the future for these individuals is rather bleak. Recent research suggested that it is also difficult for them to find new positions after loosing their jobs in these circumstances. Agrawal and Walkling (1994) examined the impact of takeovers on the careers of chief executive officers (CEO's) using UK data. These authors found that fifty-five percent of the CEO's in their sample were sacked after the successful acquisition of their company. In addition to this, sixty-five percent of these CEO's were still unemployed twelve months after the deal had taken place. The findings of this article clearly demonstrated that there are no benefits to the managers of a company that is taken over. There is, however, one exception to this rule which occurs when the managers have golden parachutes.

A golden parachute is a compensation contract that provides the managers with financial security whilst they seek another position, in the event that they are sacked. As a result the managers should be prepared to relinquish control of the company if a good offer is made by another firm, which would maximise the shareholders wealth. Regrettably, such a contract is difficult to set up correctly and often fails to work properly. There are two potential problems with these contracts depending on how much the managers will receive if they leave the firm. If the contracts are not generous enough, in the opinion of the managers, they will still fight to retain control of the company in a takeover attempt irrespective of whether the deal is in the interests of the owners or not. Alternatively, a very generous golden parachute may induce the managers to actively seek a purchaser for their firm, irrespective of whether the purchaser is the right company to gain control of the target, so that they can realise the value of their compensation contract. The use of a golden parachute is just about the only way that the managers of the target company can benefit from the takeover of their firm, which explains the current popularity of this type of contract with the managers of many companies.

6.1.2 Benefits to Shareholders Resulting from Acquisition Activity

Benefits to the Shareholders of the Acquiring Companies

The evidence considering the benefits to the shareholders of acquiring firms is mixed depending on whether the firms are examined in the long or the short term. When the long term impact of an acquisition is considered, it is quite likely that the shareholders of the bidding company will benefit from the increased size of their firm which could be reflected in higher share prices. An alternative source of benefits exists if the acquiring firm used the acquisition to engage in some important form of restructuring that makes its future more secure. Unfortunately, it is very difficult to examine the long term effects of an acquisition empirically as this would require the prediction of how the acquiring firm would have behaved, in the event that the takeover bid had not been made, for a long period of time.

In the articles considering the short term effects of an acquisition, for example Lev (1992) and Dodd (1992), there is a theory that states that the shareholders of the acquiring companies will not benefit as the share price of this firm drops by a significant amount when the bid is announced and remains low for some time after the completion of the takeover. This reduces the value of the shareholder's investment which is clearly not to their advantage. The empirical evidence on this subject, however, is inconclusive. A typical paper that considers the benefits to the shareholders of acquiring companies was by Jarrell, Brickley and Netter (1988) in which the authors considered six hundred and sixty-three acquisitions in America between 1962 and 1985. The results of their investigation are typically inconclusive. In the earlier years the bidding firms experience positive excess returns but in the 1980's these abnormal returns become negative in line with the theory discussed above. Another inconclusive result can be found in the paper by Jensen and Ruback (1985) in which the authors concluded that the owners of the purchasing firms do not loose in the acquisition process although there are no significant benefits to these people either. In some other papers it is suggested that the nature of the bid offer, whether it is cash, stock or a mixture of the two, could have an impact on the benefits to the acquiring firms and their shareholders. There is still relatively little empirical work concerning the acquiring firms, however, when compared to the quantity of empirical analysis that exists concerning the impact of an acquisition on the shareholders of the acquired companies.

Benefits to the Shareholders of the Acquired Companies

The shareholders of the target company benefit from the acquisition of their firm if they sell their shares during the bid. If they do not sell in the acquisition then it is debatable whether they will benefit from the takeover. Although the value of their shares may increase these individuals have not realised that profit as they are still in possession of the stock which could decrease in value in the future. It is also possible that the new owners of the firm will decide to make a compulsory re-purchase of the outstanding shares and, in these circumstances, the new owners can decide how much they will pay irrespective of the market value of the stock at that time. This process is

known as greenmail and can result in the shareholders receiving far less than their shares are worth. If the new owners of the firm plan to do this they will often make their original acquisition bid two-tiered. A two-tiered offer states that the acquiring company will pay one price for the shares in the course of the acquisition and plans to instigate a compulsory re-purchase of the remaining stock after completing the deal. At this time the purchase price will be significantly reduced and under these circumstances there is little or no benefit to the shareholders of the target firm if they retain ownership of their shares after the acquisition.

In the event that the shareholders sell their stock in the acquisition then they will benefit from the purchase of their company. The benefits are created by an increase in the value of their shares which results from two factors. Firstly it is usual for the shares of a target company to increase considerably in value when the takeover is announced or even when the acquisition is rumoured to be imminent. Secondly, most purchase offers incorporate a premium, in excess of the price of the stock, as an incentive for the shareholders to sell and the combination of these two values makes an acquisition beneficial for the shareholders of the target company. This increases the value of the shareholder's investment irrespective of whether or not the stock is accurately valued at that time. Consequently, it is very difficult for the shareholders of the target firm not to benefit from the purchase of their company if they sell when the purchase offer is made. There has been a considerable amount of empirical work concerning the gains to target shareholders in an acquisition. A typical paper was by Bradley, Desai and Kim (1988) who estimated the cumulative abnormal returns made by targets in over two hundred acquisitions in the USA between 1963 and 1984. The authors concluded that there were very large positive increases in the value of the target stock and, consequently, that the shareholders of these firms benefited greatly from the purchase of their company. A more recent paper was by Limmack (1994) who examined the same phenomena for UK companies. Limmack found cumulative abnormal returns of up to fifty-one percent for the target companies which again suggests that there are considerable benefits to the shareholders of these firms in an acquisition.

6.1.3 Benefits to the Market Resulting from Acquisition Activity

One of the most frequently mentioned motives for acquisition activity is the removal of inefficient management from the target firm and, as Agrawal and Walkling (1994) discovered, it is quite probable that the managers of an acquired firm will be sacked after the takeover. According to Scherer (1988) this particular consequence of acquisition activity should serve to increase the overall level of efficiency in the market. He argued that, in a totally efficient market, any firms that were not performing to the utmost of their abilities and any managerial teams that were ineffective would be eliminated by the market reaction to this information. Since this does not happen the acquisition market is necessary to correct for this failure. However, Scherer's argument is only true if the original managers really are inefficient which discounts a wide variety of other reasons for acquisition activity that may have absolutely nothing to do with the effectiveness of the managers. The impact of acquisition activity on market efficiency cannot be tested, however, and empirical analysis of the benefits that result from takeovers is limited to the individuals who take part in acquisition activity.

6.2 Methodology and Empirical Results

In the introduction to this chapter it was stated that two different ways of calculating the results will be used. The examination of the benefits that are received by the shareholders centres on the calculation of cumulative abnormal returns (CAR's). The first methodology is the use of the market model to estimate the behaviour of the share prices which is a very popular technique in articles on benefits such as Franks and Harris (1993). The second methodology represents a theoretical improvement on the market model methodology. Here the market model is improved by extending it to reflect changing levels of volatility in the share price which could bias the estimations if left unaccounted for. Section 6.2.1 describes these techniques.

6.2.1 Methodology

Abnormal Returns

Abnormal returns are used as a measure of the change in the return on a share that results from some specific event. In this case the event is an acquisition. The abnormal return is calculated by subtracting the expected value of that share from the actual value, as in equation 6.1.

$$AR_{it} = R_{it} - E(R_{it}) \qquad (6.1)$$

where
AR_{it} is the value of the abnormal return experienced by firm i in time period t as the result of some event
$E(R_{it})$ is the expected value of the returns for firm i at time t, as will be calculated empirically using two forms of the market model
R_{it} is the actual returns on shares in firm i at time t

This equation represents the abnormal return experienced by a particular firm in a single time period. It is usual to consider the impact of an acquisition over several time periods and to estimate the cumulative abnormal return for each of the firms in question. The average abnormal return is calculated by summing together the individual abnormal returns within the sample period that is being used and dividing them by the length of that sample period. Equation 6.2 represents the calculation of the average abnormal return for a single company.

$$\bar{AR}_i = \sum_{t=1}^{n} \frac{AR_i}{n} \qquad (6.2)$$

where the total impact of the takeover is considered over a period of n time periods.

This value represents the total difference between the actual and expected values of a share over a certain time period, or event window. If there is a significant difference then it is possible to say that an acquisition generates excessive returns, either positive or negative, for the companies in the data sets and consequently the

benefits or losses that the takeover generates can be evaluated. There are many different ways that the expected value of the shares can be calculated. In this chapter the market model will be used in two different ways.

The Market Model

In most of the articles concerning the benefits of acquisition activity the market model is used to estimate the value of a company's beta. The market model can be represented in the form of equation 6.3, below.

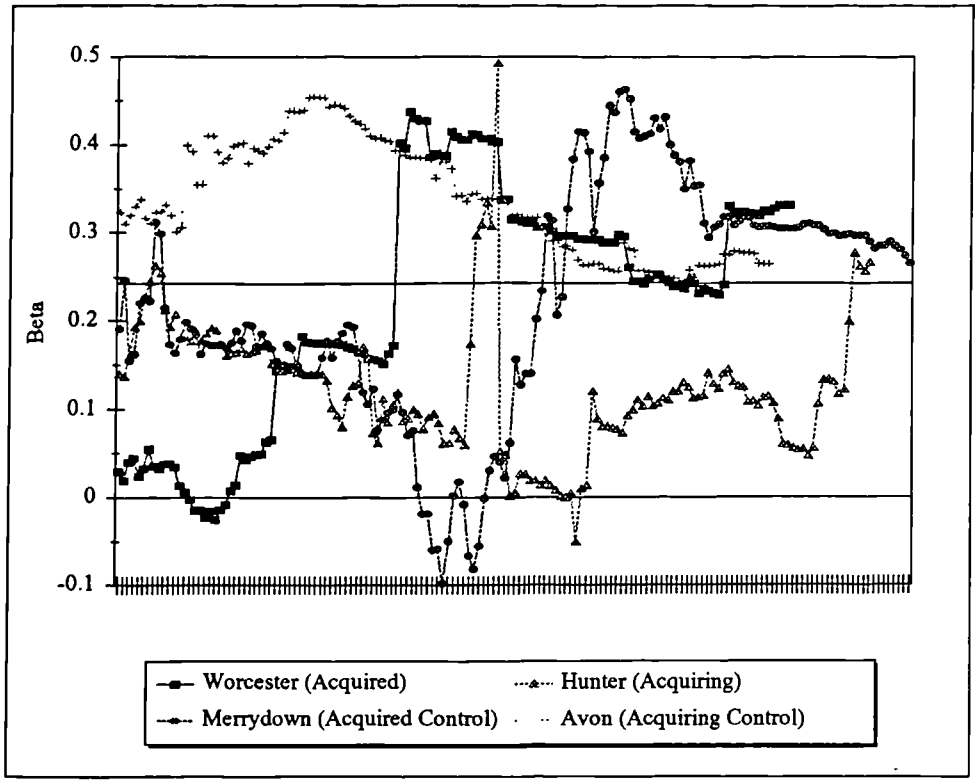
$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad (6.3)$$

where
β_i is a scalar that represents the degree of reaction in the firm share price generated by an alteration in the return on the market,
R_{mt} represents the return on the market as a whole, which is represented here by the returns on the FTA index and
α_i is a constant

The market model in its original form incorporates a constant coefficient. This means that the model is incapable of incorporating information about the relative volatility of the firm and the market returns. It is possible that the riskiness of the asset may change fundamentally at some point, owing to alterations in external conditions. Previous papers such as Ferson, Kandel and Stambaugh (1987) and Mark (1988) incorporated time varying betas in their estimations of asset prices for exactly this reason. It is also possible to identify time variance in the betas for the firms in the data sets that will be used here. For this demonstration a small number of firms were randomly selected from the data sets that will be used in this chapter. The results given here are for one of the targets, one of the bidders and one firm from each of the control samples. There is no link between these firms and they were not involved in the same takeovers. A simple demonstration of the time variance in the beta values involves estimating the market model using recursive regression. It is clear that none of the beta values resulting from these estimations are constant over time as Figure 6.1, below, shows. Furthermore, a Chow test confirms that these value are not constant

over time. The Chow test examines the stability of regression coefficients under the null hypothesis that there is no change with time and assuming that the variances of the data series are equivalent. For all of the firms tested here the Chow test is rejected at the 95% level implying that the values of beta alter with time.

Figure 6.1 Recursive Regression Beta Values



Since the value of beta alters with time the estimates produced using the market model may be improved by using a time varying version of this coefficient. This could be done using the recursive regression technique that produced the terms shown in Figure 6.1 but this methodology assumes that the residuals have a constant variance and a mean of zero as discussed by Brown, Durbin and Evans (1975). This assumption may not hold for the firms in these data sets which would reduce the accuracy of the estimations. Instead a GARCH model can be used to estimate the time-varying coefficient for the market index. This approach is preferable to the simple form of the market model as it will account for any fundamental alterations in the riskiness of a company's share price which may create an error in the more usual estimations of the market model. The GARCH model was devised following the work of Engle (1982).

GARCH models are an extension of the ARCH process (autoregressive conditional heteroscedasticity). Arch models are used to solve one of the most persistent problems of non-linear modelling; namely that the residuals rarely have a constant covariance matrix. If this matrix changes with time then estimating it's value can be difficult. Engle suggested that the expected value of the covariance matrix can be can be estimated using information about the past errors. The GARCH model (generalised autoregressive conditional heteroscedasticity) is an extension of this approach which allows other terms to be used in the estimation of the covariance matrix in conjunction with the previous errors. To estimate the multivariate GARCH model five equations are used, equations 6.4 to 6.8, below. These equations specify the returns series for the company and the market, the variances for these two series and the covariance between the two, respectively. Using the BHH algorithm these equations can be used to generate a estimates for the variance and covariances of the data. Once these two values have been estimated then the time varying beta can be calculated as the ratio of the covariance of the returns on the individual company and the market divided by the variance of the returns on the market.

$$R_i = \alpha + \alpha_0 Cov_{R_m,R_i} + \varepsilon_t \qquad (6.4)$$

$$R_m = \beta + \beta_0 Var_{h_{Rm}} + u_t \qquad (6.5)$$

$$h_{R_{i,t}} = \alpha_0 + \alpha_1 h_{R_{i,t-1}} + \alpha_2 \varepsilon_{t-1}^2 \qquad (6.6)$$

$$h_{R_{m,t}} = \beta_0 + \beta_1 h_{R_{m,t-1}} + \beta_2 u_{t-1}^2 \qquad (6.7)$$

$$Cov_{R_m,R_i} = c_0 + c_1(\varepsilon_{t-1}^2 . u_{t-1}^2) + c_2 Cov_{R_m,R_{i,t-1}} \qquad (6.8)$$

6.2.2 Data

All of the data used in this chapter represents company share prices for acquiring companies, acquired companies and the firms in the control samples. The size of the sample used in this chapter is a reduced version of the sample used in the

earlier chapters of this thesis. It was not possible to gather share price data on all of the firms that were used in the data sets in Chapters 4 and 5 and so the data sets are smaller than previously. The boom period data set has been reduced to one hundred acquisitions whilst the recession sample has been reduced to sixty-eight takeovers.

When attempting an event study it is necessary to select an appropriate window around the acquisition. The window will stretch from a certain date before the first announcement of the acquisition until a certain number of days after the last announcement concerning the bid. For example, the event window could run from ten days before the announcement until ten days after the last announcement. In the recent empirical work concerning the benefits of acquisition activity there is no consistency in the size of the event windows that has been used. The size of the event window ranges from five days before the takeover is announced until five days after it is completed, as in Bradley, Desai and Kim (1988), up to twelve months before to twelve months after the takeover, as in Asquith and Kim (1982), and there are many different windows used in other papers. It has been suggested, by authors such as Asquith and Kim (1982), that the market anticipates many acquisitions before they are announced and so a slightly larger window could be more effective although it is unlikely that this would have an impact on market behaviour a long time before the bid.

An acquisition offer in the UK must be open for at least twenty-eight days under the current legal system. In addition to this there will be a certain period before and after the bid that will also be included in the event window and finally six months of data prior to the window will be used to facilitate the calculation of accurate estimates. Owing to limitations in the availability of share prices on the target firms it is not possible to examine share prices beyond twenty days after the end of the acquisition attempt. In total it is possible to examine windows of three different sizes, five days before and after the bid, ten days before and after the bid and twenty days before and after the bid.

In addition to the share prices for these companies there is also available information on the nature of the deals themselves. Some of the deals were successfully

completed whilst others failed. There is evidence to suggest that abnormal returns still exist even when acquisitions are incomplete, as Parkinson and Dobbins (1993) investigated. Their analysis considered failed acquisition attempts in the UK and concluded that the abnormal returns created by the acquisition attempt remained even after the bid lapsed. In addition, some of the acquisition attempts considered here were hostile and resisted vigorously by the target firm or involved more than one bidding firm. Lastly, there were a few acquisitions that involved white knights and a very small number of takeovers that were referred to the Mergers and Monopolies Commission for investigation. Unfortunately, there was insufficient data to model the referred bids and so they had to be eliminated from the sample. It would be interesting to determine whether the different nature of the acquisitions in the sample will affect the level of the abnormal returns that are generated by the takeover process.

The data sets span the years from January 1987 to December 1994. This period stretches from a boom through a recession and the beginning of the next upswing in the economic cycle. As in the previous chapter the different effects of the economic cycle can be examined here to determine whether the underlying condition of the economy has an impact on the level of the abnormal returns realised by the companies involved in the takeovers. As before, the boom period is taken to be the years from 1987 to the end of 1990 and the recession period is from 1991 to the end of 1993. The year 1994 appears to be the start of another period of relative economic prosperity but it is still too early to determine whether or not that supposition is correct. There are also very few takeovers in that year of the data set for which the necessary data was available and, as a consequence, this year will be left out when examining the abnormal returns created by these acquisitions.

6.2.3 Empirical Results

The results generated using the two methodologies outlined earlier in this chapter, see section 6.2.1 above, produced results that were virtually identical when they were applied empirically to the data sets. The results produced using the time-varying beta were of a slightly larger magnitude than the results generated with

the original form of the market model but this is the extent of the differences between them. There are also no real differences between the three different event windows that were used although the size of the abnormal returns did increase a little with the longer windows. This provides some support for the notion that the stock market may anticipate acquisition activity but these findings are not conclusive on this point. Given the very close resemblance that exists between all of the results it is only necessary to give one table of results here. A complete set of results can be found in Appendix V. The tables of results here was generated using the time varying beta over an event window that runs from twenty days before the bid was announced to twenty days after the last announcement concerning the final outcome of the acquisition attempt.

The results contained in this table represent the average values of the cumulative abnormal returns for the companies in the data sets for a certain window. The results are given for each year within the data set and are also grouped into boom and recession periods. The first four lines in the tables contain the results for all of the takeovers in a certain year irrespective of the outcome of these acquisition attempts. The next two sets of results represent the successful and unsuccessful attempts, respectively. It is not possible for a single deal to fall into both the successful and unsuccessful groups simultaneously as these two events are clearly mutually exclusive. The last three groups in the tables of results all refer to the nature of this bid as it was reported at the time; hostile, contested or white knight. Acquisitions can fall into none of these groups, more than one of these groups and it is even possible for a single deal to lie in all three of the categories in certain circumstances. The first of these are the hostile bids in which the target managers strenuously attempted to prevent the sale of the firm. An example of this type of acquisition was Godfrey Davis' bid for Sketchley in February 1990. Godfrey Davis offered £138m for Sketchley in an attempt to expand its textile and cleaning interests. The bid was a mixed offer in which the shareholders were asked to swap three of their Sketchley shares for five Davis shares and three pounds fifty pence in cash. Despite a positive response from at least one large institutional shareholder, Sketchley's management rejected the offer as inadequate. Sketchley's managers then released a profits forecast which was far below market expectations which caused an immediate drop in the value of Sketchley's shares

on the market. Godfrey Davis promptly withdrew the offer, realising that it vastly over-estimated Sketchley's value. Shortly afterwards another bid was made for Sketchley. This time the acquirer was the laundry firm Compass who offered just one hundred and six million pounds, all in shares, reflecting Sketchley's much lower market value. Once again, Sketchley rejected the offer and used their profits forecast to drive off a potential purchaser. This time, they claimed, the profits forecast was even worse as it had to take into account the cost of fighting off the first acquisition attempt. To this day, no-one has managed to make a successful offer for Sketchley. Any acquisition that generates a defensive measure from the target, irrespective of the final outcome, is classed as hostile and placed in the first of these groups.

The second of these sub-divisions represents contested bids. These acquisitions involve more than one potential purchaser. A classical example of this type of takeover involved Macarthy, a pharmaceuticals chain, in May 1991. The first bid was made by the conglomerate Grampian Holdings, which made a mixed bid worth a total of £56.6 million. This bid was unsuccessful at the first closing date as less than one percent of Macarthy shareholders agreed to sell their stock. Grampian increased the value of the offer to £63.3 million but again received a negligible response and let the bid lapse. One of the reasons for this failure was a contesting bid launched by the pharmaceutical firm Unichem at the same time as Grampian's revised offer. Unichem valued Macarthy at seventy three million pounds and offered shareholders seven shares and four pounds twenty pence in exchange for six Macarthy shares. Unichem fared little better than Grampian and, despite extending the closing date on two occasions, their bid seemed unlikely to succeed. Finally, in September 1991, Unichem's offer was referred to the Mergers and Monopolies Commission (MMC) and was allowed to lapse. Unichem's offer was not accepted by the shareholders because, in August, a third contesting bid was launched which offered even more for Macarthy. Lloyds Chemist's offered nearly eighty million pounds for Macarthy in the form of a mixed offer involving the exchange of one Lloyds share and twenty-one pence for one Macarthy share. This offer was also referred to the Mergers and Monopolies Commission but the MMC let it go ahead and, in March 1992, Lloyds declared the deal was unconditional and took control of Macarthy.

Lastly, there are the deals involving the white knights. There are very few of these acquisitions in the data sets. The reason for this is probably two-fold. Firstly, very few companies are genuinely prepared to become white knights as this is a costly procedure that generates relatively little benefit for the firm in question unless they are already seeking to acquire, and secondly target firms are often distrustful of companies that purport to be white knights as, recently, some "white knights" have proved to be less than chivalrous once they have gained a stake in the target firm. In many cases in this data set the white knight company comes from overseas rather than the UK. Nevertheless, these deals do occur periodically although it is rare to see more than two or three in any year. A good example of a white knight in action is the acquisition of the chemical firm Chemoxy International in February 1990. Chemoxy was a relatively small firm that was the recipient of an unwanted takeover bid from another chemical company MTM. MTM valued Chemoxy at just under twelve million pounds and offered shareholders one hundred and eighty-six MTM shares in return for one hundred Chemoxy shares. There was also a cash alternative of four pounds a share. Chemoxy's managers said that the bid was inadequate and advised their shareholders to reject the offer. MTM announced that it would not revise its offer at which point a white knight appeared. The white knight was the industrial holding company Suter. Suter made an all cash offer of four pounds fifty a share which valued Chemoxy at approximately thirteen and a half million pounds. Chemoxy's managers recommended that the shareholders should accept this new offer. MTM refused to be drawn into a bidding war with Suter and allowed their bid to lapse leaving Suter to take control of Chemoxy. This type of bid is primarily worth note because of the presence of a white knight but it is also a demonstration of how it is possible for a single acquisition offered to fall into more than one of these classifications. MTM's bid was rejected by Chemoxy's managers which classifies this takeover as hostile and the presence of two potential acquirers also makes it a contested bid. This means that this acquisition will fall into each of the three classifications representing the nature of the takeovers which appear in the lower sections of the tables of results.

A T-statistic can be used to determine whether the mean value of each series of cumulative abnormal returns is significantly different from zero. These statistics will be calculated for each group of takeovers in each of the years that are considered here and the null and alternative hypotheses are :

$\mathbf{H_0}^1$: the mean of the series of cumulative abnormal returns is equal to zero

$\mathbf{H_A}^1$: the mean of the series of cumulative abnormal returns is not equal to zero

The test statistic appears in many previous articles considering the benefits of acquisition activity. The notation used here comes from DeAngelo and Rice (1983) and is defined in equation 6.9, below. Each of the calculated values will be compared to the appropriate critical value from the standard two-tailed T tables which will depend on the number of takeovers there are in the series under examination. The results for this t-test will appear with the average abnormal returns in the first table of results.

$$t = \frac{A\bar{R}}{\left[\frac{1}{n-1}\Sigma\left(A\bar{R} - \left(\Sigma\frac{A\bar{R}}{n-1}\right)\right)^2\right]^{0.5}} \qquad (6.9)$$

where
$A\bar{R}$ is the mean value of the sequences of cumulative abnormal returns in each of the samples and
n is the number of observations in each of the sequences of cumulative abnormal returns to the examined

A second set of t-tests are also used to determine whether the average abnormal return differs between groups of companies. For example, whether the average abnormal return for the acquired firms in a certain year is different from the abnormal return for the acquiring companies in the same year. These statistics will be calculated between the acquired and acquiring firms, and between both sets of involved

firms and their respective control samples. The null and alternative hypotheses here are :

H_0^2 : the difference between the mean values of the two series of cumulative abnormal returns is equal to zero

H_A^2 : the difference between the mean values of the two series of cumulative abnormal returns is not equal to zero

The results of these calculations will appear in the second table of results. It will not be possible to calculate a value for this statistic in the acquisitions involving white knights as there are too few takeovers of this type in the data sets and this will also be true for some other groups of acquisitions where there is a single takeover is consider.

Table 6.1, below, contains the average values of the cumulative abnormal returns for the firms in these data sets using an event window from twenty days before the first announcement until twenty days after the date of the last announcement concerning the outcome of the takeover attempt. The first group of results in the table represent all the acquisitions in these data sets irrespective of the outcome and nature of these bids. The average abnormal returns for the acquired firms are always positive in these takeover which corresponds to the findings in recent articles on this subject such as Jarrell, Brickley and Netter (1988) and Limmack (1994). The average gain in the boom period is 12.3% whilst the average for the recession period is 9.03%. The acquiring firms received negative average abnormal returns in all of the periods which again corresponds to the frequently quoted theories on this subject, for example Lev (1992) or Bradley, Desai and Kim (1988). The average abnormal return in the boom period is -0.25% whilst the equivalent value for the recession period is -0.56%. These losses are smaller than might be expected given the size of the gains in the value of the target firms demonstrating that the reaction of the market to the announcement of an acquisition is not symmetrical and the benefits to the targets clearly outweigh the losses incurred by the acquiring companies. The difference between these two figures represents the gain in value of the target firm created by the reaction of the market to

the announcement of the acquisition bid and, as can be seen in Table 6.2, on average the null hypothesis that there is no difference between the average abnormal returns to the targets and the bidders can be rejected at the one percent level. This means that it is better to be the owner of an acquired firm than an acquiring company and also implies that the managers of the acquiring firms are not acting to enhance the value of the shareholders investment.

In Chapters 4 and 5, there were data sets of control companies that were used in conjunction with the data sets of acquired and acquiring firms to examine the differences between the nature of those firms that became involved in takeovers and companies of the same size that remained uninvolved in the market for corporate control. These control samples are used again in this chapter to determine how firms that were not involved in acquisition activity performed, compared to expectations, in the same way as the acquired and acquiring firms are examined. By examining the abnormal returns for the firms in the control samples it should be possible to view the impact of the acquisition on targets and bidders more accurately. The control sample paired with the target firms shows that these uninvolved firms are performing better than expected in the boom and very much as would be expected in the recession which suggests there is more benefit to the shareholders of an acquiring firm in a recession than in a boom. The average abnormal returns for the control firms in these periods are 11.9% and 0.1% respectively. The level of these returns does not, however, match the returns experienced by the target firms and Table 6.2 confirms that many of these values are statistically different. This means that shares in the acquired firms are outperforming shares in firms of an equivalent size that were not involved in takeovers. Considering these companies supports the theory that the abnormally high returns demonstrated by the target firms are generated by the announcement of the acquisition attempt and are not created by some unknown external factor as this would, presumably, have had an impact on all firms of a similar size in the stock market. Once again this supports the theory that the shareholders of acquired firms benefit from the acquisition of their company.

Table 6.1 Average Cumulative Abnormal Returns Estimated for a Twenty Day Window

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired firms	17.7*	20.5*	1.5	9.42*	*12.3**	18.6*	0.13	0.81	*9.03**
Acquiring firms	-2.5**	-3**	-3**	-1.05	*-0.25*	-0.22	-1.33	-0.52	*-0.56*
Acquir'd control	15.9*	0.81	29.4*	-4.16*	*11.9**	-0.41	-0.4	0.57	*-0.1*
Acquir'g control	2.7**	-2**	1.4	-7.42*	*-0.8*	-1.28	2.8**	3.71*	*1.16*
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired firms	17.6*	1.9**	0	7.4*	*6.53**	15.8*	-1.8**	-0.58	*6.17**
Acquiring firms	-3.4**	2.6**	-4.05*	-1.6	*-1.8***	-0.3	-1.25	-0.63	*-0.63*
Acquir'd control	15.9*	3.2**	37.7*	-2.2**	*15.6**	0.52	0.5	-9.95*	*-3.2***
Acquir'g control	-3.7*	-0.44	-0.43	-6.73*	*-2.6***	-4.09*	1.58	-1.8**	*-2***
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired firms	18*	29.7*	6.14*	2**	*17**	25.6*	7.67*	-33.5*	*13.4**
Acquiring firms	-0.7	-3.7**	1.29	0.25	*-1.1*	0	-1.6	-11*	*-1.9***
Acquir'd control	15.9*	-2.1**	9.14*	-0.5	*6.13**	-2.8**	-4*	19*	*0.07*
Acquir'g control	15.6*	1.1	7.86*	-2.3**	*6.57**	6*	7.67*	-0.5	*5.43**
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired firms	11*	14*	-6.2*	14.8*	*7.5**	25.3*	-	-8.5*	*11.8**
Acquiring firms	-1	-10.4*	-1.2	-0.25	*-3.8***	0	-	-6*	*-2.4***
Acquir'd control	18*	-2.8**	-159*	-3**	*-49.3**	-12.7*	-	16.5*	*-1*
Acquir'g control	15*	-10.8*	-0.8	-8.5*	*-3.9***	-29.7*	-	30.5*	*-5.6**
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired firms	40*	16.8*	2.4**	19*	*12.6**	21*	-	-23*	*6.33**
Acquiring firms	18*	-12*	0.4	-1	*-2.6***	-3**	-	-12*	*-6**
Acquir'd control	0	2.8**	-42.4*	-13*	*-19.5**	-8*	-	0	*-5.33**
Acquir'g control	11*	1.8	2.4**	10*	*3.64**	10*	-	14*	*11.3**
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired firms	-	-19*	-1	-	*-10**	-18*	-	-	*-18**
Acquiring firms	-	4**	6*	-	*5***	-6*	-	-	*-6**
Acquir'd control	-	0	0	-	*0*	-16*	-	-	*-16**
Acquir'g control	-	1	3**	-	*2*	20*	-	-	*20**
Significant at 1% *, 5% **, 10% ***									

Table 6.2 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	2.89*	5.58*	1.49	2***	5.7*	3.62*	0.32	0.31	3.06*
Acquired & Control	1.36	4.39*	0.85	2.7**	0.17	3.17*	0.81	0.21	2**
Acquiring & Control	1	0.26	1.52	2***	0.83	0.16	1.11	0.94	0.82
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	2***	4.57*	1.03	1.59	3.95*	2.4**	0.9	0.93	2.4**
Acquired & Control	1.15	2.52*	0.78	2.2**	0.11	2***	0.78	0.63	1.4
Acquiring & Control	1.67	0.74	0.89	1.47	0.54	0.74	0.75	0.7	0.21
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	2.6**	5.33*	1.18	1.46	4.89*	3.6*	0.42	1.84	2.1**
Acquired & Control	0.75	6.27*	0.98	5.4**	0.44	3.41*	1.8	1.94	2.8**
Acquiring & Control	2***	0.79	2.8**	1.6	2.3**	0.76	0.75	0.59	0.96
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	0.98	3.6**	3.2**	1.38	3.1*	4.3	-	0.25	1.7
Acquired & Control	0.34	1.86	0.96	3.3**	0.6	0.59	-	20.3*	4.2*
Acquiring & Control	0.39	0.84	0.65	1.05	0.88	0.21	-	3***	0.7
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	1.35	0.9	-	1.31	0.66	-	-	0.51
Acquired & Control	-	0.7	0.83	-	0.79	0.94	-	-	0.47
Acquiring & Control	-	1.38	0.78	-	1.03	1.12	-	-	2.17
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	1.84	-	-	-	-
Acquired & Control	-	-	-	-	1.09	-	-	-	-
Acquiring & Control	-	-	-	-	11.8*	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

The impact of examining the firms that are paired with the bidders is even more revealing. The firms in the control sample have negative abnormal returns in the boom period where the average value for these companies is -0.8% which decreases to -1.161% in the recession. Acquiring companies are performing better in the boom but not as well the recession period as firms of an equivalent size which suggests that, from the shareholders perspective, it may be better to remain uninvolved in acquisition activity than to attempt to purchase another firm. This corresponds with the findings of previous research such as Lev (1992) who claimed that bidding firms suffer a loss in value when an acquisition is announced. This difference is not statistically significant, however, suggesting that any drop in the value of the acquiring firms is not, on the whole, great enough to impact very negatively on the shareholders. This demonstrates the importance of one of the innovations introduced in this chapter; analysing the control samples as well as the involved firms. This places added clarity on the results which enables more accurate conclusions to be drawn and the impact of acquisition activity on the acquired firms to be more accurately evaluated. The drop in the value of the acquired firms is indicative, however, of the opinion held by the stock market of the acquiring companies actions. This reflects some scepticism about the wisdom of attempting to purchase another firm which may suggest that the acquisitions are not, on average, a natural step for the purchasing firms to take. This offers some support for the theory that a large proportion of the acquisitions are motivated by reasons other than the good of the acquiring firm and its shareholders as these individuals suffer from their firms involvement in the takeover process. This supports the findings in Chapters 4 and 5 that many takeovers are prompted by managerial ambition rather than for the good of the firms owners.

The second group of results in Table 6.1 refer to those acquisitions that were known to be successful. The results here generate the same overall impression as above. When examining the targets in this group it is clear that the cumulative abnormal returns are always positive for these companies. The average abnormal returns for these successful acquisitions are 6.53% in the boom period and 6.17% in the bust period. Again this result mirrors the findings in previous research in this area, such as the article by Holderness and Sheehan (1992), and suggests that there are

considerable gains to be made by the shareholders of target firms. In comparison the average abnormal returns for the acquiring firms are negative in both the boom and recession periods. In the boom period the average abnormal return is -1.84% which rises to -0.63% in the recession. This result is in accordance with theories concerning the negative impact that an acquisition has upon an acquiring company, as authors such as Limmack (1994) stated. The smaller loss incurred in the recession period could be a reflection of the fact that a successful bid is a considerable achievement in a recession when most firms are avoiding risks as much as is possible. Again, the differences between these mean values is statistically significant at the one percent level indicating very clearly that the abnormal returns for the acquired and acquiring firms are distinctly different, as Table 6.2 shows. The next line of results in Table 6.1 refers to the control sample that is paired with the target firms. In the boom period the average abnormal return is 15% which decreases to -3.17% in the recession period. These abnormal returns demonstrate some differences when compared to the target abnormal returns but there are no clear conclusions here and, on average, Table 6.2 shows that the acquired firms do not have different abnormal returns when compared with these control companies. The average abnormal returns for the sample of firms that are paired with the bidders are negative in both the boom and the recession. The average values are -2.61% and -2.02% for these periods. Once again it appears that the shareholders of acquiring firms may suffer as a result an acquisition attempt but the shareholders of companies of an equivalent size that do not purchase another firm are in somewhat worse position, although the null hypothesis that these values are different cannot be rejected. These smaller negative abnormal returns could be a reflection of the fact that these bids were all successfully completed and the share prices of the bidding firms may recover when it becomes clear that the bid is going to be a success. Nevertheless, there is still no benefit in these bids for the owners of the acquiring firm and it still cannot be said that the takeovers were attempted for their benefit which, once again, offers support for the idea that there is a clear agency problem in many firms and that managerial ambition was a major motivator for acquisition activity in the years under examination here.

The third group of results in the table refer to the failed acquisition attempts. The average gain to the shareholders of a target firm are 17% in the boom period and 13.4% in the recession which implies that the shareholders of the targets still benefit even if the bid fails. In 1993 Parkinson and Dobbins investigated failed bids and found that the gains to the targets were maintained after the takeover attempts had failed, which is the same as the results here. They suggested that the acquisition attempt improved the economic performance of the target firm which justified the higher share value. It is possible that the market expects an increase in efficiency to follow and the share price remains high in expectation of future improvements. The acquiring companies in these data sets have negative abnormal returns with average values of -1.1% and -1.93% for the boom and recession periods respectively which corresponds to the theory concerning the impact of a takeover on the acquiring firm. Once again, the t-tests in Table 6.2 demonstrate that these values are very different and the null hypothesis that they are the same can be rejected at the one percent level in the boom years and at the five percent level in the recession. The control sample of firms that are paired with the targets are positive in most of the years under examination here. The average cumulative abnormal return in the boom period is 6.1% and 0.07% in the recession. Both of these average abnormal returns are lower than the returns experienced by the target firms and significantly different in several if the years under examination which serves to emphasises the magnitude of the benefits that accrue to the shareholders of the target firms in a takeover attempt. The last line in this section of the table refers to the non-involved firms that are paired with the bidding companies. In the boom period these firms have an average abnormal return of 6.57% which is far larger than the loss for the acquiring companies whilst in the recession period the average abnormal return for these control firms is 5.43%. The boom period is one of the few cases in which the average abnormal returns for the bidding companies are statistically different to the equivalent values for the control firms, as Table 6.2 shows. This emphasises the fact that there are few benefits to the shareholders of the bidding firm in the short term as the value of their investment decreases and falls to a far lower rate than the returns on companies of a similar size. In the long term they may well benefit of the acquisition enables their firm to scale new heights and make greater profits, but this type of long term benefit cannot be seen in this sort of study and would

require more information than was available on many of the firms here. This offers more support for the theory that managerial ambition may prompt many acquisitions that are considered ill-advised by the stock market. The fact that these takeover attempts all failed may be a further reflection of the fact that the acquisition may not have been in the best interests of the bidding firm and the target was poorly chosen. There can be little doubt that the interests of the owners of the bidding companies were not considered when these acquisition attempts were launched and there is no indication that they benefited in anyway from their companies involvement in the takeover process.

The remaining three groups of results consider the nature of the acquisitions rather than final outcome. The first of these is the case of hostile acquisitions where the target makes a determined attempt to avoid being purchased. As in the earlier sections of this table the acquired firms have positive average abnormal returns. In the boom period the average value is 7.5% which increases to 11.8% in the recession although these values are a little lower than in the other sections of Table 6.1. Other recent research on this topic has not drawn any definite conclusions concerning hostile acquisition attempts and so there is no precedent to assist in providing an explanation for this result. If a firm becomes the subject of an acquisition attempt it may be viewed as a good way of realising a profit for the shareholders and rejecting such an offer is, perhaps, thought to indicate considerable confidence concerning the firms future prospects. Alternatively, the gains could be created by the announcement of the takeover attempt and are not altered by any later announcements concerning the nature of the bid. In comparison, the acquiring companies have negative average abnormal returns in hostile bids which are slightly larger than in most of the other sections of this table. In the boom period the average abnormal return is -3.8% which rises slightly to -2.4% in the recession. The values in Table 6.2 demonstrate that these values are different and that the second null hypothesis in this chapter can be rejected but only during the boom years. This may reflect the fact that the stock market views takeover bids that are strenuously rejected as ill-advised potential investments. The fact that the target firm elects to reject the acquisition offer may imply that the bid has less chance of success than in other takeovers where the target does not make a vigorous attempt

to mount a defence. This could be the reason behind the somewhat lower abnormal returns that the target firms receive. Equally, selecting a target that defends itself again an acquisition attempt may also reflect badly on the bidding company which could be the reason why these firms have larger average abnormal returns that other companies. The magnitude of these losses are relatively large which implies that the market may view hostile acquisitions as being poorly selected investments for the potential acquirer, compared to takeovers in which the target offers little or no resistance.

The firms that are paired with the target companies demonstrate negative average abnormal returns in both the boom period and in the recession. Comparing these values to the average abnormal returns for the target companies emphasises the fact that being the shareholder of a firm that is the subject of an acquisition attempt is a far more beneficial position to occupy even if that takeover does not generate the level of abnormal returns that other types of bids receive. The slightly lower average abnormal returns received by the targets means that the acquired firms and the control sample with which they are paired do not demonstrate different mean abnormal returns in the majority of years as the figures in Table 6.2 demonstrates. Finally, there are the companies that were not involved in acquisition activity that are paired with the bidding firms. In the boom period the average abnormal return for these companies is -3.9% which is virtually the same as the abnormal return for the acquiring companies. In the recession period the average abnormal return is negative and larger than the equivalent value for the acquiring companies. This result implies that the shareholders of the acquiring firms suffer a loss but entering the market for corporate control may be a little better than remaining uninvolved in takeover activity. Table 6.2 shows that the average abnormal returns between the acquiring firms and the companies in this control sample are not statistically different as the null hypothesis that the difference is zero cannot be rejected in the majority of years under investigation here.

The penultimate group of results in this table are the contested bids involving more than one potential bidder. In theory this type of bid should increase the benefits to the target shareholders as it could result in a bidding war between the contesting acquirers as they each make bids of increasing value until only one bidder can afford to

continue. Conversely it is thought that the winning bidder, assuming that one of the potential acquirers manages to purchase the target, suffers from the "winner's curse" which results in particularly large negative abnormal returns to the acquiring firm as it could end up paying far more for the target than that firm is actually worth. Both of these ideas appear in the theoretical papers but are the subject of little or no empirical work in the recent literature. The acquired firms in this section have positive average abnormal returns for both the boom and recession periods, with average values of 12.55% and 6.3% respectively which are all significantly different from zero. The results for these periods are not very different from any of the other sets of target firms in the other groups of acquisitions represented in Table 6.1. This result suggests that the contested acquisitions were either resolved quickly or the bidders accurately valued the target and did not offer much more than was necessary as the shareholders of the target firms benefit from their involvement in the takeover process but the magnitude of their gains is no greater in a contested acquisition than in any other type of takeover attempt. The bidding firms in this group have average abnormal returns of -2.64% in the boom period and -6% in the recession and the majority of the values for these companies are statistically different from zero. This corresponds to the idea that bidding firms loose value when a takeover is announced but these values is not noticeably larger than the losses shown by acquiring firms in other sections of this table which is again contrary to the idea of a "winner curse" in bids of this nature. For the first time, the mean values for the target and the bidding firms are not different as the t-tests in Table 6.2 illustrate. This is a most unusual finding and is quite contrary to expectations although it may be due to the relatively small number of takeovers of this type in the data sets. The control sample of firms that are paired with the targets have a large average abnormal return in the boom period, -19.5%, although the recession period value is much smaller. Compared to these firms the acquired companies display much larger gains in both periods but it is difficult to determine whether there are any extra gains generated by the presence of multiple bidders. The relationship between the non-involved firms and the acquirers suggest that it is unwise to attempt this type of takeover in either a boom or a recession as the presence of more than one bidder may suggest that the target is a company that is worth purchasing but it is debatable whether the extra expense incurred through a bidding war is justifiable. Once again,

these findings imply that the managers of the bidding company are not thinking of their shareholders as they begin the takeover process. The owners of these firms suffer in the takeover from the negative abnormal returns that the firm experiences which reduces the value of their investment. This is clearly against their interests and, given that this frequently happens in takeovers, it demonstrates that there must be an agency problem in the firms that enables the managers to undertake this type of investment without worrying about the impact that it will have on the owners of their company.

Finally, there are the white knight deals. These results are based on a very small number of takeovers and the findings cannot be generalised in any way. Equally, it is not possible to calculate t-tests to determine whether the mean abnormal returns for each of the groups of firms are different from each other in the years in which such takeover were reported as there are too few observations in this section. There are, however, a few surprises in these results. The target companies do not benefits from their inclusion in these deals as they have negative average abnormal returns whilst the acquiring companies gain from their involvement in the same deals. When compared to the control samples, it appears that it is more beneficial to remain uninvolved in acquisition activity than to take part in this type takeover. None of these results would be expected in an acquisition but, given that none of the previous research has concentrated on this type of purchase it is possible that deals involving a white knight do not conform to the usual behavioural patterns. It is also important to note that there are so few takeovers of this type in these data sets that these results may be specific to these few deals and cannot be generalised in any way.

The results in these tables provide the same conclusions as much of the previous research on this topic. The owners of the target firms benefit in a takeover due to the increased value that the event places upon their shares. This corresponds to the empirical work already existing in this area, for example Limmack (1994) and Bradley, Desai and Kim (1988). This increase in the value of the target's shares is particularly clear when the acquired firms are compared to the bidding companies. In these results it is clear to see that there are consistently negative average abnormal returns generated by acquisition activity for the shareholders of these companies and

that these sets of values are clearly different as the null hypothesis that the difference between them is zero can be rejected without hesitation at the one percent level in all of the different types of takeovers considered here except the white knight bids. As with the findings concerning the acquired companies, this results corresponds to the current theories concerning the impact of acquisitions on the purchasing firms, as can be seen in papers such as Jarrell, Brickley and Netter (1988). The poor performance of the bidding firms also corresponds with the findings of Chapters 4 and 5 in which it was suggested that acquisitions are often prompted by the managers of the purchasing firm and that the motivation behind these takeover attempts has little or nothing to do with the shareholders best interests. When the control samples are included they serve to highlight further the level of positive gains that are received by the acquired firms as the control companies rarely perform as far above expectations as the target firms although it is not always possible to reject the hypothesis that there are no differences between the average values for these two groups of firms. The opposite is true of the control sample which is paired with the acquiring firms. Here the average abnormal returns received by these firms are rarely different to the returns experienced by the firms in the control samples. This suggests that, in the short term, it may not be too bad to be a shareholder in a company that attempts to purchase another firm than to own shares in a non-involved firm although shares in the bidding firms always decrease in value by an amount that is considerably greater than zero. This recurring results offers strong support for the theory that many acquisitions are motivated by managerial ambition rather than from any desire to benefit the shareholders as the actions of the managers in entering the corporate control market are not to the advantage of the shareholders who would almost certainly prefer that their firm remained uninvolved to preserve the value of their shares on the stock market.

Conclusion

This chapter was designed to investigate the benefits of acquisition activity. The benefits that can be examined in this way are created by fluctuations in the share prices away from the expected levels for each firm. Two methodologies were used to estimate the abnormal returns reported here. The first of these was the market model

as has been used in previous papers and the second approach involved the estimation of a time varying beta for use in the market model. A further innovation involved comparing the firms that took part in the takeovers with companies of an equivalent size that remained uninvolved in the acquisition process. Lastly, the outcome and the nature of the individual acquisitions were examined to further increase the level of detail that could be applied to these results. The results in this chapter are consistent across all of the event windows that were considered and across both of the methodologies that were used. Furthermore, these findings agreed with previous research on the benefits that are created by takeovers in the cases where there is a precedent in the literature.

In brief, the findings of this chapter are as follows. The target firms have positive average abnormal returns during an acquisition attempt that are significantly greater than zero and frequently exceed the returns on firms of equivalent size that remain uninvolved in takeovers by a clear margin. These positive returns represent a gain for the shareholders of these firms whose investment increases in value even when the takeover attempt fails. The high abnormal returns in failed bids could be a reflection of the fact that takeover attempts, even failed ones, are thought to increase the efficiency of the target firms which could result in improved future performance. The only surprising results when examining the acquired firms come when the acquisitions are subdivided into groups reflecting the nature of these takeovers. In particular, the contested bids yielded some unexpected findings. In these takeovers the shareholders of the target firms are thought to benefit to a greater extent as the presence of multiple bidders is thought to elevate the offer price. In the contested acquisitions that appear in these estimations there is no evidence of this outcome. However, when the contested bids that feature in these data sets are examined it becomes clear that the majority of them were settled without a prolonged bidding war which could account for this unusual result. Alternatively, this result could be a reflection of accurate pricing on behalf of the bidding companies but, as the purchasers have incomplete information when making their bid, this seems to be a rather more unlikely explanation for these results.

The results for the purchasing firms also reflect the theories concerning the benefit for the shareholders. In general, the average abnormal returns for these firms are negative and greater than zero which reflects a loss in value for the shareholders. This result offers empirical support for the theory that most firms have an unresolved agency problem that allows the managers to behave as they wish to without any limitations on their authority. In this case this agency problem manifests itself in the purchasing of another firm which is rarely to the advantage of the shareholders of the bidding company. The shareholders investment decreases sharply in value when the bid is announced and remains low for some time after the bid is completed, irrespective of the outcome. It is well known that the share prices of purchasing firms often fall when a takeover attempt is announced and yet these bidding companies went ahead with takeover attempts with seemingly little regard for the impact that this would have on the value of the shares. Such an investment is highly unlikely to be approved of by the shareholders which means that the managers are able to behave as they want without any fear of reprisals from the owners of the firms for which they work. This is a clear demonstration of the agency problem that allows managers to attempt takeovers for their own gain rather than for the good of their company.

These results only reflect a short time around the takeover and cannot reflect the long term impact of making an acquisition which may eventually lead to the restoration of the bidding firms share price and might even be to the shareholders benefit. Results of this kind cannot be reflected in this type of event study and it is impossible to infer whether benefits of this nature would follow a takeover. The findings presented here correspond to the previous literature concerning the bidding companies. An unexpected result came from the analysis of the contested takeover attempts as it did with the target firms above. Here the victorious bidding company is thought to incur exceptionally large negative average abnormal returns as a result of over-paying for the target in a bidding war. There is no evidence of this "winner's curse" in these data sets which is surprising but could be a reflection of the fact that very few of the contested bids examined here involved protracted bidding wars. In the majority of cases all but one of the potential bidders dropped out after a very short period of time. These results make it clear, however, that there are no short term

benefits for the shareholders of firms that become bidders in acquisitions. There may be long term benefits but the identification of these potential gains is outside the reach of this study. In the previous chapters it was apparent that the majority of acquisitions are prompted by the managers of the bidding firms for reasons that rarely have anything to do with maximising the shareholders wealth. The results in this chapter offer clear support for these arguments as there are no short term benefits to these shareholders in the majority of takeovers.

When the results for the acquired and acquiring firms are compared it becomes clear that there is a difference between the magnitude of the gains that the target companies make and the losses experienced by the bidders. The target firms gain far more than the bidding companies loose and the hypothesis that these values are the same can be comprehensively rejected as Table 6.2 illustrated. This implies that the benefits created by the acquisitions are not simply the result of a transfer of value from the shareholders of the purchasing firm to the shareholders of the target company. The reaction of the stock market to the announcement of an acquisition seems to create extra value for the target companies that they receive in excess of the value that is transferred from the bidding firms. If the value of a company increases, perhaps because it is the target of an acquisition attempt, then it is possible that individuals who observe this change will also buy shares in that firm as they hope to benefit from continued increases in the price. These purchases serve to push the value of shares up even further which could account for the extra value that is created for the acquired firms during an acquisition attempt.

There is also some evidence to support the suggestion that the stock market pre-empts acquisition activity and begins to adjust share prices before the takeover offer is made. The results calculated using the larger windows have greater magnitude in many cases than in smaller windows. Equally, it appears that the gains are made when the acquisition is announced rather than throughout the bid or when the takeover attempt ends. In the failed acquisitions the average abnormal returns to both the targets and the bidding firms are very similar to the returns in successful bids. This

implies that the alterations in the share prices created by the takeover correspond to the starting of the bid rather than the ending.

Lastly, it remains to observe that this chapter only examined to benefits that manifest themselves in the share price of the involved firms. It was possible to infer from these results that managerial ambition is an important motive in takeover activity and that many companies suffer from agency problems but the precise benefits that acquisitions create for the managers of the bidding firms are unknown as no information was available about the details of the managers contracts or the impact that an acquisition might have on their pay and bonuses. Furthermore, the impact of the takeovers were only considered for a short time period around the takeover and any long term impacts will not be reflected in these findings. Both of these factors represent areas for potential future research.

Conclusion

This thesis aimed to investigate acquisition activity in the UK in recent years. Chapter 1 introduced the literature review and demonstrated the diversity of topics that exist within this field. It demonstrated the diversity of previous literature and many of the short-comings of the previous research. The first of the empirical chapters was Chapter 2. Here the behaviour of the market for corporate control was examined and it was demonstrated that there is a link between takeovers and the economy. Chapter 4 examined the firms that became involved in takeovers and clarified the motives that prompted these acquisitions. This chapter also introduced a new type of model, which incorporates an element of time, into the estimation. Chapter 5 combined the results of the previous two chapters by adding macro-economic data to the models that were used to identify the firms that took part in the acquisitions. This investigated the impact that differing economic conditions have on the selection of firms that are involved in takeovers and, once again, represents an innovation in this area. The last empirical work was contained in Chapter 6. Here the benefits created by the takeovers were investigated by comparing the expected returns on the shares of the involved companies with the actual returns.

Summary of Previous Results

The first chapter was the literature review. Although it contained no empirical work it represented a very thorough examination of the previous literature on the subject of acquisitions. In particular, it illustrated the wide range of subjects within this field. The articles considered ranged from purely hypothetical papers such as Berkovitch and Khanna (1991), in which the authors used games theory to model acquisitions, to entirely practical articles such as Creehan and Leger's paper (1994) on competitive positioning. In this chapter there was also a consideration of the laws that control acquisition activity and a discussion of the legal requirements that are involved in attempting a takeover. This examination of the literature also demonstrated the eccentricities in the market for corporate control. For example, under certain

circumstances it is possible for an acquisition defence to increase the probability of a takeover. Equally a perceived saviour, a white knight, can become a thoroughgoing villain in a very short period of time. It is debatable if any other area of finance could contain so many tales of adventurous action, unscrupulous behaviour or, on occasions, total stupidity.

Chapter 2 starts the empirical work with an investigation of the levels of acquisition in the UK. In the past other authors have examined the level of acquisition activity in various countries but have failed to derive a single theory that can account for the level of takeover activity. Furthermore, there is still some debate about whether the behaviour of the corporate control market is random or not. This chapter started by addressing this issue and investigated the level of acquisition activity in two different ways. The first approach was to replicate a test from the paper by Golbe and White (1987). By examining the residuals of a simple regression estimation, which modelled the number of acquisitions against time, it was possible to determine that there is a link between acquisition numbers in consecutive time periods. This was followed by a Box-Jenkins analysis of the same data which confirmed that the number of acquisitions in the UK display a clear autoregressive component. These two findings made it possible to reject the suggestion that acquisition activity is random and, therefore, unpredictable. Once this decision had been made it was then possible to examine the relationship between the level of acquisition activity and the economic conditions in the proceeding months using the general to specific methodology. The results of these estimations indicated a clear link between economic conditions and the level of takeovers in the following periods. It appears that an increase in takeover numbers follows increases in industrial production and share prices and decreases in foreign exchange rates, interest rates and the price of North Sea oil. These factors could encourage managers to attempt more investment and suggest that their firms are in a good financial position. The combination of these economic factors makes a very effective model for acquisition numbers but the model in unable to predict accurately during the merger wave period. This model is incapable of predicting the heights to which the corporate control market will rise during a merger wave although they can

accurately identify the upswing in acquisition numbers that marks the start of such a wave.

It appears that merger waves are triggered by an upturn in the economic conditions, but then the level of acquisitions rises above the expected level. This description makes a merger wave sound like a rational bubble in which the fundamental series is the economic cycle. The last empirical section in Chapter 2 considered this possibility and it appeared that this could be a viable explanation for the observed patterns of acquisition behaviour. However, none of the features identified there, that characterise a bubble, are unique to bubbles and consequently this does not offer definitive proof for this idea. Nevertheless, it could explain why it has not been possible in the past to create a single theory that can explain acquisition numbers.

Chapter 3 dealt with the issues of sampling theory. Companies involved in acquisitions make up a relatively small percentage of the total number of firms. When examining acquisitions it is important to maximise the amount of information that can be gathered on this small section of the population, which often leads to deliberate over-sampling of the firms that are involved in acquisitions. Various methods of constructing the samples were considered in this chapter, starting with simple random sampling and progressing through stratified sampling to choice based sampling. The earlier methods of sampling were rejected on the grounds that they do not allow for the deliberate over-sampling. Choice-based sampling is the only technique that allows the deliberate over-sampling of a small proportion of the firms in the population which makes it the most suitable manner in which to construct a sample containing acquired or acquiring firms. This sort of sampling technique, however, may not be acceptable with certain methods of estimation and could create a significant bias in the results. This is certainly the case with logit models if they are estimated using the maximum likelihood technique. In this situation the use of a choice based sample can result in a significant bias in the results. This bias increases the probability that the individuals in the sample will be identified as belonging to the over-sampled section of the data, irrespective of whether this is correct or not. Superficially, this produces impressive looking results but has very little to do with the adequacy of the model. Fortunately,

the magnitude of this bias can be evaluated and the predicted values adjusted accordingly. There is no problem at all with the proportional hazard function models, which are estimated with a partial likelihood function and are unaffected by the construction of the samples. This means that it is possible to use this type of sample in the empirical work in this study.

The acquired and acquiring companies in the data sets are also matched with firms that were not involved in takeovers during the period under consideration. The companies were paired according to their size and all of the data was represented as percentage deviations from the industry average. This last change removes any difficulties that may result from using companies that operate in many different industries. Certain industries can exhibit behavioural patterns that are quite distinct from other areas and these natural differences can create misleading results. By representing the data as percentage deviations from the industry average this type of problem can be removed and the data can be used to investigate the characteristics of companies that take part in the acquisition process. This chapter also included tables which represent the variables that appeared in previous empirical work, the theories of acquisition activity and the covariates that were used in the empirical work in Chapters 4 and 5. These tables demonstrate the diversity of variables used in the previous empirical work and show that the terms selected for use in the empirical work in this thesis all have strong links to previous work in this area.

Chapter 4 deals with the identification of firms that took part in takeovers. Samples were created that represented the data in each of the five years before the acquisition took place and these, coupled with the data sets including the non-involved firms, made it possible to examine the differences between the bidders and the targets as well as between the two sets of involved and non-involved firms over several years before the takeover occurred. The results indicated that there were clear differences between the acquired and acquiring companies and also between both of these groups of firms and the non-involved companies with which they were paired. The results of these investigations can be simply summarised. Firstly, the level of information in the results was far greater when using a hazard function model than with the logit

methodology. This supports the idea that this new methodology, involving the length of time for which a company has lived, is more suitable to the analysis of takeovers than the more conventional discrete choice approach. The results created with these models were consistent over all of the five years of data suggesting that the involved firms are not subject to rapid alterations in their performance or conditions. Both the acquired and acquiring companies demonstrated distinct sets of characteristics that distinguished these firms from each other and from the companies that remained uninvolved in takeovers. Specifically, the target firms were found to be less efficient than either the bidding firms or the non-involved companies. They were less profitable than the non-involved firms although they were not always less profitable that the bidders. These companies paid high dividends to their shareholders but had relatively low price to earnings ratios which implies that they possess the potential to invest in new projects in the future but are probably undervalued on the stock market. The impression of poor managerial efficiency is increased by the fact that the acquired firms have low liquidity whilst the fact that they have low tax charges reflects their relatively low profitability. The overall impression created by these results is that target companies are relatively inefficient and poorly managed. They are also poor performers although they have the potential to do far better in the future.

In comparison the acquiring companies appeared to be more efficient than either the acquired firms or the companies that were not involved in acquisitions. Furthermore, they have higher profits than the non-involved firms with which they are paired. Unlike the acquired firms these companies have both high dividends and high price to earnings ratios which implies that these companies are in a secure financial position and could fund at least part of the takeover with retained dividends. The liquidity of these firms is higher than either the target firms or the companies that remain uninvolved in takeovers which suggests they are in a sound financial position. The published tax charge for the acquiring firms is higher than either of the groups of firms that they are modelled against which is probably a reflection of their higher profitability. Lastly, the acquiring firms have a higher managers to employees ratio which, according to Lecraw (1984), suggests that they are likely to diversify into new areas in order to provide the managers with something to occupy their time. In short,

the acquiring firms are profitable and well run companies that may be seeking new investments or new market areas into which they can expand their interests.

The results in this chapter suggested that acquisitions may be motivated by the ambition of the managers of the acquiring company. Alternatively, these managers could be seeking another firm to buy in order to expand their interests into new areas or to restructure their firm. The targets are inefficiently run companies that are under-performing at the time of the takeover but have demonstrated that they possess the potential to do much better in the future, provided that new investment opportunities can be found.

Chapter 5 added macro-economic factors to the accounting variables that were used in the previous chapter. The selection of the macro-economic terms that were used in these component terms was based on the results of Chapter 2 although these series contained an increased quantity of data. Furthermore, the data in this sample was split into two sections representing the boom and recession periods in the UK economy. This innovation took place to determine whether different macro-economic factors are important under different economic conditions. When these results are considered it appears that the addition of macro-economic factors does not significantly alter the characteristics of the companies that become either bidders or targets in an acquisition. These findings correspond to the previous chapter in many respects and these findings there is considerable support for both the managerial inefficiency and the managerial ambition motives for takeovers in addition to the restructuring and diversification theories.

The main difference in this chapter comes when the macro-economic factors are considered. Here there were clear differences between the boom and recession periods. In a time of economic prosperity the important macro-economic variables were all concerned with the value of equity and funding but in a recession the emphasis changed to production, sales and business confidence. The overall impression was that takeovers in a boom period were more opportunistic and linked to the easier funding options that are thought to exist at that time. In a recession period acquisitions can be

linked to production, sales and business confidence. This implied that takeovers were used to secure the acquiring company's position and market share rather than to branch out into new areas. The targets were lower risk companies in these periods and takeovers may be used as a substitute for overseas investment if the value of Sterling drops significantly.

The last chapter in this thesis, Chapter 6, was concerned with the benefits created by acquisition activity. The innovations in this chapter were concerned, firstly with an improvement in the method that was used to estimate the returns for each share and secondly with the many different types of acquisitions that were considered. It was possible to sub-divide the acquisitions in the sample depending on the outcome of the bid and also on the nature of the takeover process itself. Lastly, the acquisitions were divided into boom and recession periods, as in Chapter 5, to investigate whether the different economic conditions can have an impact on the level of benefits that result from the takeover.

In all cases there were obvious benefits to the shareholders of the target firms as the value of their investment increased significantly. The cumulative abnormal returns were positive even when the takeover attempt failed and the target firm remained independent. This suggested that the gains may be associated more with the initial announcement of the acquisition than with any later announcements concerning the outcome of the takeover attempt. When the contested bids are considered the target firms should experience unusually large returns as the bidding war between the contesting bidders should result in an increase in the value of the offer they receive. However, there was no evidence of this result and the gains to the shareholders of the targets are no greater than in any other type of purchase. Furthermore, there are no statistically significant differences between the level of returns generated in the boom period and the recession for the shareholders of the acquired firms as the returns on targets do not alter by a significant margin between these periods.

The returns for the acquiring firms, in virtually all of the different types of takeovers considered here, demonstrate negative cumulative abnormal returns. Such a

results represents a loss to the shareholders of these companies as the value of their investment decreases. As with the target firms, a surprising result occurs when the contested bids are examined. In the recent literature it has been thought that these types of bids result in larger losses to the acquiring firm than in other instances. The bidding war that is supposed to develop in these cases can result in significant over payment for the acquired firm. However, in these takeovers there is no evidence of this phenomena, known as the "winner curse", taking place. The cumulative abnormal returns to the acquiring firms were negative here as in other cases but are not particularly larger than the equivalent values for other types of takeovers. Once again there are no significant differences between the boom and recession periods and the condition of the economy does not seem to have an impact of acquisition benefits.

These results imply that the takeovers benefit the shareholders of the target companies but not the shareholders of the purchasing firms. This corresponds to the theories in the previous literature concerning the benefits of takeovers but cannot represent the benefits to the managers of these companies or reflect the long term impact that an acquisition can have. These findings confirm the results in the previous chapters in which it appeared that takeovers are prompted by the managers of the acquiring firms and that their motives for attempting to purchase another firm have little or nothing to do with creating benefits for their shareholders. It is possible, however, that the acquisition may place the acquiring firm in a stronger position and could improve its prospects for the future which would, eventually, benefit the shareholders by increasing the profits that the company makes which can, in turn, increase the value of their investment.

Areas for Future Research

The literature concerning acquisitions is very wide spread and there are still many possible areas for future research in this field. There is still no theory that comprehensively links acquisition activity to the economy which is also certainly the main area for further research. The results in Chapter 3 suggest that the bubble explanation appears to fit the observed behaviour however none of the tests there are

conclusive as none of the characteristics that they distinguish are unique to bubbles. There is an unique test, in a paper by McQueen and Thorley (1994), that employs duration dependence to determine the probability that a sequence of abnormal values will end and this would presence an ideal starting point for further research in this area.

Chapters 4 and 5 both offer the prospects for future research. In both cases extra variables could be added to the data sets. In particular, information on the ownership structure of the firms could be added, as could data concerning any defence techniques that the targets use and the nature of the managers contracts. In this last point it would be especially interesting to know if the managers of the bidding companies are rewarded for increasing the size of the firm and whether the target managers have golden parachutes. All of these factors are thought to influence behaviour in acquisitions and their addition in the data sets could increase the information that can be gathered about the firms that take part in takeovers and the motives that prompt those takeovers. It may also be possible to alter the structure of the data sets themselves in the future. Stratification variables could be added that subdivide the data sets into groups based on either the nature of the bid, the value of the bid or the outcome of the takeover attempt. The samples could be also reconstructed to form panel data sets. These could be made to analyse the impact that passing time has on the results which would also increase the level of information that can be inferred from these data sets.

Lastly, the study of acquisitions benefits in Chapter 6 also suggests some potential areas for future research. The share prices and the event study methodologies that were used in this study can only measure the impact that a takeover has in the short term and cannot examine the consequences of an acquisition over a longer period. Analysing the accounts of the involved firms may be more informative, especially when considering the impact that a takeover has on the firm as a whole. Furthermore, share prices only reflect the benefits that the acquisition creates for the owners and cannot reflect the impact that the takeover has on the managers or on the firm as a whole. The managers may own shares in their firm but this does not

convey any information about the impact that a takeover may have on their remuneration packages.

Cross-border acquisitions are occasionally examined in the previous literature but do not appear to have been subjected to the same level of scrutiny that domestic acquisitions have endured. Chapter 1 demonstrates the large volume of work that exists on domestic takeovers and the variety of approaches that can be taken in analysing these acquisitions. Virtually all of those areas would be applicable in the case of cross-border takeovers and this represents a very large area for potential research.

Finally, the empirical work included here could be repeated on larger data sets by adding information on the takeovers that have occurred since the end of 1994. Hopefully, these results would confirm the findings already given here and add to the knowledge that already exists on the nature of acquisition activity in the UK.

Appendix I. Companies Included in the Data Sets for Chapters 4 and 5.

Acquired Firms

A Goldberg
AGB Research
API
Abaco Investments
Aberdeen Construction
Aberdeen Petroleum
Airflow Construction
Alida
Allebone
AmBrit International
Anchor Chemical
Arlington Securities
Armstrong Equipment
Arncliffe
Ash & Lacy
Associated Fisheries
Associated Newspapers
Atlantic Computers
Avana
Ayrton Saunders
BTS
Babygro
Baker Perkins
Bank of Wales
Banro Industries
Barham
Bassett
Beatson Clark
Beckenham
Bejam
Berisford International
Berisfords
Birmid Qualcast
Birmingham Mint
Blackwood Hodge
Boase Massimi Pollitt
British Car Auction
British Syphon Industries
Britoil
Broadcast Communications
Burgess Products
C D Bramall
C H Beazer
C Walker & Sons
CCA Publishing
Cahill May Roberts
Camford Engineering
Camotech
Carbo
Carless, Capel & Leonard
Catalyst Communications
Central Independent TV
Chase Property
Checkpoint Europe
Chemoxy
Clifford Foods
Coalite
Colroy
Combined English Stores

Consolidated Gold Fields
CoxMoore
Cramphorn
Crosby
Crossley
Crown House
Crystalate
Cundell
D G Durham
DDT
DPCE
Daks Simpson
Dale
Dale Electric International
Davenport Vernon
Davies & Metcalfe
Davy Corporation
De La Rue
Deritend Stamping
Derwent MacDee
Desoutter Brothers
Dixons
Dom
Dowty
Dubilier International
Ealing Electro-Optics
Edbro
Ellerman
Empire Stores
Enterprise Computer Services
Etam
Eucalyptus Pulp Mills
Evans
Evode
Extel
F H Lloyd
Feb International
Ferranti
Fitch Lovell
Flightspares
Framlington
Freeman Group
Freemans
G W Thornton
Gabicci
Garfunkels Restaurants
Garner Booth
Gateway
Granyte Surface
Coatings
Habit Precision Engineering
Handley-Walker
Hargreaves Quarries
Harrison Industries
Hawthorn Leslie
Henlys
Hestair
Higgs & Hill
Hillards
Hille Ergonom
Hobsons Publishing
Hogg Group
Holt Lloyd International
Horizon Travel

Hoskyns
Hugh Mackay
Hunslet
Hunter Saphir
Hunting Associated Industries
Imperial Continental Gas
Interlink Express
Irish Distillers
J A Devenish
James Burrough
James Finlay
James Wilkes
Jessups
John Crowther
John Green
Johnsen & Jorgensen
Juliana's
Keep Trust
Kembrey
Kennedy Brookes
Kingsgrange
Kingsley & Forester
LDH
LWT
Laidlaw Thomson
Lambert Howarth
LandLeisure
Lec Refrigeration
Lee (Arthur) & Sons
Linread
London Shop
Lyon & Lyo n
Macarthy
Macmillan
Magnetic Materials
Manders
Marina Development
Matthew Brown
Matthew Hall
Mayfield
Melville Engineering
Micrelec
Midlands Radio
Millford Docks
Millward Brown
Mitchell Cotts
Molins
Monument Oil & Gas
Morland
Mount Charlotte Investments
Myson
Norcros
Norfolk Capital
Nottingham Brick
Octopus
Owners Abroad
Pacific Media
Parkdale
Parkway
Peachey Property
Pearl
Peerless
Penny & Giles International
Pickwick

Pittard Garner
Plastic Constructions
Pleasurama
Plessey
Plumb
Powerline International
Quotient
Racal Electronics
Radio City
Ratcliffes (Great Bridge)
Riley Leisure
Robertson
Ross Catherall
Rowntree Mackintosh
Royal Sovereign
Ruberoid
SMAC
Samuelson
Sandhurst Marketing
Sarasota Technology
Savage
Scholes
Scott Greenham
Scott's Restaurant
Shield
Sintrom
Southampton Isle of Wight & S of Eng Royal Mail Steam Packet
Southern Radio
Sovereign Oil & Gas
Stag Furniture
Stead & Simpson
Steetley
Stothert & Pitt
Superdrug
Sutherland
TMD Advertising
Tace
Technical Components
Telephone Rentals
Tenby Industries
Teredo Petroleum
Textured Jersey
Thames Television
Thermax
Thomas Robinson
Thomson T-Line
Thurgar Bardex
Tilbury
Tootal
Torday & Carlisle
Touchstone
Trade Promotion Services
Trans World
Trebor
Trent
Tricentrol
Trimoco
Triton Europe
Tysons
UCL
UEI
Unilock
United Packaging

Viking Packaging

WSL

Walter Lawrence

Walter Runciman

Ward White

Wayne Kerr

Westland

Westpool Investments Trust

Wetten Brothers

Whitbread Investment Company

Wilding Office Equipment

Williams Collins

Wolstenholme Rink

Woodhouse & Rickson

Worcester

Wordplex Information Systems

Yougal Carpets

Zetters Leisure

Acquiring Firms

600 Group

AAH

ACT

AMEC

APV

Aegis

Air Products and Chemicals

Airtours

Alan Cooper

Albert Fisher

Allied Textile

Anglo United Development

Antares

Apricot Computers

Associated British Foods

Associated British Ports

Atlas Copco AB

Australia Mutual Provident (AMP)

Avis Europe

BET

BM

BS Group

BSG International

Bank of Scotland

Bardsey

Barry Wehmiller

Bass

Beauford

Belhaven

Berkeley

Blacks Leisure

Blue Circle Industries
Boddington's Brewery
Booker McConnell
Boots
Boustead
Bowater Industries
Bowthorpe Holdings
Brent Walker
Brierley Investment
Britannia Security
British & Commonwealth
British Aerospace
British Petroleum
British Steel
Bromsgrove Industries
Cable & Wireless
Cadbury Schweppes
Cairn Energy
Cambridge Electronic
Cap Gemini Sogeti
Caparo Group
Capital Radio
Carclo Engineering
Carlton Communication
Cattle's
Charles Baynes
Charter Consolidated
Charterhall
Chloride
Clayform Properties
Coats Viyella
Coloroll
Conder
Cookson
Corton Beach
Culver Holdings
Daily Mail & General Trust
Delta
Dewhist
Donelon Tyson
Dowding & Mills
EIS
EIT
EMAP
Eagle Trust
Elf Aquitaine
Emess Lighting
Epicure
Evans Halshaw
Farnell Electronics
Ferguson Industrial
Ferrari Holdings
Ferry Pickering
Fitzwilton
GEC
GKN
Glynwed International
Goode Durrant
Govett Strategic Investment Trust
Granada
Graystone
Greenalls
Greene King
Guardian & Manchester Evening News

HTV
Hanson Trust
Harrisons & Crossfield
Hartwell
Hawley
Hazlewood Foods
Helene
Heywood Williams
Hollis
Holmes & Marchant
Hopkinsons
Hunter
IMI
Ibstock Johnsen
Iceland Frozen Foods
Inchcape
International Business Communications
Isosceles
John Mowlem
John Waddington
Johnson & Firth Brown
Kalon
Kelt Energy
Kingfisher
Ladbroke
Laporte Industries
Leisure Investments
Lilley
Linton Park
Lloyds Chemists
Local London
London Merchant Services
Lookers
Lynwood
MJ Gleeson
MTM
Markheath Securities
Marley
Marrel
Maxwell Communication
Mayne Nickless
McKechnie Brothers
McLeod Russell
Mecca Leisure
Meggitt
Midsummer Leisure
Minerals & Resources Corporation
Morgan Crucible
NMC
Neste Oy
Nestle
Newman Tonks
News International
Next
Nimex Resources
Norsk Data AS
Norton Opax
Oakwood
Oceana
Omnicom
P-E International
Pavilion Leisure
Peek Holdings
Peel Holdings

Pentos
Pergamon Professional Financial Services
Pernod Ricard
Peter Black
Pittard
Pittencrieff
Polypipe
Porter Chadburn
Queen's Moat
RHP
RMC
Raine Industries
Ranks Hovis McDougal
Redland
Redoute
Reed International
Robert Bosch
Robert H Lowe
S Casket
SI Group
Sankyo Seiko
Scott & Robinson
Scottish &
Newcastle Brewers
Seacon Holdings
Sears
Severn Trent Water
Sheffield Insulations Group (SIG)
Sime Darby
Simon Engineering
Spring Ram
Stratagem
Strong &Fisher
Sunleigh Electronics
Suter
Systems Reliability
T Cowie
TI
TT
Tarmac
Tate & Lyle
Telfos
Tesco
Thorn EMI
Throgmorton Trust
Thyssen Industries
Tozer Kemsley & Millbourn
Tractebel
Trafalgar House
Triplex
Triton Energy
Trusthouse Forte
Tyzack Turner
Unigate
United Energy
United Newspapers
Vickers
Vodafone
W H Smith
WPP
Wace
Wagon International
Wassell
Waverley Cameron

Wembley

Wereldhaven

Wheway

Whitbread

Whittington

Williams Holdings

Woolworth

Wyevale Garden Centres

Y J Lovell

Yule Catto

Acquired Control Firms

A Beckman

AG Barr

AG Holdings

Aberdeen Steak Houses

Adwest Group

Aim Group

Air London International

Alexandra Workwear

Alexon Group

Allied Colloids

Amersham International

Anagen

Appleyard Group

Arjo Wiggins

Arlen

Armour Trust

Asda

Asprey

Ayrshire Metal

BBA Group

BNB Resources

Barratt Development

Beckman (A)

Bemrose Corporation

Bernard Matthews

Bilston & BSea

Black Arrow

Blockleys

Bluebird Toys

Bodycote International

Bogod Group

Borthwicks
Bostrom
Boxmore International
Brammer
Breedon
Bridport-Gundry
British Bloodstock Association
British Borneo
British Dredging
British Polythene
British Vita
Briton Group
Brown & Jackson
Brown (N) Group
Brunel Holdings
Bryant Group
Bullough
Bunzl
Burnfield
CI Group
Caffyns
Calor Group
Cantors
Cape
Carpetright
Castings
Castle Mill International
Chamberlaine & Hill
Charter
Chieftan Group
Chiroscience
Clarkson (Horace)
Cluff Resources
Clyde Petroleum
Cobham
Concentric
Courts
Crabtree Group
Crean (James)
Crest Nicholson
Danka Business
Delaney Group
Devro International
Dinkie Heel
Diploma
Dolphin Packaging
Domino Printing
Druck Holdings
Dudley Jenkins
ERF Holdings
Eadie Holdings
Eclipse Blinds
Elbief
Elliott (B)
Ensor Holdings
Eurocamp
Eurotherm
Eve Group
Expamet International
Eyecare Products
FW Thorpe
Fairey Group
Farepak
Faupel Trading

Filofax
Fine Art Development
Forminster
Forward Technology
Friendly Hotels
Fuller Smith
GBE International
Galliford
Gaskell
Gates (Frank G)
Gibbon Group
Gibbs & Dandy
Graseby
Greenacre
Gresham Computers
HP Bulmer
Hadleigh Industries
Haggas (John)
Hallite
Hampden Group
Hampson
Industries
Hardy Oil & Gas
Harmony Property
Hartlepools
Hay (Norman)
Hickson International
Highland Distilleries
Hollas Group
Home Counties Newspapers
Howard Holdings
Howden Group
Isotron
Jaks
James Fisher
James Latham
Jarvis
Jeyes
Jo Walker
Jones & Shipman
Kalamazoo Computers
Kelsey Industries
Kwik Save Group
Laser Scan Holdings
Laura Ashley
Leeds Group
Liberty
Lilleshall
Linx Print Technology
Loades
London & Clydeside
Lopex
Low & Bonar
M.R. Data Managment
MMT Computing
Macallan-Glenlivet
Macdonald Mart
Manganese Bronze
Mansfield Breweries
Manweb
Martin International
Maunders (John)
Mayborn Group
Mayflower Corporation

Menvier-Swain
Merrydown
Metalrax Group
Metsec
Microgen holdings
Mid-States
Moran Holdings
More O'Farrell
Morgan Sindall
Morris Ashby
NSM
National Express
Neepsend
Newarthill
Nichols (Vimto)
North Midland Construction
North West Water
Novo Group
Ocean Group
Oceanics
Orbis
Osbourne & Little
Oxford Instruments
Parkland Group
Pegasus
Pendragon
Perry Group
Phoenix Timber
Photo-Me International
Polar
Powell Duffryn
Powerscreen
Prospect Holdings
Psion
Quadrant Group
Ramus Holdings
Readicut International
Real Time Control
Reckitt & Coleman
Record Holdings
Redrow
Reed Exectutive
Reg Vardy
Regal Hotels
Regent Corporation
Renishaw
Renold
Rexam
Richards Group
Ropner
Rugby Group
Sandersons Electric
Scholl
Scottish TV
Seafield Group
Security Services
Seet
SelecTV
Select Appointments
Servomex
Shiloh
Silent Night
Sims Food Group
Sirdar

Sleepy Kids
Smith & Nephew
Somic
Soundtracs
Southern Newspapers
Spandex
Storm Group
Surrey Group
Sutcliffe Speakman
Sycamore Holdings
T&S Stores
Tay Homes
Taylor Woodrow
Thomas Jourdan
Time Products
Transport Development
Transtec
Trinity International
Try Group
Ugland International
Unipalm
United News and Media
Usbourne
Vendome Luxury
Verson International
Vista Entertainment
WM Morrison
Wakebourne
Watmough's Holdings
Whatman
Widney
Wilson (Connolly)
World of Leather
Wyefield Group
Young (H)

Acquiring Control Firms

AF Bulgin

Acatos & Hutchinson

Acorn Computers

Alex Holdings

Alexon Group

Allied Colloids

Allied Domecq

Alvis

Amalgamated Metal Corp

Amber Industrial

Amec

Amersham International

Amstrad

Anglian Water

Arlen

Arthur Wood

Asda

Asprey

Astec (BSR)

Austin Reed

Avon Rubber

BAA

BBA Group

BCE Holdings

BOC

BPB Industries

BSS

Baggeridge Brick

Bedford (William)

Bellway

Bensons Crisps

Bentalls

Bespak

Betterware

Beverley Group

Black (A&C)

Black Arrow Group

Body Shop International

Brammer

Brasway

Brent International

British Fittings

British Mohair

British Thornton

Bunzl

Burndene Investments

Burton Group

Campari International

Central Motor Auction

Cheam Group

Chrysalis Group

City Centre Restaurants

Clinton Cards

Copymore

Cordiant

Cosalt

Costain Group

Countryside Property

Courts

Cussins Property

Dawson Holdings

Denmans Electricals

Dobson Park

Dyson
ERA Group
ERF Holdings
Electrocomponents
Enviromed
European Colour
Eurotherm
Excalibur Group
Eyecare Products
FII Group
FKI
Faber Priest
Feedback
Fife Indmar
Finelist Group
First Choice Holidays
First Leisure
Firth Holdings
Flextech
French
Gieves Group
Glaxo Wellcome
Global Group
Great Universal Stores (GUS)
Greggs
Guiness
Hall Engineering
Hartons Group
Haynes Publishing
Hewden-Stuart
Hickson International
Hill & Smith
How Group
Huntingdon International
ISA International
J Bibby
Jacks (William)
James Latham
Jarvis Porter
Johnson Matthey
Kwik Save Group
LEP Group
Laing (J)
Lamont Holdings
Laura Ashley
Liberty
Logica
Lonhro
Macallan-Glenlivet
Macdonald Mart
Macfarlane Group
Mansfield Breweries
Marks & Spencer
Marshalls
Matthew Clark
McAlpine
McCarthy & Stone
Menzies
Merchant Retail
Metal Bulletin
Mid-States
Midlands
Mitie Group
North West Water

Northern Foods
Nurdin & Peacock
OEM
OMI International
Ocean Wilsons
Oliver Group
Owen & Robinson
P&O
PCT Group
Paterson Zoch
Photo-Me International
Pifco Holdings
Pilkington
Plysu
Pochins
Portsmouth & Sunderland Newspapers
Premier Oils
Princedale Group
Protean
Quicks Group
Radius
Ransom (William)
Readicut International
Reckitt & Coleman
Reuters Holdings
Rexam
Rexmore
Ricardo Group
Richards
Rolls-Royce
Rotork
Rugby Group
Scantronic
Scapa Group
Scottish TV
Securicor Group
Security Group
SelecTV
Senior Engineering
Seton Health Care
Shandwick
Shell Transport
Shoprite Group
Smith & Nephew
Smith (David S)
Smith Industries
Smithkline Beecham
South Green Holdings
Spirax-Sarco
St Ives
Stakis
Stanley Leisure
Staveley Industries
Stylo
Swan (John)
T&N
T&S Stores
Telspec
Thames Water
Thompson Marston
Thorntons
Ticketing
Travis Perkins
Treatt

Tunstall Group

Unilever

United News and Media

VSEL

Vardon

Vaux Group

Vega Group

Victaulic

Volex Group

WEW Group

Wainhomes

Walker Greenbank

Waterhouse Group

Watson & Philip

Weir Group

Welpac

William Morrison

Wilson (Connolly)

Wilson Bowden

Wimpey (George)

Wolseley

Worthington Group

Yorkshire Chemicals

Young & Co

Appendix II : Consistency of the Hazard Function and Logit Results

In many of the results, the hazard function and logit methodologies appear to generate results that are substantially different. There are several points that can be made to demonstrate that these models are, in fact, consistent and that any error is more likely to lie in the logit estimations than the hazard models.

The hazard function specification includes a duration term that increases the level of information present in the models. This is in direct contrast to the logit methodology for which the absence of a time factor is an often mentioned problem. Thus it is reasonable to state that the hazard model is theoretically a superior result compared to the logit estimation, as it is not subject to this serious deficit. This point is also made by Ravenscraft and Scherer (1991). Furthermore, the hazard function models are nearly always better specified at both the multiple and individual variable levels; the t-statistics and likelihood ratio tests are usually higher for these models. In addition to this, the hazard function models always include more variables than the equivalent logit estimations. Clearly, a model is more likely to be statistically consistent if it involves more terms. Both of these points suggest that the hazard function models are better specified in practice as well as in theory. A last point to be made in support of this supposition is that fact that the logit models fail to replicate any of the popular theories concerning the motives for acquisitions and the nature of the involved firms. The opposite holds for the hazard function results which further supports the idea that they are the better models.

The obvious extension from this finding is to suggest that any inconsistencies lie with the logit methodology rather than the hazard function. These inconsistencies are likely to be created during the construction of the models that are given in the text. The hazard function models and the logit models are consistent, to within two standard errors, when the models are estimated using all the data; the starting point for the creation of the presented models. The tables below show two of the original models

from which the results are created. The first column represents the logit model and it is easy to show that, with the sole exceptions of the total sales and capital gearing terms, all of the variables in this model lie comfortably within two standard errors of the value given in the second column, the equivalent hazard function model. The total sales item and the capital gearing term are both subject to very high levels of volatility but nevertheless the terms in the logit model lie within three standard errors of the values given in the hazard model. Throughout the estimations the coefficients are consistently very small. Thus, it is possible to see how the signs could change without altering the consistency of the results. Furthermore, it is possible to say that the hazard function and logit models are initially consistent and that any differences that appear in the later models are almost certainly due to the reduced informational content of the logit methodology.

Table A2.1 Initial Logit and Hazard Function Models

Variable	Type of Model	
	Logit	Hazard Function
Turnover to assets employed	-0.15 (-0.32)	0.25 (1.08)
Turnover to fixed assets	0.38 (1.24)	-0.18 (-1.99)
Sales per employee	0.5 (1.14)	-0.31 (-1.22)
Stock ratio	-0.19 (-1.24)	
Return on capital employed	-0.1 (-0.57)	0.08 (0.66)
Return on s'holders equity	0.17 (1.16)	-0.1 (-1.17)
Pre-tax profit margin		
Net profit margin	-0.15 (-0.39)	-0.17 (-0.6)
Dividends per share	-0.01 (-0.06)	0.18 (1.43)
Earnings per share	-0.19 (-1.46)	0.21 (2.12)
Dividend yield		
P/e ratio	0.01 (0.04)	0.12 (0.7)
Capital gearing	-0.05 (-0.54)	0.03 (0.47)
Current ratio	0.71 (1.11)	-0.81 (-1.69)
Acid test ratio		
Debtor days	-0.36 (-0.61)	0.61 (1.25)
Creditor days	-0.2 (-0.32)	-0.12 (-0.22)
Total sales	-0.05 (-1.66)	0.03 (1.13)
Manager/employee ratio	-0.12 (-1.2)	0.04 (2.44)
Total tax charge	-0.08 (-1.31)	0.03 (0.54)
Likelihood ratio test (Critical value in parentheses)	27.76 (27.59)	40.38 (27.59)
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		

Appendix III : Complete Hazard Function and Logit Results for Chapter 4

A3.1 Acquiring and Acquired Companies

Table A3.1.1 Logit Results One Year Before the Acquisition

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets	0.32** (1.78)	0.28*** (1.66)	0.31*** (1.66)	0.4** (2.49)	0.32*** (1.69)	0.3 (1.61)
Sales per employee			0.29 (1.31)		0.49 (1.49)	0.5 (1.56)
Stock ratio	-0.21*** (-1.66)	-0.26 (-1.6)	-0.2*** (-1.92)	-0.2*** (-1.93)		
Return on capital employed						
Return on s'holders equity						
Pre-tax profit margin						
Net profit margin					-0.43 (-1.38)	-0.41 (-1.43)
Dividends per share						
Earnings per share	-0.21*** (-1.75)	-0.19*** (-1.75)				
Dividend yield					0.42 (1.38)	
P/e ratio					-0.4 (-1.3)	
Capital gearing						
Current ratio						
Acid test ratio	0.43*** (1.78)	0.39*** (1.7)				
Debtor days						
Creditor days						
Total sales	-0.05*** (-1.66)		-0.05 (-1.6)		-0.06*** (-1.92)	-0.06*** (-1.93)
Manager/employee ratio			-0.12 (-1.17)	-0.13 (-1.18)		
Total tax charge	-0.71 (-1.28)		-0.07 (-1.28)		-0.11*** (-1.82)	-0.11*** (-1.86)
Likelihood ratio test	18.59*	12.58*	19.22*	12.45*	16.78**	14.66*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 42 48	 46 52	 38 52	 42 48	 42 52	 38 48
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.1.2 Logit Results Two Years Before the Acquisition

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets	0.27 (1.39)		0.28 (1.47)	
Sales per employee	1.56* (2.91)	1.74* (3.18)	1.45* (2.8)	1.61* (3.05)
Stock ratio				
Return on capital employed				
Return on s'holders equity				
Pre-tax profit margin		-1.17* (-3.47)		
Net profit margin				
Dividends per share				
Earnings per share				
Dividend yield	0.93* (3.52)	0.86* (3.35)	0.93* (3.6)	0.87* (3.41)
P/e ratio				
Capital gearing				
Current ratio	0.46 (1.61)	0.48*** (1.65)		
Acid test ratio				
Debtor days				
Creditor days	-1.19* (-3.13)	-1.86* (-3.2)	-1.46* (-2.7)	-1.38** (-2.54)
Total sales	-1.18* (-3.53)		-1.09* (-3.43)	-1.06* (-3.34)
Manager/employee ratio				
Total tax charge				
Likelihood ratio test	45.05*	41.79*	41.49*	38*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 48 52	 42 40	 40 42	 40 36
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.1.3 Logit Results Three Years Before the Acquisition

Variable	Models	
Turnover to assets employed		
Turnover to fixed assets		
Sales per employee		
Stock ratio	0.13 (1.17)	
Return on capital employed		
Return on s'holders equity		
Pre-tax profit margin		
Net profit margin		
Dividends per share		
Earnings per share		
Dividend yield	0.45* (1.97)	0.46* (2.04)
P/e ratio		
Capital gearing		
Current ratio		
Acid test ratio		
Debtor days	0.7*** (1.79)	0.67*** (1.75)
Creditor days		
Total sales	-1.26* (-3.29)	-1.11* (-3.13)
Manager/employee ratio		
Total tax charge		
Likelihood ratio test	21.33*	19.47*
Predictive Accuracy (%). Acquired firms Acquiring Firms	42 38	38 44
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

Table A3.1.4 Logit Results Four Years Before the Acquisition

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets				
Sales per employee				
Stock ratio	0.21 (1.37)	0.26*** (1.7)	0.23 (1.46)	0.22 (1.41)
Return on capital employed				
Return on s'holders equity				
Pre-tax profit margin				
Net profit margin				
Dividends per share				
Earnings per share				
Dividend yield				
P/e ratio				
Capital gearing			-0.47 (-1.16)	
Current ratio	1.2* (2.92)			
Acid test ratio			1.56* (3.1)	1.21* (3.03)
Debtor days		1.4* (3.05)		
Creditor days				
Total sales	-1.13* (-3.2)	-1.59* (-3.33)	-1.26* (-3.04)	-1.35* (-3.26)
Manager/employee ratio			-0.07 (-1.46)	-0.06 (-1.4)
Total tax charge	-0.13 (-1.36)	-0.12 (-1.31)	-0.12 (-1.34)	-0.13 (-1.37)
Likelihood ratio test	21.05*	22.59*	25.16*	23.77*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 36 40	 38 44	 42 36	 38 36
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.1.5 Logit Results Five Years Before the Acquisition

Variable	Models		
Turnover to assets employed			
Turnover to fixed assets			
Sales per employee			
Stock ratio			
Return on capital employed			
Return on s'holders equity			
Pre-tax profit margin			
Net profit margin			
Dividends per share			
Earnings per share	-0.12 (-1.36)	-0.11 (-1.22)	
Dividend yield	-0.83** (-2.45)	-0.74** (-2.06)	-0.74** (-2.07)
P/e ratio	0.84* (2.59)	0.75** (2.33)	0.72** (2.26)
Capital gearing			
Current ratio		1.24* (2.62)	1.17 (2.5)
Acid test ratio			
Debtor days			
Creditor days			
Total sales		-1.31* (-3.05)	-1.33* (-3.07)
Manager/employee ratio			
Total tax charge	-0.25** (-2.18)		
Likelihood ratio test	21.3*	27.08*	25.51*
Predictive Accuracy (%). Acquired firms Acquiring Firms	30 44	41 37	42 42
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses			
Denotes term is significant at 1% *, 5% **, 10% ***			

Table A3.1.6 Hazard Function Results One Year Before the Acquisition

Variable	Models						
Turnover to assets employed	0.32 (1.47)		0.32 (1.4)		0.31 (1.37)	0.28 (1.24)	
Turnover to fixed assets	-0.19** (-2.23)		-0.19** (-2.2)	-0.11 (-1.46)	-0.18** (-2.1)	-0.19 (-2.17)	
Sales per employee	-0.36 (-1.54)		-0.33 (-1.41)	-0.3 (-1.54)	-0.37 (-1.55)	-0.45 (-2.13)	-0.39** (-2)
Stock ratio	0.35* (2.89)	0.37* (2.99)	0.36* (2.9)	0.33* (2.87)	0.34* (2.75)	0.3* (2.6)	0.3* (2.59)
Return on capital employed							
Return on s'holders equity							
Pre-tax profit margin							
Net profit margin							
Dividends per share	0.17 (1.35)		0.18 (1.41)		0.21*** (1.66)	0.21*** (1.76)	0.21*** (1.79)
Earnings per share	0.2** (2.07)	0.26** (2.54)	0.2** (2.01)	0.23* (2.29)			
Dividend yield					0.21 (1.31)		
P/e ratio							
Capital gearing							
Current ratio	-0.84** (-2.05)	-0.94* (-2.69)	-0.67 (-1.37)		-0.11** (-2.43)		
Acid test ratio			-0.28*** (-1.8)	-0.42* (-3.61)		-0.34* (-3.16)	-0.33* (-3.11)
Debtor days	0.53 (1.43)	0.47 (1.53)	0.61 (1.54)	0.41*** (1.7)	0.75*** (1.67)	0.36 (1.45)	0.4* (2.64)
Creditor days							
Total sales							
Manager/employee ratio	0.4** (2.55)	0.4* (2.61)					
Total tax charge							
Likelihood ratio test	33.51*	26.5*	31.44*	26.33*	26.53*	24.67*	21.42*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 72 66	 70 64	 70 66	 68 66	 70 68	 68 66	 66 62
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses							
Denotes term is significant at 1% *, 5% **, 10% ***							

Table A3.1.7 Hazard Function Results Two Years Before the Acquisition

Variable	Models						
Turnover to assets employed							
Turnover to fixed assets	-0.06 (-1.39)		-0.06 (-1.45)		-0.06 (-1.42)	-0.06 (-1.59)	-0.06 (-1.45)
Sales per employee					-0.19 (-1.26)		
Stock ratio							
Return on capital employed							
Return on s'holders equity	0.15 (0.96)						0.2 (1.21)
Pre-tax profit margin							
Net profit margin							-0.46* (-2.76)
Dividends per share							
Earnings per share	0.07 (1.12)		0.07 (1.23)		0.07 (1.22)		0.09 (1.49)
Dividend yield	-0.4* (-2.31)	-0.3*** (-1.85)	-0.3*** (-1.74)	-0.25 (-1.5)	-0.33 *** (-1.88)	-0.36 ** (-2.19)	-0.32 *** (-1.85)
P/e ratio							
Capital gearing							
Current ratio			-0.29 *** (-1.89)	-0.28 *** (-1.92)			
Acid test ratio							
Debtor days	-0.03* (-3.46)	-0.27* (-3.18)					
Creditor days							
Total sales	0.82* (4.64)	0.84* (5.25)	0.86* (5.02)	0.81* (4.89)	0.79* (4.95)	0.7* (4.82)	0.83* (4.53)
Manager/employee ratio							
Total tax charge	-0.03 (-1.19)		-0.03 (-1.06)		-0.03 (-0.99)		
Likelihood ratio test	38.92*	33.18*	34.64*	30.65*	34.5*	29.76*	37.37*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 72 68	 70 66	 70 66	 68 62	 70 66	 66 64	 70 66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses							
Denotes term is significant at 1% *, 5% **, 10% ***							

Table A3.1.8 Hazard Function Results Three Years Before the Acquisition

Variable	Models	
Turnover to assets employed		
Turnover to fixed assets	-0.04 (-1.25)	
Sales per employee	-0.57** (-2.57)	-0.55** (-2.52)
Stock ratio		
Return on capital employed	0.66*** (1.92)	0.55*** (1.65)
Return on s'holders equity	-0.02 (-1.6)	
Pre-tax profit margin		
Net profit margin		
Dividends per share		
Earnings per share		
Dividend yield		
P/e ratio	-0.24*** (-1.67)	-0.25*** (-1.68)
Capital gearing		
Current ratio		
Acid test ratio		
Debtor days	-0.62* (-2.97)	-0.6* (-2.89)
Creditor days		
Total sales	1.08* (4.01)	1.12* (4.16)
Manager/employee ratio	0.06 (1.41)	
Total tax charge		
Likelihood ratio test	42.36*	37.88*
Predictive Accuracy (%). Acquired firms Acquiring Firms	66 62	66 60
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

Table A3.1.9 Hazard Function Results Four Years Before the Acquisition

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets						
Sales per employee	-0.41** (-2.09)	-0.4** (-2.01)	-0.46** (-2.44)	-0.43** (-2.25)	-0.43** (-2.2)	-0.43** (-2.25)
Stock ratio						
Return on capital employed						
Return on s'holders equity						
Pre-tax profit margin						
Net profit margin						
Dividends per share	-0.12 (-1.12)				-0.13 (-1.22)	
Earnings per share			-0.07 (-1.29)			
Dividend yield	0.22 (1.29)				0.23 (1.35)	
P/e ratio						
Capital gearing	0.41 (1.58)	0.43 (1.64)	0.39 (1.41)	0.36 (1.3)	0.34 (1.26)	0.36 (1.3)
Current ratio	-0.81** (-2.39)	-0.79** (-2.34)				
Acid test ratio			-0.58*** (-1.83)	-0.58*** (-1.78)	-0.58*** (-1.79)	-0.58*** (-1.78)
Debtor days						
Creditor days						
Total sales	1.07* (4.04)	1.16* (4.26)	1.04* (4.01)	1.06* (4.04)	1.01* (3.89)	1.06* (4.04)
Manager/employee ratio						
Total tax charge	0.08 (1.08)		0.09 (1.14)			
Likelihood ratio test	43.65*	39.36*	40.63*	37.24*	39.65*	37.24*
Predictive Accuracy (%).						
Acquired firms	60	60	58	60	56	58
Acquiring Firms	56	56	52	54	56	54
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.1.10 Hazard Function Results Five Years Before the Acquisition

Variable	Models						
Turnover to assets employed							
Turnover to fixed assets							
Sales per employee							
Stock ratio	0.15 (1.28)						
Return on capital employed							
Return on s'holders equity	0.41*** (1.76)	0.38 (1.62)	0.36 (1.45)				
Pre-tax profit margin							
Net profit margin							
Dividends per share							
Earnings per share						0.08 (1.07)	
Dividend yield	0.87* (3.82)	0.91* (3.96)	0.74* (3.17)	0.96* (4.17)	0.99* (4.55)	0.79* (3.43)	0.78* (3.37)
P/e ratio	-0.51** (-2.53)	-0.52** (-2.55)	-0.39*** (-1.87)	-0.54* (-2.64)	-0.46** (-2.32)	-0.39*** (-1.89)	-0.38*** (-1.87)
Capital gearing							
Current ratio				-1.16*** (-1.69)		-0.69** (-2.33)	-0.63** (-2.15)
Acid test ratio				0.71 (1.33)			
Debtor days	1.1*** (1.82)	1.19*** (1.95)		0.65 (1.35)			
Creditor days	-1.37** (-2.16)	-1.32** (-2.06)	-0.88** (-2.44)				
Total sales			0.93* (3.2)			0.95* (3.47)	0.96* (3.5)
Manager/employee ratio							
Total tax charge	0.24* (2.69)	0.22* (2.84)		0.21** (2.55)	0.23* (3.11)		
Likelihood ratio test	56.19*	54.46*	56.41*	51.39*	46.64*	55.61*	54.31*
Predictive Accuracy (%). Acquired firms Acquiring Firms	 52 48	 52 48	 46 42	 48 46	 46 42	 50 48	 48 42
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses							
Denotes term is significant at 1% *, 5% **, 10% ***							

A3.2 Acquired and Non-Involved Companies

Table A3.2.1 Logit Results One Year Before the Acquisition

Variable	Models			
Turnover to assets employed	1.97* (4.57)	1.93* (4.14)	1.98* (4.57)	1.93* (4.14)
Turnover to fixed assets				
Sales per employee				
Stock ratio				
Return on capital employed				
Return on s'holders equity				
Pre-tax profit margin				
Net profit margin				
Dividends per share				
Earnings per share	-0.27*** (-1.82)	-0.3** (-2.11)	-0.33** (-2.2)	-0.3** (-2.11)
Dividend yield	0.66*** (1.73)		0.64*** (1.67)	
P/e ratio	-0.55 (-1.49)		-0.6*** (-1.65)	
Capital gearing				
Current ratio				
Acid test ratio	-0.82*** (-1.76)	-0.95** (-2.13)	-1.59** (-2.27)	-0.95** (-2.13)
Debtor days				
Creditor days			0.7 (1.22)	
Total sales				
Manager/employee ratio	-0.8* (-4.88)	-0.75* (-4.92)	-0.75* (-4.8)	-0.75* (-4.92)
Total tax charge				
Constant	0.17 (1.48)			
Likelihood ratio test	89.84*	84.53*	89.19*	84.53*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 32 78	 26 75	 30 66	 24 72
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.2.2 Logit Results Two Years Before the Acquisition

Variable	Models					
Turnover to assets employed	0.96 (1.53)		0.7 (1.16)		0.68 (1.13)	
Turnover to fixed assets	0.86*** (1.99)	1.1* (3.21)	0.95** (2.14)	1.1* (3.21)	1** (2.2)	1.15* (3.3)
Sales per employee			-0.45 (-1.29)		-0.44 (-1.24)	
Stock ratio						
Return on capital employed	-1.41* (2.93)	-1.23* (-3.26)	-1.49* (-3.23)	-1.23* (-3.26)	-1.57* (-3.33)	-1.34* (-3.47)
Return on s'holders equity	0.27 (1.31)		0.22 (1.17)		0.19 (1.06)	
Pre-tax profit margin						
Net profit margin						
Dividends per share						
Earnings per share						
Dividend yield	0.43** (1.98)	0.39** (1.97)	0.35*** (1.68)	0.39** (1.97)		
P/e ratio					0.45** (2.28)	0.48* (2.59)
Capital gearing						
Current ratio						
Acid test ratio						
Debtor days						
Creditor days	-0.9*** (-1.87)					
Total sales						
Manager/employee ratio						
Total tax charge	0.06*** (1.87)					
Likelihood ratio test	25.48*	18.23*	22.68*	18.23*	24.65*	21.32*
Predictive Accuracy (%).						
Acquired firms	30	26	25	22	35	25
Non-Involved Firms	66	72	66	75	62	70
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.2.3 Logit Results Three Years Before the Acquisition

Variable	Models			
Turnover to assets employed	1.69* (2.82)	1.54* (2.65)	1.63* (2.76)	1.55* (2.68)
Turnover to fixed assets				
Sales per employee	-0.99** (-2.33)	-0.89** (-2.15)	-0.91** (-2.19)	-0.86** (-2.1)
Stock ratio				
Return on capital employed	-1.72* (-2.61)	-1.21** (-2.2)	-1.69* (-2.59)	-1.31** (-2.35)
Return on s'holders equity				
Pre-tax profit margin				
Net profit margin				
Dividends per share				
Earnings per share				
Dividend yield			0.48* (2.27)	0.47* (2.23)
P/e ratio	0.34*** (1.78)	0.38** (2.03)		
Capital gearing				
Current ratio				
Acid test ratio				
Debtor days	0.39 (1.27)		0.37 (1.24)	
Creditor days				
Total sales				
Manager/employee ratio				
Total tax charge				
Constant	-0.13 (-1.2)			
Likelihood ratio test	21.09*	17.99*	20.29*	18.63*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 27 66	 26 72	 24 66	 26 62
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.2.4 Logit Results Four Years Before the Acquisition

Variable	Models	
Turnover to assets employed		
Turnover to fixed assets	0.61** (2)	0.6** (2.02)
Sales per employee		
Stock ratio		
Return on capital employed	-1.45** (-2)	-0.65** (-2.1)
Return on s'holders equity		
Pre-tax profit margin		
Net profit margin		
Dividends per share		
Earnings per share		
Dividend yield		
P/e ratio	0.28 (1.37)	
Capital gearing		
Current ratio		
Acid test ratio		
Debtor days		
Creditor days	0.57 (0.89)	
Total sales		
Manager/employee ratio	-0.24* (-3.07)	-0.25* (-3.1)
Total tax charge		
Likelihood ratio test	30.86*	26.51*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	23 63	24 58
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

Table A3.2.5 Hazard Function Results One Year Before the Acquisition

Variable	Models					
Turnover to assets employed	-0.32 (-1.59)	-0.25* (-3.78)	-0.32 (-1.59)	-0.26* (-3.96)	-0.36*** (-1.79)	-0.36*** (-1.81)
Turnover to fixed assets	-0.23* (-3.0)		-0.23* (-3.0)		-0.23* (-3.01)	-0.23* (-3.04)
Sales per employee						
Stock ratio						
Return on capital employed						
Return on s'holders equity	-0.16 (-1.55)		-0.16 (-1.51)		-0.17 (-1.64)	
Pre-tax profit margin						
Net profit margin						
Dividends per share			0.14 (1.17)		0.15 (1.28)	
Earnings per share	0.29** (2.51)	0.2*** (1.88)	0.22*** (1.94)	0.28** (2.53)	0.22*** (1.92)	0.28** (2.56)
Dividend yield	-0.18 (-0.75)					
P/e ratio	0.18 (0.84)					
Capital gearing						
Current ratio						
Acid test ratio						
Debtor days	2.46* (3.27)	2.15* (3.15)	2.33* (3.1)	2.04* (2.98)	2.57* (3.55)	2.55* (3.59)
Creditor days	-1.91* (-2.75)	-1.88* (-2.86)	-1.82* (-2.62)	-1.91* (-2.89)	-1.97* (-2.98)	-2.05* (-3.14)
Total sales						
Manager/employee ratio	0.06* (4.83)		0.07* (5.73)	0.07* (5.88)	0.07* (5.7)	0.07* (5.86)
Total tax charge					-0.05** (-2.50)	-0.05** (-2.22)
Likelihood ratio test	46.05*	20.82*	46.77*	41.31*	49.39*	45.89*
Predictive Accuracy (%).						
Acquired firms	75	66	75	66	72	70
Non-Involved Firms	66	60	72	60	66	66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.2.6 Hazard Function Results Two Years Before the Acquisition

Variable	Models					
Turnover to assets employed	-0.65* (-3.02)	-0.7* (-3.3)	-0.63* (-2.89)	-0.68* (-3.19)	-0.68* (-3.12)	-0.72* (-3.48)
Turnover to fixed assets	-0.05 (-1.11)		-0.05 (-1.11)		-0.05 (-1.15)	
Sales per employee						
Stock ratio						
Return on capital employed						
Return on s'holders equity	-0.23*** (-1.92)	-0.22*** (-1.88)	-0.22*** (-1.83)	-0.22*** (-1.82)	-0.19 (-1.46)	
Pre-tax profit margin						
Net profit margin					-0.29 (-1.52)	-0.31*** (-1.69)
Dividends per share	0.22** (2.55)	0.22** (2.54)	0.23* (2.62)	0.22* (2.65)	0.27* (2.98)	0.27* (2.92)
Earnings per share						-0.27*** (-1.72)
Dividend yield						
P/e ratio					-0.26 (-1.63)	
Capital gearing	0.1 (1.0)					
Current ratio			-0.29*** (-1.72)	-0.29*** (-1.75)		
Acid test ratio						
Debtor days						
Creditor days	1.11* (4.11)	1.21* (4.7)	1.46* (4.82)	1.47* (4.87)	1.62* (5.14)	1.47* (5.15)
Total sales						
Manager/employee ratio						
Total tax charge	-0.08* (-3.68)	-0.08* (-3.71)	-0.08* (-3.8)	-0.08* (-3.83)	-0.09* (-4.09)	-0.09* (-3.99)
Likelihood ratio test	30.15*	27.8*	30.44*	29.5*	35.09*	31.93*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 72 66	 66 66	 72 70	 70 66	 75 66	 70 64
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.2.7 Hazard Function Results Three Years Before the Acquisition

Variable	Models			
Turnover to assets employed	-0.31 (-1.11)			
Turnover to fixed assets				
Sales per employee				
Stock ratio				
Return on capital employed	1.22* (2.96)	1.25* (4.77)	1.12* (4.17)	1.15* (4.34)
Return on s'holders equity	-0.03*** (-1.74)	-0.01 (1.6)	-0.03*** (-1.78)	
Pre-tax profit margin				
Net profit margin				
Dividends per share	0.11 (1.35)		0.12 (1.31)	
Earnings per share				
Dividend yield	0.23 (1.26)		0.28 (1.52)	0.32*** (1.77)
P/e ratio	-0.41* (-2.85)	-0.26*** (-1.93)	-0.42* (-2.95)	-0.42* (-2.94)
Capital gearing				
Current ratio				
Acid test ratio				
Debtor days	-0.58* (-2.76)	-0.5** (-2.45)	-0.49** (-2.41)	-0.49** (-2.38)
Creditor days				
Total sales	0.33 (1.35)			
Manager/employee ratio				
Total tax charge				
Likelihood ratio test	37.19*	26.37*	33.62*	29*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 66 62	 60 56	 64 62	 62 60
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.2.8 Hazard Function Results Four Years Before the Acquisition

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets	-0.24 (-1.31)		-0.24 (-1.31)	
Sales per employee				
Stock ratio				
Return on capital employed				
Return on s'holders equity				
Pre-tax profit margin	0.09* (4.07)	0.09* (3.82)		
Net profit margin			0.07* (3.88)	0.06* (3.62)
Dividends per share				
Earnings per share				
Dividend yield				
P/e ratio	-0.05 (-1.29)		-0.05 (-1.27)	
Capital gearing				
Current ratio				
Acid test ratio				
Debtor days	2.75* (6.14)	2.47* (6.08)	2.71* (6.06)	2.44* (5.99)
Creditor days	-1.98* (-5.01)	-1.96* (-4.97)	-1.92* (-4.9)	-1.9* (-4.86)
Total sales				
Manager/employee ratio				
Total tax charge				
Likelihood ratio test	37.29*	34.68*	36.6*	34.03*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	 62 52	 54 50	 58 52	 54 50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

A3.3 Acquiring and Non-Involved Companies

Table A3.3.1 Logit Results One Year Before the Acquisition

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets				
Sales per employee				
Stock ratio	-0.36** (-2.24)		-0.4** (-2.42)	-0.15*** (-1.71)
Return on capital employed				
Return on s'holders equity	-0.29*** (-1.77)		-0.29*** (-1.74)	-0.19 (-1.33)
Pre-tax profit margin				
Net profit margin				
Dividends per share				
Earnings per share				
Dividend yield				
P/e ratio				
Capital gearing				
Current ratio	-3.21** (-2.22)			
Acid test ratio		-4.11* (-2.99)	-4.16* (-2.87)	-3.83* (-2.76)
Debtor days	3.55** (2.46)	4.28* (3.06)	4.51* (3.08)	4.28* (3.05)
Creditor days				
Total sales	0.19 (1.24)		0.21 (1.39)	
Manager/employee ratio	-0.11** (-2.4)	-0.15* (-2.75)	-0.16* (-2.69)	-0.15* (-2.73)
Total tax charge	0.3* (2.77)		0.31* (2.86)	0.06 (1.37)
Likelihood ratio test	49.02*	29.66*	53.26*	37.11*
Predictive Accuracy (%).				
Acquiring firms	34	32	36	30
Non-Involved Firms	62	54	60	56
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.3.2 Logit Results Two Years Before the Acquisition

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets	0.76* (3.06)	0.77* (3.12)	1.3* (2.59)	1.41** (2.37)	1.24* (2.37)	1.41** (2.37)
Sales per employee			-1.6* (-2.62)	-0.99** (-2.03)	-0.8 (-1.44)	-0.99** (-2.03)
Stock ratio					-0.13 (-1.3)	
Return on capital employed						
Return on s'holders equity						
Pre-tax profit margin			0.82*** (1.8)			
Net profit margin						
Dividends per share	-0.45* (-2.63)	-0.41** (-2.49)	-0.54* (-3.18)	-0.46* (-2.84)	-0.55* (-3.03)	-0.46* (-2.84)
Earnings per share					0.08 (1.41)	
Dividend yield	-0.42*** (-1.85)	-0.43*** (-1.87)				
P/e ratio						
Capital gearing						
Current ratio						
Acid test ratio						
Debtor days						
Creditor days						
Total sales					0.1 (0.88)	
Manager/employee ratio	-0.29* (-2.98)	-0.28* (-2.92)	-0.23** (-2.49)	-0.25* (-2.65)	-0.27* (-2.64)	-0.25* (-2.65)
Total tax charge	0.05 (1.45)					
Likelihood ratio test	37.64*	34.95*	40.07*	37.02*	44.29*	37.02*
Predictive Accuracy (%).						
Acquiring firms	32	30	32	34	40	34
Non-Involved Firms	54	56	50	46	42	50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.3.3 Logit Results Three Years Before the Acquisition

Variable	Models				
Turnover to assets employed					
Turnover to fixed assets	0.91** (2.1)	0.85** (2.04)	0.79*** (1.87)	0.9** (2.12)	0.79** (1.96)
Sales per employee					
Stock ratio					
Return on capital employed					
Return on s'holders equity					
Pre-tax profit margin					
Net profit margin					
Dividends per share					
Earnings per share					
Dividend yield					
P/e ratio					
Capital gearing					
Current ratio	-1.16** (-2.55)	-1.12** (-2.35)		-1.51* (-3.22)	-1.17* (-2.82)
Acid test ratio			-4.44* (-3.29)		
Debtor days			3.21** (2.54)		
Creditor days					
Total sales					
Manager/employee ratio	-0.09*** (-1.82)	-0.09*** (-1.85)	-0.14* (-2.73)	-0.08*** (-1.83)	-0.09** (-2.02)
Total tax charge	0.07 (1.61)		0.11** (2.13)	0.07 (1.51)	
Constant	-0.23** (-2.07)	-0.19*** (-1.78)	-0.26* (-2.33)	-0.17 (-1.61)	
Likelihood ratio test	29.63*	26.75*	30.66*	26.33*	22*
Predictive Accuracy (%).					
Acquiring firms	28	26	32	28	34
Non-Involved Firms	60	56	60	56	66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

Table A3.3.4 Logit Results Four Years Before the Acquisition

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets	1** (2.03)	1.1* (2.86)	0.94** (2.07)	0.9** (2.06)
Sales per employee	-1.15* (-2.72)	-1.09* (-2.79)	-1.23* (-2.86)	-1.27* (-2.98)
Stock ratio				
Return on capital employed				
Return on s'holders equity				
Pre-tax profit margin	-0.38 (-1)		-0.52 (-1.3)	
Net profit margin				
Dividends per share				
Earnings per share	-0.17 (-1.54)	-0.19*** (-1.74)	-0.2*** (-1.77)	-0.22*** (-1.95)
Dividend yield				
P/e ratio	-0.49** (-2.02)	-0.52** (-2.28)	-0.54** (-2.21)	-0.6** (-2.49)
Capital gearing				
Current ratio	-1.44 (-1.44)			
Acid test ratio			-2.4** (-2.37)	-2.34** (-2.31)
Debtor days	1.93*** (1.77)			
Creditor days			3.25* (2.99)	2.84* (2.83)
Total sales				
Manager/employee ratio	-0.12** (-2.07)	-0.11** (-2.02)	-0.12*** (-1.75)	-0.11*** (-1.77)
Total tax charge	0.12*** (1.72)	0.13*** (1.82)	0.13*** (1.8)	0.12*** (1.77)
Likelihood ratio test	64.7*	59.36*	72.35*	70.51*
Predictive Accuracy (%). Acquiring firms Non-Involved Firms	 30 58	 30 60	 32 56	 28 54
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.3.5 Logit Results Five Years Before the Acquisition

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets						
Sales per employee						
Stock ratio			-0.35* (-2.63)	-0.28** (-2.35)		
Return on capital employed						
Return on s'holders equity						
Pre-tax profit margin						
Net profit margin						
Dividends per share						
Earnings per share						
Dividend yield			0.47 (1.31)			
P/e ratio			-0.8** (-2.33)	-0.35*** (-1.91)	-0.39* (-2.59)	-0.31** (-2.23)
Capital gearing						
Current ratio						
Acid test ratio	-0.44* (-2.66)	-0.36** (-2.3)				
Debtor days						
Creditor days						
Total sales						
Manager/employee ratio	-0.14** (-2.03)	-0.14** (-2.06)	-0.14** (-2.12)	-0.14** (-2.12)	-0.17** (-2.34)	-0.16** (-2.32)
Total tax charge	0.09 (1.48)		0.11 (1.54)		0.09 (1.47)	
Constant			-0.2*** (-1.7)	-0.19*** (-1.81)		
Likelihood ratio test	21.93*	18.01*	35.99*	29.27*	21.57*	17.71*
Predictive Accuracy (%).						
Acquiring firms	32	26	37	24	28	32
Non-Involved Firms	56	54	60	48	50	48
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.3.6 Hazard Function Results One Year Before the Acquisition

Variable	Models					
Turnover to assets employed			-0.53 (-1.2)		-0.82*** (-1.73)	
Turnover to fixed assets			0.3 (1.15)		0.44 (1.62)	
Sales per employee						
Stock ratio					0.23* (2.79)	0.22* (2.71)
Return on capital employed					0.1** (2.04)	0.08*** (1.75)
Return on s'holders equity	0.09*** (1.77)	0.09*** (1.74)	0.09*** (1.8)	0.09*** (1.7)	0.09*** (1.77)	0.08*** (1.68)
Pre-tax profit margin					-0.72** (-2.28)	-0.73** (-2.34)
Net profit margin						
Dividends per share	0.26** (2.22)	0.29** (2.45)	0.27** (2.3)	0.27** (2.3)	0.33* (2.7)	0.32* (2.67)
Earnings per share	0.09 (1.24)					
Dividend yield						
P/e ratio						
Capital gearing	-0.08 (-1.55)		-0.08 (-1.58)	-0.08 (-1.63)		
Current ratio	0.51* (2.85)	0.5* (3.04)			0.83** (2.28)	0.53*** (1.72)
Acid test ratio			0.83* (3.07)	0.61* (3.52)		
Debtor days					0.4*** (1.73)	0.38*** (1.74)
Creditor days						
Total sales	-0.01 (-1.53)	-0.01*** (-1.66)	-0.01 (-1.63)	-0.01*** (-1.68)	-0.01*** (-1.9)	-0.01** (-1.99)
Manager/employee ratio						
Total tax charge	-0.03** (-2.4)	-0.03** (-2.47)	-0.04* (-2.71)	-0.03** (-2.5)	-0.05* (-3.57)	-0.04* (-3.24)
Likelihood ratio test	42.68*	39.25*	43.46*	42*	57.49*	54.66*
Predictive Accuracy (%). Acquiring firms Non-Involved Firms	70 64	66 66	70 66	68 64	72 66	70 66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A3.3.7 Hazard Function Results Two Years Before the Acquisition

Variable	Models						
Turnover to assets employed	-0.16 (-0.68)		-0.15 (-0.63)				-0.22 (-0.89)
Turnover to fixed assets							
Sales per employee					0.32 (0.9)		0.46 (1.28)
Stock ratio							
Return on capital employed	0.5** (2)	0.42** (1.96)	0.5*** (1.94)	0.43*** (1.88)	0.43** (2.12)	0.42** (1.96)	0.54** (2.23)
Return on s'holders equity							
Pre-tax profit margin	-0.94* (-2.85)	-0.96* (-2.93)	-0.88* (-2.73)	-0.88* (-2.68)	-1.12* (-3.13)	-0.96* (-2.93)	-1.1* (-3.04)
Net profit margin							
Dividends per share	0.6* (4.68)	0.6* (4.69)	0.61* (4.74)	0.6* (4.71)	0.61* (4.75)	0.6* (4.69)	0.61* (4.79)
Earnings per share							
Dividend yield							
P/e ratio	0.24*** (1.7)	0.25*** (1.8)	0.25*** (1.74)	0.26*** (1.83)	0.26*** (1.82)	0.25*** (1.8)	0.25*** (1.72)
Capital gearing			0.28 (0.72)				
Current ratio	0.69** (2.12)	0.64** (2.03)			0.48 (1.38)	0.64** (2.03)	
Acid test ratio			0.33 (0.76)	0.54*** (1.76)			0.41 (1.27)
Debtor days							
Creditor days							
Total sales	-0.03** (-2.18)	-0.03** (-2.23)	-0.03** (-2.21)	-0.03** (-2.19)	-0.03** (-2.27)	-0.03** (-2.23)	-0.02** (-2.17)
Manager/employee ratio	0.16** (2.04)	0.15** (1.99)	0.15** (2.05)	0.14** (1.97)	0.14*** (1.85)	0.15** (1.99)	0.14*** (1.86)
Total tax charge							
Likelihood ratio test	65.59*	64.59*	64.6*	63.79*	65.42*	64.59*	65.76*
Predictive Accuracy (%).							
Acquiring firms	70	68	70	68	72	70	70
Non-Involved Firms	68	66	64	66	68	68	62
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses							
Denotes term is significant at 1% *, 5% **, 10% ***							

Table A3.3.8 Hazard Function Results Three Years Before the Acquisition

Variable	Models						
Turnover to assets employed							
Turnover to fixed assets	-0.22 (-1.46)		-0.25*** (-1.74)	-0.25*** (-1.69)	-0.24 (-1.57)	-0.25*** (-1.71)	-0.23 (-1.54)
Sales per employee			0.48** (1.97)	0.49** (2)	0.53** (2.05)	0.49** (2.12)	0.5*** (1.91)
Stock ratio							
Return on capital employed							
Return on s'holders equity							
Pre-tax profit margin							0.34 (0.98)
Net profit margin	0.3 (1.09)				0.33 (1.04)		
Dividends per share			0.13 (1.09)				
Earnings per share			-0.06 (-1.22)				
Dividend yield	0.34** (2.18)	0.37** (2.36)	0.35** (2.13)	0.39** (2.44)	0.39** (2.43)	0.38** (2.39)	0.4** (2.52)
P/e ratio							
Capital gearing							
Current ratio			0.55*** (1.79)	0.55*** (1.85)			
Acid test ratio	0.68** (2.27)	0.8* (4.76)			0.93** (2.13)	0.56** (2)	0.9** (2.06)
Debtor days					-0.79 (-1.39)		-0.73 (-1.34)
Creditor days							
Total sales							
Manager/employee ratio	0.05 (1.04)				0.05 (1.11)		0.05 (1.08)
Total tax charge	-0.06** (-1.99)	-0.06** (-2)	-0.06** (-2.38)	-0.06** (-2.25)	-0.06** (-2.29)	-0.06** (-2.3)	-0.07** (-2.34)
Likelihood ratio test	58.72*	54.81*	61.42*	59.72*	63.45*	60.27*	63.47*
Predictive Accuracy (%). Acquiring firms Non-Involved Firms	 68 60	 62 58	 68 62	 66 62	 64 60	 64 58	 68 62
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses							
Denotes term is significant at 1% *, 5% **, 10% ***							

Table A3.3.9 Hazard Function Results Four Years Before the Acquisition

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets	-0.46** (-2.49)	-0.4** (-2.12)	-0.51* (-2.68)	-0.49** (-2.51)
Sales per employee	0.36*** (1.76)	0.42** (2.13)	0.46** (2.22)	0.48** (2.32)
Stock ratio				
Return on capital employed			0.92*** (1.88)	1.08** (2.26)
Return on s'holders equity				
Pre-tax profit margin	0.34 (1.56)		0.28 (1.2)	
Net profit margin				
Dividends per share				
Earnings per share	0.17** (2.02)	0.2** (2.26)	0.17** (1.97)	0.19** (2.14)
Dividend yield				
P/e ratio	0.3*** (1.84)	0.36** (2.31)	0.27*** (1.65)	0.3*** (1.89)
Capital gearing	0.48** (2)	0.57** (2.49)	0.62** (2.35)	0.62** (2.26)
Current ratio				
Acid test ratio				
Debtor days				
Creditor days			-1.01** (-2.37)	-1.02** (-2.45)
Total sales				
Manager/employee ratio	0.08** (2.21)	0.08** (2.29)	0.08** (2.33)	0.09** (2.36)
Total tax charge	-0.03 (-1.39)		-0.04 (-1.52)	
Likelihood ratio test	85.76*	81.96*	89.69*	86.54*
Predictive Accuracy (%).				
Acquiring firms	62	56	62	58
Non-Involved Firms	56	54	58	50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A3.3.10 Hazard Function Results Five Years Before the Acquisition

Variable	Models						
Turnover to assets employed	-0.36 (-1.15)		-0.49 (-1.25)				-0.45 (-1.37)
Turnover to fixed assets							
Sales per employee					0.18 (1.14)		0.18 (1.04)
Stock ratio							
Return on capital employed			0.63 (1.31)				
Return on s'holders equity					-0.02 (-1.09)		
Pre-tax profit margin			-0.05 (-1.5)				
Net profit margin							
Dividends per share	0.14 (1.56)		0.14 (1.61)	0.15*** (1.7)	0.15*** (1.69)	0.15*** (1.7)	0.14 (1.61)
Earnings per share							
Dividend yield							
P/e ratio	0.31*** (1.97)	0.37** (2.44)	0.33** (2.07)	0.35** (2.27)	0.36** (2.3)	0.35** (2.27)	0.32** (2.02)
Capital gearing	0.4 (1.1)		0.58*** (1.81)	0.65* (3.95)	0.53* (2.66)	0.65* (3.95)	0.41 (1.12)
Current ratio	0.66 (1.56)	0.75* (4.63)					0.58 (1.34)
Acid test ratio							
Debtor days							
Creditor days							
Total sales							
Manager/employee ratio	0.1** (2.31)	0.11** (2.34)	0.1** (2.27)	0.09** (2.28)	0.09** (2)	0.09** (2.28)	0.09** (2.04)
Total tax charge	-0.04** (-2.18)	-0.04** (-2.5)	-0.04** (-2.16)	-0.04** (-2.13)	-0.04** (-2.28)	-0.04** (-2.13)	-0.04** (-2.26)
Likelihood ratio test	76.59*	71.92*	76.65*	74.08*	76.18*	74.08*	77.68*
Predictive Accuracy (%).							
Acquiring firms	52	50	52	52	54	56	54
Non-Involved Firms	50	46	48	48	54	52	50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses							
Denotes term is significant at 1% *, 5% **, 10% ***							

A3.4 Hazard Function Results for the Boom and Recession Periods

Table A3.4.1 Hazard Function Results for the Boom and Recession Periods

Variable	Models					
	Acquired and Acquiring Firms		Acquired and Non -Involved Firms		Acquiring and Non -Involved Firms	
	Boom	Recession	Boom	Recession	Boom	Recession
Turnover to assets employed			-0.36 (-0.4)	-0.56 (-1.17)	-0.04 (0.91)	0.03 (2.32)
Turnover to fixed assets	0.01 (0.54)	0.02 (0.79)	-0.16 (-0.25)	-0.02 (-0.19)		
Sales per employee						
Stock ratio						
Return on capital employed					-0.01 (0.48)	-1.04 (-1.72)
Return on s'holders equity			@0 (0.88)	-0.13 (-1.59)		
Pre-tax profit margin					0.24 (0.61)	-0.25 (-0.35)
Net profit margin			0.05 (0.64)	-0.08 (-0.14)		
Dividends per share			0 24 (1.68)	0.1 (0.39)	0.15 (0.18)	0.53 (1.84)
Earnings per share	0.11 (1.28)	0.05 (0.63)				
Dividend yield	0.35 (1.24)	0.34 (0.44)				
P/e ratio			-0.06 (-0.34)	0.36 (0.9)	0.03 (0.91)	0.49 (0.99)
Capital gearing						
Current ratio	-0.99 (-2.94)	-0.44 (-0.57)			0.18 (0.73)	1.23 (1.53)
Acid test ratio						
Debtor days						
Creditor days			0.18 (0.36)	1.01 (1.29)		
Total sales	0.5 (2.09)	0.08 (0.3)			-0.17 (-0.91)	-0.03 (-0.92)
Manager/ employee ratio					0.2 (0.013)	0.52 (1.91)
Total tax charge	0.05 (0.47)	0.12 (2.03)	-0.01 (-0.24)	0.08 (1.16)	-0.03 (0.64)	-0.03 (0.45)
Likelihood ratio test (Critical value in parentheses)	13.97 (12.59)	7.2 (12.59)	6.86 (15.51)	14.79 (15.51)	26.59 (16.91)	41.23 (16.91)
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						

Appendix IV : Complete Hazard Function and Logit Results for Chapter 5

A4.1 Acquiring and Acquired Companies

Table A4.1.1 Logit Results For Acquired and Acquiring Firms In the Boom Period

Variable	Models		
Turnover to assets employed			
Turnover to fixed assets			
Sales per employee	2.14* (2.6)	2.06* (2.6)	2.27* (2.82)
Stock ratio			
Return on capital employed			
Return on s'holders equity			
Pre-tax profit margin			
Net profit margin			
Dividends per share			
Earnings per share			
Dividend yield			
P e ratio			
Capital gearing			
Current ratio	2.93 (1.16)		
Acid test ratio			
Debtor days			
Creditor days			
Total sales	-0.51 (-1.62)		-0.49 (-1.58)
Manager/employee ratio	-0.07 (-1.33)	-0.08 (-1.48)	-0.08 (-1.51)
Total tax charge			
Macro1			
Macro2			
Macro3	-4.26 (-1.59)	-1.75** (-2.18)	-1.48*** (-1.83)
Macro4			
Macro5			
Macro6			
Likelihood ratio test	22.24*	14.52*	19.31*
Predictive Accuracy (%). Acquired firms Acquiring Firms	63 52	55 34	55 34
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses			
Denotes term is significant at 1% *, 5% **, 10% ***			

Table A4.1.2 Logit Results For Acquired and Acquiring Firms In the Bust Period

Variable	Models		
Turnover to assets employed			
Turnover to fixed assets			
Sales per employee			
Stock ratio			
Return on capital employed			
Return on s'holders equity			
Pre-tax profit margin			
Net profit margin			
Dividends per share			
Earnings per share			-0.29 (-1.34)
Dividend yield			
P/e ratio			
Capital gearing			
Current ratio	2.47*** (1.74)		2.06* (2.15)
Acid test ratio			
Debtor days			
Creditor days			
Total sales			-2.07 (-1.48)
Manager/employee ratio			
Total tax charge	-0.24 (-1.55)	-0.24 (-1.53)	
Constant		26 (1.25)	24 (1.22)
Macro1	-2.33 (-1.61)	-1.6 (-1.48)	
Macro2			
Macro3		1.78*** (1.67)	
Macro4			0.77 (1.43)
Macro5	0.69*** (1.92)	0.66*** (1.83)	
Macro6			
Likelihood ratio test	15.54*	15.12*	11.34***
Predictive Accuracy (%). Acquired firms Acquiring Firms	63 60	63 66	55 58
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses			
Denotes term is significant at 1% *, 5% **, 10% ***			

Table A4.1.3 Hazard Functions Results For Acquired and Acquiring Firms In the Boom Period

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets						
Sales per employee	-0.31** (-2.2)	-0.38* (-2.86)	-0.34** (-2.41)	-0.32** (-2.27)	-0.33** (-2.35)	-0.33** (-2.34)
Stock ratio						
Return on capital employed						
Return on s'holders equity						
Pre-tax profit margin						
Net profit margin						
Dividends per share						
Earnings per share	0.11 (1.25)			0.11 (1.26)		
Dividend yield	0.46 (1.4)	0.47 (1.5)	0.54*** (1.73)	0.5 (1.53)	0.39 (1.35)	0.53*** (1.68)
P e ratio	-0.2 (-1.24)	-0.27*** (-1.74)	-0.24*** (-1.57)	-0.2 (-1.23)		-0.22 (-1.42)
Capital gearing			1.37** (2.44)	1.44** (2.56)	1.47* (2.64)	
Current ratio	-0.4** (-2.35)			-1.33** (-2.26)	-1.38** (-2.38)	-1.38** (-2.33)
Acid test ratio						
Debtor days			-0.91** (-2.38)			
Creditor days		-1.26** (-2.13)				
Total sales	0.63** (2.38)	0.52** (2.09)	0.59** (2.26)	0.62** (2.33)	0.63** (2.37)	0.64** (2.38)
Manager employee ratio	0.05*** (1.8)	0.05*** (1.76)	0 05*** (1.83)	0.05*** (1.87)	0.05*** (1.81)	0.05*** (1.74)
Total tax charge						
Macro1	-0.8** (-1.99)		-0.98** (-2.54)	-0.83** (-2.04)	-0.78*** (-1.91)	-0.75*** (-1.84)
Macro2						
Macro3	1.49** (2.52)	0.97 (1.55)				1.52** (2.57)
Macro4						
Macro5						
Macro6						
Likelihood ratio test	27.59*	21.66*	27.17*	28.87*	25.55*	25.78*
Predictive Accuracy (%). Acquired Acquiring Firms	75 50	66 59	66 52	75 58	58 42	75 52
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A4.1.4 Hazard Function Results For Acquired and Acquiring Firms In the Bust Period

Variable	Models	
Turnover to assets employed		
Turnover to fixed assets		
Sales per employee	-0.31 (-1.23)	
Stock ratio		
Return on capital employed		
Return on s'holders equity	-0.11 (-1.27)	-0.12 (-1.46)
Pre-tax profit margin		
Net profit margin		
Dividends per share		
Earnings per share	0.25 (1.47)	0.23 (1.3)
Dividend yield		
P/e ratio	1.37*** (1.86)	1.25*** (1.71)
Capital gearing		
Current ratio		-4.62** (-2.19)
Acid test ratio	-2.26** (-2.2)	
Debtor days		
Creditor days		2.8 (1.15)
Total sales	1.75 (1.63)	1.28 (1.25)
Manager/employee ratio	-0.04 (-1.26)	-0.04 (-1.25)
Total tax charge		
Macro1		
Macro2		
Macro3		
Macro4	-0.66 (-1.61)	-0.48 (-1.23)
Macro5		
Macro6		
Likelihood ratio test	16.18**	13.46***
Predictive Accuracy (%). Acquired firms Acquiring Firms	83 66	75 58
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses		
Denotes term is significant at 1% *, 5% **, 10% ***		

A4.2 Acquired and Non-Involved Companies

Table A4.2.1 Logit Results For Acquired and Non-Involved Firms In the Boom Period

Variable	Models				
Turnover to assets employed	2.2* (2.89)		2.14* (2.81)		1.95* (2.61)
Turnover to fixed assets					
Sales per employee					
Stock ratio					
Return on capital employed	-4.54* (-3.2)	-4.31* (-3.02)	-4.13* (-2.97)	-3.75* (-2.7)	-5.97* (-3.6)
Return on s'holders equity					
Pre-tax profit margin					
Net profit margin					
Dividends per share					
Earnings per share					
Dividend yield					-0.49 (-1.39)
P e ratio					
Capital gearing					-1.55*** (-1.95)
Current ratio					
Acid test ratio					
Debtor days					
Creditor days	1.25 (1.43)		1.23 (1.41)		1.38 (1.35)
Total sales					
Manager employee ratio					
Total tax charge					
Constant		19.68 (1.64)		17.79 (1.49)	
Macro1					
Macro2			1.43 (1.51)	1.14 (1.22)	
Macro3	1.78** (1.97)	1.73*** (1.91)			5.31* (2.67)
Macro4					
Macro5					
Macro6		3.51* (2.59)		3.48** (2.47)	
Likelihood ratio test	22.17*	24.84*	20.03*	22.09*	29.35*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	66 42	50 33	66 42	50 25	66 42
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

Table A4.2.2 Logit Results For Acquired and Non-Involved Firms In the Bust Period

Variable	Models		
Turnover to assets employed			1.38 (1.72)
Turnover to fixed assets	0.84*** (1.71)		
Sales per employee			
Stock ratio	1.11 (1.62)	1.39 (1.83)	
Return on capital employed			
Return on s'holders equity			
Pre-tax profit margin	8.01 (2.17)		
Net profit margin			
Dividends per share		-0.63 (-1.41)	-0.57 (-1.3)
Earnings per share			
Dividend yield			
P/e ratio			
Capital gearing	-0.17 (-1.48)		-0.3 (-1.25)
Current ratio			
Acid test ratio	-11.45 (-2.72)		
Debtor days			
Creditor days		-5.39 (-1.74)	-2.28 (-1.86)
Total sales			
Manager/employee ratio			
Total tax charge			
Macro1			
Macro2			
Macro3			1.5 (1.15)
Macro4			
Macro5	1.52 (2.41)		
Macro6		4.59 (1.46)	
Likelihood ratio test	21.11*	16.41*	8.31
Predictive Accuracy (%). Acquired firms Non-Involved Firms	66 50	58 42	50 42
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses			
Denotes term is significant at 1% *, 5% **, 10% ***			

Table A4.2.3 Hazard Function Results For Acquired and Non-Involved Firms In the Boom Period

Variable	Models					
Turnover to assets employed			-1.08* (-2.6)	-1.14* (-2.72)	-1.13* (-2.7)	
Turnover to fixed assets	-0.79* (-2.61)	-0.78* (-2.57)				-0.53 (-1.26)
Sales per employee				-0.1 (-0.65)		
Stock ratio						
Return on capital employed	3.01* (3.21)	2.88* (3.19)	3.37* (3.42)	3.38* (3.41)	3.19* (3.63)	2.64* (3.57)
Return on s'holders equity						
Pre-tax profit margin						
Net profit margin						
Dividends per share	0.16 (1.11)			0.17 (1.22)	0.18 (1.3)	0.15 (1.12)
Earnings per share						
Dividend yield			0.43*** (1.72)			
P e ratio						
Capital gearing						
Current ratio			0.93 (1.18)	0.77 (1)		
Acid test ratio						
Debtor days	-1.44* (-3.16)	-0.81 (-1.55)	-1.61* (-3.05)	-1.42* (-2.94)	-1.15* (-2.99)	
Creditor days		-1.8* (-2.92)				-1.64* (-3.04)
Total sales		0.21 (1.01)				
Manager employee ratio	0.06* (3.12)		0.07* (3.53)	0.06* (3.18)	0.06* (3.26)	0.06* (3.3)
Total tax charge						
Macro1	-1.32* (-2.99)		-1.19** (-2.43)	-1.2** (-2.47)	-1.19** (-2.44)	
Macro2	1.19 (1.28)	1.1 (1.16)				
Macro3	-0.89 (-1.13)	-0.81 (-1.15)	-0.84 (-1.12)	-0.58 (-0.75)		
Macro4						
Macro5						
Macro6						-0.75 (-1.1)
Likelihood ratio test	26.09*	17.01**	25.56*	26.7*	25.31*	24.81*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	75 66	83 58	83 66	75 66	75 66	75 58
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A4.2.3 Hazard Function Results For Acquired and Non-Involved Firms In the Bust Period

Variable	Models			
Turnover to assets employed		-0.55 (-1.25)	-0.66 (-1.55)	-0.66 (-1.55)
Turnover to fixed assets				
Sales per employee	-0.03 (-1.23)	-0.03 (-1.24)	-0.03 (-1.22)	
Stock ratio		-0.52* (-3.15)	-0.47* (-2.93)	-0.47* (-2.93)
Return on capital employed	-1.43** (-2.22)			
Return on s'holders equity	-1.14 (-1.32)	-1.4*** (-1.78)	-1.37*** (-1.68)	-1.36*** (-1.67)
Pre-tax profit margin		-6.14** (-2.08)	-5.86** (-2)	-5.97** (-2.05)
Net profit margin	-2.78 (-1.41)			
Dividends per share	0.39 (1.51)	0.31 (1.16)		
Earnings per share				
Dividend yield				
P/e ratio				
Capital gearing				
Current ratio				
Acid test ratio				
Debtor days				
Creditor days	4.9** (2.14)	8.81** (2.56)	8.68** (2.54)	8.77* (2.58)
Total sales				
Manager/employee ratio				
Total tax charge				
Macro1				
Macro2				
Macro3	0.53 (1.11)			
Macro4				
Macro5	-0.68*** (-1.78)	-1.1** (-2.2)	-1.04** (-2.09)	-1.06** (-2.14)
Macro6				
Likelihood ratio test	19**	25.47*	24.06*	23.01*
Predictive Accuracy (%). Acquired firms Non-Involved Firms	70 55	75 66	83 66	75 66
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

A4.3 Acquiring and Non-Involved Companies

Table A4.3.1 Logit Results For Acquiring and Non-Involved Firms In the Boom Period

Variable	Models				
Turnover to assets employed		-1.74 (-1.63)			
Turnover to fixed assets					
Sales per employee				-1.02 (-1.42)	-1.87** (-2.13)
Stock ratio					
Return on capital employed					
Return on s'holders equity					
Pre-tax profit margin					
Net profit margin	-1.03 (-1.61)				
Dividends per share					
Earnings per share					
Dividend yield					
P/e ratio					
Capital gearing					
Current ratio	-4.4** (-2.32)			-4.17*** (-1.79)	
Acid test ratio					
Debtor days	2.03** (2.02)		1.5 (1.55)		1.78*** (1.75)
Creditor days					
Total sales					
Manager/employee ratio	-0.37* (-2.66)	-0.3** (-2.18)	-0.33** (-2.33)	-0.29** (-2.13)	-0.31** (-2.22)
Total tax charge					0.18 (1.51)
Macro1					
Macro2		-6.59** (-2.15)	-6.51** (-2.07)		-6.51*** (-1.91)
Macro3	3.68** (2.12)	5.39*** (1.82)	5.24*** (1.8)	5.36** (2.18)	6.63*** (1.95)
Macro4					
Macro5					
Macro6		3.19** (2.13)			
Likelihood ratio test	24.58*	25.37*	22.54*	22.59*	29.33*
Predictive Accuracy (%). Acquir'g Firms Non-Involved Firms	66 51	66 50	34 25	54 41	66 50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses					
Denotes term is significant at 1% *, 5% **, 10% ***					

Table A4.3.2 Logit Results For Acquiring and Non-Involved Firms In the Bust Period

Variable	Models			
Turnover to assets employed				
Turnover to fixed assets				
Sales per employee				
Stock ratio		-0.37 (-1.52)	-0.47 (-1.62)	
Return on capital employed			11.1** (2.45)	
Return on s'holders equity			-2.63** (-2.12)	
Pre-tax profit margin				6.19** (2.14)
Net profit margin				
Dividends per share				
Earnings per share				
Dividend yield	-1.01 (-1.37)	-1.06 (-1.44)	-1.38 (-1.56)	-1.04 (-1.3)
P/e ratio				
Capital gearing				
Current ratio	-7.04*** (-1.9)			-9.49** (-2.16)
Acid test ratio				
Debtor days				
Creditor days	5.32*** (1.91)			
Total sales				
Manager/employee ratio	-1.03** (-2.52)	-0.94* (-2.58)	-1.04** (-2.33)	-1.05** (-2.5)
Total tax charge		0.23 (1.32)	0.32 (1.38)	
Macro1				
Macro2		0.14 (1.18)	-7.56*** (-1.78)	
Macro3				
Macro4				
Macro5				1.2*** (1.74)
Macro6	2.16 (1.54)			2.61*** (1.57)
Likelihood ratio test	37.55*	37.62*	53.92*	39.34*
Predictive Accuracy (%). Acquiring Firms Non-Involved Firms	42 25	42 34	66 50	66 50
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses				
Denotes term is significant at 1% *, 5% **, 10% ***				

Table A4.3.3 Hazard Function Results For Acquiring and Non-Involved Firms In the Boom Period

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets						
Sales per employee						
Stock ratio						
Return on capital employed						
Return on s'holders equity						
Pre-tax profit margin					-0.06 (-1.39)	
Net profit margin						0.31 (1.56)
Dividends per share	0.16 (1.4)				0.16 (1.4)	0.16 (1.41)
Earnings per share		0.06*** (1.89)	0.06 (1)	0.06*** (1.9)		
Dividend yield			0.14 (1.5)			
P e ratio		0.16 (1.55)				
Capital gearing				-0.46** (-2.34)	-0.45** (-2.29)	
Current ratio		2.14* (2.62)				
Acid test ratio						
Debtor days		-0.22 (-0.42)		-0.24 (-0.4)		-0.42 (-0.68)
Creditor days	-0.42 (-1.51)	-0.45 (1.53)				-0.46 (-1.55)
Total sales						
Manager employee ratio	0.21* (2.71)	0.22* (2.62)	0.22* (2.58)	0.22** (2.46)	0.2** (2.54)	0.21* (2.79)
Total tax charge					-0.02 (-0.4)	
Macro1			-0.47 (-0.9)	-0.47 (-0.9)	-0.46 (-0.8)	
Macro2	1.9* (3.17)		1.93* (2.58)	1.58*** (1.93)	1.33** (2.18)	2.05** (2.47)
Macro3	-1.18** (-2.24)	-1.22** (-2.33)	-1.21* (-2.67)			-1.18** (-2.23)
Macro4						
Macro5						0.01 (0.73)
Macro6						
Likelihood ratio test	30.74*	29.52*	28.45*	28.2*	30.38*	31.56*
Predictive Accuracy (%). Acquiring Non-Involved Firms	75 83	66 75	75 66	58 66	58 66	66 58
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Table A4.3.4 Hazard Function Results For Acquiring and Non-Involved Firms In the Bust Period

Variable	Models					
Turnover to assets employed						
Turnover to fixed assets						
Sales per employee	-0.77 (-1.26)				-0.78 (-1.3)	
Stock ratio	0.22 (1.51)	0.23 (1.57)	0.23 (1.6)	0.3*** (1.87)	0.25*** (1.66)	0.19 (1.33)
Return on capital employed						
Return on s'holders equity	0.73 (1.4)	0.71 (1.47)	0.68 (1.45)	0.87*** (1.74)	1.02*** (1.81)	0.66 (1.38)
Pre-tax profit margin						
Net profit margin						
Dividends per share	0.89* (2.65)	0.75** (2.13)	0.97** (2.56)	0.7** (2.2)	0.45 (1.57)	0.81** (2.16)
Earnings per share	-0.17 (-1.65)	-0.18** (-1.94)	-0.19** (-1.97)			-0.18*** (-1.93)
Dividend yield						
P/e ratio						
Capital gearing				-1.36** (-1.99)		
Current ratio	1.89** (2.37)				1.66** (2.15)	1 (1.54)
Acid test ratio						
Debtor days						
Creditor days						
Total sales					-	
Manager/employee ratio	0.79* (2.76)	0.66** (2.54)	0.74* (2.82)	0.82* (2.79)	0.79* (2.6)	0.71* (2.67)
Total tax charge		-0.09* (-3.03)				
Macro1						
Macro2		1.11*** (1.7)				
Macro3	-1.71** (-2.13)	-1.72** (-2.17)	-1.03 (-1.49)		-2.06** (-2.53)	-1.17** (-2.22)
Macro4	-0.02* (-2.96)		-0.02* (-3)	-0.01* (-2.67)		-0.16* (-2.88)
Macro5						
Macro6	-0.45 (-1.3)					
Likelihood ratio test	46.97*	45.65*	42.36*	41.19*	39.31*	44.32*
Predictive Accuracy (%). Acquiring Non-Involved Firms	75 66	66 83	66 83	58 66	66 58	75 58
All coefficients are in thousands (x 10^{-3}), t-statistics in parentheses						
Denotes term is significant at 1% *, 5% **, 10% ***						

Appendix V : Complete Set of Results for Chapter 6

A5.1 Results Generated with the Original Form of the Market Model

Table A5.1.1 Average Cumulative Abnormal Returns Estimated for a Five Day Window

Type of Bid	Window : 5 days before the acquisition to 5 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	*100*	**32**	**15**	**21**	*68*
Acquired firms	10.7*	21**	0.25	3.42**	*9.05**	18.6*	3.47**	2.5**	*10.26**
Acquiring firms	-0.41	-3.4**	-0.14	-0.89	*-1.21*	-0.06	-4.6*	-1.43	*-1.49*
Acquir'd control	3.96*	0.58	0.11	-5.79*	*0.15*	0.56	-2.6**	-2.5**	*-1.09*
Acquir'g control	2.6**	-1.12	2.04**	-5.47*	*-0.06*	1.7**	5.13*	3.57*	*3***
Successful bids	**18**	**16**	**21**	**15**	*70*	**23**	**12**	**19**	*54*
Acquired firms	8.78*	16.5*	116.7*	0.53	*41.16**	15.7*	3.92*	5.47*	*9.48**
Acquiring firms	-2.4**	-4.38*	-3.81*	-1.53	*-3.1***	-0.74	-2.4**	-2.6**	*-1.8***
Acquir'd control	2.5**	0.31	23.9*	-7*	*6.39**	-1.13	-1.17	-2.5**	*-1.6*
Acquir'g control	1.44	-2.3**	0.81	-4*	*-0.76*	0.65	8.67*	4.11*	*3.65**
Failed bids	**9**	**10**	**7**	**4**	*30*	**9**	**3**	**2**	*14*
Acquired firms	14.33*	28.9*	-6.43*	1.5	*12.63**	27.44*	1.67	-26*	*14.29**
Acquiring firms	3.7**	-2.8**	11.29*	1	*2.93***	-1.67	13*	-10*	*0.29*
Acquir'd control	7*	1	138.9*	0.25	*35.1**	4.89*	-8.33*	-2**	*1.07*
Acquir'g control	4.89*	0.5	57.71*	-4*	*14.57**	4.33*	13.33*	-1.5	*5.43**
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	*16*	**3**	**0**	**2**	*5*
Acquired firms	39*	13.2*	-4**	12.5*	*10.88**	29.33*	-	-0.5	*17.4**
Acquiring firms	-4**	-13.6*	-9.6*	0.75	*-7.56**	0.33	-	-7*	*-2.6***
Acquir'd control	4**	-4.4**	-34.6*	-1.5	*-12.1**	-3**	-	13.5*	*3.6***
Acquir'g control	-2**	-10.2*	2.2**	-7.5*	*-4.6***	1.67	-	1.5	*1.6*
Contested bids	**1**	**4**	**5**	**1**	*11*	**2**	**0**	**1**	*3*
Acquired firms	44*	19.5*	-6*	26*	*12.73**	30.5*	-	81*	*47.33**
Acquiring firms	14*	15.5*	2.2	12*	*9**	-2.5**	-	-14*	*-6.33**
Acquir'd control	19*	11*	129.8*	21*	*66.64**	-10.5*	-	24*	*1*
Acquir'g control	13*	2.25**	0.6	7*	*2.91***	9*	-	13*	*10.33**
White knight bids	**0**	**1**	**1**	**0**	*2*	**1**	**0**	**0**	*1*
Acquired firms	-	-9*	3**	-	*-3***	-15*	-	-	*-15**
Acquiring firms	-	9*	5**	-	*7**	-5**	-	-	*-5***
Acquir'd control	-	-15*	-173*	-	*-21**	-21*	-	-	*-21**
Acquir'g control	-	0	1	-	*0.5*	-1	-	-	*-1*
Significant at 1% *, 5% **, 10% ***									

Table A5.1.2 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 5 days before the acquisition to 5 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	1.69	3.74*	0.23	0.4	4.43*	3.45*	0.59	0.87	3.08*
Acquired & Control	0.51	3.14*	0.97	2***	0.6	0.12	0.34	0.9	3.19*
Acquiring & Control	0.28	0.5	0.44	0.15	0.45	0.87	0.54	0.49	1.16
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	3.46*	2***	0.7	0.7	3.34*	2.4**	1.16	0.64	2.79*
Acquired & Control	1.2	2***	1	1.23	0.15	1.12	0.48	0.28	2.6**
Acquiring & Control	0.36	0.59	0.51	0.48	1.27	0.96	0.35	0.64	0.74
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	0.54	2.7**	0.7	1.2	3.05*	1.04	0.98	1.07	1.3
Acquired & Control	2***	4.9*	0.53	0.69	0.53	2***	0.37	0.49	2***
Acquiring & Control	0.58	0.67	0.19	0.36	0.68	0.26	0.27	0.57	0.96
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	1.82	2	0.69	0.7	3.61*	1.65	-	0.84	2***
Acquired & Control	1	1.96	0.7	1.3	0.76	1.4	-	1.74	1.15
Acquiring & Control	0.94	0.52	0.4	0.8	1.23	0.91	-	0.36	0.82
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	0.76	3.9**	-	0.59	0.58	-	-	1.26
Acquired & Control	-	0.62	0.61	-	0.7	0.44	-	-	0.89
Acquiring & Control	-	0.18	0.58	-	1.32	0.58	-	-	1.82
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	1.2	-	-	-	-
Acquired & Control	-	-	-	-	0.89	-	-	-	-
Acquiring & Control	-	-	-	-	0.84	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

Table A5.1.3 Average Cumulative Abnormal Returns Estimated for a Ten Day Window

Type of Bid	Window : 10 days before the acquisition to 10 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired firms	18*	21*	2.4**	4.32*	*11.8**	-2.3**	4.53*	3.57*	*1.03*
Acquiring firms	-1.48	-3.4**	-0.57	-2.2**	*-1.9***	-0.66	-4.53*	-1.33	*-1.7***
Acquir'd control	-0.11	0.58	-0.21	-5.84*	*-1.05*	-0.25	-0.33	-4.14*	*-1.47*
Acquir'g control	3.63*	-1.12	1.07	-7.05*	*-0.35*	1.8**	5.8*	4.19*	*3.4**
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired firms	18.1*	16.5*	1.7	1.4	*9.21**	16.7*	4.25*	6.53*	*10.4**
Acquiring firms	-4.06*	-4.38*	-3.4**	-3**	*-3.71**	-1.13	-2.5**	-2.4**	*-2***
Acquir'd control	5*	0.31	22.6*	-6.87*	*6.66**	-0.83	0.67	-4.16*	*-1.7*
Acquir'g control	1.44	-2.2**	-0.1	-5*	*-1.23*	0.7	9.75*	4.53*	*4.06**
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired firms	17.8*	28.9*	-4.71*	2**	*14.2**	27.2*	5.67*	-24*	*15.3**
Acquiring firms	3.7**	-2.7**	8.43*	1.25	*2.3***	-0.67	12.7*	-12.5*	*0.5*
Acquir'd control	9.33*	1	18.6*	0.25	*7.5**	1.22	-4.3*	-4*	*-0.71*
Acquir'g control	6.78*	0.5	4.57*	-5.25*	*2.5***	4.56*	12.3*	1	*5.71**
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired firms	21*	13.2*	-5.4*	13.3*	*8.38**	30.3*	-	-3**	*17**
Acquiring firms	-5*	-13.6*	-6*	-0.25	*-6.81**	0.33	-	-7*	*-2.6***
Acquir'd control	7.5*	-4.4**	-52.2*	-2.5**	*-17.4**	-2.3**	-	13.5*	*4***
Acquir'g control	9*	-10.2*	1.8	-9.5*	*-3.9***	-1.33	-	9*	*2.8***
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired firms	39*	19.5*	-6.2*	26*	*10.2**	27*	-	48*	*34**
Acquiring firms	19*	15.5*	2	14*	*9.55**	-1.5	-	-14*	*-5.67**
Acquir'd control	19*	11*	162*	67*	*85.9**	5**	-	12*	*7.33**
Acquir'g control	13*	2.3**	0.8	3	*2.7***	11*	-	41*	*21**
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired firms	-	-9*	1	-	*-4***	-18*	-	-	*-18**
Acquiring firms	-	9*	6**	-	*7.5**	-3**	-	-	*-3***
Acquir'd control	-	-15*	-26*	-	*-20.5**	10*	-	-	*10**
Acquir'g control	-	0	1	-	*0.5*	9*	-	-	*9**
Significant at 1% *, 5% **, 10% ***									

Table A5.1.4 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 10 days before the acquisition to 10 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	2.5**	3.75*	0.47	1.19	4.15*	4.95*	2***	0.68	2.96*
Acquired & Control	0.27	3.14*	1	0.44	0.5	0.26	0.9	0.54	3.26*
Acquiring & Control	0.35	0.49	0.54	0.71	1.08	0.74	0.62	0.42	0.91
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	4.2*	2***	0.47	0.9	3.2*	3.5*	1.14	0.53	2.3**
Acquired & Control	0.8	1.84	0.79	0.83	0.24	2***	0.92	0.18	2.6**
Acquiring & Control	0.59	0.6	0.15	0.56	2**	0.79	0.39	0.63	0.58
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	0.25	2.7**	0.85	0.64	2.7**	0.84	0.63	1.2	2***
Acquired & Control	1.6	4.9*	0.57	0.66	0.52	0.55	0.4	0.96	2.3**
Acquiring & Control	0.41	0.6	0.26	0.29	0.68	0.41	0.51	0.5	0.75
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	0.83	2	0.94	0.84	2.3**	2.3	-	0.77	1.44
Acquired & Control	0.87	1.96	0.88	1	0.78	1.2	-	2	0.75
Acquiring & Control	0.59	0.52	0.2	0.63	0.77	0.95	-	0.36	0.54
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	0.76	3.4**	-	0.9	0.64	-	-	0.91
Acquired & Control	-	0.62	0.58	-	0.62	0.73	-	-	0.5
Acquiring & Control	-	0.18	0.42	-	1.2	0.62	-	-	1.6
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	1.89	-	-	-	-
Acquired & Control	-	-	-	-	0.89	-	-	-	-
Acquiring & Control	-	-	-	-	3.8	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

Table A5.1.5 Average Cumulative Abnormal Returns Estimated for a Twenty Day Window

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired firms	21.9*	21*	3.1**	2.7**	*12.7**	19.6*	6*	1.29	*10.9**
Acquiring firms	3.7*	-3.4**	-0.79	-1.47	*-0.38*	-1.31	-3.6*	0.05	*-1.4*
Acquir'd control	11.9*	0.62	-19.1*	-5.84*	*-3.1***	1.9**	-0.2	-13	*-3.2***
Acquir'g control	6*	-1.15	3.1**	-9.05*	*0.47*	2.1**	6.13*	4.71*	*3.81**
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired firms	23*	16.5*	1.24	-0.47	*9.96**	17.7*	4.42*	5.74*	*10.5**
Acquiring firms	-0.39	-4.38*	-3.5**	-2**	*-2.6***	-1.35	-1.17	-1.05	*-1.2*
Acquir'd control	7.67*	0.38	20.1*	-6.33*	*6.73**	2**	1	-12.1*	*-3.2***
Acquir'g control	2.9**	-2.2**	1.05	-6.07*	*-0.74*	-0.3	10.2*	5.11*	*3.93**
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired firms	19.6*	28.9*	8.71*	0.75	*17.6**	26.7*	12.3*	-41*	*13.9**
Acquiring firms	11.9*	-2.7**	8*	1	*4.67**	1.22	13.3*	-10.5*	*2.1***
Acquir'd control	20.2*	1	28.1*	-0.5	*12.9**	1.56	-5*	-22*	*-3.2***
Acquir'g control	12.2*	0.5	9.29*	-10.8*	*4.57**	8.33*	12*	1	*8.07**
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired firms	39*	13.2*	-3**	14*	*11.6**	31*	-	4**	*20.2**
Acquiring firms	-1.5	-13.4*	-9*	-0.5	*-7.31**	0.33	-	-14.5*	*-5.6**
Acquir'd control	12.5*	-4.2**	-93.4*	-3.5**	*-29.8**	-6*	-	16*	*2.8***
Acquir'g control	15*	-10*	1.4	-10	*-3.3***	-1.67	-	24*	*8.6**
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired firms	44*	19.5*	5.4**	34*	*16.6**	24*	-	33*	*27**
Acquiring firms	39*	15.5*	2	11*	*11.1**	-4**	-	-29*	*-12.3**
Acquir'd control	13*	11*	22.8*	23*	*17.6**	-6.5*	-	26*	*4.33**
Acquir'g control	12*	2.3**	4**	17*	*5.3***	20*	-	14*	*18**
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired firms	-	-9*	0	-	*-4.5***	-18*	-	-	*-18**
Acquiring firms	-	9*	2	-	*5.5***	-8*	-	-	*-8**
Acquir'd control	-	-15*	-46*	-	*-30.5**	-13*	-	-	*-13**
Acquir'g control	-	0	3**	-	*1.5*	-8*	-	-	*-8**
Significant at 1% *, 5% **, 10% ***									

Table A5.1.6 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	3.87*	3.77*	2***	4.4*	3.09*	5.1*	0.19	0.74	2.81*
Acquired & Control	0.4	3.12*	0.98	1.29	0.3	3.5*	0.9	0.15	3.2*
Acquiring & Control	0.54	0.49	0.31	0.54	0.77	0.9	0.7	0.29	0.91
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	3.4*	2.2**	1.32	0.79	2.9*	3.4*	0.93	2***	2.3**
Acquired & Control	0.77	1.8	0.86	2***	0.4	2.7**	1.18	0.97	2.69*
Acquiring & Control	0.32	0.59	0.18	0.8	1.44	0.62	0.32	0.39	0.68
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	2.9**	2.7**	0.87	1.75	2.1**	2.4**	0.61	1.1	1.68
Acquired & Control	2***	4.9*	0.65	0.88	0.76	1.55	0.36	1.1	1.73
Acquiring & Control	0.68	0.61	0.53	0.36	0.43	0.38	0.79	0.64	0.62
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	0.93	2.2**	0.85	0.9	2.8**	1.76	-	0.66	1.28
Acquired & Control	0.91	1.96	0.93	1.1	0.78	1.29	-	1.9	0.68
Acquiring & Control	0.54	0.52	0.11	0.7	0.89	0.95	-	0.16	0.59
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	0.76	0.74	-	0.8	0.6	-	-	1.04
Acquired & Control	-	0.62	0.53	-	0.56	0.55	-	-	1.15
Acquiring & Control	-	0.18	0.43	-	2***	0.5	-	-	1.42
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	1.33	-	-	-	-
Acquired & Control	-	-	-	-	0.52	-	-	-	-
Acquiring & Control	-	-	-	-	3**	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

A5.2 Results Generated with the Market Model and a Time Varying Beta

Table A5.2.1 Average Cumulative Abnormal Returns Estimated for a Five Day Window

Type of Bid	Window : 5 days before the acquisition to 5 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired firms	8.48*	15.54*	-2.7**	6.95*	*6.9**	17.59*	5.07*	2.86**	*10.28**
Acquiring firms	-3.2**	-3.62*	-0.71	-0.47	*-2.1***	-0.81	-0.67	-0.14	*-0.57*
Acquir'd control	5.78*	-0.15	-3.96*	-3.4**	*-0.23*	-1.25	-1.8**	-2.4**	*-1.7***
Acquir'g control	-1.3	-1.27	1.46	-4.47*	*-1.12*	-1.38	1.93**	2.14**	*0.44*
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired firms	5.89*	10.25*	-1.19	4.93*	*4.56**	10.91*	4.67*	4.79*	*7.37**
Acquiring firms	-5.28*	-4.25*	-0.33	-0.93	*-2.6***	0.17	-2	0.89	*-0.06*
Acquir'd control	6.83*	0.25	-4.57*	-3.93*	*-0.4*	-1.78	-0.58	-2.42*	*-1.74*
Acquir'g control	-3.6**	-3**	1.14	-3.1**	*-1.9***	-2.8**	2.17*	2.63*	*0.22*
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired firms	13.67*	24*	-7.14*	14.75*	*12.4**	34.7*	6.67*	-15.5*	*21.5**
Acquiring firms	0.78	-2.6**	-1.86	1.25	*-0.9*	-3.44*	5*	-10*	*-2.6***
Acquir'd control	3.56**	-0.9	-22.1*	-1.25	*-4.57**	0.11	-6.67*	-2	*-1.64*
Acquir'g control	3.33**	1.5	-2.4**	-9.75*	*-0.37*	2.22*	1	-2.5*	*1.29*
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired firms	2	8*	-3**	13*	*5.06**	23.67*	-	-9*	*10.6**
Acquiring firms	-2.5**	-12.6*	-1.8	0.75	*-4.6***	0	-	-5*	*-2*
Acquir'd control	13.5*	-3.4**	-97.6*	-1.5	*-30.3**	-6.33*	-	14.5*	*2*
Acquir'g control	4.5**	-8.8*	1.4	-6.75*	*-3.44*	-29.7*	-	-1	*-18.2**
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired firms	28*	3.75**	-12.2*	31*	*1.18*	28*	-	-13*	*14.33**
Acquiring firms	17*	-5.3**	1.8	4**	*0.82*	-1.5	-	-10*	*-4.3***
Acquir'd control	0	7.5*	198*	52*	*97.64**	-12.5*	-	0	*-8.44**
Acquir'g control	0	2	1.2	7*	*1.91*	2.5**	-	-2	*1*
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired firms	-	0	-9*	-	*-4.5***	-15*	-	-	*-15**
Acquiring firms	-	0	6*	-	*3***	-3**	-	-	*-3***
Acquir'd control	-	0	0	-	*0*	-25*	-	-	*-25**
Acquir'g control	-	0	2	-	*1*	-4**	-	-	*-4***
Significant at 1% *, 5% **, 10% ***									

Table A5.2.2 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	1.63	5.85*	0.7	1.35	3.5*	3.86*	2***	0.5	3.55*
Acquired & Control	0.31	3.97*	0.36	2***	0.61	3.55*	1.59	0.76	3.45*
Acquiring & Control	0.55	0.93	1.09	1.63	0.73	0.16	0.87	0.78	0.51
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	1.05	4.48*	0.32	0.91	2.3**	2.2**	1.74	0.57	2.4**
Acquired & Control	0.7	2.3**	0.36	1.4	0.48	2.3**	1.14	0.96	2.5**
Acquiring & Control	0.36	0.35	0.59	0.9	0.17	0.83	0.96	0.54	0.29
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	2.9**	6.1*	0.64	0.69	3.35*	4.73*	0.31	1.31	3.58*
Acquired & Control	1.86	4.8*	0.8	0.73	0.38	3.63*	2***	2.8	3.54*
Acquiring & Control	0.5	1.09	1.5	1.35	1.23	1.8	0.62	0.73	1.09
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	0.24	3.5**	0.7	1.4	0.73	1	-	2.5	0.7
Acquired & Control	0.5	2***	0.91	2.8**	0.91	2.3	-	2.6	0.91
Acquiring & Control	0.33	0.73	0.64	0.9	0.12	1.64	-	1.13	1.51
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	1.1	3**	-	2.2**	0.72	-	-	0.87
Acquired & Control	-	0.63	0.92	-	1.16	1.34	-	-	0.48
Acquiring & Control	-	4.2**	1.8	-	0.31	0.71	-	-	1.03
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	3***	-	-	-	-
Acquired & Control	-	-	-	-	4.4**	-	-	-	-
Acquiring & Control	-	-	-	-	0.29	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

Table A5.2.3 Average Cumulative Abnormal Returns Estimated for a Ten Day Window

Type of Bid	Window : 10 days before the acquisition to 10 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired firms	15.4*	17.4*	-0.75	7.95*	*9.97**	17.3*	4.4*	33*	*19.3**
Acquiring firms	-5.56*	-3.1**	-3**	-1.9**	*-3.5**	-0.03	0	-0.1	*-0.04*
Acquir'd control	10.7*	0.23	-13.4*	-3.3**	*-1.4*	-0.13	-0.87	-3.2**	*-1.25*
Acquir'g control	0	-2**	0.32	-6*	*-1.57*	-1.25	2.5**	3.1**	*0.91*
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired firms	14.7*	12.7*	0.95	5.67*	*8.17**	10.7*	3.2**	5.47*	*7.19**
Acquiring firms	-8.67*	-2.5**	-3.5**	-2.4**	*-4.37**	0.61	-2.3**	1.26	*0.2*
Acquir'd control	11.9*	0	-23.7*	-3.5**	*-4.8**	-0.61	-0.08	-3.2**	*-1.41*
Acquir'g control	-4.78*	-4*	-0.33	-4.2*	*-3.1***	-3**	2.6**	3.5**	*0.54*
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired firms	16.9*	24.8*	-6*	16.5*	*14.1**	34.1*	9*	-17*	*21.4**
Acquiring firms	0.67	-4*	-1.29	0	*-1.43*	-1.78	9*	-13*	*-1.07*
Acquir'd control	8.44*	0.6	17.7*	-2.5**	*6.53**	1.11	-4*	-3.5**	*-0.64*
Acquir'g control	9.56*	1.2	2.3**	-12.8*	*2.1***	3.2**	2.3**	0	*2.6***
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired firms	-3.5**	12.8*	-3**	13.5*	*6**	25*	-	-10.5*	*10.8**
Acquiring firms	-4.5**	-11.4*	1.4	-0.25	*-3.8***	0	-	-6*	*-2.4***
Acquir'd control	19*	-2.6**	-121	-2.8**	*-37.1**	-7.33*	-	14.5*	*1.4*
Acquir'g control	2.5**	-10.8*	0.6	-10*	*-5.38**	-28.3*	-	10*	*-13**
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired firms	33*	5.5**	-11.6*	27*	*2.18*	24.5*	-	-14*	*11.7**
Acquiring firms	8*	-5**	-0.2	-12*	*-2.27*	0	-	-12*	*-4***
Acquir'd control	0	7.5*	22.2*	40*	*16.5**	3**	-	0	*2*
Acquir'g control	2	1.75	1.8	12*	*2.7***	10*	-	4**	*8**
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired firms	-	0	-6*	-	*-3***	-18*	-	-	*-18**
Acquiring firms	-	0	6*	-	*3***	0	-	-	*0*
Acquir'd control	-	0	0	-	*0*	6*	-	-	*6**
Acquir'g control	-	0	1	-	*0.5*	-5*	-	-	*-5**
Significant at 1% *, 5% **, 10% ***									

Table A5.2.4 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 10 days before the acquisition to 10 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	2.8**	5.93*	0.69	2***	4.96*	3.45*	1.37	0.56	3.25*
Acquired & Control	0.46	4.27*	0.13	2.1**	0.43	3*	1.21	0.89	3.07*
Acquiring & Control	1.34	0.38	1.34	1.32	1.18	0.32	0.79	0.81	0.45
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	2***	4.5*	1.29	1.24	3.66*	2***	1.59	0.88	2.2**
Acquired & Control	0.18	2.6**	0.2	1.55	0.38	1.59	0.64	1.08	2.1**
Acquiring & Control	0.71	0.45	1.02	0.59	0.32	0.7	1.49	0.53	0.89
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	3.52*	7.15*	0.63	1.6	3.97*	4.89*	1.2	0.83	3.13*
Acquired & Control	1.72	5.28*	0.7	1.7	0.2	4.56*	3***	15.1*	3.35*
Acquiring & Control	1.39	1.19	1.13	1.22	2***	0.71	0.94	0.94	0.7
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	0.5	3.63*	1.17	1.5	2.2**	1.17	-	1.76	0.95
Acquired & Control	0.9	2.1**	0.96	3**	0.31	1.8	-	2.21	0.54
Acquiring & Control	0.7	0.9	0.18	1.2	0.2	1	-	5.3**	0.57
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	0.94	3***	-	0.2	0.58	-	-	0.61
Acquired & Control	-	0.8	0.86	-	0.87	0.47	-	-	0.35
Acquiring & Control	-	1.38	0.49	-	0.49	0.7	-	-	1.41
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	5.1**	-	-	-	-
Acquired & Control	-	-	-	-	1.94	-	-	-	-
Acquiring & Control	-	-	-	-	0.56	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

Table A5.2.5 Average Cumulative Abnormal Returns Estimated for a Twenty Day Window

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired firms	17.7*	20.5*	1.5	9.42*	*12.3**	18.6*	0.13	0.81	*9.03**
Acquiring firms	-2.5**	-3**	-3**	-1.05	*-0.25*	-0.22	-1.33	-0.52	*-0.56*
Acquir'd control	15.9*	0.81	29.4*	-4.16*	*11.9**	-0.41	-0.4	0.57	*-0.1*
Acquir'g control	2.7**	-2**	1.4	-7.42*	*-0.8*	-1.28	2.8**	3.71*	*1.16*
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired firms	17.6*	1.9**	0	7.4*	*6.53**	15.8*	-1.8**	-0.58	*6.17**
Acquiring firms	-3.4**	2.6**	-4.05*	-1.6	*-1.8***	-0.3	-1.25	-0.63	*-0.63*
Acquir'd control	15.9*	3.2**	37.7*	-2.2**	*15.6**	0.52	0.5	-9.95*	*-3.2***
Acquir'g control	-3.7*	-0.44	-0.43	-6.73*	*-2.6***	-4.09*	1.58	-1.8**	*-2***
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired firms	18*	29.7*	6.14*	2**	*17**	25.6*	7.67*	-33.5*	*13.4**
Acquiring firms	-0.7	-3.7**	1.29	0.25	*-1.1*	0	-1.6	-11*	*-1.9***
Acquir'd control	15.9*	-2.1**	9.14*	-0.5	*6.13**	-2.8**	-4*	19*	*0.07*
Acquir'g control	15.6*	1.1	7.86*	-2.3**	*6.57**	6*	7.67*	-0.5	*5.43**
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired firms	11*	14*	-6.2*	14.8*	*7.5**	25.3*	- -	-8.5*	*11.8**
Acquiring firms	-1	-10.4*	-1.2	-0.25	*-3.8***	0	-	-6*	*-2.4***
Acquir'd control	18*	-2.8**	-159*	-3**	*-49.3**	-12.7*	-	16.5*	*-1*
Acquir'g control	15*	-10.8*	-0.8	-8.5*	*-3.9***	-29.7*	-	30.5*	*-5.6**
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired firms	40*	16.8*	2.4**	19*	*12.6**	21*	-	-23*	*6.33**
Acquiring firms	18*	-12*	0.4	-1	*-2.6***	-3**	-	-12*	*-6**
Acquir'd control	0	2.8**	-42.4*	-13*	*-19.5**	-8*	-	0	*-5.33**
Acquir'g control	11*	1.8	2.4**	10*	*3.64**	10*	-	14*	*11.3**
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired firms	-	-19*	-1	-	*-10**	-18*	-	-	*-18**
Acquiring firms	-	4**	6*	-	*5***	-6*	-	-	*-6**
Acquir'd control	-	0	0	-	*0*	-16*	-	-	*-16**
Acquir'g control	-	1	3**	-	*2*	20*	-	-	*20**
Significant at 1% *, 5% **, 10% ***									

Table A5.2.6 T-Statistics Testing the Null Hypothesis that the Difference Between the Means of the Two Groups is Equal to Zero

Type of Bid	Window : 20 days before the acquisition to 20 days after								
	Boom Period (%)					Recession Period (%)			
	1987	1988	1989	1990	*All*	1991	1992	1993	*All*
All bids	**27**	**26**	**28**	**19**	***100***	**32**	**15**	**21**	***68***
Acquired & Acquiring	2.89*	5.58*	1.49	2***	5.7*	3.62*	0.32	0.31	3.06*
Acquired & Control	1.36	4.39*	0.85	2.7**	0.17	3.17*	0.81	0.21	2**
Acquiring & Control	1	0.26	1.52	2***	0.83	0.16	1.11	0.94	0.82
Successful bids	**18**	**16**	**21**	**15**	***70***	**23**	**12**	**19**	***54***
Acquired & Acquiring	2***	4.57*	1.03	1.59	3.95*	2.4**	0.9	0.93	2.4**
Acquired & Control	1.15	2.52*	0.78	2.2**	0.11	2***	0.78	0.63	1.4
Acquiring & Control	1.67	0.74	0.89	1.47	0.54	0.74	0.75	0.7	0.21
Failed bids	**9**	**10**	**7**	**4**	***30***	**9**	**3**	**2**	***14***
Acquired & Acquiring	2.6**	5.33*	1.18	1.46	4.89*	3.6*	0.42	1.84	2.1**
Acquired & Control	0.75	6.27*	0.98	5.4**	0.44	3.41*	1.8	1.94	2.8**
Acquiring & Control	2***	0.79	2.8**	1.6	2.3**	0.76	0.75	0.59	0.96
Of which :									
Hostile bids	**2**	**5**	**5**	**4**	***16***	**3**	**0**	**2**	***5***
Acquired & Acquiring	0.98	3.6**	3.2**	1.38	3.1*	4.3	-	0.25	1.7
Acquired & Control	0.34	1.86	0.96	3.3**	0.6	0.59	-	20.3*	4.2*
Acquiring & Control	0.39	0.84	0.65	1.05	0.88	0.21	-	3***	0.7
Contested bids	**1**	**4**	**5**	**1**	***11***	**2**	**0**	**1**	***3***
Acquired & Acquiring	-	1.35	0.9	-	1.31	0.66	-	-	0.51
Acquired & Control	-	0.7	0.83	-	0.79	0.94	-	-	0.47
Acquiring & Control	-	1.38	0.78	-	1.03	1.12	-	-	2.17
White knight bids	**0**	**1**	**1**	**0**	***2***	**1**	**0**	**0**	***1***
Acquired & Acquiring	-	-	-	-	1.84	-	-	-	-
Acquired & Control	-	-	-	-	1.09	-	-	-	-
Acquiring & Control	-	-	-	-	11.8*	-	-	-	-
Reject the null hypothesis that the difference between the means is equal to zero at 1% *, 5% **, 10% ***									

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