A Study of why Corporations Acquire and Merge: External and Internal Determinants of Investment Behaviour

A Thesis Presented for the Degree of Doctor of Philosophy

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"We are creatures of habit"

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1. INTRODUCTION

From the geopolitical international landscape to the micromanagement of change, mergers and acquisitions fundamentally alter the future path of an organisation. History has provided us with countless examples of marriages made in heaven, such as the Disney-Pixar combination and divorces resulting in hell. Corporate divorces have been touted as leading to wealth destruction on a massive scale (Moeller, Schlingemann and Stulz, 2005), with the AOL-Time Warner deal most probably being the most famous to date.

Marriages end up being either successful or horrible due to multiple reasons which make corporate mergers and acquisitions nothing if not learning experiences. It is easy to believe that everyone that makes a successful acquisition simply understands at what stage their market is at. In theory, that should be easier for people already operating in that market, but shifts in technology take even the most experienced companies by surprise (see the number of retailers that have gone bankrupt, failing to anticipate the rise of ecommerce for example). Facebook's acquisition of Instagram for $1 billion in 2012 makes it look like a company that knew exactly where social media was headed. It seemed like a lot to pay for 25 million users, particularly when Facebook had millions of users already. The key was that Instagram allowed advertisers to advertise in ways that Facebook couldn't. Mark Zuckerberg knew that advertising was key to the survival of social media. Let's fast forward to 2021 and Instagram has 1 billion users. Sometimes not actively looking to acquire doesn't mean that undertaking M&A is a bad idea. Essentially if the right company appears, acquire it as this opportunity might never appear again. This was what happened when Disney acquired Pixar in 2006. The two had a distribution agreement that was coming to an end and had to be renegotiated. However, as soon as both sides considered the marriage, a merger made far more sense. The synergies on offer were huge and the best of all, Disney was able to acquire Pixar with a share deal that valued it at a premium of less than 5% of its going market price. A deal industry experts class as a match made in heaven.

Rushing the due diligence stage of acquisitions has led to many failed marriages. As soon as a firm decides to undertake a transaction, there's an inherent desire to get the deal done. This desire shouldn't overtake the necessity to make sure that everything is in order beforehand. The example of western companies trying to get on the China bandwagon through acquisitions at the turn of the century is littered with examples of companies failing to take ample due diligence in order to just get the deals done. A good example of such a case is provided by Caterpillar and ERA in 2002. On the surface, Caterpillar was acquiring an industry leader in China, giving it the ideal launchpad into the world's largest coal market. However, when we look underneath the surface, one could see ERA had been involved in coordinated accounting misconduct which was covered up for years. Caterpillar was essentially cavalier in its attitude to due diligence which resulted in a $580 million write-down in the target valuation. Caterpillar and ERA in 2002. On the surface, Caterpillar was acquiring an industry leader in China, giving it the ideal launchpad into the world's largest coal market. Synergies are the most commonly cited reason for undertaking mergers and acquisitions. As a rule, the bigger the deal, the bigger the estimated synergies from the deal will be and while synergies usually do exist, so does the temptation to overstate them. In the M&A industry, there is a built-in bias in dealmakers' thinking which was confirmed by a Bain & Company survey (2012) of 352 global executives. They found overestimating synergies was the second most common reason for disappointing deal outcomes with due diligence ranking number 1. The survey of executives showed that around 60% of them state that they're guilty of overestimating synergies from deals. Mixing new with traditional media provides ample cases of firms overpaying for new media with the idea that it will generate huge synergies. The case of News Corporation acquiring MySpace for $580 million in 2005 is a case in point. News Corporation, with its specialty in delivering media adverts, thought Myspace would generate $1 billion in synergies per year. This was a huge overestimation. Some years later, it was divested for a figure of $35 million.

There has not yet been definitive indications over truly why M&As create value and why they don't, despite several proven determinants. Indeed, a large portion of the existing literature does indicate statistically and economically significant losses for the majority of acquirers long-term.

So why do firms decide to initiate an M&A when in fact these firms make a loss in the long run?[1] Classical economics proposes that humans are rational beings who undertake careful due diligence when making investment decisions. Adam Smith in his seminal work The Wealth of Nations (1774) reasoned that we all have an incentive to unearth as much information as possible before undertaking an investment for otherwise we incur the additional risk that we otherwise could have avoided. This is irrespective of macro or microeconomic situations, this incentive remains. Under this trail of thought, Eugene Fama gave birth to the Efficient Market Hypothesis in 1965, with later modifications in 1970. This hypothesis has formed the foundation block for most empirical explorations in the financial world. Fama reiterated the work of Smith to model market participants as efficient players in a rational world. Efficient markets were defined as those in which stock prices react instantaneously to the arrival of new information entering the market, of which there are three forms. Weak-form markets should offer no profitable opportunities for the exploitation of past information; Semi-strong form markets should also offer no profitable opportunities from past or current public information, which should already be incorporated into stock prices and finally strong form markets should see stock prices reflecting all past, public and private information. If there are ever situations in which stock prices do not incorporate this information such that profitable opportunities do exist, then arbitrageurs should exploit this opportunity pushing prices back towards efficiency. This idea of market efficiency is central to the notion of the random walk of stock prices. Hence, if markets are efficient then stock prices should only adjust based on new information

[1] Kapoor and Sharma (2018) found that firms may initiate M&A transactions to achieve economies of scale, reduce competition, or gain access to new markets. However, the study also found that M&A transactions can result in a loss for the acquiring firm if they fail to achieve the expected synergies or if there is a lack of compatibility between the firms. Sahu and Jayakumar (2019) also found that firms may initiate M&A transactions to achieve various strategic objectives, including market expansion, diversification, and synergy creation. However, the study found that the success of M&A transactions is contingent on various factors, including the compatibility of the firms' cultures and strategies, the effectiveness of post-merger integration, and the level of due diligence performed prior to the transaction

arrivals. This new information cannot be predicted and hence should be a random evolution of prices over time. [2]

Whether individuals are or are not rational decision-makers has been a long-debated question. John Maynard Keynes (1936) spoke about *animal spirits*[3], introducing the idea that individuals may not seek to undertake due diligence as keenly promoted by Adam Smith, and in fact may be influenced in their decision making by their emotions rather than by their intellectual assessments. Keynes argued that an individual cannot forecast the future evolution of stock prices, and yet makes an investment decision on an expectation over what they are most likely to do. This expectation gives way to emotional heuristics in the decision-making process, whereby personal biases can infer the decision.

The development of cognitive and behavioural psychology over the years has unearthed many findings on how individuals make decisions. Thaler (1993) reviews the application of psychology to financial markets and questions the foundations of Fama's efficient market hypothesis (1965/1970). Thaler (1993) notes that there is a gulf between academic exploration and modelling of financial

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[2] One potential link between the EMH and M&A literature is the idea that M&A announcements should not generate abnormal returns, as any relevant information regarding the transaction should have already been incorporated into the stock prices of the companies involved. This idea is consistent with the EMH, as it suggests that asset prices are already fully reflecting all available information. Several studies have examined the relationship between the EMH and acquisition activity. For example, a study by Dong and Hirshleifer (2005) found that while M&A announcements initially generate abnormal returns, these returns quickly dissipate as new information is incorporated into stock prices. Similarly, a study by Renneboog and Spaenjers (2013) found that M&A activity is more likely to occur in periods of high market efficiency, suggesting that firms are more likely to initiate M&A transactions when asset prices are accurately reflecting all available information. Some studies have found support for the EMH, for example, Faccio, Masulis, and McConnell (2006) found that acquisitions tend to have little impact on the long-term performance of acquiring firms, suggesting that the market has already priced in the expected benefits of the acquisition. However, other studies have challenged the EMH and suggested that market inefficiencies may exist that allow acquirers to create value through acquisitions. For instance, a study by Song, Walkling, and Zhou (2016) found that acquirers who engage in value-creating acquisitions tend to outperform the market in the long run, indicating that the market may not fully incorporate all available information.

[3] These "animal spirits" can be linked to the acquisition literature through the concept of overconfidence. In the context of acquisitions, overconfident managers may initiate transactions that are not in the best interests of their firms, leading to poor outcomes. This idea is consistent with Keynes' concept of "animal spirits," as it suggests that emotions and instincts can lead to irrational decision-making. Another way in which "animal spirits" can be linked to M&A literature is through the concept of herd behavior. Herd behavior refers to the tendency of individuals to follow the actions of a larger group, rather than making independent decisions based on their own analysis. In the context of acquisitions, herd behavior may lead to a wave of transactions that are driven more by sentiment than by rational analysis. This can result in a "bubble" in acquisition activity, where prices are bid up to unsustainable levels. This idea is also consistent with Keynes' concept of "animal spirits," as it suggests that emotions and instincts can lead to group behavior that is not necessarily rational. Finally, the concept of "animal spirits" can be linked to the motivations of investors who participate in M&A transactions. Investors may be driven by a desire to capture the value that they believe is not reflected in the current market price of a target company. This idea is consistent with Keynes' concept of "animal spirits," as it suggests that investors are motivated by emotions and instincts, rather than purely rational analysis. Overall, the concept of "animal spirits" introduced by Keynes provides a useful framework for understanding the motivations and behaviors of managers and investors in the context of acquisition transactions. By recognizing the role of emotions and instincts in economic decision-making, researchers and practitioners can gain a better understanding of the drivers of M&A activity and the outcomes that result.

economics with general perceptions and views, writing that *'whenever financial markets make it on the news the story is always accompanied by pictures of people engaged in wild activity'* (Thaler, 1993: xv). The dominant image is that financial markets are driven by people such that the thought arises, *are markets any different because of human presence and involvement?* As technology advances, we are left with the question remaining, *would the financial world be materially different if investors traders, and workers were all replaced by computer programs?* (Thaler, 1993:xv). Richard Thaler concludes yes and given the evidence it is hard to disagree.

If we consider some of the findings from behavioural finance, we can see the intuition behind Thaler's certainty. Fisher Black (1986) produced one of the early papers related to what he termed "financial noise", the idea that people trade on what they perceive to be information but in reality, is information that means little or nothing. Such trading can result in a large divergence between a security's fundamental value and its prevailing market price. Lee, Shleifer and Thaler (1991) explore noise in the close-end find puzzle and wrote that 'investor sentiment can represent trading on noise rather than news' (Thaler, 1993: 60). The authors find that discounts in the value of shares of close-end funds are high when investors are pessimistic about future returns, while discounts are low when investors are optimistic (Thaler, 1993).

As research progressed, the influence of people on financial markets became increasingly apparent. John Kenneth Galbraith wrote in his seminal work *A short History of Financial Euphoria* in 1990 that *'not only fools but quite a lot of other people are recurrently separated from their money in the moment of speculative euphoria'* (Galbraith, 1993: viii) concluding that *'recurrent speculative insanity and the associated financial deprivation and larger devastation are …. Inherent in the system'* (Galbraith, 1993: viii). No longer can research ignore the power of people and indeed this is no truer than in the fields of economics and finance. However, while nearly all agree that psychological influences can have an impact on decision-making, there is continued disagreement over whether or not these matter at an aggregate level. Fama (1965/1970) wrote that efficient markets are random and predictable. Yet, notable anomalies appeared with statistical and economic significance, including returns increasing during January (Rozeff and Kinney, 1976), and higher returns than expected for small firms (Banz, 1981; Reinaganum,1981; Fama and French, 1992). Value effects derived from positive relations between returns and accounting-based cash flow/value ratios plotted against market prices (Graham and Dodd, 1940; Ball, 1978; Basu, 1977), return predictability via price momentum (Jegadeesh and Titman 1993; Cahart, 1997), weekend effects with negative returns on Mondays (French, 1980) …. the list could go on. Fama (1991) himself notes in the light of such evidence, that the issue of whether or not markets are efficient has become much 'thornier'.

If these findings mean that investment decisions can be less than fully rational at times, then research began to focus on the effects exerted upon various decisions undertaken. Being one of the largest investment decisions made by a firm, research into mergers and acquisitions began to focus on the motivations and incentives behind explaining why transactions occurred and what stock price effects were experienced by acquirers and their targets. Trautwein (1990) summarises the competing theories behind corporate marriages, including neoclassical rational motives such as the theories of efficiency, monopoly, raider, disturbance, and process, as well as the less than rational motives of valuation and empire-building.

Chapter Three of this thesis examines the decision to merge and the consequential effects on returns, focussing primarily on valuation theory at a firm and market level. The market-timing hypothesis of Shleifer and Vishny (2003) motivates mergers as a rational managerial response to an inefficient market. The market, infected by noise, has priced the acquirer at a level exceeding its fundamental value. This means that long-term, once the market corrects its mistake, losses will be incurred as the acquirer's stock price falls downwards to its true fundamental level. The market-timing hypothesis reasons that a rational manager in pursuit of shareholder wealth maximization must think of ways in which s(he) can maintain the superior price level of the firm. One such way is via a merger and acquisition. In this scenario, the acquirer can raise the fundamental value of the firm by buying the target's assets. This leads to shareholder wealth creation when the acquirer does so using the firm's overvalued equity, under the condition that the target must be less overvalued than the acquirer. This thesis does not disagree with such substitution of assets as it would help explain why an equity swap would be a tool in the eyes of the acquirer to operationalize an acquisition. The equity of an undervalued asset may be difficult to use to mount an acquisition, which would imply why cash is required in such cases. For cash-rich companies, liquidity is a key determinant in acquisition leading to arguments as to why the information in the company's financial statements is more appropriate to explain the determinants of acquisition. The Golden rule of the theory implies that the overvalued acquiring company's management will most likely acquire companies that are undervalued. An acquirer would however always wish to acquire the assets of a firm that appears to be undervalued. A key indicator could be the market-to-book value ratio, or a situation where the Tobin's Q of the target firm exceeds that of the acquirer. The market timing theory predicts that the long-run returns to acquirers are likely to be negative in stock acquisitions and positive in cash acquisitions. This argument follows from a relative as compared with absolute over-valuation. Absolute overvaluation is likely to be linked with cash acquisitions as the shareholders are less likely to consider the share to represent fair value and thus will not engage in share swaps to fund the acquisition. As the firm to be acquired is considered to be more overvalued, then this differential is squeezed and as such the extent to which the shareholders of the target are prepared to accept equity shifts and thus the shareholder of the target is more likely to accept equity. It is important that there is no bias in the extent to which valuation is measured. To this effect, the issue may be better seen in terms of the relative or expected values in the market as compared with the market-to-book values where the denominator may have systematic biases.

In addition to the market-timing hypothesis, Bouwman, Fuller and Nain (2009) and Petmezas (2009) reason that while the valuation of the firm is important, so is the valuation of the market. Galbraith (1990) concluded that booms and busts are inherent parts of the financial system. When making an investment decision, therefore, the macroeconomics climate can also exert an influence on managers. A sizeable portion of academic research has revealed that mergers do come in waves, and the quality of mergers undertaken can be influenced by market-wide conditions. Rhodes-Kropf and Viswanathan (2004) show that market-wide misvaluation can lead to ex-post poor financial decisions correlated at a market and industry level. When market conditions are booming such that prices are rising, targets can fail to correctly filter out the market-wide price effect and accept bids that appear more attractive than they are. So in this case, for an acquirer, deals that are initiated in booming periods are worse than those initiated when markets are depressed (Bouwman, Fuller and Nain, 2009).

Chapter three examines these anomalies simultaneously in the US market, extending the previous literature through reassessing whether or not US mergers create value using an intuitive methodology. If mergers are to the benefit of acquiring firm shareholders, then those deals that complete should outperform those that do not complete. Thus, the chapter compares a sample of US M&As according to deal outcome, with successful deals contrasted against those that fail to consummate. The methodological approach is unique in that it stratifies the sample of failed deals according to the reason for the failure of the deal. Investigating every single failed M&A deal using Factiva, NY-Times, LexisNexis and Marketline Advantage in an attempt to determine the reason for failure is by no means an easy task as it required extensive research as simply reading headlines or applying a coding metric will obscure the real causes of deal failure. This is a significant contribution to understanding the literature as no study to the best of my knowledge has analysed failed deals intensively to understand why it has failed. This leads to the creation of a sample of deals that fail for reasons outside the acquirer's control. This robustly controls for any endogeneity issues in the econometric procedure.

The successful and failed samples are then stratified according to the two anomalies explored by the chapter – firm misvaluation and market misvaluation. Misvaluation at the firm level is captured using a rolling twelve-month and twenty-four-month historical acquirer P/E ratio. If the P/E ratio on the announcement month is higher (lower) than the twelve-month average P/E (or twenty-four-month average P/E), then the firm is deemed to be above (below) its fundamental value. We then take the top (bottom) 30% of the above-fundamental value deals and classify them as overvalued (undervalued). This information is used to construct overvalued and undervalued portfolios for short and long-run analyses for both successful and failed acquirers.

In addition to firm misvaluation, market misvaluation is captured using a detrended market P/E ratio following the work of Bowman, Fuller and Nain (2009). Given the inflation and other effects, firms' P/E ratios tend to drift upward over time and thus without detrending the P/E ratio, the sample would see more high (low) value periods later (earlier) in the sample period. If the month of the transaction has a market P/E ratio higher (lower) than the preceding five-year average then the month is classified as above-average (below-average). The top 25% of the above-average months (and the deals announced within these months) are classified as high-valuation while the bottom 25% of the below-average months and the deals announced within these months are classified as low-valuation (Bouwman, Fuller and Nain, 2009).

Chapter three finds that although successful firms make losses in the long run, these losses are significantly lower than for the control sample. This suggests that mergers are indeed beneficial to acquiring firms. Here, it also found that in the long term the gains realized are overall positive. When the deals are stratified by the method of payment, we find the gains to be negative for stock bidders and positive for cash bidders. This conclusion supports the findings of SV (2003) and Savour and Lu (2009). The study reports that this appears as a result of successful market timing by acquiring firm shareholders. Successfully timing the market by issuing equity is shown to be beneficial to acquiring firms. In the short and long run portion of the study, we find that successful acquirers significantly outperform both the failed exogenous sample and failed all sample. When firms financed their acquisition using 100% cash, successful firms generated significant positive gains over the control sample. For stock acquirers, we find that significant losses are made in all samples however, these losses were greater for firms who failed at consummating the deal. This further supports the notion that M&A is indeed NPV-enhancing for the firm.

The thesis also assessed the performance of acquirers when the market was misvalued. Bouwman et al. (2009) suggest that the valuation of the market plays a role in the quality of acquisitions. Gorton et al. (2009) also provided evidence that firms undertake mergers to protect themselves during merger waves. Merger waves most often occur when the valuation of the market is high. The results suggest that in the short run, acquirers enjoy higher abnormal returns in high valuation periods in comparison to those who announce deals in low valuation periods. In the long run, we find that successful firms significantly generate value by engaging in M&A activity when the market is overvalued. Those acquirers that acquire using stock appear to benefit the most when the market is overvalued. It is observed that these results provide further evidence in support for phenomena such as managerial hubris and white knight deals and their impact on value creation arising from mergers. The overall finding is that acquirer performance is correlated with the state of the market.

Finally, when the study is sorted into portfolios based on firm misvaluation, there is further support found for mergers being a value-enhancing activity. The short-run and long-run results support the notion of undertaking mergers using equity (cash) when the firm is overvalued (undervalued).

Now we have established that 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 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. Chapter 4 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 identification of companies that become involved in acquisitions has been attempted before however a gap in the literature still exists when it concerns the firms that are likely to become involved in acquisitions. The literature has focussed heavily on examining the acquired firms mainly because their identification can be seen to be financially significant while the same is not observed from the discussion above for the acquiring firms. A more complete picture of takeover activity would benefit from integrating the acquisition process from the side of both the target in addition to the acquirers.

Also, the construction of the data sets is of significant importance as the factor of interest in this thesis (acquisition activity) does not apply to all of the individual firms in the population. This will be the first study to the best of our knowledge that tries to identify firms over what we class as a long run horizon (40 years). The construction of the dataset and the selection of the two models employed within this thesis are explained in detail later on in Chapter 4. The two models used are the logit model and the Cox proportional hazard model. The second element of this chapter 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 purchasing other companies.

Chapter 4 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. Over a long horizon study that covers multiple merger waves, the results found in this study suggest that there is no clear superior model. Both models offer results that are 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 acquired firms were examined twice, firstly against the companies that 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. Overall, the efficiency variables show that acquired firms are less effectively managed than either the acquiring firms or the firms that are not involved in the acquisition process. This supports the managerial inefficiency theory for takeovers, as suggested by many authors including Wen and Chen (2020) and McMillan and Gargett (2021), 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 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 the company can 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 the table.

The second group of variables is the profitability terms. These terms when the acquired firms are modelled against the acquiring companies show mixed results. Some terms are consistent with the prevailing notions concerning the nature of target companies, thus, they are 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 relate 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 on a whole are mostly negatively linked to the probability that the firms will be acquired. 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 is an underestimation. 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. The p/e ratios for acquiring firms are higher than those of the companies that do not take part in the takeover process. This means that acquiring firms are relatively over-valued which may make it easier for them to raise the funding necessary for the purchase of another firm (Zhang and Tucker (2017); Jenter and Lewellen (2017); Kim et al. (2018)).

The liquidity of the target firms is poor in the results generated when matched against both the acquiring and the non-involved firms. When the bidders are used in the models, the liquidity variables suggest that target firms 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 results remain consistent and convey the same impression about the financial condition of the targets (Lu, (2018); Chen and Ovtchinnikov (2020)). 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 and growth. When the acquired firms are modelled against the acquiring companies, the size variable becomes significant however the results are mixed. In the literature, it is often observed that the targets of acquisition activity are smaller than the bidders. This is not always the case here as some terms representing size such as Market Value and Total Sales show positive and significant signs. These signs can be positive as some target firms have large market values relative to book values due to the nature of their business. Considering Total Sales are in line with the market value, then it is of no surprise that the firm's market value is correctly reflecting the business's level of sales. The opposite sign could also be due to the time period used as large companies could also become the targets of acquisition activity when they would normally be safe from takeover attempts. 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.

Something that has appeared in terms of theory is related to the internal and external investment decision. Although this is clearly understood in the textbook exposition of Financial Theory and

Corporate Policy (for example Copeland and Weston, 1984), this has not been investigated in terms of the literature on acquisitions. While the microeconomics literature on firms has made some considerations on investment (Blundell et. al, 1990), the two have not been drawn together. This forms the contribution of the final empirical chapter as we attempt to determine whether such decisions are heterogeneous.

Chapter 5 also looks at the case where the firm faces a hierarchy of costs for alternative sources of finance. This chapter assesses whether the investment spending of the firms is affected by the availability of internally generated finance (retained earnings), reflecting some constraints on the ability of these firms to raise external finance (debt or new equity) for investment. This age-old question has several important implications which need investigating. Profits tend to be highly cyclical, so if investment depends directly on the availability of profits then investment spending will be more sensitive to fluctuations in economic activity than would otherwise be the case. If post-tax profits help to determine investment spending then the impact of company taxes on investment will be more complicated than is often assumed.

The final empirical chapter reports that the standard specification of the Euler equation model that applies when investment and financial decisions are independent may only characterize the investment behaviour of a sub-sample of firms pursuing a particular financial policy. This suggests a test of the implications of the hierarchy of finance model based on the parameter constancy of the basic Euler equation specification across groups of firms pursuing different financial policies. The hierarchy of finance model also suggests the possibility that some firms may be in a regime in which their investment expenditure is liquidity constrained, in that it would increase in response to a windfall increase in earnings. The results have highlighted the sensitivity of parameter estimates in such models to the choice of dynamic specification, exogeneity assumptions and measurement errors in Q. Q was found to be a positive and significant determinant of investment. These findings are consistent with those found by Blundell et al. (1990) and Bond and Meghir (1994).

To derive the theoretical relationship between the investment rate and average Q that is used in estimation, several strong assumptions on technology and adjustment costs as well as on the efficiency of the stock market are made. Dynamic generalizations are an important factor in the derivation of a data-coherent specification, but the results also suggest that autoregressive restrictions on the pattern of dynamics suggested by the theory are acceptable. In the estimated models, there is an allowance for individual firm-specific effects which, with the inclusion of lagged dependent variables implied by the dynamic generalizations, requires a careful choice of estimation technique. Since the average Q variable is also allowed to be endogenous and possibly correlated with the firm-specific effects, the chosen estimator i.e. Generalised Method of Moments is, therefore, suitable as past variables can be used as instruments for analysis. This model of investment was estimated using microeconomic data for a panel of 1050 quoted U.K. firms over the period 1980-2017. The results for the whole sample indicate that the dynamic relationship between current investment and its previous rate is broadly consistent with the expectation implied by the adjustment costs model. The results suggest that investment depends on measures of dividends and not much on new share issues when we do not allow for regimes.

The key contribution of Chapter 5 was to test for heterogeneity between acquiring firms and non-acquiring firms. We find conclusive evidence that acquiring firms are different from the non-acquiring firms in our sample using the specification of the Euler equation model. The findings suggest that cashflow and debt are the key terms that differentiate these two firms apart. The results support the use of external finance (debt) to engage in investments. We believe that this lends support to the use of leverage buyouts in the acquisition process as it uses the target's assets as collateral during the transaction. After testing for the absence of financial effects and financial regimes, we find dividends to be a significant variable when it comes to the investment behaviour of firms whereas issuing new shares tend to be insignificant in all the models. The study also finds that the debt term which controls for the non-separability between investment and borrowing is negative and close to zero in some models. When this term and cashflow are dropped from the model, we find that our sales term predicts investment behaviour for the firms in the sample. This supports the notion that revenues are linked with investment and this phenomenon is driven by firms that issue positive dividends and no share issues. The findings lend support to the dividend signalling argument discussed earlier in the chapter and back the notion that issuing debt is important when it comes to financing investments as opposed to equity.

The remainder of this thesis is organized as follows: Chapter 2 empirically examines value creation using an intuitive methodology controlling for firm and market-wide misvaluations. Chapter 3 uses discrete choice models to solve the identification problems of firms involved in the acquisition process. Chapter 4 introduces investment models and bridges the gap between the acquisition literature and the microeconomics literature on investment. Finally, Chapter 5 concludes the thesis, discussing the main findings and contributions made.

2. MERGERS AND VALUE CREATION

2.1 Introduction

An essential element of a dynamic economy is Mergers and Acquisitions (M&A). It is a known fact that demand declines in mature industries and resource allocation could be problematic at different stages of a company's life span. M&A offers an alternative route to acquiring resources and capabilities. The route of dependence of each company is unique and its existing resources and capabilities profile provide a degree of protection against replication (Peteraf, 1993). Complex and simple models can be used to describe the level of uniqueness of resources and capabilities and competitive advantage. A valuable piece of information a practical researcher can acquire in the field of M&A is related to value creation. One could say that acquisitions create value when the cash flows of the merged company are greater than they otherwise would have been for the individual companies themselves. An increase (or decrease) due to an event can be considered an *abnormal performance*, and if the performance of interest is measured as a return, then this is classed as an *abnormal return* (Healy, Palepu and Ruback, 2002).

With imperfect information, there may be a failure of the internal mechanism for the shareholders to control the management. Thus, M&A may also be seen as a mechanism by which the market is made more efficient from the perspective of the shareholders of the acquired firm**.** M&A thus becomes an external procedure by which they maximize shareholder value. Of course, the same may not be the case for the shareholders of the acquiring firm, especially in the short run. Often synergy both operational and financial can be seen as the rationale for an acquisition. Financial synergy is often seen as an argument when company data is analysed, but operational synergy is generally more difficult to assess.

A significant amount of research has been undertaken over the last three decades examining abnormal returns in an M&A context. While the target company earns significant gains from being acquired, the same cannot be said within the literature for bidders. Some researchers have argued that one-third or more of companies that acquire destroy value for their shareholders due to a transferring of all benefits of the acquisition to the target shareholders (Hunter and Komis (2000); Koller et al. 2010).[4] In the US, the short-run performance in terms of the bidders' potential return has been found to be negative or insignificant by many researchers. [5]

In addition, the long-run performance for the bidder's abnormal return is shown to be mixed. [6] On average, negative abnormal returns are observed with firms that engage in M&A activity. This is an empirical puzzle since why would firms initiate deals in the first place if they know that they would earn negative returns in the future. Hunter and Komis (2000) offer a discussion as to why this tends to happen. Do mergers really destroy value in the long term when the target has finally been incorporated into the new firm?[7] In this Chapter, we will examine further whether or not it is possible to identify any abnormal returns for the bidder shareholders around the announcement period of acquisition (short-run) and post-acquisition period, the years following (long-run). Using an intuitive methodological approach, the paper controls for the performance of successful acquirers, had their deals not been completed through the creation of a sample of deals that fail for potentially exogenous reasons (a natural experiment). By comparing value creation this way, endogeneity is controlled for when the merger failed due to reasons relating to the acquirer.

There is unequivocal evidence that the method of payment is one of the most powerful signals that the manager can send to the market. The behavioural finance literature implies that acquirers should only use equity (cash) to finance mergers when it is overvalued (undervalued). This is a finding that is robust and consistent across the literature. This study adopts a robust approach to defining when a firm is overvalued or undervalued. By doing this, an assessment can be made if firm

[4] Hunter and Komis (2000) using an argument that follows from a game theoretic interpretation of the acquisition (Giammarino and Heinkel, 1986) came to a similar conclusion over the gains to the acquiring firm being illusory or likely to be over a longer time frame.

[5] Jensen and Ruback (1988); Andrade Mitchell and Stafford,(2001); Bouwman, Fuller and Nain (2009) find negative abnormal returns in the short run using varying event windows.See literature review for more details.

[6] A positive abnormal return is found by Loughran and Vijh (1997), Rau and Vermaelen (1998). Zero returns is found by Mitchell and Stafford (2000). Negative returns is found by Frank, Harris and Titman (1991), Bouwman, Fuller and Nain (2009), Langetieg (1978); Magenheim and Mueller, 1988; Moeller, Schlingemann and Stulz (2007). More derails on this can be seen in the Literature review (Table 2 and 3)

[7] The degree of divestiture is discussed later in the thesis. The literature has used a maximum of a 3 year period post-acquisition to assess long-term performance however we are aware that in practise this isn't always the case.

misvaluation plays a significant role in wealth creation for acquiring firms. Additional analysis is also done on whether firms that successfully acquire outperform those that do not acquire when the firm is misvalued.

Existing theory suggests that market valuations may affect not only merger activity but also the quality of completed deals. Research has shown that deals initiated when markets are booming do create less value for acquiring-firm shareholders than deals initiated when markets are depressed. This paper sheds light on the issue by assessing whether acquisitions that are announced when the market is booming fundamentally differ from those that are initiated during market troughs. Specifically, the study investigates whether acquirers in the period of boom outperform acquirers in depressed markets over the long run, and if so why? Additional analysis is also done on whether firms that successfully acquire outperform those that do not acquire in such valuation periods

The remainder of the chapter is organized as follows: Section 2 addresses theories, existing literature and hypotheses. Section 3 discusses data, Section 4 discusses the methodology and Section 5 discusses conclusions and provides future areas to focus on.

2.1 Literature Review

2.1.1 Wealth Effects of 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 share price impact is not the only issue concerning what happens in 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.

2.1.2 Short Term Effects

Jensen and Ruback (1983) in their comprehensive study of merger findings in the early eighties showed that the acquired company undoubtedly gain from merger activity. Overall, targets significantly gain 20% when the deal successfully completes but earn insignificant losses of -3%. Of the 13 studies reviewed, the target gain is found to range from 6.2% to 13.4% for successful merger deals while unsuccessful deals result in no significant difference at the time of announcement. As time progresses to the announcement of deal termination, the returns gradually fall to their pre-offer level. The results show that while targets gain, they only do so when the control of their assets is successfully transferred to the acquirer. The authors also examine the effects on the acquiring firm. It is this which has evoked much attention in the literature. At the announcement date, the weighted average return is not significantly different from zero for most studies. Dodd (1980) however finds significantly negative returns for acquirers at announcement. Asquith et al. (1983) is the only paper which finds a significantly positive announcement effect for acquirers. Table 2 summarises short-term studies of prior on acquisition returns. Overall, the returns show mergers that have no NPV enhancement to the investments for acquiring firms. When we look at deals which fail, the market reaction to the termination of the deal is shown to be mixed. If mergers are indeed wealth maximising endeavours, then the market should react negatively to the deal's termination. A competing hypothesis argues that these returns can be positive if the acquirer walks away from the merger so as to avoid overpayment, as was witnessed with the 1991 takeover battle for Southern Newspapers. Ruback (1983) investigated this theory and found that if acquirers had continued to match the final offer price, then they would have been undertaking projects that degrade NPV. This suggests that managers are rational enough to walk away when the figures indicate the deal is likely to reduce value.

However, some of these earlier studies faced problems in their execution. Asquith et al. (1983) warn that existing results may not be reliable if they do not account and control for various factors such as relative size and the nature of the merger program. Jensen and Ruback (1983) also posit that while targets can only be bought once, acquirers can engage in a serial acquisition program. Thus, to view only one deal within this program provides an incomplete picture of the profitability of each merger. Acquirers tend not to announce merger programs and hence this became something worth investigating. Asquith et al. (1983) assessed how profitable merger programs are for acquirers using a sample of 156 firms over a time period from 1963 to 1979. They showed evidence relating to acquirers undertaking mergers and assessed their first four bids. The authors reasoned that the earlier bids contained the most information. As the program continues, the market becomes aware of the acquirer and this information is supposedly more quickly compounded in the price and thus less information is revealed as more becomes known. The results show that the second bid generates the highest abnormal return of 3.70% for the acquirer. These gains fall to 2.80% at the announcement of the fourth bid. Nevertheless, the gains are positive and significant indicating that large merger programs are beneficial for shareholders. Franks and Harris (1989) also support this assertion. They examine 1800 UK takeovers undertaken during the period 1955-1985 and find that on the whole, mergers in the UK have been value-creating investments for acquiring firms.

Schleifer and Vishny (1988) also noted that most of the gains go to the shareholders of the acquired company. Their results were also based on the analysis of how the share price is affected by the announcement of the takeover. Dodd (1992) analysed 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. He found that targets have negative abnormal returns which turn positive when the acquisition is announced. Holderness and Sheehan (1992) did a similar study looking at mergers between 1977 to 1982. They find a similar result to the papers just mentioned i.e. target firms are the main beneficiaries of the takeover process. The literature shows wealth effects for targets but they typically do not exist after completion of acquisition deals. Existing research provides robust evidence of positive abnormal returns for target firms i.e. the overall value effect of acquisitions on target firms has been significantly positive and increasing over time.

Also assessing the impact of the deal’s success or failure, Hviid and Prendergast (1993) developed a model which shows that targets gain regardless of the deal outcome. They find that deal termination could positively impact target returns as the market receives a signal that the target is low-cost leading to a revaluation of the target firm upwards. There are three possible explanations as to why this could be the case. First and foremost, if the target refuses the bid, then it reveals to the market that they believe their firm to be undervalued or a better stand-alone operation than has previously been thought. Secondly, the threat of a potential takeover can stir the target’s management to remove any inefficiencies and this can benefit shareholders accordingly. Finally, the refusal of an offer might signal to the market that a rival bid may be imminent (Bradley et al. 1983)

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, 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 firm's stock.

Table 1: Existing Studies on market reaction to acquisition announcement

Sample Period	Author(s)	Market	Size D/A/T	Method: Event Window	Method: Benchmark	CAARs(%): Acquirer	CAARs(%): Target	CAARs(%): Combined
1919-1930	Leeth and Borg (2000)	US	466A/72T	(-1,close)	MM,MA	0.14	15.57***	
1955-1972	Franks et al. (1977)	UK/M	70	(0,+20)	MM	4.60[n/a]	16.00[n/a]	8.60[n/a]
1955-1985	Franks and Harris (1989)	UK/TO	1012/1693/46/121	(0,+20)	MA	1.2**	24.0**	
1956-1974	Kummer and Hoffmeister (1978)	US/TO	17/50	(0,+20)	CAPM	5.20*	16.85***	
1958-1978	Dodd and Ruback (1977)	US/TO	124/133	(0,+20)	MM	2.83**	20.89***	
1962-1976	Asquith (1983)	US/M	211/196	(-2,0)	MM	0.2[n/a]	6.20***	
1962-1977	Bradley (1980)	US/TO	88/161	(-20,+20)	MM	4.36***	32.18***	
1962-1980	Dennis and McConnell (1986)	US/M	90/76	(-19,0)	MA	1.07	16.67***	
1962-1996	Fan & Goyal (2006)	US	2162D	(-1,+1)	MM			1.9***
				(-10,+10)				
1962-2001	Bhagat et al. (2005)	US	1018	(-5,+5)	MM	0.18	30.01***	5.27***
1963-1978	Eckbo (1983)	US/HM	102/57	(-1,+1)	MM	0.07	6.24***	
				(-20,+10)		1.58	14.08***	
1963-1979	Asquith et al. (1983)	US/M	214/54	(-20,0)	MM	2.8***	16.8***	
1963-1986	Chatterjee (1992)	US/TO	436	(0,+20)	MM	3.33*	22.04***	
1966-1982	Eckbo and Langohr (1989)	France/TO/Pub	52/90	(0,+5)	MM	-0.29	16.48***	
1968-1986	Lang et al. (1989)	US/TO	87	(-5,+5)	MM	0.01	40.30***	
1969-1974	Malatesta (1983)	US/M	256/83	(0,+20)	MM	0.9	16.8***	
1969-1975	Firth (1980)	UK/TO	434	(0,+20)	MM	-6.30***	28.1***	
1970-1977	Dodd(1980)	US/M	60/71	(-20,0)	MM in Growth Return	0.8	21.78***	
1971-1982	Kaplan and Weisbach (1992)	US	271A/209/209	(-5,+5)	MM	-1.49***	26.9***	3.74***
1972-1987	Servaes (1991)	US	384/384/704	(0,close)	MM	-1.07**	23.64***	3.66***
1973-1998	Andrade et al. (2001b)	US	3688	(-1,+1)	MM	-0.7	16.0**	1.8**
				(-20,close)		-3.8	23.8**	

Sample Period	Author(s)	Market	Size D/A/T	Method Event Window	Benchmark	CAARs(%) Acquirer	Target	Combined
1975-1984	Franks et al. (1991)	US	399	(-5,+5)	MM	-1.02*	28.04***	3.90***
1975-1990	Higson and Elliott (1998)	UK	830	(0,close)	Size-decile	0.43	37.5***	
1977-1993	Kang et al. (2000)	Japan	154A	(-1,0)	MM	1.17***		
				(-1,+1)		0.90*		
				(-5,+5)		2.22***		
1979-1984	Healy et al. (1992)	US largest acquisitions	50	(-5,close)	MA	-2.2	45.6***	9.1***
1979-2002	Bouwman et al. (2009)	US	2944D	(-1,+1)	MM	-0.48***		
1980-1986	Smith and Kim (1994)	US	177	(-5,+5)	MM	0.50	30.19**	8.88**
				(-1,0)		-0.23**	15.84**	3.79**
1980-1987	Byrd and Hickman (1992)	US/TO	128	(-1,0)	MA	-1.23		
1980-1995	Graham et al. (2002)	US	356	(-1,+1)	MM	-0.78***	22.51***	3.4***
1980-1996	Walker (2000)	US	278	(-2,+2)	MA	-0.84*		
1980-2001	Moeller et al. (2004)	US	12023	(-1,+1)	MM	1.10****		
1980-2001	Moeller et al. (2005)	US	12023D/1967T	(-1,+1)	MM	1.10na		1.35na
1981-1997	Bae et al. (2002)	Korea Non-financial	107A	(-1,+1)	MM	1.84***		
				(-5,+5)		2.67**		
				(-10,+10)		3.39**		
1984-2000	Conn et al. (2005)	UK	4320	(-1,+1)	MA	0.59***		
1986-1991	Danbolt (2004)	UK	514	(0,+20)	MA,CAPM,	18.76***		
				(-2,+1)	Size-Decile	20.64***		
1987-2004	Antonios et al. (2007)	UK, LSE frequent bidders	1401D	(-2,+2)	MA	1.26***		
1988-1995	DeLong (2001)	US, banking	280	(-10,+1)	MM	-1.68***	16.61***	0.04
1990-1999	Mulherin and Boone (2000)	US	281D	(-1,+1)	MA	-0.37***	20.2***	3.56***
1990-2000	Fuller et al. (2002)	US	3135D	(-2,+2)	MA	1.77***		
1990-2004	Wang and Xie (2009)	US,Domestic	396D	(-5,+5)	MM	-2.91***	21.52***	0.97**

Sample Period	Author(s)	Market	Size D/A/T	Method: Event Window	Method: Benchmark	CAARs(%): Acquirer	CAARs(%): Target	CAARs(%): Combined
1990-2007	Usyal (2011)	US	7814D	(-1,+1)	MM	0.10***		
1991-2004	Wang and Whyte (2009)	US	10767D	(-1,0)	MM	-0.0001		
1993-1998	Datta et al. (2001)	US	1719D	(-1,0)	MM	0.02		
1994-2005	Ushijima (2010)	Japan,PM	106D	(-1,+1)	MA	1.3***		
		M	38D			3.8***		
1996-2009	Golubov et al. (2012)	US	4803D	(-2,+2)	MM	0.37		
1998-2003	Ahn et al. (2010)	US	1207A	(-1,0)	MM	-1.01***		
				(-1,+1)		-1.30***		
				(-2,+2)		-1.46***		
				(-5,+5)		-1.88***		
1999-2007	Ishii and Xuan (2014)		539A	(-1,+1)		-1.97	20.06	1.04
2000-2018	Yamada & Managi (2021)	Japan	3189D	(-2,+2)	MM	-1.41%**	7.54%**	
				(-1,+3)		-1.16%**	7.15%**	
				(0,+4)		-0.96%**	6.71%**	
2001-2018	Bouallegui (2020)	GCC Region	22D	(-1,+1)	MM	-1.89%**	2.14%**	
				(-2,+1)		- 2.15%***	2.61%**	
				(-1,+2)		-2.05%**	2.82%**	
2010 - 2019	Ahmed et al. (2021)	Multiple	193D	(0,+1)	MM	-0.26	1.36***	
				(-1,+1)		-0.52**	3.16***	
				(-2,+2)		-0.43*	2.99***	
				(-5,+5)		-0.36**	5.71***	
				(-10,+10)		-1.58**	2.93***	
2010 - 2019	Chen and Krichevskiy (2021)	US	389D	(-2,+2)	MM	-2.39%**		
				(-1,+3)		-2.31%**		
				(0,+4)		-2.15%**		
				(-2,+3)		-1.73%**		
				(-1,+4)		-1.63%**		
2010 - 2019	Liu and Yu (2022)	US	108D	(-2,+2)	MM	-1.37%**	6.45%**	

(-1,+3)		-1.27%**	6.90%**
(0,+4)		-1.24%**	5.69%**

*Note : This table summarises existing studies on announcement returns of mergers and acquisitions for firms involved in mergers and acquisitions while most studies provide abnormal return estimations for acquirers, a number of previous studies also report combined abnormal returns and abnormal returns for target firms; however, studies in the USA and UK typically report slightly negative and insignificant abnormal returns for acquirers. M = Mergers, TO = Tender Offers, MA = Market-Adjusted Model, MM = Market Model, D = Deal, A= Acquirer, T= Target, n/a = not available, *** = significance at 1% level, ** significance at 5% level, * = significance at 10% level

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) however mentioned that it is still possible for these people to benefit under certain conditions. He pointed to golden parachutes in the managers compensation contracts. He also suggested that there may be occasions when the value of the parachute is so high that the managers will actively seek the acquisition of the firm so that they can take advantage of these contracts. This view is also held by Agrawal and Walkling (1994). The authors analysed the impact that acquisitions have on the employment of chief executive officers (CEOs). The authors found that acquisitions occurred when the CEOs of the target firms have abnormal levels of compensation and more than fifty percent were sacked after the firm was acquired. This conclusion supported Larcker (1992) idea that managers will seek to have their firms purchased in order to realise these benefits. Furthermore, Agrawal and Walkling (1994) 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, that an acquisition has a negative reputational impact on the managers of the target firm.

Readdressing acquirer gains in the UK, Draper and Paudyal (2006) assess acquisitions undertaken between 1981-2001. The UK is unique in that a large proportion of the firms acquired are privately held i.e. unlisted. The authors find that acquirers of targets which are listed suffer no significant effect to their value, dependent upon the methodology chosen, while those which are privately held earn significant wealth gains modelled as being due to the implied shared information between target and acquirer. In addition, the authors find the returns to be dependent upon a variety of factors such as firm size, mode of payment among others.

If as the short-term studies assume, financial markets are semi-strong efficient, these results imply that acquisitions, on average these do not enhance NPV for acquirers. Behaviourists will argue that this is the reaction of the market to acquisition announcements and does not necessarily reflect the value effects of the deals. Rosen (2006) suggests that acquirers are likely to gain positive announcement abnormal returns if recent mergers by other firms have been received well or if the overall stock market is doing better. The author, however, suggests that there is a long-term reversal in returns for acquirers who make a deal during hot market periods compared to those who acquire at other times.

1.1.1 Long Term Wealth Effects

Analysing the long-term performance of mergers is limited to the acquiring firm as the target is incorporated into the acquirer's operations past the date of completion. In the literature, there has been disagreement over the correct methodology to measure an acquirer's long-term performance. The evidence suggests that overall long-term abnormal returns are either negative or insignificant. Early studies including Firth (1980) and Asquith et el. (1983) find significant one-year post-announcement loses for acquirers. Limmack (1991) using UK data finds a significant downward drift to acquirer's stock prices when analysing 24-month CARs from the date of effective completion. The authors find losses ranging -14.08% (market model) to -6.87% using the index model. When a value weighted return is computed, the results show that there is no significant abnormal return generated and thus Limmack (1991) indicates that acquirers earn zero abnormal returns. The returns seem to suggest that the market takes longer to respond to smaller acquirers and this is in part due to information asymmetry. While the market fails to reward successful acquirers, it shows no sympathy for those which fail to complete their deal with significant losses of -20.23% from the date of termination. Table 3 presents a brief review of prior long-term studies.

Long-term post-acquisition performance has been central to research studies over the past three decades. Table 3 includes an abstract of the numerous studies that have been undertaken to measure abnormal performance. Although a large amount of research has been done on this issue, some questions still remain unanswered. Most importantly, from a decision-making perspective, will a particular acquisition deal improve the long-term performance of an acquirer firm?[8]

A plethora of metrics have been used to measure long-term performance however there is no overall agreement about average return for acquisitions. It is apparent that the results between investigations vary depending on the metric type (Table 3), benchmarks and samples of the different studies. Most of the existing literature document zero or negative average abnormal returns in the long run, however a number of studies that use accounting ratios or economic value-added methods find positive average performance. There's been research addressing the accuracy of different metrics and the appropriate benchmarks, especially those concerning long-term abnormal returns on stock price. Although these discussions contribute to improved metrics, investigations are generally limited to only one aspect of corporate performance and ignore the other dimensions. Aside from that, the variance surrounding the association between acquisition activity and post-completion performance suggests that subgroups of firms do experience significant positive returns from such activity (King et al. 2004).

[8] This is a multibillion pound question and the difficulty is the reference, which has most often been the CAPM or the relative return further controlled for risk. Following this are factor models, but there is an issue as to whether the Fama-French Factors are appropriate. It may be that economic performance might be a relevant comparator or something that may pay attention to merger waves. A forward looking approach could consider some measure of discounted profits or cash flow (NPV) that would be PV related to the original entity relative to the new entity where the cost of the acquisition needs to appropriately considered. One solution to that would be to consider that the shareholders of the acquired firm ought to be able to capture any readily exploitable gains from the acquisition. What they may not be able to easily exploit are prospective gains from synergy. As these gains depend on the strategy that only the new entity is able to employ. Of course, based on the power relations that reside between the board of the target as compared with the acquiring entity. If the target form has other opportunities or are able to play hardball, then the reputational damage to the acquiring firms board may make it possible for the target shareholders to exploit all of this. Hence, short-medium term gains may be extracted as compared with anything that is less easy to exploit.

1.1.2 Origins of Acquisition Benefits

Empirically evidence shows that the shareholders of the target firm benefit as their shares increase in value when an acquisition is announced. At the same time, the acquiring 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) found that target shareholders benefit a lot from acquisitions. The authors 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 firms that engage in long term strategies are frequently undervalued and become targets. The authors posited that when these long-term strategies come to

Table 2: Long Run Studies on market reaction to acquisition announcement

Sample Period	Author(s)	Market	Size	Benchmark	Method Event Window(months)	Metric	Abnormal Return(%)
1929-1969	Langetieg (1978)	US	149	Industry	(+1,+12)	CAR	-0.87**
					(+1,+24)		-1.08**
1941-1962	Mandelker (1974)	US	241	MA	(+1,+12)	CALT	0.6***
1955-1972	Franks et al. (1977)	UK	94	MM	(-40,+40)	CAR	-0.04
1955-1987	Agrawal et al. (1992)						
1958-1976	Dodd and Ruback (1977)	US	124	MA	(0,+60)	CAR	-5.9
1960-1985	Frank and Harris (1989)	UK	1048	MM	(+1,+24)	CAR	-12.6***
				MA			4.8**
				CAPM			4.5**
1961-1993	Mitchell and Stafford (2000)	US	2068	Size & B/M	(+1,+36)	BHAR-EW	-1.0
						BHAR-VW	-3.8**
			389			CALT-EW	-1.44
						CALT-VW	-1.08
			366	FF3FM	(A,+6)	CAR	-5.12***
					(A,+12)		-10.63***
					(A,+24)		-18.01***
1962-1976	Asquith (1983)	US	196	Beta port.	(o, +12)	CAR	1.00***
1964-1983	Eckbo (1986)	Canada	1138	MM	(+1,+12)	CAR	-7.2***
1969-1974	Malatesta (1983)	US	256	MM	(0,+36)	CAR	-7.6***
1969-1975	Firth (1980)	UK	434	MM	(+1,+12)	CAR	0.5
					(+13, +36)		-0.4
1970-1989	Loughran and Vijh (1997)	US	947	Size, B/M firm	(+1,+60)	BHAR	-6.5
1973-1985	Buhner (1991)	Germany	110	MM	(+1,+12)		-6.93
					(+1,+24)		-5.98

Sample Period	Author(s)	Market	Size	Benchmark	Method: Event Window(months)	Method: Metric	Abnormal Return(%)
1975-1984	Franks et al. (1991)	US	448	Adjusted Beta	(A, +24)	CAR	-4.67*
				MM			-14.96***
				MA			-7.43***
1975-1990	Higson and Elliott (1998)	UK	814	Size	(0,+12)	BHAR	-0.74
			776		(0,+24)		-1.14
			722		(0,+36)		0.83
1977-1986	Limmack (1991)	UK	448	Adjusted Beta	(A, +24)	CAR	-4.67*
				MM			-14.96***
				MA			-7.43***
1977-1990	Chatterjee (2000)	UK	153	MA	(0,+12)	CAR	5.4
					(0,+24)		-4.1
					(0,+36)		-17.9
1979-2002	Bouwman et al. (2009)	US	2944	Size & B/M	(+1,+24)	BHAR	-7.22***
				Four-factor model		CALT	15.84***
1980-1989	Kennedy and Limmack (1996)	UK	345	Size	(0,+23)	CAR	-5.03*
1980-2001	Moeller et al. (2004)	US	12023	Four-factor model	(0,+36)	CALT (Ave. month return)	6.48 (0.018)
1981-2007	Yaghoubi et al. (2004)	US	3101	Size & B/M	(-1, +1)	CAR	-1.1***
1983-1995	Sudarsanam and Mahate (2003)	UK	519	Size,B/M,MA	(+2, +36)	BHAR	-14.76***
1984-1992	Gregory (1997)	US	452	FF3FM	(A, +6)	CAR	-5.12***
					(A, +12)		-10.63***
					(A, +24)		-18.01***

Sample Period	Author(s)	Market	Size	Benchmark	Method Event Window(months)	Metric	Abnormal Return(%)
1984-1994	Gregory and McCorriston (2005)	Cross-border acquisitions by UK acquirers	333	Size & B/M	(+1, +12)	BHAR	0.65
					(+1, +36)	BHAR	-3.90
					(+1, +60)	BHAR	-9.29
1984-2000	Conn et al. (2005)	UK	4344	Size & B/M	(+1, +36)	BHAR	-9.02
						CALT	-0.21
1990-2001	Croci (2007)	EU	83		(0, +12)	BHAR	-9.47
			50		(0, +24)		-24.36**
			23		(0, +36)		-6.94
1991-1996	Aw and Chatterjee (2004)	US	77	MM	(+1, +6)	CAR	-1.86
					(+1, +12)		-8.01***
					(+1, +18)		-9.45***
					(+1,, +24)		-17.87***
1993-1998	Datta et al. (2001)	US	485	Size,B/M one-year pre-acquisition stock return, matched firm	(0, +36)	BHAR	-9.31

*Note: The table above was developed from a number of sources and similar to the approach taken by Yaghoubi et al. (2016) who review a number of empirical issues relating to mergers and acquisitions. This table summarises existing studies on long-term abnormal returns of mergers and acquisitions for firms involved in mergers and acquisitions, previous studies report negative long-term abnormal returns. M = Mergers, TO = Tender Offers, MA = Market-Adjusted Model, MM = Market Model, CAR = Cumulative Abnormal Returns, CALT = Calendar-time portfolios, BHAR = Buy and Hold Abnormal Returns, *** = significance at 1% level, ** significance at 5% level, * = significance at 10% level realization, 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 offers an explanation for these short-term gains but it relies on the assumption that market undervalues every firm that is acquired.[9]

Roll (1986) also attempts to identify the origins of acquisition gains. The author believed that acquisition gains hardly ever exist and are overestimated in the few cases when they genuinely do occur. He posited that a huge chunk of the increase in the value of target shares is transferred from the acquirer i.e. 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

[9] Also it may not be that the market undervalues every firm, but that the market is not able to value the likely possible gains that may arise from what maybe a combinatorial based on the extent of an industry (n) and the number of likely firms that are able to engage in an acquisition (i). This leads to an expected return calculation computed across these likely combinations which are measured relative to the non-acquisition case. All of these prospective future gains are also discounted so when the most likely state is of non-acquisition and all of these additional gains are discounted, then we are back to the geometric random walk with the best guess as to the value of the stock next period being the value today. Hence, these prospective gains are an innovation.

acquisition then Roll (1986) 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 acquirer 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 does not mean that all individual participants are rational. The author claimed that the market is composed of irrational investors whose behaviour cancelled out in aggregate giving an 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 acquiring 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, the author 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/failure of the bid and thirdly that the share price drops again on the completion of a successful bid. This led to the development 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 acquirer's current assets which is not offset by the prospect of overpaying for the target. Consequently, there is a small downward revision in the acquirer's value as it becomes more and more obvious that the target will be acquired at too high a price. The notion that takeover benefits are fabricated 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.

1.1.3 External Effects of Acquiring a Company

There are external effects generated by an acquisition that are rarely discussed in the literature. Hughes (1993) considers the impact of a takeover on factors other than share prices. This author discussed several points on the consequences of an acquisition which are discussed below:

1.1.3.1 Real Resource Effects

When examining real resource effects, the main 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 MMC.[10] 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 UK laws change with respect to acquisitions it is possible that this issue could be promoted to considerable importance once again.

1.1.3.2 Investment Effects

There is empirical evidence showing that the link between mergers, investment and improved relative productivity isn’t purely 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, the author 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. There maybe other stratifications that might also yield such gains, vertical acquisition may also lead to economies and gains as a result of security in supply and a change in risk profile

[10] Professor Martin Cave, previously Head of Economics and Finance at Brunel was a former Chair of the MMC in the 1980s. He wrote the Technical Annex for M Cave, “Enquiry on the market position of Vodaphone”, OFTEL report to the Monopolies and Mergers Commission, October 1998. Markets and Mergers is now a Directorate of the Competition and Markets Authority of which Martin was a member after it was created in 2013. Anyone can bring an Acquisition to the attention of the CMA.

1.1.3.3 *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. 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. Many technical acquisitions may relate to small private companies and thus may not be represented in the data sets analysed as they are not amenable to an event study. This might be because they are in the market data.

1.1.3.4 Regional Effects

There may be regional impacts following an acquisition. One of the criteria considered by the MMC 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 new entity might dominate the region and this may lead to a local monopoly. In particular, acquisitions are often linked to high closure rates and lower rates of employment growth. This has been related to the transfer 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.

2.1 Hypothesis Development

2.1.1 Merger Wealth Effects

In the academic literature, many theories have emerged to explain why firms continue to initiate deals despite overwhelming evidence indicating that shareholders will effectively lose out.[11] The empirical evidence shows that over the long run, cash acquisitions generate value while stock acquisitions lose out due to the signal[12] related to using equity (Giannopoulos et al. (2018) ; Liu and Wang (2019); Burchardi and Rau (2020)). The information asymmetry theory suggests that using cash is associated with a zero to positive news signal (Travlos, 1987; Shleifer and Vishny, 2003).[13] On the other hand, stock-financed deals suggest a mispricing of the firm. A firm can be mispriced upward (overvalued) or downward (undervalued), this led to the development of the market-timing hypothesis. This hypothesis forms a central theme within this thesis. It was introduced by Shleifer and Vishny (2003), henceforth SV) and centres around a rational manager-irrational investor framework. Here, the manager is believed to be able to rationally assess the value of his/her firm. In line with Myers and Majluf (1984), a manager will want to capitalize on the overvaluation of the firm and the market timing hypothesis suggests that he/she does this through a merger. The manager '*times'* the market by assessing the performance of their firm. If the manager believes that the firm value will not rise higher than its current level and in the future will fall towards its intrinsic value, then it capitalizes on the gain by using this overvalued stock to buy a target firm. The acquisition raises the value of the acquirer through the purchase of the target's assets using overvalued equity. Over the long-term, the acquirer's value falls towards its intrinsic level, however by acquiring the

[11] Hunter and Komis (2000) discuss the capacity of the shareholder to monitor the management, which leads to an informational asymmetry. Jensen and Meckling (1976) consider that under such circumstances the objectives of managers as compared with those of shareholder may not be the same. A distinction arises here between profit maximisation and maximising the value of the company. With imperfect monitoring, the principle may not be able to ensure that the agent optimises the objective function preferred by the shareholders.

[12] Spence (1973) first considered the role of education as a signal in the labour market. The effectiveness of signalling is impacted by asymmetric information. This may lead to an overinvestment in the signal and the limits to the effectiveness of any signal as a result of that. The intention being to separate the market. There are further comparisons when acquisition is an aspect of the market for market control (Hunter and Komis, 2001). Grossman and Stiglitz (1978) consider this in the context of informational asymmetry and efficiency in financial markets where by inefficiency arises when signalling is overly expensive while the same arise when information is inexpensive. There may also be problem in observing a unique signalling equilibrium when it is not possible to determine whether the signal is credible.

[13] Also when the bidding firm values control then the method of payment used is cash or debt (Amihud et al. 1990).

target, the manager effectively raises this intrinsic level through the value of the target's assets. The only requirement as such is that the target must be *less overvalued* than the acquirer.[14]

Figure 1: Market Timing

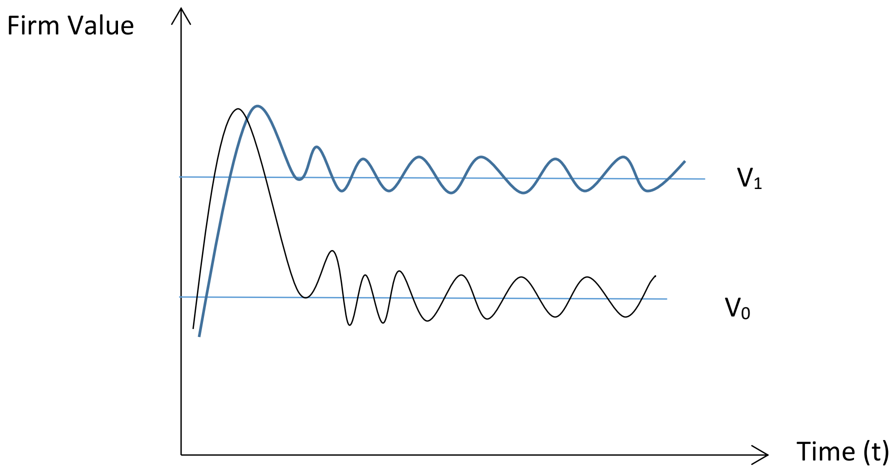

Figure 1 shows how acquisitions can help '*cushion'* the fall in acquirer's value over time. Assuming a firm's value fluctuates around its intrinsic level, sometimes deviating over and under. In cases where it is over (under) this level, the firm is overvalued (undervalued). For an overvalued firm, if its value rises above the fundamental level of V_0 on the basis that the market is short-term inefficient then at some point in the future there is an expectation for the market to correct itself as arbitrageurs will move the price back towards its fundamental level. This is shown by the black line. The market timing hypothesis suggests that the managerial team of an overvalued firm can "*time"* the market and engage in an acquisition deal during the overvalued period. By doing so, when the market corrects in the long term, the intrinsic level of the firm is raised from V_0 to V_1. The increase in the acquirer's value is the addition of the target's assets. The market timing theory produces many

[14] This thesis does not disagree with such substitution of assets as it would help explain why an equity swap would be a tool in the eyes of the aquirer to operationalise an acquisition. The equity of an undervalued asset may be difficult to use to mount an acquisition, which would imply why cash is required in such cases. For cash rich companies, liquidity is a key determinant in acquisition leading to arguments as to why the information in the company's financial statements is more appropriate to explain the determinants of acquisition. The Golden rule of the theory implies that, the overvalued acquiring company's management will be most likely to acquire companies undervalued. An acquirer would however always wish to acquire the assets of a firm that appears to be undervalued. A key indicator could be market to book value or large Q exceeding for the aquired firm exceeding Q for the aquirer.

predictions for merger activity. The authors of the model consider two firms, 0 and 1 with capital stocks K and K_1 and stock market valuations per unit of capital of Q and Q_1. They assume that Q and Q_1 are not efficient valuations of the firm and represent misvaluations with $Q_1 > Q$. Within this scenario the market-timing model is developed making several predictions relating to merger activity including the following:

1. Acquisitions are disproportionate for stock when aggregate or industry valuations are high
2. Acquisitions are disproportionate for cash when aggregate or industry valuations are low
3. Volume of stock acquisitions increases with the dispersion of valuations among firms
4. Target firms in cash acquisitions earn low prior returns, whereas bidding firms in stock acquisitions earn high prior returns
5. Acquirers in stock acquisitions show signs of overvaluation such as earnings manipulation and insider selling
6. The long-run returns to bidders are likely to be negative in stock acquisitions and positive in cash acquisitions[15]
7. Despite negative long-run returns, acquisitions for stock serve the interest of long-term shareholders of the bidder[16]

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[15] This argument follows from relative as compared with absolute over-valuation. Absolute overvaluation is likely to be linked with cash acquisitions as the shareholders are less likely to consider the share to represent fair value and thus will not engage in share swaps to fund the acquisition. As the firm to be acquired is considered to be more overvalued, then this differential is squeezed and as such the extent to which the share holders of the target are prepared to accept equity shifts and thus the shareholder of the target are more likely to accept equity. It is important that there is no bias in the extent to which valuation is measured and to this effect the issue may be better seen in terms of the relative or expected values in the market as compared with market to book values where the denominator may have systematic biases. In particular, historic accounting or the various adjustments that have been used to pay attention to inflation.
Also, the capacity to mount an acquisition is reflective of the means by which cash might be acquired and when cash is involved this will reflect the extent to which the aquirer holds cash, has liquid assets that can be mobilised and the debt capacity of the company. This reflects information in financial statements such as measures of liquidity, debt to equity and leverage. In addition to valuation the debt capacity of the company will affect the nature of the acquisition. If the company is highly geared depending on the structure of the debt, then it may not be so easy to borrow or issue equity to make the acquisition.

[16] Investment decisions are supposed to be value enhancing otherwise firms would engage in internal growth as compared with acquisition. The book value of the acquired company is composed of cash and liquid assets, contracts, equipment, real estate, inventory, an order book, patents, skilled labour and stocks. Such assets can be mobilised to fund the acquisition and service debt. The book value of the company is based on the tangible elements of what has been considered above, i.e., a backward valuation and once the acquisition occurs, the value of the fraction of new entity related to the acquisition must relate at the minimum that book value. Once the acquisition is paid for, irrespective of any market valuation of these assets, which can in part be mobilised to pay for the acquisition there is a component, which relates to the present value of the sales less any variable costs. Any payment made in cash is paid to the shareholders of the target as a sunk cost of the acquisition which will be reflected in the valuation of the new entity meaning any cash acquisition is paid out right and hence there is no overhead going forward. Hence, the forward component of the acquisition should enhance the value of the new entity. Whereas any acquisition using equity would dilute the share value of the new entity were the net value of the acquisition bid to zero as a result of the acquisition process as any short-run gains are bid away. Generally, event studies use short horizons to assess the

8. Managers of targets in stock acquisitions are likely to have relatively short horizons or alternatively get paid for agreeing to the deal

Whilst most research conducted has been devoted to assessing the validity of the market-timing model, one key paper is central to the progression of work in this thesis. Savour and Lu (2009) use an intuitive methodology to examine the market-timing model. They categorise bidders by deal outcome, in terms of whether the deal successfully completed or fails to complete. By creating '*a sample of mergers that fail for exogenous reasons*' (Savour and Lu, 2009: 1061), they provided the perfect control group for assessing the true performance of bidders over the long-term[17]. The unsuccessful acquirers (bidders who exogenously failed to complete the deal) are used as '*a proxy for how the successful ones would have performed had they not managed to close their transactions*' (Savour and Lu, 2009; **1063**). They separate the acquirers by the method of payment and found significant results for stock acquisitions. They find that '*unsuccessful stock bidders underperform successful ones in an economically meaningful and statistically significant way*' (Savour and Lu, 2009: 1093), which '*increases with the length of the holding period*' (Savour and Lu, 2009: 1093). Their study confirms that acquirers who successfully complete their deals create value for shareholders through cushioning the collapse of long-term overvalued stock prices hence supporting the existence of market-timing in the US.[18]

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performance of any deal. Relative to the long-term value of the joint enterprise, three years would be considered to be short-run. Another way that the longer term notion of the value of the new entity might be seen assuming that any non-tangible gains were extracted by the share holders of the target firm would imply that a valuation of the joint assets might be seen as a forward projection of the acquisition. One way of computing this would be by projecting forward the pre-acquisition asset value from the return on the market. Any synergetic gains would imply that the joint entities value would exceed this. Again this would depend on any such gains not being extracted in the bargain made at the point of acquisition between the target firms shareholders and the management of the acquiring company. Hence, any ability to determine any gains from the acquisition needs to project forward the long-term value of the new entity solely associated with the effect the acquired company has going forward on the new entity less the cost of the acquisition. However, that present value calculation is more than might be anticipated from the excess returns from an event study.

[17] Savour and Lu (2009) define exogenous as anything that resulted in the termination of the deal which is outside the control of the acquirer (for statistical purposes in a rational expectations context they need to be invariants). Variables invariant to the process analysed are considered exogenous. Times series models consider this in terms of the stability of the parameters of any sub-system or single equation. While in the cross section or panel context the observed process does not change in response to a natural experiment**.**

[18] The CAPM can be used as a notion of valuation that may be carried forward post-acquisition. The CAPM is in principle forward looking and depends on information that could solely depend on share valuations (including market capitalisation). Therefore :
An initial valuation of the market value of the asset holding might be derived from the CAPM:

$$y_{it} - y_{it-1} = \alpha + \beta(r_{mt}) + \varepsilon_{it} \quad (1)$$

Which assuming an Ito process or geometric Brownian motion explains the market:

$$r_{mt} = \mu + \varepsilon_{mt}$$

Substituting (2) into (1), then

Rhodes-Kropf et al. (2005) employ the use of the market-to-book ratio to assess firm misvaluation and find support for the predictions of SV (2003). They find that cash acquirers are less overvalued than stock acquirers. Their results indicate that merger activity can be linked to '*short-run deviations in valuation from long-run trends, especially when stock is used'* (Rhodes-Kropf et al., 2005: 601). The paper also finds that deals that failed tend to have '*larger differences than completed transactions, while successful deals display higher levels of misvaluation'* (Rhodes-Kropf et al., 2005: 601). Other opposing theories continue to emerge providing different results. Gugler et al. (2012) also employ an intuitive methodology to test merger waves. They compare overvalued acquirers with other overvalued firms of similar characteristics which decided not to merge. They find that the firms which do not merge outperform those which merge and the authors report this result as an indication that mergers do not provide better returns for acquiring shareholders by 'cushioning' losses.

This chapter extends the previous literature by reassessing whether or not UK mergers create value using a comparative assessment approach. If mergers are indeed to the benefit of acquiring firms, then those deals which complete should outperform those which do not complete. This forms the basis of the chapter. This suggests that if mergers are in the best interests of existing shareholders,

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$$y_{it} - y_{it-1} = (1-\beta)r_t + \alpha + \beta(\mu + \varepsilon_{mt}) + \varepsilon_{it}$$
$$y_{it} = y_{it-1} + (1-\beta)r_t + \alpha + \beta\mu + \beta\varepsilon_{mt} + \varepsilon_{it}$$

Subject to knowledge of the initial value of the asset, then the above equation given shocks might be used to project forward any anticipated market value of any acquisition, which would be added pro-rata to the initial value of the parent company going forward. Meaning, the market value of the new entity could be viewed as evolving in this way.

An important element is which initial valuation is adopted in terms of any such projections. Thus, any overvaluation in the acquisition would be avoided were the initial value used for the target to be taken prior to the bid and that it were assumed that the asset at this point was undervalued.

If the market is considered over-valued, then this figure might be the book value, but as previously discussed this measure is purely backward looking.

If the impact of the acquisition is neutral, which may be the case when from the perspective of the shareholders of the target they manage to bid away any prospective gains from the acquisition, then when the cost of the acquisition is subtracted and paid for by the shareholders of the original company this initial value and the market value at the point of sales is what is realised then:

$$y_{it} = (1-\beta)r_t + \alpha + \beta\mu + \beta\varepsilon_{mt} + \varepsilon_{it}$$

Suggesting that any dilution as being complete as a result of any swap purchase from issuing shares in the parent company. Then beyond the acquisition any gains will purely be the expected return as a result of drift and any gains as a result of the assets being better performing than the market.

If consideration is made based on the arguments adopted in previous studies any cash used to purchase the asset could be viewed differently as it does not dilute the asset's value. So this aspect of the deal may need to be added back in terms of the impact on the above valuation, possibly as being viewed in terms of the book value. If a leveraged buy out is adopted, then this should be considered in a similar manner except for the cost of servicing the debt.

This pays no attention to the over-valuation argument in terms of the parent company, but there is the share value of the new entity that should reflect this. The other issue would be any projected future profit stream or the proportion arising from any gains from synergy that is not revealed to the shareholders of the target.

then successfully completed deals should outperform those which subsequently fail due to exogenous reasons. Notably, if successfully completed deals outperform those which fail in terms of the gains generated in both the short and long run, then the evidence will suggest that managers are working towards their key objective of maximizing shareholder value and mergers will be financially worthwhile for acquiring firm shareholders. Even if losses are incurred for both successfully completed deals and their failed counterparts, mergers can still be beneficial to acquiring firm shareholders so long as the losses to successfully completed deals transpire to be lower than those of deals that fail over the long-term (Savour and Lu, 2009). This is further robustly checked with a cross-sectional analysis to assess the relationship between key variables such as the method of payment.

This forms the basis of the first hypothesis

H1: If mergers are in the best interests of acquiring firm shareholders, then deals which successfully complete should outperform those which exogenously fail. This should hold in both the short and long run

2.1.2 Market Valuation

There remains an empirical puzzle over why mergers in industries are clustered and why industry shocks happen at the same time. Neoclassical theories have suggested that shocks such as regulatory or technological can have an effect on macroeconomic conditions which makes the combination of firms attractive (Mitchell and Mulherin, 1996; Harford, 2005; Owen 2006). On the other hand, behaviorists argue that a stronger motive for mergers and acquisitions is market valuations (SV, 2003; Rhodes-Kropf and Viswanathan, 2004; Rhodes-Kropf, Robinson and Viswanathan, 2005). It is the validity of the valuation of the market in merger wealth creation that leads to the second testable proposition.

Neoclassical vs Behavioural

Neoclassical Finance

Neoclassical finance or economics relates to the birth of financial research. The twin pillars of neoclassical finance are efficient markets and modern portfolio theory (the theory of asset pricing and, most notably, no arbitrage and risk neutral pricing). In 1952, Harry Markowitz created modern portfolio theory while a doctoral candidate at the University of Chicago. Modern Portfolio Theory (MPT) is a stock or portfolio's expected return, standard deviation and its correlation with the other stocks or mutual funds held within the portfolio. Within these three concepts, an efficient portfolio can be created for any group of stocks or bonds. An efficient portfolio is a group of stocks that has the maximum (highest) expected return given the amount of risk assumed, or, on the contrary, contains the lowest possible risk for a given expected return. Another main theme in neoclassical finance is the Efficient Market Hypothesis (EMH). The Efficient Market Hypothesis posits that all information has already been reflected in a security's price or market value and that the price (today's trading price) is its fair value. Since stocks are considered to be at their fair value, proponents argue that active traders or portfolio managers cannot produce superior returns over time that out-perform the market. Therefore, they believe investors should just own the "entire market" rather than attempting to pick stocks. This premise is supported by the fact that the S&P 500 stock index beats the overall market approximately 60% to 80% of the time.

There are many forms of this theory, but for our purposes, it is probably best to narrow the scope to a simple observation. Fama (1970) introduced the Efficient Market Hypothesis upon completion of his PhD and presented three market forms. The first is 'Weak-Form Efficiency', which is also known as the random walk theory. This market form suggests that past price movements do not affect a stock's price and can't be used to predict its future direction. Advocates of weak-form efficiency believe all current information is reflected in stock prices and past information has no relation to current market prices. Efficiency is enhanced in a 'semi-strong' form which assumes that current stock prices adjust rapidly to the release of all new public information. Finally, there's the 'strong' form which says the market embeds all past, all publicly and all privately held information into the securities prices. The final notion has been significantly tested and the finding of profits generated by insiders (Jaffe, 1974) puts serious doubts over its validity.

There is much debate over the validity of an 'efficient' market and subsequently also neoclassical financial theories. This has led to the emergence of behavioural finance. The conflict between the two schools of thought will form a recurring theme throughout this work. Within this thesis, neoclassical finance will refer to theories relating to merger activity which broadly follow the efficient market proposition.

Behavioural Finance

Behavioural finance attempts to explain and increase understanding of the patterns of investor behaviours, including the emotional processes involved and the degree to which they influence decision-making (Ricciardi and Simon, 2000). It essentially attempts to explain the what, why and how of finance and investing from a more human science perspective. Behavioural finance studies financial markets as well as provide explanations of many stock market anomalies (such as the January effect), speculative market bubbles (.com bubble of 1999) and crashes (1929, 1987 and 2008). Within the mergers and acquisitions context, the confusion lies within the post-merger effects of the two firms. Whilst the target largely gains (Jensen and Ruback, 1983), the acquiring firm shareholders earn negative to zero abnormal returns (Mueller, 1985; Loughran and Vijh, 1997; Antoniou et al.,2007). It is the question of why firms merge which drives behavioural theorists to continue to formulate models with theories such as market-timing and market-catering, amongst a long line of others.

Academic literature has explored the implications of neoclassical and behavioural theories on firm valuation. Some studies have found that market valuation of firms can be influenced by behavioural factors, such as investor sentiment, overconfidence, and herd behaviour. For example, research by Baker and Wurgler (2007) found that firms with high levels of investment and low levels of profitability are more likely to be overvalued during periods of high investor sentiment, leading to mispricing in the market. Additionally, studies by Shleifer (2000) and Hirshleifer (2001) have shown that investor sentiment and behavioural biases can affect stock prices and lead to market inefficiencies. On the other hand, proponents of neoclassical theory argue that rational valuation based on expected cash flows and discount rates is the fundamental driver of firm valuation in the long run. They argue that any mispricing caused by behavioural factors will be corrected over time as market participants learn from their mistakes and adjust their valuation models accordingly.

Mitchell and Mulherin (1996) study industry-level patterns during the 80's merger wave. They find that industries that were exposed to the greatest economic shocks such as technological change and financial deregulation experienced a changing industry structure. They concluded that the 80's merger wave was driven by the industries which were exposed to these economic disturbances.

Harford (2005) also supports the neoclassical view and finds that a merger wave moves from an industry level to a wider macroeconomic level depending on the capital liquidity available to the market at that point in time. Gurgler et al. (2006) disagree with his reasoning as they perceive that the existence of some kind of shock and an appropriate level of capital liquidity at the same time to be unlikely. Owen (2006) supports the economic disturbance theory of Mitchell and Mulherin (1996), Harford (2005) and Gurgler et al. (2005). Owen (2006) adds to the neoclassical school of thought by explaining that the availability of capital and regulatory framework promotes merger activity claiming it will lead to a clustered period of mergers and acquisitions. She makes an interesting comment that merger theories are based on the idea that exogenous events can drive the decisions of firms, potentially overriding any internal concerns (such as cultural differences) regarding the deal in question (Owen, 2006).

From the behavioural table, Rhodes-Kropf and Viswanathan (2004, henceforth RKV) also favour the role the market plays in merger activity. They propose a rational theory where errors in valuing potential takeover synergies are correlated with an overall valuation error. The theory is based on the question that "*why would a value-maximizing target knowingly accept over-valued currency in a takeover offer?*" The idea behind the theory is that acquirers and targets both have private information about the true value of their respective companies. However, each of these firm values will be affected by a firm-specific error, a sector-wide error and an overall market-valuation error. When assessing whether or not to accept the acquirer's proposal, the target mistakenly overestimates the synergies on offer by underestimating the level of the market-wide valuation error. A combination of this can lead to clustered merger activity during periods when the market, firm is misvalued. Even though the authors refrain from sharing the cause of the misvaluation error, they support the notion that misvaluation drives merger activity. However, Savor and Lu (2003) believe that target managers knowingly work to maximise their own short-term gains rather than their shareholders. Although SV (2003) and RKV (2004) propose economically different theories, they both support the link between misvaluation and merger waves. Neither paper offers explanations as to the cause of the misvaluation, but its effect is shown thoroughly in their analysis. Rhodes-Kropf, Robinson and Viswanathan (2005) test the predictions of SV (2003) and RKV (2004). They do this by developing a decomposition that breaks the market-to-book ratio into three components. Market-to-book ratio is decomposed into 1) the firm-specific pricing deviation which measures the difference between the firm's market value and implied valuations. 2) a time-series sector error which measures the differences that arise when contemporaneous multiples differ from long-run multiples. 3) long-run value to book derived from their respective long-run valuation multiples to book value**.** Using the breakdown of the market-to-book ratio, they find support for the predictions of SV (2003) and RKV (2004). An interesting prediction is that '*acquires and targets cluster in sectors with high time-series sector error* thus *acquirers and targets appear to share a common misvaluation component' (*Rhodes-Kropf, Robinson and Viswanathan, 2005: 563). This can be problematic for firms when calculating the synergies from the deal and their own value. The authors show targets of cash offers to be undervalued i.e. they have a negative firm-specific error which infers low valuations while targets of stock offers are slightly overvalued. This is in line with the market-timing argument.

They also find that highly overvalued bidders are responsible for the majority of mergers in these waves. They conclude that while '*neoclassical explanations are important for understanding merger activity at the sector-level, misvaluation is critical for understanding merger activity, even when the merger may be part of a neoclassically motivated merger wave'* (Rhodes-Kropf, Robinson and Viswanathan, 2005: 564). Merger waves offer an opportunity for bidding firms to capitalise on misvaluation by using overvalued equity as their payment method when financing a deal. The authors robustly check if their results were driven by the Q theory of merger waves or misvaluation. The Q theory argues that merger waves occur as a response to some sort of economic shock which causes firms to reorganise their assets.

They do this by assessing successful deals versus failed deals. The Q theory expects firms with large discrepancies in market-to-book figures to have a higher chance of successfully completing the deal. They find that failed deals have lower misvaluation levels and a higher long-run Q. The evidence suggests that misvaluation measures drive out q-theory based proxies for merger activity implying that misvaluation is a stronger driver of merger waves, not an efficient reallocation of assets. Rhodes-Kropf, Robinson and Viswanathan (2005) also show support for the neoclassical theory despite proving misvaluation to be the main driver of merger waves. They show that regulatory, technological and economic shocks also play a key role in merger waves suggesting that it is their combination with misvaluation that causes market-wide merger waves.

Gorton et al. (2009) propose a model in which defensive merger waves are triggered by managers' desire to have their companies remain independent rather than be acquired. It is a fact that managers derive private benefits from managing a firm. In particular, the larger a firm, the more financial compensation they receive. When a shock occurs forcing firms to acquire one another due to the potential synergies on offer, then the larger the target is, the higher the synergies the acquirer will be able to extract. If managers are sufficiently rational, only profitable acquisitions occur. Also, when managers work to serve their own personal interests then mergers are avoided at all costs as they fear the loss of control and private benefits. However, if their preference for organizational independence is strong enough, managers will engage in defensive acquisitions. Assuming that larger firms are harder to take over, managers want to expand their firms through unprofitable acquisitions to avoid being (profitably) acquired themselves. This self-reinforcing dynamic leads to a merger wave.

Bouwan, Fuller and Nain (2009) empirically examine the relationship between market valuation and acquisition quality as discussed by SV (2003) and RKV (2004). Bouwman et al. (2009) classify the market as being 'hot', 'neutral' and 'cold' according the PE ratio of the S&P 500 index. The authors note that the PE ratio has increased steadily over time therefore employ a detrended PE ratio. If they use the normal P/E ratio of the market, then their approach would lead to classifying all acquisitions that occurred in the 1st half of the sample period (1979-1991) as low-market acquisitions and all acquisitions that were announced in the 2nd half (1992-2002) as high-market acquisitions. If the current month in question has a market PE ratio higher (than) the preceding five-year average then the month is classified as 'above average' ('below average'). The top 25% of the 'above-average' months (and the deals announced within these months) are classified as 'hot' or high-valuation while the bottom 25% of the 'below-average' months and the deals announced within these months are classified as 'cold' or low-valuation. Every other month is classified as neutral. After stratifying the sample this way, they find in the short-term that the acquirer's announcement return is insignificantly negative for acquisitions undertaken in high-valuation months but significantly negative for those conducted in low valuation months. There is a significant outperformance of deals undertaken in high valuation months versus those executed during low-valuation months. In the long run, there are significantly lower long-run returns for acquirers who initiated their deal in a high valuation month when compared to those in low-valuation months. The authors attribute the wealth destruction in the nineties to acquirers using cash in hot-valuation markets. They suggest that cash may destroy value when used inappropriately. In summary, the paper shows that deals initiated in high-valuation periods are significantly worse than deals initiated in low valuation periods[19]

In line with the market-timing hypothesis, mergers that are conducted when the market is valued highly have a wealth-enhancing effect due to the reduction of long-term losses as the firms within the market revert back to fundamentals (Shleifer and Vishny, 2003 ; Savor and Lu, 2009). In the study by Rhodes-Kropf, Robinson and Viswanathan (2005), acquirers and targets (and thus merger activity) are found to cluster in *'sectors with high time-series sector error'* (Rhodes-Kropf, Robinson and Viswanathan,2005: 563) when they decompose the market-to-book ratio. This suggests that industry-wide valuation errors drive merger activity.

Much of the existing literature has shown that the choice of financing is governed by the valuation of the market. Equity financing is deemed more attractive when valuations are high and less attractive when valuations are low such that cash is used as an alternative (Shleifer and Vishny, 2003 ; Savor and Lu, 2009). Therefore, when the market is highly valued, and thus the firms within it share a component of this misvaluation, we should see a higher proportion of equity deals as opposed to cash deals (and vice versa). This is because rational managers should aim to capitalise on this misvaluation in a way which best enhances the returns on offer for investors.

There are two major reasons in previous literature why wealth creation for shareholders has been linked to the valuation of the market – merger momentum and investor sentiment. The merger momentum hypothesis posits that deals announced in a high valuation month should generate significant positive returns for the acquirer. The idea is that an upward moving stock price should continue to move upward due to the momentum of the stock. Rosen (2006) argues that if a stock hits the market increasing the synergies on offer, then a favourable market reaction can be enjoyed by all acquirers within the sector which can see momentum continuing to rise upwards. This hypothesis works in line with the work of DeBondt and Thaler (1985) suggesting that winners remain

[19] There is a risk of failure at different points of the cycle due to the White Knight acquisition

winners and losers remain losers over the short-term period. However, at some point, the market corrects its mistake and share prices revert downwards so that deals conducted in high valuation months should see long-term falls while those undertaken in low-valuation months should enjoy long-term rises. The investor sentiment literature argues that when the market is valued highly, this misvaluation can systematically affect the quality of deals being undertaken. Petmezas (2009) argues that in high-valuation months when information of a merger enters the market, investing participants will reward this news with significant positive abnormal returns. This is because when the market is valued highly, investors become over-optimistic. They seek to ride the upward trend and fail to rationally assess each merger deal. Petmezas(2009) finds support for this reasoning. There are significant positive abnormal returns for acquirers who announce their merger in a high-valuation month as opposed to those who announce during a low-valuation month. When the market is highly valued, it is not just investors who are at risk of over-optimism (overconfidence) but also firm managers. Croci, Petmezas and Vagenas-Nanos (2010) examined the performance of rational versus overconfident managers in high and low valuation markets. When the market is valued highly, Croci et al. (2010) find that managers can also become bullish. In these periods, managers can be found guilty of overestimating the potential synergies on offer and thus significantly lower returns should be experienced. The authors classified managers as being either rational or overconfident using two proxies – the Multiple Acquisitions proxy and the Stock Options proxy. They find that rational managers enjoy the highest abnormal return while deals announced in high valuation months enjoy the most significant and positive returns on offer. In this way, the valuation of the market is shown to reap positive rewards for short-term gains when valued highly.

Bouwman, Fuller and Nain (2009) examine the performance of mergers in high and low valuation periods. They find that while there are significant gains on offer from conducting acquisitions in highly-valued months in the short-term, these are eroded over a long-term horizon. Significantly lower long-term abnormal returns are found for acquirers that undertake their merger in a high valued month versus those undertaken in a low valuation month. Their work shows that the long-term quality of deals is lower for those conducted in high valuation markets.

This literature leads to the second testable hypothesis:

H2A: In high-valuation markets, acquirers should enjoy short-term abnormal returns but these should reverse in the long-term period as the market corrects downwards.

H2B: Successful and failed acquirers should enjoy higher abnormal returns in high-valuation months in the short-term but should suffer lower abnormal returns over the long-term periods[20]

2.1.3 Firm Valuation

2.1.3.1 Selecting the Medium of Exchange

Selecting the medium of exchange is an important decision in the takeover process. The right mixture of assets and cash based on the firm's circumstances can maximise the profit produced during the takeover. Slusser and Riggs (1994) looked at various types of currency that could be used in an acquisition. They stated that the correct combination of stock and cash would be unique to each acquisition and based on the individual circumstances. Below is a discussion of the mediums of exchange in the current literature.

Specific Securities

If the acquisition is paid for using 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 an effective medium provided that everyone knows the true value of the paper that they are either giving or receiving. This

[20] Also, this reversal might not happen due to the issues relating to valuation discussed in footnote no.15 and 16.

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.

Exchanging Stock

This is the most common way to finance a merger or acquisition. If a company wishes to acquire or merge with another, it is to be assumed the company has plentiful stock and a strong balance sheet. During the exchange, the acquiring firm exchanges its stock for shares of the target company. This financing option is relatively safe as both parties share risk equally. This payment method works to the acquirer's advantage if the stock is overvalued. Here, the acquirer will receive more stock from the seller than if they'd paid in cash. However, there's always the risk of a stock decline, especially if traders learn about the merger or acquisition before the deal is finalized. Stock transactions are particularly advantageous to sellers who plan to remain shareholders after the acquisition. 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. Using stock-based payments, such as issuing shares of acquiring firm's stock as consideration in acquisition deals, can impact firm valuation. Research has shown that stock-based payments tend to result in higher valuations for the acquiring firms compared to cash payments (Andrade et al. (2001); Mitchell et al., (2004)). This is because stock-based payments can signal positive information about the future prospects and growth opportunities of the combined entity, leading to a positive market reaction and potentially higher firm valuation.

Cash Payments

A cash payment is an obvious alternative to paying in stock. Cash transactions are clean, instantaneous, and do not require the same high level of management as stock transactions. Cash value is less dependent on a company's performance except in cases involving multiple currencies.

Exchange rates may vary substantially, as seen in the market's response to the British pound after the UK voted to leave the European Union. While cash is the preferred payment method, the price of a merger or acquisition can run into the billions, making the cost too high for many companies. 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. Cash-based payments, on the other hand, may result in lower firm valuations compared to stock-based payments. This is because cash payments may be seen as a transfer of value from the acquiring firm to the target firm, resulting in a reduction in the acquiring firm's cash reserves and potentially impacting its financial position and future growth prospects (Harford, 2005). Cash payments may also signal that the acquiring firm lacks confidence in its own stock, which can result in a negative market reaction and lower firm valuation.

Debt or Preferred Stock

Agreeing to take on a seller's debt is a viable alternative to paying in cash or stock. For many firms, debt is a driving force behind a sale, as subpar market conditions and high interest costs make it impossible to catch up on payments. In such circumstances, the debtor's priority is to reduce the risk of additional losses by entering into a merger or acquisition with a company that can pay the debt. From a creditor's standpoint, this is a cheap way to acquire assets. From the seller's point of view, sale value is reduced or eliminated. When a company acquires a large quantity of another company's debt, it has greater management capabilities during liquidation. 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.

Bonds

Corporate bonds are a simple, quick way to raise cash from current shareholders or the general public. A company may release time-definite bonds with a predetermined interest rate. In buying a bond, an investor loans money to the company in hopes of a return, but bonds have one big disadvantage: once they're bought, the money can't be used until the bond's maturation date. The security makes bonds popular with long-term, risk-averse investors. Today, companies are taking advantage of low U.S. interest rates to fund M&A. However, the trend is tied closely to the cost of borrowing, and bond issuance is only a good value if the buyer can cheaply access credit and has a clear goal.

Convertible Securities and Contingent Payments

Convertible securities can be used as compensation in an acquisition. 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 lose out as the later payments will not be forthcoming.

Loans

It can be costly to borrow money during a merger or acquisition. Lenders and owners who agree to an extended payment arrangement will expect a reasonable rate for the loans they make. Even when interest is relatively low, costs can quickly add up during a multimillion-dollar deal. Interest rates are a primary consideration when funding a merger with debt, and a low rate can increase the number of loan-funded transactions.

Where cash is not an option, there are many other ways to finance a merger or acquisition, many of which result in an effortless, lucrative, and quick transaction. The best method for a firm to use depends on the acquirer and target firm, their respective share positions, asset values, and debt liabilities. Each method of funding a merger or acquisition comes with its own hidden fees, commitments, and risks, and it is the buyer's and seller's responsibility to practice Due Diligence during a transaction.

Hansen (1987) analysed why it is better to offer shares rather than cash during a deal. He modelled a bargaining game using data from forty-five acquisitions that took place in the mining and manufacturing industry in the years 1976 and 1977. The game was set up to replicate firm behaviour in an acquisition involving both debt financing. It involved asymmetric information and incorporated revealed information as the game progressed. Hansen (1987) concluded 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 acquiring firm's advantage. Higson (1991) also examined the reasons for offering either cash or shares in an acquisition attempt using a sample of three hundred and seventy-three firms involved in acquisitions between April 1976 and October 1987. The author found 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.

Undertaking a merger is a huge corporate event for the acquiring firm in particular and it is the uncertainty regarding the post-acquisition performance which can lead to varying results. The initial courting process can be long and complex, forcing managers to make a series of decisions over factors such as how to finance their deal. After deal completion, the acquiring firm has to integrate the new target into the culture and operations of their firm and this can be difficult to truly achieve. Most managers are aware of the uncertainty surrounding their firm and some research has suggested that managers reveal information in the decisions that they make. They reveal this information through the signals that they send to the market in the form of the merger terms and the announcement of the deal. Travlos (1987) reveals that the method of payment is one of the most powerful signals that the manager can send to the market. His work was built on the foundations of Myers and Majluf (1984) who believe that managers who know that their firm is undervalued will avoid issuing equity at all costs. The opposite is suggested for overvalued periods. Travlos (1987) focussed their findings on merger activity using a US dataset. He finds that the return from a shares exchange is different from a deal using cash.

As discussed earlier, the market-timing hypothesis argues that the valuation of the acquiring firm in the market drives its acquisition activity. The key to this story is the notion of the simultaneous emergence of an irrational stock market and a rational managerial team. The rational manager notes the upward misvaluation of his/her firm in the market and responds through the execution of a merger deal using the overvalued equity of the firm. The idea is that the acquirer can acquire a less overvalued or ‘cheap’ target firm and its respective assets using overvalued equity, thus ultimately at a lower price than would otherwise be possible. The only requirement for the value creation is that the target is less overvalued than the acquirer. Long-term, Shleifer and Vishny (2003) propose that an acquiring firm's shareholders can gain as the merger cushions the collapse of the firm’s value once the market efficiency corrects its mistake. It is assumed that the market will eventually recognise its mistake but the acquisition of the target’s assets will increase the intrinsic value of the acquirer and thus the shareholders' gain emanates from a reduction of losses that would have otherwise been fully endured without the deal.

Savour and Lu (2009) directly tested the implications of the market-timing hypothesis in the US market using 100% stock and 100% cash-financed deals. They intuitively designed a methodological approach to assess whether or not overvalued equity acquisitions in the short term do indeed lead to a reduction of long-term losses. They create a sample of deals that are abandoned for exogenous reasons. These reasons include, for example, anti-trust legislation that form the basis of regulatory controls adopted by the government in the US to avoid restrictions on trade that are likely to reduce competition and create local monopolies post-merger announcement. After ensuring the strict criteria are met, the unconsummated sample (355 deals) is compared with a sample of consummated deals (1773 deals). The strict criteria are:

1. The announcement date falls between 1978 and 2003. 2003 is used as a cut-off to provide at least 3 years of data for each firm after the initial announcement.
2. The acquirer is a U.S. public firm.
3. Relevant data on the acquirer are available from CRSP and CRSP/COMPUSTAT.
4. The acquirer's market capitalization exceeds that of firms in the bottom decile using NYSE size breakpoints.
5. Pre-announcement market value of the target's equity is at least 5% of the acquirer's market value.[21]
6. The mode of payment is all-cash or all-equity.[22]
7. The acquirer has not engaged in another bid in the previous 3 years using the same merger consideration.[23]

[21] The use of such a screen is normal in the literature as it ensures that the proposed deal has a material impact on the acquirer's future. The inclusion of bids for very small firms would just add noise. In any case, none of the findings change with alternative thresholds, regardless of whether they are more or less restrictive

[22] They exclude more complicated transactions because the market-timing hypothesis does not produce clear predictions for such cases.

[23] This ensures no firm appears more than once in our portfolios at any point in time

8. The bid represents the first offer by a given acquirer for a given target in that bidding cycle.[24]

Savour and Lu (2009) then assess the performance of the successful sample against that of the failed. Focussing on the long-term performance of these two samples stratified by payment method either 100% stock financing or 100% cash financing, Savour and Lu (2009) present buy and hold abnormal returns (BHARs) and calendar-time portfolio returns. The results indicate that for the deals that are equity-financed, the longer the period that is assessed, the stronger the outperformance of the successful sample relative to deals that fail. In particular, there is a significant overperformance of 22.2% over a 500-day post-merger period. On the other hand, the work fails to find any significant outperformance for successful cash deals over a similar long-term period.[25] This lends support to evidence of successful market-timing in the US. In this way, the use of equity when the firm is overvalued is portrayed as a wealth-enhancing decision for shareholders.

In a comprehensive study, Dittmar and Dittmar (2008) examine corporate finance events such as Initial Public Offerings (IPOs), Seasoned Equity Offerings (SEOs) and mergers. Lowry (2003), Baker and Wurgler (2000) and Rhodes-Kropf, Robinson and Viswannathan (2005) study each respective corporate event individually and suggest that misvaluation is a key determinant of the activity of each. Dittmar and Dittmar (2008) criticise this segmented approaches arguing that it is necessary to comparatively assess the level of activity in each in order to understand the key forces at work. In their study, they analyse the level of stock repurchases against both equity issuance and mergers and comment that a negative relationship should exist. While market-timing suggests that firms capitalise on overvaluation through the issuance of overvalued stock, either for cash or to acquire a target's assets, the same logic can be applied to stock repurchases. This makes it fair to assume that stock repurchases should occur in periods when the firm is undervalued (under the umbrella of

[24] Otherwise they would be overweighing contested (by competitors or regulators) deals, which account for a disproportionate number of failed bids, and in the process bias the statistics upwards

[25] Sir John Hicks in Capital and Time (1979) considers the impact of significant sunk costs on the Investment decisions of firms. Investment decisions of firms may be considerably impacted by significant up-front costs. M&As represent examples of such deals, which may provide a rationale for them to be limited to good as compared with bad times especially as fundamentals may not be propitious with liquidity being limited, high borrowing costs, increased risk of failure and poorer market conditions leading to reduced sales turnover for the acquired and acquiring company. Such conditions are reversed during periods of boom.

market timing). However, no evidence is found. In fact, there is a positive correlation between the activities of each of the three corporate events, when the volume of stock repurchases surges so does the issuance of equity and the level of mergers undertaken. There is a definitive cyclical pattern to the volume but from the results, it is unlikely to be driven by misvaluation. Instead, the evidence indicates that the state of the economy is a stronger driving factor. In periods of economic expansion, the volume of all three corporate events increases. This may seem contradictory at first glance for the issuance and repurchase of equity to occur simultaneously but in actuality, they don't occur together. They actually show that at the start of an economic expansion, firms have limited cash but a growing desire to invest and acquire in order to benefit from the upward trend of the market. This motivates the issuance of equity. Later in the boom, firms have a lower level of investment opportunities and instead seek to repurchase equity. Thus while each of the three activities happens in the same economic cycle, they do so at different times. In this manner, misvaluation per se does not directly drive the decision to merge, but rather it could be free cash flow (Jensen, 1986).

From an accounting viewpoint, Botsari and Meeks (2008) investigated whether equity-financed acquirers manipulate their earnings prior to offering their stock for the target's assets in an equity exchange. The Earnings Management hypothesis says in this setting that managers have an incentive to manage earnings prior to a merger in both acquiring and target firms. The acquirer in particular has a strong incentive to portray their firm as powerful and attractive as possible to ensure the target accepts the offer made. Furthermore, if earnings management could lead to an upward rise in the stock price of the firm in this period, then it suggests that managers not only time the market, but aim to also manipulate it. This could then mean that overvalued equity can be exchanged for the target's assets. The authors of this paper suggest that acquirers engage in income-increasing accrual manipulation in the year preceding the offer announcement (as early as Year -1) and that this manipulation is aimed at the working capital component of accruals. Their findings are unsurprising since a company normally has discussions (a year or more before) regarding external expansion via mergers/acquisitions before identifying a target. The findings of this paper are robust to varying approaches concluding that managers could directly be manipulating their stock price before capitalising on the firm's overvaluation. In this way, equity-financed deals should occur when the stock price is high.

Erickson and Wang (1999) support the earnings management hypothesis. Using a US dataset with a sample spanning from 1985 to 1990 (55 firms in the final sample), the authors argue that the higher the price of acquirer's stock, the less shares they need to give to targets which reduces the likelihood of share dilution previously considered. This is a strong incentive for acquiring firms to engage in 'window-dressing' activities especially if the managers want to maintain control over the firm. By ensuring their shares are less diluted then the more control they have after the merger. Managers of large firms are known to have larger remunerations or larger benefits hence managers are motivated to engage in such activities.

Louis (2004) also examines earnings management in a market efficiency framework, investigating how the market processes and adjusts to manipulated accounting statements. The paper finds strong results supporting the view that acquirers overstate earnings in the preceding quarter to which the stock for stock merger is announced. The paper indicates that analysts fail to fully anticipate a post-merger reversal following earnings management at announcement, however the consensus is shown to adjust by the time the following quarterly earnings are released.

So far we have discussed how managers manipulate earnings to achieve a higher stock price prior to mergers however the method of manipulating earnings has not been argued. Ge and Lennox (2011) examine whether firms mislead investors by issuing overly optimistic forecasts of future earnings (i.e. deception by commission) or by withholding bad news about future earnings which could have a negative impact on the stock price (i.e. deception by omission). They find that when acquisitions are financed using stock, companies are not more likely to issue overly optimistic earnings forecasts during the pre-acquisition period compared with the post-acquisition period. However, these same acquirers are more likely to withhold forthcoming bad news about future earnings. The findings suggest that deception by omission occurs more often than deception by commission i.e. acquirers window-dress to manipulate the price at which they pay for the target (stock-financed transactions).

Bi and Gregory (2011) using the UK market compare the Q-theory of merger activity with stock-market driven theories (SV, 2003). They observe that rational managers work to the benefit of existing shareholders at the expense of new ones or debtholders. Existing literature shows that the firm's share price is low following an equity-financed deal (Loughran and Vijh, 1997; Rau and Vermaelen, 1998; Agrawal and Jaffe, 2002) meaning that rational acquiring managers would only use equity when the stock is at an all-time peak in order to maximise existing shareholder value. Literature also suggests that the stock price after the merger (even though low) should be higher than if the deal did not occur. The Q-theory totally dismisses firm misvaluation and attributes the high valuation of the firm to the skill of the managerial team in its ability to invest in NPV enhancing projects. In this theory, firms use equity to preserve cash for other NPV enhancing opportunities. This is because the market values the skill of the managerial team and the growth opportunities of the firm highly if it perceives both to be good. The authors find unequivocal evidence for the market-timing explanation of stock-financed merger activity. There is a lot of debate regarding whether or not misvaluation causes merger waves. Some researchers argue that equity-financed mergers are simply a response to market misvaluations but are not a cause of it initially. Others have said misvaluation is a result of earnings manipulation.

As we can see from existing literature, there remains controversy as to whether or not misvaluation causes merger waves. As discussed, some authors argue that stock-financed mergers are simply a response to market misvaluations but are not the cause of the misvaluation in the first place. The effects of misvaluation are however very clear. To recap, Shleifer and Vishny (2003) argue that when the firm is overvalued, there is an incentive for managers to use the firm's equity to cushion the long-term downward revision to par. Savor and Lu (2009) argue that while there are low stock returns post-acquisition, they are higher than they would otherwise have been without the deal because of the addition of the target's assets. Bi and Gregory (2011) find more persuasive evidence in favour of market-timing as opposed to Q-theory.

Given the literature arguing the attractiveness of using equity when it is overvalued against others which refute its benefits, our final hypothesis is established:

H3: When the firm is overvalued (undervalued), it should seek to use equity (cash) in its payment method.

2.2 Data and Methodology

2.2.1 Data

The data used for this thesis is obtained from Thomson One Banker, Thomson DataStream and Wharton Research Data Service (WRDS). The information related to the characteristics of the deals (i.e. acquirer name, target nation, deal number, announcement date, date of effective completion/withdrawal, method of payment, deal status, deal value and target status) is taken from Thomson One Baker. Information related to the acquiring firm such as market value, market-to-book ratio (MBTV), price-to-earnings ratio (P/E), market P/E (S&P 500) is obtained from Thomson by US DataStream. The stock data used for the empirical research is taken from Wharton Research Data Service (WRDS) as it provides access to the Centre for Research in Security Prices (CRSP) data.

According to Thomson One, 295,720 deals were announced by US acquirers between 01/01/1980 and 31/12/2014 of which 230,732 were flagged as completed and 11,243 flagged as failed.

The study will restrict the sample to meet the following requirements:

1. The acquirer company is a US firm with data available on Thomson DataStream. (717 and 86 deals were deleted from the completed and withdrawn samples respectively)
2. The target company is a US firm with data available on Thomson DataStream. (12419 and 472 deals were deleted for completed and withdrawn deals respectively)
3. The target nation is the US. (2529 and 171 deals were deleted from the completed and withdrawn samples respectively)
4. The acquirer is a publicly listed company (64461 and 1699 deals were deleted from the completed and withdrawn samples respectively)
5. The acquirer is a publicly-listed US firm with three days of return data around the takeover announcement and three years of return data on the WRDS database. (44 and 32 acquirers deals were deleted from the completed and withdrawn samples respectively)

6. The deal value is no less than £1 million. (38013 and 2155 deals were deleted from the completed and withdrawn samples respectively)
7. Relevant data on the acquirer is available on Thomson Datastream (272 and 4 deals were deleted from the completed and withdrawn samples respectively)
8. Acquirers and Targets which are financial or Utility firms are excluded from the sample[26] (47858 and 4511 deals were deleted for completed and withdrawn deals respectively)
9. The acquirer has not engaged in another bid in the previous 3 years using the same merger consideration. This ensures no firm appears more than once in the portfolios at any point in time. (333 and 57 deals were deleted for completed and withdrawn deals respectively)
10. The method of payment is all-cash or all-equity. Other methods of payment are excluded because the market timing hypothesis does not produce clear predictions for such cases. (20091 and 1224 deals were deleted for completed and withdrawn deals respectively)
11. The acquirer purchases more than 50% of the target's shares as a result of the takeover (42064 deals were deleted for the completed sample)
12. The acquirer owned more than 51% of the target after the transaction. (1463 deals was deleted for the completed sample)

The final sample consists of 1680 successful deals and 832 failed deals. Figure 2 shows the time-series distribution of these merger bids.

This is a similar selection criterion employed by Savor and Lu (2009) who found this sample selection criterion to be robust. Their results did not change to the inclusion of American Depository Receipts, acquirers in the bottom NYSE size deciles, acquirers who have made a merger bid within the last 3 years.

The main investigation in this research relates to the performance of successful deals in relation to those which fail. A successful deal is one in which the acquirer gains a holding of 51% or above of the

[26] See Fuller et al. , (2002)

target firm post-acquisition. A failed deal is defined as one in which the deal is withdrawn (flagged by Thomson One Banker). This study suggests that if mergers are in the best interests of existing shareholders, then successful deals should outperform those which subsequently fail. If this is the case, then the result will suggest that managers are working towards their key objective of maximising shareholder value and the M&A would be an NPV enhancing investment. By comparing, the post-merger returns of the two groups, the study can infer whether mergers are in the best interests of the acquirer's shareholders. If losses are incurred for both the successful and failed sample, mergers can still be beneficial to shareholders of acquiring firms so long as the losses to successful acquirers appear to be lower than the deals which fail in the long run (Savor and Lu, 2009).

It is very important to control the reason for deal failure as suggested by Savor and Lu (2009). One essential assumption underlying our approach is that the cause of deal failure be unrelated to the valuation of an acquirer. If there is a positive correlation between the acquirer's overvaluation and the probability of failure, then the average performance of failed bidders should be worse than that of successful ones even if market-timing had nothing to do with why the deal was proposed.

For example, some bids fail because of a fall in acquirer's stock price days before the merger. This is extremely likely since a lot of overvalued acquirers would want to use their stock as currency to negotiate a deal. An example of an interesting deal was Neoforma.com Inc. intention to acquire Eclipsys Corporation in 2000. Both companies had an intention to merge. After following the media coverage around the deal it was realised that Neoforma shares dropped 30% days after the company said it planned to acquire software maker Eclipsys. The study classifies a case like this as a fall in the acquirer's stock price. Deals like this failed for endogenous reasons and to compare such a deal with another deal that successfully completes may produce invalid results were the null hypothesis to be accepted.

It seems likely that the target is less receptive to offers made by overvalued firms. To address such concerns, the study screens out deals that fail for endogenous reasons. If this is not done then the results will be biased in accepting the hypothesis that failed acquirers underperform successful ones.

I investigate every failed deal using Factiva, NY-Times, LexisNexis and Marketline Advantage and attempt to determine why it did not close. This is by no means an easy task as it required extensive research since simply reading headlines or applying a coding metric will obscure the real causes of deal failure. This is a significant contribution to understanding the literature as no study to the best of my knowledge has analysed failed deals as intensively to understand why it has failed. For this purpose, news items on each merger deal were analysed to try to best determine the reason for failure. There are cases of mergers were looking solely at the headline or coding would incorrectly categorise it so it is important to carefully read it. For example, Mattel's bid for Hasbro in 1999 has been considered as being of considerable interest and has been regularly referenced. From careful examination, it became clear that Hasbro flagged up the deal to the regulatory authorities as a way of putting a stop to it; implying that from sole consideration of the headline then this deal would have been incorrectly classified as exogenous. Whereas here it is considered to be a target refusal after investigation.

The study uses such information to exclude any deal whose failure was endogenously caused from the sample containing all failed bids (All Failed Sample).[27] If a reason for the failure of the deal cannot be identified, it has been decided not to include such deals as it was felt they may impact the reliability of any inference. Deals within the exogenous failed sample are deals that did not close mainly due to regulatory blocks by authorities such as the Securities and Exchange Commission (SEC). The study also excludes deals that failed as a result of target related issues like a fall in target stock price or unexpected developments in the target's industry. Table 4 shows the construction of the exogenously failed sample.

[27] Complex textual analysis has become a popular tool in the accounting literature which can be undertaken using artificial intelligence.

The study also looks at firm valuation and market-wide valuation. In order to identify which firms are overvalued (or undervalued), valuation changes will be assessed using a twelve, twenty-four and thirty-six-month historical firm P/E centered around the announcement month. If the P/E ratio on the announcement month is higher (lower) than the average for all 3 historical averages,[28] then the firm is deemed to be above (below) fundamentals. The top (bottom) 30% of the above (below) fundamental deals are taken and classified as overvalued (undervalued). The analyses uses this information to construct overvalued and undervalued portfolios for short and long run analyses for both successful and failed acquisitions.

The study also follows the work of Bouwman, Fuller and Nain (2009) in order to classify the market as high-valuation or low-valuation. Due to inflation and other factors, a firm's P/E ratio tends to move with a drift and so the study will use a detrended P/E proxy.[29] After de-trending, if the month in which the acquisition takes place has a market P/E ratio higher (lower) than the preceding 5-year average then the study refers to that month as 'above-average' ('below-average'). The top 25% of the 'above-average' months will be classified as high valuation while the bottom 25% of the 'below-average' months are classified as low valuation.

[28] The empirical studies on the determinants of Merger valuation may be best seen as multifactorial as most models include a measure of value such as Market value, Q or PE. Hunter and Fairclough (1998) found the PE ratio to be a highly significant variable. However, this was based on the non-linear model that followed from the neural network, which may reflect why the measures adopted by Deitrich and Sorensen (1984) was insignificant.

[29] The P/E is a ratio of two nominal values, which would suggest that any inflation in prices as compared with assets would be reflected equally in numerator and denominator. To detrend implies that what is being considered is deterministic, but financial assets follow a random walk and this is also the case for prices. For equities the drift in the stochastic process is composed of both inflation and growth. Earnings are composed of elements that are likely driven by inflation and this may still give rise to a margin that may increase over time. Typically, ratios are measured as percentages and depending on the denominator would usually lie in the range [0,1], this is why it is less obvious that ratios are non-stationary. This is not impossible as cycling is linked with data that may follow a unit root process without drift and this is why detrending does not eliminate non-stationarity when series are I(1). Thus, there is evidence that some ratios especially those that exceed one have been found to be non-stationary. This study notes these issues but follows the work by Bouwman, Fuller and Nain (2009)

Figure 2: Merger Bids by Method of Payment over Time

The upper bar plots the number of stock-financed merger bids over time. The lower bar plots the number of cash-financed merger bids over time

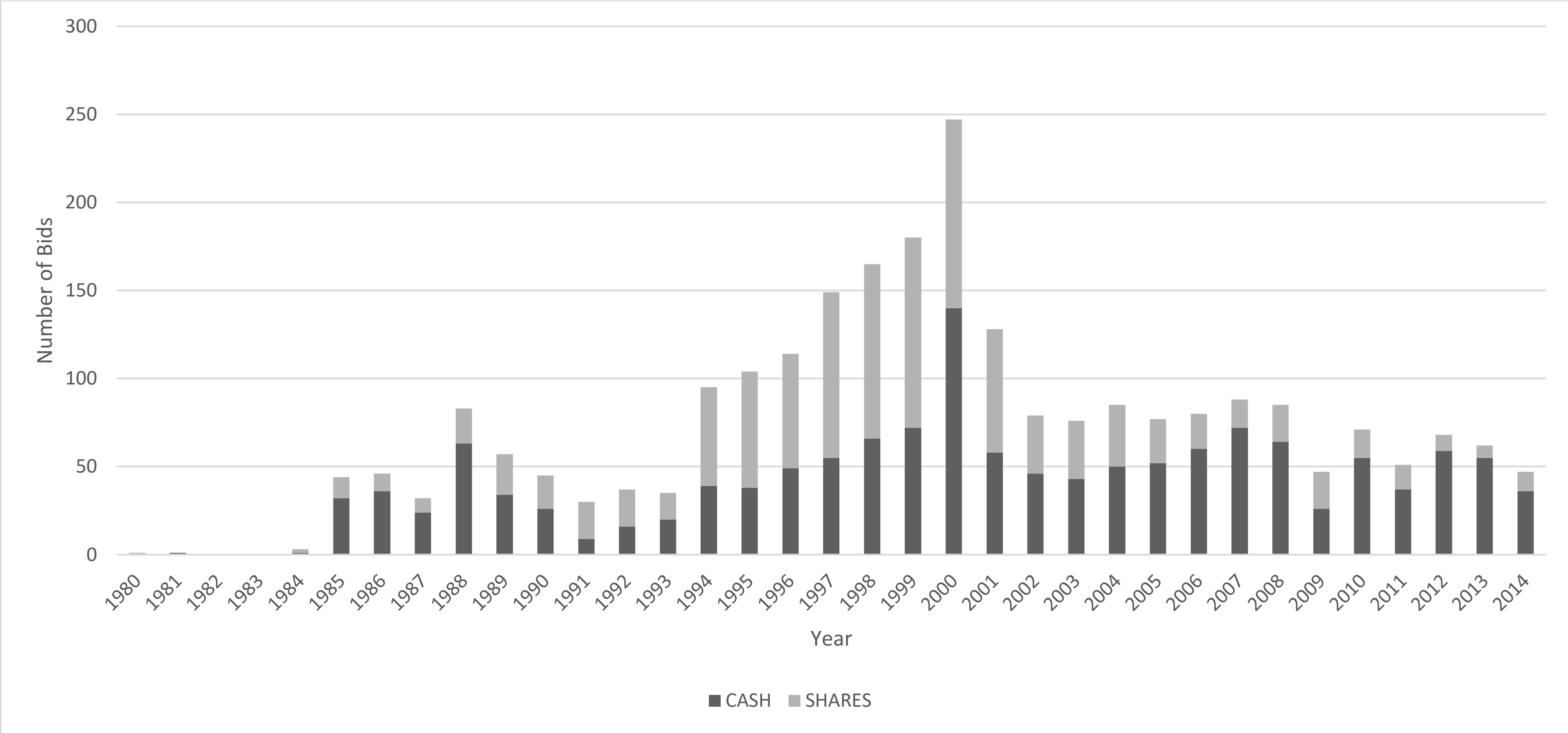

Table 3: Time-Series Distribution of Merger Bids

This table reports the time-series distribution of merger bids according to deal outcome and payment method. The successful sample contains all bids that resulted in the completion of an acquisition. The Failed All sample contains only bids that failed for exogenous reasons (i.e. outside of the acquirer's control). The Cash (Stock) sample contains deals that were financed using 100% cash (stock).

Year	Successful			Failed All			Failed Exogenous		
	All	Cash	Shares	All	Cash	Shares	All	Cash	Shares
1980	0	0	0	1	0	1	1	0	1
1981	1	1	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	2	1	1	1	0	1	0	0	0
1985	22	18	4	22	14	8	4	3	1
1986	30	23	7	16	13	3	2	2	0
1987	18	12	6	14	12	2	4	3	1
1988	42	29	13	41	34	7	9	8	1
1989	31	19	12	26	15	11	4	3	1
1990	28	15	13	17	11	6	4	2	2
1991	16	6	10	14	3	11	3	0	3
1992	22	12	10	15	4	11	6	0	6
1993	18	12	6	17	8	9	3	0	3
1994	60	22	38	35	17	18	15	8	7
1995	72	25	47	32	13	19	6	1	5
1996	75	26	49	39	23	16	9	5	4
1997	104	32	72	45	23	22	12	10	2
1998	131	46	85	34	20	14	11	5	6
1999	130	48	82	50	24	26	3	7	6
2000	125	41	84	122	99	23	30	22	8
2001	90	34	56	38	24	14	11	9	2
2002	64	37	27	15	9	6	5	3	2
2003	54	29	25	22	14	8	3	2	1
2004	68	40	28	17	10	7	2	1	1
2005	56	36	20	21	16	5	3	3	0
2006	65	48	17	15	12	3	3	3	0
2007	67	56	11	21	16	5	3	3	0
2008	49	35	14	36	29	7	9	7	2
2009	32	18	14	15	8	7	3	2	1
2010	52	39	13	19	16	3	4	4	0
2011	31	20	11	20	17	3	5	4	1
2012	48	39	9	20	20	0	5	5	2
2013	40	33	7	22	22	0	2	2	0
2014	37	28	9	10	8	2	5	3	2
Total	1680	880	800	832	554	278	199	130	69

Table 4: Summary Statistics

The table reports the summary statistics for the three samples: S refers to the Successful sample that contains all bids which resulted in the completion of an acquisition; F(A) refers to the Failed All sample that contains all deals that failed to complete; and F (E) refers to the Failed Exogenous sample contains only bids that failed for exogenous reasons (i.e. outside of the acquirer's control). N defines the number of bids in each category. The market value (MTBV) is the market value (market to book value) of the acquirer one month before the announcement of the deal ($ millions). To classify high and low valuation months, the study uses the detrended P/E proxy of Bouwman, Fuller & Nain (2009) and the number of deals conducted in high and low valuation conditions are reported for each deal category. Time Interval measures the number of days between deal announcement and either completion or withdrawal for the samples respectively. For each of the deal categories, cases relating to privately held targets; publicly listed targets; domestic targets; foreign targets; targets within the same industry (Related Target); targets within different industries (Unrelated Target); acquirers with high MTBV values (glamour); acquirers with low MTBV value (value); small (big) acquirers as measured using the bottom (top) 30% of acquirers when ranked by market value one month prior to the announcement of the deal; and finally those deals financed using 100% cash (Cash) or 100% Stock (Stock).

	N			Market Value ($ mil)			MTBV			High Valuation Month			Low Valuation Month			Time Interval (Days)		
Category	S	F(A)	F(E)	S	F(A)	F(E)	S	F(A)	F(E)	S	F(A)	F(E)	S	F(A)	F(E)	S	F(A)	F(E)
All	1680	832	199	10589	5171	10973	2.61	2.64	3.06	982	534	138	698	298	61	114	336	396
Cash	880	554	130	13404	5062	9027	2.67	2.60	3.11	451	346	89	429	208	41	91	443	525
Shares	800	278	69	7493	5390	14640	2.56	2.72	2.97	531	188	49	269	90	20	139	124	151
Private Target	60	11	1	2100	3247	16647	2.31	2.70	3.04	33	7	0	27	4	1	96	131	52
Public Target	1534	815	195	11071	5234	11108	2.64	2.65	3.08	908	523	137	626	292	58	114	340	401
Subsidiary	86	6	3	7918	200	352	2.47	1.55	2.02	41	4	1	45	2	2	121	174	183
Related Target	1016	619	164	8746	5186	9140	2.63	2.73	3.14	583	399	112	433	220	52	117	406	456
Unrelated Target	664	213	35	13410	5131	19563	2.59	2.40	2.72	399	135	26	265	78	9	109	135	115
Friendly	1607	345	83	10768	4634	13013	2.64	2.55	3.03	933	239	63	674	106	20	112	133	147
Hostile	24	74	15	11292	4284	4725	2.34	2.76	3.04	15	44	10	9	30	5	158	123	103
Glamour	508	245	71	22601	10961	19150	4.85	5.07	5.23	304	170	56	204	75	15	105	288	309
Value	521	239	43	66	1287	2820	0.31	0.62	0.97	316	159	27	205	80	16	131	345	505
Big	499	254	109	33345	15319	19248	3.57	3.42	3.31	272	164	73	227	90	36	110	374	502
Small	445	308	30	128	100	97	1.70	1.94	2.74	268	211	23	177	97	7	121	263	145

2.2.2 Methodology

2.2.2.1 Short – Run Performance

A plethora of empirical studies discussed in the literature review chapter has attempted to discover the short-term returns to shareholders for both the acquirer and the acquired. The five-day window (i.e. -2, +2) and the three-day window (i.e. -1,+1) surrounding the date of deal announcement has predominantly been used in the existing literature. This thesis will use the aforementioned windows and also include a two-day window (i.e. 0, +1) for robustness to measure the performance of acquirers in the short term.[30]

The study employs the standard event study methodology and computes abnormal returns using the market-adjusted return model (Brown and Warner, 1985). The market-adjusted return is defined through this linear relationship:

$$MAR_{it} = \alpha_I + \beta_i R_{mt} + e_{it} \quad (1)$$ [31]

Where t is the time index, i= 1, 2, …, N stands for security. MAR_{it} is the market-adjusted return on security I and R_{mt} is the CRSP value-weighted market portfolio return. Equation (1) is estimated over a period that uses an estimation window that ends 46 days before the event date and is 255 days in length. This estimation procedure is commonly used in event studies to calculate the expected returns of a firm's stock during the event period. The estimation period is typically chosen to be long enough to capture the effects of any systematic factors that might influence the firm's returns, but

[30] Please see literature review (Table 2 and 3) on the existing papers that employ these event windows.

[31] Market-adjusted returns are commonly used to assess the impact of a particular event on the stock price performance of a security, by comparing the actual returns observed during the event window (i.e., the period around the event) to the expected returns based on market movements. If the actual returns are higher or lower than the expected returns, it may suggest that the event has caused abnormal or market-adjusted returns, which could indicate an information or price effect associated with the event. Academic literature on event studies often employs market-adjusted returns as a key measure to evaluate the impact of various events on stock price performance. Brown and Warner (1980) used market-adjusted returns to assess the impact of corporate events such as stock splits, stock dividends, and earnings announcements on stock prices. Similarly, Barber and Lyon (1996) used market-adjusted returns to examine the long-term abnormal returns of firms following corporate events like mergers and acquisitions.

Normal returns of the firm are calculated using daily price data as follows: $R_i = In(\frac{P_t}{P_{t-1}})$. In the determination of the short run abnormal returns, there are abundant methods available (Sharpe, (1964) ; Lintner, (1965); Lyon et al., (1977)) . The study follows the guidelines of Seiler (2004) that AR's are defined as anything earned above the market return each day so that the expected return of a stock is assumed to be that earned by the market.

short enough to avoid changes in the firm's performance or market conditions that might render the model invalid.

The market model with a 255-day estimation period has been used in several studies on the market reaction to acquisitions. For example, in the study by Kwangwoo Park and Moon H. Song (2019), the authors used a 255-day estimation period to estimate the expected returns of target firms in the US during the event window surrounding the M&A announcements. Similarly, in the study A. F. Aysan et al. (2018), the authors also used a 255-day estimation period to estimate the expected returns of acquiring and target firms in the US banking industry during the event window.

The short-term event window in this study is defined as a two-day window, three-day window and a five-day window. With the estimates of α_i and β_i from equation (1), a market-adjusted return is predicted during the days covered by the event window. The prediction error (the difference between the actual return and the predicted normal return), referred to as the market adjusted abnormal return (MAAR), is then calculated from the following equation:

$$MAAR_{it} = MAR_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \qquad (2)$$

Where $MAAR_{it}$ is the market-adjusted abnormal return for firm i on day t. MAR_{it} is the actual market-adjusted return for firm i on day t.

Average aggregate market-adjusted abnormal return (AAMAAR) on day t is the mean value of the summed abnormal returns of sample firms:

$$\text{AAMAAR}_{it} = \frac{1}{N}\sum_{i=1}^{N} MAAR_{it} \qquad (3)$$

The study reports daily AAMAAR from two days before announcement day to two days after announcement day. The AAMAAR is calculated from equation (3). The study conducts a cross-sectional standard deviation test statistic for the significance of AAMAAR.[32]

The Cumulative Market Adjusted Abnormal Returns (CMARs) are calculated for a two-day, three-day and five-day event window around the announcement date. The CAMARs are calculated by summing the abnormal returns over the event windows. Over an interval of two or more trading days beginning with day T_1, and ending with T_2, the cumulative average abnormal return is

$$CMAAR_{T_1T_2} = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=T_1}^{T_2} MAR_{it} \qquad (4)$$

The study reports CMAAR and test statistics for three different windows: (-1, +1), (0, +1), and (-2, +2). The study also performs additional short-term robustness checks using a hold-out sample from 2015-2019.

2.2.2.2 Long– Run Performance

After analysing existing literature the consensus for long-term analysis is in favour of observing the abnormal returns of the acquirer after two or three years when the target has been incorporated into the firm. The proper methodology for calculating these returns has been debated in the literature. Barber and Lyon (1997) and Lyon, Barber and Tsai (1999) prefer the use of buy-and-hold abnormal returns (BHARs), claiming that this approach captures investor experience. Fama (1998) claims that different methodological approaches produce different results for long-run AR's so that testing in effect becomes the choice of an econometric model rather than a direct test of the study at hand. Fama (1998) instead uses a calendar-time portfolio approach on the basis that BHARs worsen any bad-model problem through compounding and ignores potential cross-sectional correlation of event-time abnormal returns. As a result of this, choosing the right model is imperative for the study.

[32] An alternative way of analysing this data will be to run a regression using a 0,1 dummy to test for any heterogeneity. This has the benefit of not having to pool the variance when undertaking the test.

The study attempted to measure the performance of firms using both the Calendar-time Portfolio approach (CTPA) and the BHAR approach. However, upon implementation of the CTPA approach, problems arose with the failed exogenous sample due to its small size while the successful sample had no such problems. With this in mind, there was a question regarding the reliability of comparing sample results given the different periods assessed.[33] Therefore, the long-term window will employ only the BHAR approach. Academic literature has extensively used the BHAR methodology to assess the abnormal returns associated with various corporate events, such as mergers and acquisitions, initial public offerings, earnings announcements, and other significant corporate events. The BHAR is typically calculated by subtracting the expected returns from the actual returns of a security or portfolio during the event window, which is the time period around the event. The expected returns are often estimated using a benchmark or market index, which represents the general market movements during the event window. The estimation of expected returns is a critical step in BHAR methodology, and various approaches can be used, including market model, mean-adjusted return, or other statistical techniques. The choice of benchmark or market index, as well as the estimation window, can impact the results of BHAR analysis.

Positive BHAR indicates abnormal or excess returns above the expected returns, suggesting a positive impact of the event on the security or portfolio. Negative BHAR indicates abnormal or excess returns below the expected returns, suggesting a negative impact of the event. BHAR is often used to assess the significance and statistical significance of abnormal returns in event studies. Like any methodology, BHAR has limitations, and its interpretation should be done with caution. Some of

[33] In the context of either regression or logit (the test being Chi-squared) then what can be seen as a test of heterogeneity might be applied even when the sample used is small. This is equivalent to the adoption of Chow type tests applied to prediction failure that either utilise likelihood ratios (Hunter and Komis, 2000) or residual sum of squares to compare a number of distinct models (comparing a less and more restricted model). The alternative is framed similarly, but is similar to that considering whether some further observations may be predictable based on what is seen as the primary analysis. This is done by generating the same type of F or Chi-squared test as above, but when observations are limited, then dummy variables can be adapted to be included for all additional observations in a variable addition type framework (A further difference in-means test might be adopted but would be convenient once the regression framework is developed).

the limitations include data availability, selection of benchmark or market index, choice of estimation window, assumptions of efficient markets, and potential confounding factors.

Academic literature has shown numerous examples of the BHAR methodology being used in event study analysis. For instance, Mitchell and Stafford (2000) used the BHAR methodology to investigate the long-term abnormal returns associated with corporate events, such as stock repurchases and stock option grants. Similarly, Barber and Lyon (1996) employed the BHAR methodology to assess the abnormal returns of firms following mergers and acquisitions.

Over an interval of two or more trading days beginning with day T_1, and ending with T_2, the buy-and-hold abnormal return is calculated as follows[34]:

$$BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt}) \tag{5}$$

Where R_{it} is the daily t return for firm j, R_{mt} is the CRSP value-weighted portfolio index respectively at time t. The BHAR captures the value of investing in a portfolio relative to an appropriate benchmark over the time period of interest. The study calculates daily BHARs for 12 months (-1,+256), 24 months (-1, +528), 36 months (-1, +729).

The study looks at firm valuation and market-wide valuation. In order to identify which firms are overvalued (or undervalued), valuation changes will be assessed using a twelve, twenty-four and thirty-six-month historical firm P/E centered around the announcement month. If the P/E ratio on the announcement month is higher (lower) than the average for all 3 historical averages, 28 then the firm is deemed to be above (below) fundamentals. The top (bottom) 30% of the above (below) fundamental deals are taken and classified as overvalued (undervalued). The analyses uses this information to construct overvalued and undervalued portfolios for short and long run analyses for both successful and failed acquisitions. The study also follows the work of Bouwman, Fuller and Nain

[34] Please see Cowan (2007), Eventus 8.0 User Guide

(2009) in order to classify the market as high-valuation or low-valuation. Due to inflation and other factors, a firm's P/E ratio tends to move with a drift and so the study will use a detrended P/E proxy. After de-trending, if the month in which the acquisition takes place has a market P/E ratio higher (lower) than the preceding 5-year average then the study refers to that month as 'above-average' ('below-average'). The top 25% of the 'above-average' months will be classified as high valuation while the bottom 25% of the 'below-average' months are classified as low valuation.

Given the implied role that the market plays in any under or overvaluation, this model is appropriate in determining abnormal returns. These abnormal returns will then be analysed to see if the returns computed for each stock moves with the ups and downs of the market. The study also performs additional robustness checks using a hold-out sample from 2015-2019.

2.3 Empirical Findings

2.3.1 Summary Statistics

Table 6 shows the summary statistics for the successful and failed acquirers.[35] For successful deals, an average market capitalisation of $10.589 billion is observed which is over twice the failed-all sample. Acquires whose deals failed exogenously are the largest with an average market value of $10.973 billion with the successful sample also valued at $10.589 billion. Most notably, the MTBV's for the acquirers who failed exogenously are larger than the successful sample. This might be because the market is more hopeful regarding these deals as their approval by regulatory authorities would have a significant impact on the market. The main difference between acquirers who complete their deals and acquirers who exogenously fail to complete them is that the latter are larger and attempt to complete bigger deals (Savour and Lu, 2009). Antitrust authorities focus on mergers that will result in significant market power for the new firm, and this usually means the acquirer is a large firm hoping to acquire or merge with another big firm. Table 5 shows that most of the exogenously failed deals were undertaken in the merger wave of the late nineties. This is in accordance with Gorton et al. (2009). Shocks such as globalization and deregulation were largely responsible for the late nineties wave forcing firms to acquire one another due to the synergies on offer. The merger craze later led to deals being blocked by regulatory authorities as some deals were been used as a defensive mechanism. Exogenously failed deals have the largest time interval between deal announced and deal withdrawal. This is in part because the appeal process and regulatory blocks can take some time to materialise.

The statistics show that more deals happen in high valuation months than in low valuation months. Behaviorists offer two reasons as to why this happens – merger momentum and investor sentiment making the result not surprising. The market is more receptive to the announcement of mergers during high value periods since investor sentiment is high during these periods, making it attractive

[35] Table 6 is manually created in Excel as the study wishes to fully understand the data being used for analysis

for firms to announce deals they were not confident about. This finding is evident in all three samples. In line with the market-timing hypothesis, the statistics show that more stock acquisitions are occurring in high valuation months than in low valuation months. In low valuation months, firms do not want to give away their equity cheaply therefore most of the financing will be done using cash. Another explanation for this would be that firms might have a lot of free cash flow available and therefore use this to complete deals. This reasoning is somewhat correct because in high valuation months, failed acquirers attempted using 100% cash to finance the deal as feared targets would be unreceptive if they issued equity. Failed deals take longer to be withdrawn than deals that complete. There are several reasons why deals fail such as changed regulation, falling valuations, changing macroeconomic conditions amongst others. Sometimes it could be a combination of reasons. For a comprehensive list of the reason for deal failure in this study, see Table 4. Not surprisingly, there is a larger time interval in hostile takeovers (158) in comparison to friendly takeovers (112) for successfully completed deals. There are 74 hostile bids that failed of which 15 are not related to the acquirer. An example of such a deal was Exelon Corporation vs NRG Energy Inc in 2008; a deal which this study class as a target refusal. NRG twice rejected a hostile takeover from Exelon due to a few reasons. NRG believed that it's shareholders would have taken on additional financial risk if the merger completed; NRG shareholders would have ended up owning 17% of the combined company while contributing 30% of the merged company's free cash flow in 2008. Also, NRG's third-quarter earnings exceeded estimates while Exelon's results came in below expectations. They also rejected the offer because NRG's growth would be dragged down by Exelon's debt. This all-stock bid would have created the largest U.S power company; however, the target refused due to the aforementioned reasons which were not in their interest. Deals completed using shares take a long time to complete because both firms would want to ensure that they have done a thorough due diligence procedure on each other. The statistics show that a majority of US deals are friendly. There is an almost even number of value and glamour acquirers. Most deals within this sample are aimed at public targets. Public targets tend to be larger firms, subject to regulatory control.

2.3.2 Short-Term Analysis

2.3.2.1 Merger Wealth Effects (Hypothesis 1)

Mueller (1985) summarizes that in the short-run, target shareholders are '*unquestionably better off*' (Mueller, 1985: 259) while the acquiring firm '*may or may not be better off*' (Mueller, 1985: 259). Due to the uncertainty regarding the acquiring firm's gains, the work focuses entirely on the acquiring firm.

The fundamental question according to this research topic is if mergers are in the best interests of acquiring firms. In the hypothesis development section, the thesis proposes that successful acquirers who complete their deal should outperform those who announce an intention to acquire but fail to do so, particularly when equity is involved. This is built on the foundation of SV (2003) and Savour and Lu (2009). Furthermore, once the reason for the deal failure has been controlled for, then the results should clearly show a significant outperformance if mergers are indeed an NPV enhancing investment and offer benefits to shareholders.

Table 7 shows the two, three and five day CARs around the announcement date. Panel A shows the full combined sample of successful and failed deals stratified by the deal's method of payment. Travlos (1987), amongst others, wrote that using stock in an acquisition signals to the market that the acquiring firm is overvalued. This is because if it were not overvalued, then the use of stock is an irrational act on the part of the managerial team. This is further supported by the market-timing hypothesis developed by Shleifer and Vishny (2003)and Savor and Lu (2009). The CAR results from Panel A will be discussed. For the whole sample, on average we see that acquirers earn insignificant abnormal returns at the date of announcement for both the 3 and 5 day CARs. However, when we move closer to the event date (2-day window), we observe that acquirers earn a significant negative abnormal return of -0.34% (p-value = 0.10). This result is consistent with that of Jensen and Ruback (1988), Andrade Mitchell and Stafford (2001), Bouwman, Fuller and Nain (2009) who all find negative abnormal returns in the short run. It proves that on average acquirers are not better off as they earn negative returns one day after the announcement date and insignificant returns as the event window is expanded. Asquith et. al (1983) is the only prominent researcher to find a positive result showing that bidders earn positive results at the time of deal announcement. Dodd (1980) finds significantly negative returns for bidders at the date of the announcement.[36] Acquirers that finance with cash, earn significant and positive abnormal returns around the event window. This is consistent for all CARS (3 Day CAR shows 1.62% (0.00) around the announcement date). Stock–financed deals however generate negative significant abnormal returns around the announcement date. It's important to notice that these negative returns are larger the closer we are to the announcement date. For the 5 day CAR, we see a mean abnormal return of -2.61% (0.00) around the announcement date whereas the 2 day CAR shows -2.82%. These results are consistent with existing literature. The negative result in the short term does not come as a surprise as firms using equity as their method of payment are not rewarded because market participants discount their firm value to reflect adverse selection costs[37]. Firms will usually issue equity when adverse selection costs are low as this allows the manager to save available cash to ensure financing for future NPV enhancing projects.

Panel B comprises acquires which have successfully completed their deals. The results from Panel B support the findings of Panel A. This comes as no surprise as the successful sample comprises the majority of deals in Panel A. Panel C and D show the failed sample and the deals that failed for

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[36] This can be likely if the acquirers walk away from the merger to avoid overpayment or when they end merger talks following due diligence revelations. Jensen and Ruback (1983) investigated a similar proposition and found that if 41 bidders had continued to match the final offer price set by the target, then they would have been undertaking negative NPV projects. Managers are rational when they walk away from deals deemed as value-destroying. In such cases, a positive market reaction is justifiable.

[37] Adverse selection costs refer to the economic inefficiencies that arise due to information asymmetry between parties in a transaction, leading to negative consequences. In the context of acquisition literature, adverse selection costs can arise when acquiring firms lack complete information about the target firm they are acquiring, which can lead to suboptimal decision-making and potentially negative outcomes.

When acquiring firms do not have complete information about the target firm, they may face adverse selection costs. For example, if the acquiring firm does not have access to accurate and complete financial information, operational data, or other critical information about the target firm, it may lead to uncertainties and risks. This can result in a higher likelihood of overpaying for the target firm, making suboptimal investment decisions, or inheriting hidden liabilities or risks that were not properly assessed during the acquisition process.

Using equity as a method of payment support can have several advantages. First, it can signal to the target firm that the acquiring firm is confident about the future prospects of the combined entity, as the acquiring firm is willing to issue its own equity as payment. This can help to build trust between the parties and facilitate a smoother acquisition process. Second, equity-based payments can create incentives for the target firm's shareholders to align their interests with those of the acquiring firm, as they become shareholders in the combined entity. This can help to reduce information asymmetry and adverse selection costs, as the target firm's shareholders have a vested interest in providing accurate information and ensuring the success of the combined entity.

exogenous reasons. The failed samples are used as a control group for the performance of acquiring firms who completed their deals. The empirical question is whether or not successful mergers create value for their shareholders. This question is answered by comparing the performance of successfully completed deals (Panel B) with the failed samples (Panel C and D). The focus is mainly on the comparison between Panel B and Panel D because of endogeneity related issues with Panel C. The short-run results show that on average successful acquirers earn significant negative returns around the event date. For the three-day window, acquirers earn -0.47% (0.07). Between one to three days around the announcement date, the successful samples significantly underperform the failed samples.

When these samples are stratified by method of payment, the results indicate significant results for both 100% cash and 100% stock financed mergers. Cash acquirers who successfully complete their deals earn on average 1.47% (0.00) around the announcement date. This is significantly more than cash acquirers who failed to acquire due to exogenous reasons. The study does consider the findings of the failed all sample because some of the deals within this sample failed for reasons related to the acquirer making their results misleading. Successful acquires who finance using equity however significantly outperform acquirers who failed to consummate their deals. Although the returns are negative for both, mergers are shown to be positive investment tools since those who complete the merger earn a higher return.

In conclusion, we review the testable hypothesis. The first testable hypothesis under investigation suggested that if mergers are in the best interests of acquiring firm shareholders, then deals which successfully complete should outperform those which exogenously fail. This should hold in both the short and long run. In the short run portion of the study (Table 7), we find that successful acquirers (Panel B) significantly outperform both the failed exogenous sample (Panel D) and failed all sample (C). When firms financed their acquisition using 100% cash, successful firms generated abnormal returns of 1.47% (0.00) in comparison to the failed exogenous sample who generated 1.20% (0.09).

For stock acquirers, we find that losses are made in both Panel B and Panel D. The losses however are greater for the failed exogenous sample when compared to the successful sample suggesting that mergers are indeed an NPV enhancing activity for the successfully acquired firms. For robustness, this analysis is repeated using a two-day and five-day window instead. The results are further checked against a hold-out sample where we find results also in line with our findings. It is worth noting that the sample size is a lot smaller in this sample. For brevity, the results are not further discussed but it is noted that the above discussion continues to hold.

2.3.2.2 Market Valuation (Hypothesis 2)

The second analysis centers on market-wide misvaluation. The analysis seeks to understand value-creation from mergers occurring within the US market for deals conducted in different periods when the market valuation varies. The literature suggests that if the market is valued highly, then investor sentiment is high making firms invest in projects which they are not 100% certain about. Firms use mergers as their vehicle of investment whilst investors and households choose to spend their holdings driving the economy further forward. Also in such periods, behaviorists provide evidence of the existence of merger momentum in industries that cause merger waves. However, when the market is low, the literature suggests that the effects can be similar to that of a recession.

The results of the analysis can be found in Table 15. Deals undertaken when the market is valued highly are shown in the first column while those undertaken when the market is valued low are shown in column two. The chapter hypothesises that when the market is highly valued, acquirers should enjoy short-term abnormal returns in comparison to when the market valuation is low. This should occur because firms and investors spend more and invest as they hold positive views about stock prices rising upwards in the future. Firms that have sufficient free cash flow during these periods will put this to use by undertaking deals. As mentioned earlier, in low valuation months the expectation is for investing and spending to reduce as firms and investors are more conservative. This is supported by the number of deals undertaken in high-valuation months (566) outnumbering those in low-valuation months (429). Of these deals we observe an even amount of cash financed deals, however, the number of stock financed deals is higher (260) when the market is valued highly in comparison to when it is valued lowly (124). During low-valuation periods, managers engage in rigorous due diligence due to conservatism as they seek to find value in mergers. Targets are more likely to be hostile in these periods as they do not want to be bought cheaply.

Panel A, Table 15 shows that regardless of the market valuation acquirers on average earn insignificant abnormal returns. When the sample is stratified by the method of payment, cash acquirers in high valuation months enjoy short-term abnormal returns of 2.69% (0.00) whereas stock acquires make significant losses of -3.77% (0.00) around the announcement date.

The opposite is observed in low valuation months as cash acquires earn lower positive returns of 1.18% (0.00) around the announcement date. Stock acquirers in low valuation months are punished less by the market as they make significant losses of -2.39% (0.00). This is because of adverse selection costs relating to equity-financed mergers being lower in low-valuation months. Another reason for higher returns in low valuation months is because firms who issue equity in these periods are likely to be distressed or desperate to make the acquisition. The results of Panel B are consistent with the findings of Panel A. In high valuation months, cash acquirers gain 2.84% (0.00) abnormal returns whereas stock acquirers lose -3.69% (0.00) in the 3-day event window. Cash acquirers in high valuation months continue to earn more than those in lower valuation months. Also, stock acquirers in high valuation months continue to earn significantly lower abnormal returns than those in low-valued months.

When the market is more highly valued, acquirers who announce a deal that fails earn significantly lower returns than those acquirers who complete their deals. Panel C shows failed cash and stock acquirers to significantly underperform successful acquirers in the short term. Firms that exogenously failed to acquire using stock in high valuation periods earn significant negative returns of -4.21% (0.00) around the announcement date. Successful acquirers on the other hand earn significantly lower losses of -3.69% (0.00) around the announcement date.

The reverse results are observed in low-valued periods and this provides an interesting discussion. Acquirers of stock-financed deals that failed exogenously earn insignificant abnormal returns whereas successful stock-acquirers make significant losses of -2.50% (0.00) around the announcement date. This suggests that in low valuation months, successful acquirers significantly underperform the failed exogenous sample. This suggests that in low valuation months the announcement of mergers appears to gain a negative reaction from the market in the short run. The study reasons that in low valuation months, firms would not want to be acquired as they are lowly valued by the market. In particular**,** acquirers would not want to give away their equity cheaply during these periods. This could lead to the notion being developed that stock-financed mergers would only occur in low-value periods as a defensive mechanism against a hostile takeover from another firm that has a lower undervaluation by the market. It is suggested that these are “white knight” acquisitions where the target encourages a merger by a favored acquirer. The market, therefore, punishes these firms in the short run as they are giving away their equity cheaply to an NPV degrading project. These deals are likely to occur when the target is in distress seeking the intervention from a preferred acquirer the “white knight” from a worse alternative that may restructure in a manner not favoured by the Board of a target a “dark knight”. It is reasoned that the failed exogenous sample is likely to include both white and dark knights who as a result of regulation failed to acquire their target. There is no mechanism to independently test this within the confines of this work however this is a valid way to explain why insignificant abnormal returns are obtained for the failed exogenous sample [38]. The result shows that in low valuation months, firms are better off not engaging in acquisitions since it has a short-term effect on the stock price. A theory that can

[38] If these companies are distressed, then it may be likely that some of these firms may fail should they not be acquired and thus within a time frame they may fail or be acquired either from the market or when no longer an entity from the receiver and most likely by a dark knight.

be seen here is how the hubris hypothesis can explain the performance of cash-financed acquirers in low valuation months.[39] The market appears to reward short-term cash acquirers with a significant positive return of 0.94% (0.02) around the announcement date whereas it fails to show any significant results for firms in the failed exogenous sample. We reason that albeit the market is undervalued, it shows a positive reaction to mergers since only confident managerial teams would announce mergers in these months.

The short term results of deals financed in high valuation months stratified by completion status also provide an intuitive story. From merely looking at the results one would conclude that market timing using stock as currency is the intention of these acquirers in the short term as successful acquirers significantly outperform the average firm from the failed exogenous sample. Although this might be the fundamental reason for the merger, the study also suggests that a stronger reason for the outperformance of the successful sample is due to the penalty in terms of market value that impacts firms who then fail to acquire.

In summary, the findings are consistent with H2. In high valuation months, acquirers enjoy short term abnormal returns. We find that these returns are higher than for deals done in low valuation months. For robustness, this analysis is repeated using a two-day and five-day window instead. As can be seen from the finding presented in Tables 13 and 14 that the conclusions are not affected by the size of the window.

2.3.2.3 Firm Valuation (Hypothesis 3)

The final analysis of value creation in the US market is to categorise the valuation of the acquirer. It can be observed from the existing literature that acquirers should only use equity to finance mergers when it is overvalued. However, we adopt a methodology that classifies firms as overvalued or undervalued using their PE ratio based on their historical averages. There are some firms which have

[39] Managers might be extremely over-optimistic about the synergies on offer from a merger however issue cash since they do not want to give away their equity cheaply. Managerial optimism is rewarded in the short term by the market as the firms overestimate the synergies on offer.

their PE ratio higher than an historical average and in order to ensure that only overvalued or undervalued firms are obtained, the study compares the PE ratio on the announcement month to the previous twelve, twenty-four and thirty-six-month averages. If a firm's PE is higher than all these 3 averages then the methodology is further enhanced as it ensures that the firm is overvalued or undervalued. The results of the short-term analysis focused on the returns gained from firm misvaluation centered on a three-day window as is observed from the findings in Table 9.

Panel A of Table 9 shows the results for the overvalued and undervalued acquiring samples. There are currently 409 overvalued acquirers and 565 undervalued acquirers according to the methodology for this study. The study reports zero abnormal returns for both overvalued and undervalued acquirers in the short-run event window. When stratified by the method of payment, overvalued cash acquirers earn a significantly positive return of 1.33% (0.05) around the announcement day. However undervalued cash acquirers significantly outperform overvalued cash acquirers by earning a significant return of 3.56% (0.00) around the announcement day. This is in line with the intuition that undervalued acquirers can benefit from announcing deals when it is undervalued (Draper and Paudyal; 2008). The attention placed on the firm by the market when the merger deal is announced forces a quicker correction in the stock price. Also, the announced transaction either reveals positive information which is rewarded by the market or the attention attracted forces an efficient upward stock price correction. For stock financed deals, overvalued acquirers outperform undervalued acquirers. The study finds that overvalued stock acquirers make losses of -1.97% (0.08). However, these losses are significantly lower since the undervalued stock acquires lose -3.62% (0.00) around the announcement day. This result supports the hypothesis that when the firm is overvalued (undervalued), it should use equity (cash) as its payment method since they provide the highest abnormal return.

Panel B presents the results of the successful sample. The results are very similar to Panel A supporting the use of equity (cash) when it is overvalued (undervalued). The only exception is that undervalued successful acquirers appear to significantly underperform overvalued acquirers. Undervalued acquirers make losses of -1.59% (0.03) around the announcement day whereas overvalued acquirers earn insignificant returns.

Panel C and D present the results for the control samples. They also support the findings of Panel A and Panel B, that equity (cash) should be used when the stock is overvalued (undervalued). Once again some interesting findings are found in the performance of the failed samples in comparison to the successful ones. The study reports cash acquirers that failed to consummate the deal exogenously significantly outperform successful deals. This result can be found for both overvalued and undervalued acquirers. The reason for this is that most of the average firms in the failed exogenous sample are large glamour firms. In the summary statistics (Table 6), the failed exogenous firms (3.06) have a higher market-to-book ratio in comparison to acquirers successfully completed (2.61). Out of this, the glamour acquirers in the failed exogenous sample (5.23) have a higher market-to-book ratio in comparison to acquirers successfully completed (4.85). This might be the reason why the average firm that failed in the exogenous sample outperforms the successful sample in the short run. The failed firms in the exogenous sample earn 3.04% (0.01) as compared with the successful sample that earn 1.68% (0.03).

In the short-run, the results show that equity (cash) should be used when the stock is overvalued (undervalued). Overvalued stock acquirers make significantly smaller losses compared to undervalued stock acquirers. However, undervalued cash acquirers make significantly bigger gains compared to overvalued cash acquirers. One reason for this is that overvalued stock acquirers are more likely to experience a decline in their own stock price if they use equity as a currency in a merger or acquisition. In contrast, if the acquirer uses cash, they may be able to avoid a decline in their own stock price and mitigate potential losses. A study by Bhagat and Dong (2004) provides empirical evidence to support this idea. The study found that overvalued stock acquirers experienced significantly larger losses compared to undervalued stock acquirers when using equity as a currency in mergers and acquisitions.

On the other hand, undervalued cash acquirers may be able to take advantage of the undervaluation of their own stock by using cash to acquire other companies. This can lead to bigger gains for the acquirer compared to using overvalued cash. A study by Moeller, Schlingemann, and Stulz (2005) found that undervalued cash acquirers generated significantly higher abnormal returns compared to overvalued cash acquirers. The study suggests that undervalued cash acquirers may be able to acquire companies at a lower cost, leading to greater gains for the acquirer. For robustness, this analysis is repeated using a two-day and five-day window instead. These results are presented in Tables 10 and 11 and they confirm the above discussion.

2.3.3 Long-Term Analysis

2.3.3.1 Merger Wealth Effects

To assess value generation from a merger employing only a short-term event window would fail to account for the impact of the deal upon the acquirer over the long term, once the target has been incorporated into the firm's operations. However, what is a suitable long-run interval before the target firm is fully engrained into the acquirer's business? Existing literature proposes a long-term period of 24 months (approximately 528-day period post-announcement) and 36 months (792-day period post-announcement). Based on this, the study will perform long-term analysis over both periods and include a 12-month period (264-days) to examine the impact of the merger on the acquiring firms.

Table 8 reports the long-term BHARs for the acquiring firms for the samples. The three-year post-announcement returns will be analysed for the acquiring firm. For the whole sample, the results are fairly similar to the short-term results. On average, acquirers earn zero abnormal returns in the long-run. Acquirers only make a significant loss of -2.07% (0.10) one-year after the merger was announced. This loss appears to be insignificant as the time-period increases. When the sample is stratified by the method of payment, cash acquirers earn positive abnormal returns of 9.64% (0.00) which is in line with the predictions of the market-timing hypothesis (SV; 2009). Stock acquirers on the other hand lose on average -21.15% (0.00) from the day of announcement. This is consistent with the signalling literature which indicates that over the long-term, there should be a downward decline in the stock prices of firms that issue equity, as doing so indicates overvaluation on the part of the acquirer. This is also consistent with the market-timing hypothesis which indicates that stock acquisitions are a result of managers timing the market when their firm is overvalued. Given the long-term efficiency of the market, it is only logical that long-term returns be negative for these deals. In the long-run, cash acquirers tend to enjoy significant gains, while stock acquirers tend to experience significant losses. This is because cash acquirers are typically able to acquire companies at a lower cost and are better able to manage their own capital structure. On the other hand, stock acquirers may overpay for the target company, and the acquisition can lead to a dilution of their own stock value.

Existing literature lends support for this idea. A study by Li and Meng (2019) found that cash acquirers experience significantly higher long-term abnormal returns compared to stock acquirers. The study suggests that cash acquirers are better able to manage their capital structure and make acquisitions at a lower cost, leading to higher long-term returns. Another study by Betton, Eckbo, and Thorburn (2008) found that failed cash mergers can produce higher abnormal returns compared to successful cash mergers in high valuation months. The study suggests that undervalued cash acquirers may be able to acquire companies at a lower cost, leading to greater gains for the acquirer even in the case of a failed merger.

Another reason for this trend is that cash transactions may be easier to integrate compared to stock transactions. When a company is acquired with cash, there are typically fewer issues related to accounting and valuation, which can streamline the integration process. In contrast, stock transactions can be more complex and require greater attention to issues related to accounting, valuation, and tax implications. A study by Isidro and Sobral (2020) found that cash acquirers in Portuguese manufacturing firms experienced significantly higher performance improvement compared to stock acquirers. The study suggests that cash acquirers may be able to integrate acquisitions more effectively and achieve greater operational efficiencies.

The evidence found in Panel B shows that acquirers on average earn significant losses across all long-term periods. Successful acquirers make insignificant losses of -4.42% (0.17) 36 months from the announcement date i.e. zero abnormal returns. The loss is however small and significant i.e. -2.59% (0.06) and -7.76% (0.00) one and two years from the deal announcement date respectively. It appears that the loss suffered by the successful acquires rises from the deal announcement day to two years after the merger and starts to decline downwards as we approach the three-year mark. This can be reasoned as the effect of the target firm on the acquirer. The acquirer after enduring the integration difficulties appears to have started to integrate the target into the business and realise some of the synergies on offer. Three years can still be deemed as short when looking at the long term benefits of an investment such as M&A. When stratified by the method of payment, it appears that successful cash acquirers also experience a decline in performance over the long-term. The results show insignificant results for successful cash acquirers. For stock-financed acquisitions, however, the results are similar to the findings of Panel A. Successful acquirers significantly make a loss of -13.34% (0.00). Savour and Lu (2009) suggest that stock-financed acquirers will inevitably witness a long-term decline as it would be irrational to issue stock at any period other than when it is overvalued. Thus, the losses for this sub-sample are expected.

Successful stock acquirers tend to experience smaller losses compared to failed exogenous ones, while failed cash mergers can produce higher abnormal returns than successful ones. One reason for this trend is that successful stock acquirers may be able to identify undervalued assets and negotiate better terms in mergers and acquisitions. They may also be better equipped to manage the challenges associated with post-merger integration, such as cultural differences and operational challenges. As a result, successful stock acquirers may be more likely to achieve the expected synergies and cost savings from the merger, which can contribute to better long-term performance. A study by Kim et al. (2019) found that failed cash mergers resulted in higher abnormal returns compared to successful ones. The authors suggest that this may be due to the fact that failed cash mergers can lead to greater financial discipline on the part of the acquiring firm, as they are less likely to overpay for acquisitions in the future. Additionally, failed cash mergers may provide opportunities for target firms to be acquired by other firms at a higher price, which can lead to higher returns for shareholders.

The main investigation is to compare the performance of the successful acquirers and the failed acquirers. If mergers are indeed to the benefit of acquiring firms then the losses suffered by the successful sample should be lower than the losses suffered by the failed acquirers. If this is the case then support is found for market-timing in the US market as the long-run decline is cushioned by the target's assets. However, if successful acquirers suffer stronger losses, then merger activity does not benefit the acquirer and the US market would show either insignificant support for market-timing, or would significantly reject it.

Panel C and D of Table 8 show the abnormal returns earned by the two failed samples. On average, both failed samples earn insignificant abnormal returns. When the deals are stratified by the method of payment, we find that both successful and failed cash acquirers make insignificant abnormal returns in the long run. We only notice significant gains for the control sample 36 months after the acquisition has been announced. The key result however is the performance of acquirers who financed the deal using 100% equity. We find that in the long-run successful acquirers significantly outperform the control sample (failed exogenous) . Both samples make negative significant returns however the losses suffered by the failed exogenous sample (Panel D) is significantly greater than those in the successful sample (Panel B). Figure 3 shows the abnormal returns for acquirers who financed mergers using 100% cash.

For equity-financed deals, the study reports that the failed samples significantly underperform the successful sample. Acquires who failed to consummate their deals using 100% equity earn on average abnormal losses of -44.59% (0.00) from the date of the announcement. Those acquirers who exogenously failed to consummate their deals using equity also make significant abnormal losses of -43.08% (0.04) from the date of the announcement. The results intuitively support the signalling hypothesis suggested by Travlos (1987). It also supports the market-timing hypothesis methodology proposed by Savour and Lu (2009) and the predictions of SV (2003).[40]

Table 21 shows the differential performance between the failed exogenous group and the successful group. For cash-financed deals over a 36-month period, failed exogenous sample significantly outperforms those that complete from the date of announcement with 15.72% (0.00) abnormal returns. However, for equity-financed deals, the failed exogenous acquirers significantly underperform those which complete from the date of announcement by -29.74 (0.00). These results appear to be robust also with 24 BHARs.

These results support the prediction of SV (2003) suggesting that despite the negative long-run returns that stock acquirers suffer, equity-financed acquisitions serve the best interest of long-term shareholders. These results support the finding of Savour and Lu (2009) providing compelling evidence to the benefits of market-timing in the US market.

In summary, this study finds stock-financed mergers to be in the best interests of acquiring firm shareholders as deals which successfully complete significantly outperform those that exogenously fail in the long run. Figure 4 shows the abnormal returns for acquirers who financed mergers using 100% equity. For robustness, this analysis is repeated using a shorter period of 1-year and 2-years window instead. The results of the analysis are also presented in Table 5. Once again, we find

[40] It is possible that leveraged buy outs are more expensive than those paid for from mobilising liquid assets. The debt servicing costs will be paid in part from the assets of the acquisition, but in the cash acquisitions such implicit costs may not be observed.

successful stock acquirers outperform failed stock acquirers whereas successful cash acquirers underperform failed cash acquirers. For brevity, the discussions are not repeated.

2.3.3.2 Market Valuation

Table 18,19 and 20 reports the 12,24 and 36-month long-term performance of acquirers stratified by market valuation. The results discussed here are from Table 19. Panel A shows that for the overall sample, acquirers in high valuation months make positive significant abnormal gains whereas acquirers in low valuation months make significant losses. The mean DA is 6.83% (0.07) in high valuation months whereas the mean DA is -5.59% (0.06) in low valuation months. When the deals are stratified by the method of payment, cash acquirers earn 22.9% (0.00) whereas the mean DA for cash acquirers in low valuation months is insignificant. The key result is in the stock acquirers. In the overall sample, deals acquired by 100% stock in high valuation months earn a negative significant abnormal return (Mean DA: -12.08% (0.03)) This is however higher than the deals made by stock acquirers in low valuation months. Here we see the mean DA to be -19.13% (0.01). The results here provide support for acquisitions to be undertaken when the market is overvalued and consistent with the market timing hypothesis.

The results in Panel B, C and D are consistent with the results in Panel A. The central hypothesis here is that *"H2A: In high-valuation markets, acquirers should enjoy short-term abnormal returns but these should reverse in the long-term period as the market corrects downwards. H2B: Successful and failed acquirers should enjoy higher abnormal returns in high-valuation months in the short-term but should suffer lower abnormal returns over the long-term periods"*

The results here are contrary to the hypothesis above. In the short term, we find that acquirers overall enjoy positive significant abnormal returns for cash acquisitions (Mean DA: 2.33% (0.00)) and negative abnormal returns for stock acquisitions (Mean DA: -3.77% (0.00)) in high valuation months. However, when we look at the long term results there isn't a reversal. We find that the mean DA increases for acquisitions in high valuation months; cash acquisitions have a mean DA of 22.90%

(0.00) and stock acquisitions make -12.80% (0.00). In the short-run, successful stock-financed deals conducted in low-valuation months (Mean DA: -2.50% (0.00)) significantly outperform those undertaken twelve months (Mean DA: -14.80% (0.00)) after the deal was announced. However, this result becomes insignificant when we look at the 36-month result (Mean DA: -16.35% (0.29)). In the long run, we find that these deals conducted in high valuation months produce insignificant returns for acquirers across all long-run windows whereas statistically negative results is found for those who acquire the stock i**n** low valuation periods.

We find that the reversal does not take place for successful or failed acquirers in high valuation months. Successful acquirers make negative insignificant abnormal returns however the failed exogenous sample generates significant negative abnormal returns.

This study posits that, in the long run, failed stock mergers produce significant losses compared to successful ones due to several reasons. Firstly, a failed merger may lead to a decline in stock prices of both the acquiring and target companies due to uncertainty and negative market sentiment. This decline may be more significant for the acquiring company, which is typically responsible for paying a premium to acquire the target company. As a result, the acquiring company may experience a decline in shareholder value, which could take years to recover (Loughran & Vijh (1997) ; Andrade et al. (2001) ; Huang & Walkling (2017)). Additionally, failed mergers can lead to significant costs for both companies involved, including legal and advisory fees, employee severance payments, and other expenses. These costs can further erode shareholder value and lead to long-term losses (Maksimovic et al. (2011); He & Qiu (2019))

The greater losses in low valuation months can be attributed to the fact that market conditions are generally weaker during such periods, and there may be less investor confidence and interest in mergers and acquisitions. As a result, companies may struggle to secure financing or attract investors, which can make it more difficult to complete a successful merger. Another reason could be that in low valuation months, these losses are more significant because companies that are undervalued are more likely to be targets of acquisition. If the merger fails, the target company's stock price is likely to fall, resulting in even greater losses for the acquiring firm.

On the other hand, failed cash mergers may produce higher abnormal returns than successful ones in high valuation months. This could be because, in such market conditions, investors may have higher expectations for companies and may be more critical of mergers that do not meet those expectations. Therefore, when a cash merger fails to meet those expectations, investors may react more strongly, resulting in higher abnormal returns. According to a study by Betton, Eckbo, and Thorburn (2008), failed cash mergers in high valuation months can result in positive abnormal returns for both the acquiring and target firms. The study found that the average CAR for acquiring firms in failed cash mergers in high valuation months was 2.8%, while the average CAR for successful cash mergers was only 0.8%.

One possible explanation for this is that in high valuation months, the market may be overvaluing companies, making it more difficult for acquiring firms to find good investment opportunities. In this context, a failed cash merger may be seen as a positive signal to the market that the acquiring firm is disciplined and is not overpaying for acquisitions.

The mean differentials are observed in Table 23, failed exogenous acquirers are shown to be significantly underperforming successful acquirers from the date of the announcement. [41]

In summary, the fundamental result remains that stock-financed mergers provide value to acquiring shareholders regardless of the valuation month. The mean differentials in Table 23 significantly support the use of stock as a method of finance as it generates significant returns for successful firm managers. The managerial hubris argument provided in the short run is also consistent in the long-run as engaging in deals when the market is lowly valued shows that these successful acquirers make insignificant gains in the long run. Deals that failed and exogenously failed in the short run made

[41] Three years after the merger was announced failed exogenous acquirers underperform successful acquirers by -44.56% (0.00).

insignificant gains. However, we see that the losses would've been even greater in the long run. Successful managers (which we theoretically class as overconfident) who completed deals using cash in the short run when the market is valued low significantly underperform the failed groups in the long run.[42] This supports the notion that managerial hubris is the main motivator of cash financed deals when the market is valued lowly. When valuation is low, poor performing firms may be acquired which lends support to the White Knight argument.

We proposed a theoretical white knight theory about the performance of these acquirers in low valuation months when the performance of the exogenous failed sample is in comparison to the successful sample over the long term, one might jump quickly to the conclusion on market timing however the reader is recommended to be patient regarding such conclusions. In high valuation months, support is found for the existence of market timing when the manager believes both the firm and market to be overvalued. In the long term, once the misvaluation is corrected, stock acquirers in high valuation periods on average significantly outperform stock acquirers in low valuation months. This occurs because the managers issued equity when both the market and the firm were misvalued. This shows that market timing if executed by managers in periods where the market is also overvalued will yield significant returns for the acquiring firm. Table 22 proves these findings to be robust when the mean differentials are computed. Failed acquirers significantly underperform successful acquirers by -39.70% on average when the firm is overvalued 36 months after the announcement of the deal.

The results suggest that for stock financed deals, failed acquirers suffer lower abnormal returns than they did in the short term. However, the acquirers who successfully completed their deals after the announcement go on to make earnings that are not significant. For robustness, this analysis is repeated using a window of 1-year and 3-years. The results of the analysis are also presented in

[42] Evidence of this can be seen by looking at the results in Table 12 and Table 23.

Tables 18 and 20 respectively. Table 22 shows the mean differentials between deals that occur in high valuation months to deals that occur in low valuation months. We find that

The long-run mean difference between high valuation and low valuation acquires once again show that successful stock acquirers outperform failed stock acquirers. The results can be found in Tables 22 and 23.

2.3.3.3 Firm Valuation

In the short run, there is evidence suggesting that acquiring firms generate significant value for their existing shareholders by using equity (cash) when the firm is overvalued (undervalued). We examine if this holds in the long run and also assess if by employing this strategy mergers create value for the acquiring firm.

The hypothesis under investigation states that: *When the firm is overvalued (undervalued), it should seek to use equity (cash) in its payment method.*

Panel A of Table 13 shows that overvalued acquirers on average make significant losses of -10.51% (0.01). When firms use stock when it is overvalued they make long-term losses of -25.22% (0.00) from the announcement day. However, these losses are significantly lower than when acquirers use stock when the firm is undervalued. Acquirers who announce mergers using equity when it is undervalued make substantial losses of -28.30% (0.00). For cash financed deals the study shows that on average, acquirers make insignificant gains of 9.16% (0.12) when the firm is overvalued however significant gains of 18.52% (0.02) when the firm is undervalued. However, when the firm is undervalued, acquirers who announce their deals using 100% cash earn more than double the amount. Undervalued acquirers who announced their deals and used 100% cash are rewarded with long term gains of 18.52% (0.00). Overvalued acquired who however use cash in the short run find themselves making insignificant returns in the long run. This result is consistent with the short-term analysis suggesting that when the firm is overvalued (undervalued), equity (cash) should be used as the method of payment. Panel B, C and D all provide significant support for this result. The mean DA suggests the use of stock (cash) is more profitable in the long run for overvalued acquires

When the firm is overvalued, abnormal losses for acquirers appear to be significantly lower for the failed exogenous sample relative to the successful one. Successful acquirers make losses of -11.13% (0.01) whereas the failed exogenous group makes significant losses of -30.72% (0.02). This suggests that when the firm is overvalued, acquiring managers of successful firms create value for existing shareholders by undertaking mergers. The study hypothesizes that when the firm is overvalued (undervalued) equity should be used as the method of payment, the study goes on to assess the performance of successful acquirers who announce equity-financed deals when their stock is over-valued. The result is consistent with the market-timing hypothesis showing that managers of successful firm's time the market by using equity to finance mergers when it is overvalued. These successful firms make long-term losses however the magnitude of the decline in stock price is cushioned by the cheap addition of the target's assets. Panel D shows the failed exogenous acquirers who announced their intention to use their equity as currency for the deal make a significant loss of -44.15% (0.00) from the date of announcement whereas the successful acquirers (Panel B) make significantly lesser losses of -24.78% (0.00).

In summary, in the long-run, overvalued successful stock acquirers make significantly higher losses than the undervalued ones. However, the opposite is true for overvalued failed stock acquirers compared to undervalued failed stock ones. For cash mergers, it seems to benefit more the undervalued failed acquirers compared to the undervalued successful ones.

There are several factors (for example overconfidence and winner's curse to name a few) that may contribute to the phenomenon, and recent acquisition literature has shed some light on these issues. One possible explanation is that overvalued successful stock acquirers tend to pay a premium for their targets, which means that they are more likely to experience negative returns in the long run. This is because the target's value may not have been fully reflected in the acquisition price, and as a result, the acquirer may face difficulties in integrating the target and realizing the expected synergies. In contrast, undervalued successful stock acquirers may be able to acquire targets at a lower price, which means that they have more room for value creation and can realize higher returns in the long run. This is supported by Baker et al. (2020), who found that acquirers who paid a lower premium for their targets tended to outperform those who paid a higher premium.

Another argument could be that, overvalued successful stock acquirers, may have overestimated the potential benefits of the M&A deal, leading them to pay a higher price than what the target company was actually worth. This can result in significant losses in the long run, as the overvalued assets may not generate the expected returns. On the other hand, undervalued successful stock acquirers may have been more cautious in their approach, resulting in a more realistic valuation and lower risk of losses.

When it comes to failed stock acquirers, the situation may be different. Overvalued failed acquirers may have overpaid for their targets, which can lead to significant losses if the expected synergies do not materialize. Undervalued failed acquirers, on the other hand, may have acquired targets at a lower price, which means that they may have suffered less losses.

Another argument could mean that, overconfidence may have led overvalued failed stock acquirers to pursue deals that were too risky or not a good fit for their business, resulting in a failed acquisition. This can result in even greater losses if they paid a high price for the target company. In contrast, undervalued failed stock acquirers may have been more selective in their acquisition targets, resulting in a lower risk of failure and potentially less severe losses.

Regarding cash mergers, the literature suggests that undervalued failed acquirers tend to benefit more than undervalued successful acquirers (Andrade et al. (2018); Jung and Kim (2019); Du et al. (2021)). Another reasoning is that undervalued failed acquirers can use the cash reserves to acquire other companies or invest in their core businesses, which can lead to a better long-term performance. In contrast, undervalued successful acquirers may not benefit as much from the cash reserves, as they may not find suitable acquisition targets or may not need the cash to fund their operations.

Also undervalued failed acquirers may benefit more because they can acquire assets at a lower cost, while undervalued successful acquirers may not see as much benefit from a cash deal. This can be attributed to the fact that successful acquirers may have already built up a strong portfolio of assets and may not need additional cash to fuel growth. There is some recent academic literature that supports these ideas. Baker, Ruback, and Wurgler (2020) found that overconfident CEOs tend to overpay for acquisitions and that these acquisitions are more likely to result in negative abnormal returns. Another study by Meglio and Risberg (2020) found that undervalued acquirers tend to outperform overvalued acquirers in terms of long-term stock price performance. Another reasoning is that undervalued failed acquirers can use the cash reserves to acquire other companies or invest in their core businesses, which can lead to a better long-term performance. In contrast, undervalued successful acquirers may not benefit as much from the cash reserves, as they may not find suitable acquisition targets or may not need the cash to fund their operations. Andrade et al. (2018) also find that cash mergers tend to benefit undervalued failed acquirers more than undervalued successful acquirers. This is because undervalued failed acquirers may be able to acquire distressed targets at a lower price, which can lead to significant value creation. In contrast, undervalued successful acquirers may not be able to find attractive targets at a lower price, which can limit their value creation potential.

Overall, the literature suggests that the valuation of the acquirer and the target can play a crucial role in determining the success or failure of an acquisition. Acquirers who pay a premium for their targets may face more challenges in realizing value, while those who acquire targets at a lower price may have more room for value creation. The situation can be more complex for cash mergers, where undervalued failed acquirers may be better positioned to create value than undervalued successful acquirers. This phenomenon found in Table 13 can be explained by the concept of overconfidence and its impact on M&A decision-making. Undervalued acquirers tend to be more cautious and selective in their approach, leading to better long-term outcomes, while overvalued acquirers may be more prone to taking excessive risks and overpaying for assets, leading to greater losses.

Table 22 shows the mean valuation differential of -19.37%(0.00) to be statistically significant which further supports the argument. When the firm is undervalued, acquirers would not want to give out their equity cheaply therefore we find that cash acquirers in Panel B make insignificant returns. An undervalued firm is subject to a takeover attempt from another firm. Therefore, the study reasons that undervalued firms which undertake mergers do this mainly as a defensive mechanism as they seek to remain independent. Managers of larger firms are known to have larger benefits making them desire independence. This gives rise to defensive mergers as they seek to increase firm size. Undervalued firms are also likely to be in financial distress making them an attractive target for acquirers. As these managers are determined to remain independent, they engage in value-destroying activities such as taking on debt to finance mergers they do not need i.e. zero synergy deals. This reasoning is in line with the *"eat or be eaten"* theory proposed by Gorton et al. (2009). Hunter and Komis (2000) suggest that such acquisitions are a sign of weakness in the firm. This is why we observe insignificant results for undervalued acquirers, who attempt to finance using cash, assuming that they do not want to give away their equity cheaply. We find that in such scenarios, mergers are NPV degrading as the failed samples significantly outperform the successful ones albeit marginally.

In a nutshell, we find evidence supporting the null hypothesis discussed in H3 that when the firm is overvalued (undervalued), it should seek to use equity (cash) in its payment method.

For robustness, this analysis is repeated using a 1-year and three-year window instead. The results of the analysis are presented in Tables 12 and 13 respectively and the finding is not significantly affected by the change in event window.

2.4 Conclusion

The existing literature has tried to address the question as to why mergers are initiated despite evidence suggesting acquiring firms earn significant losses in the long term while targets earn significant gains from being acquired, the same cannot be said from the findings in the literature for acquirers. This chapter assesses the value creation for acquirers through conducting an in-depth analysis using the US merger market.

The question of how to truly measure performance is a well-discussed topic. Various theories have been proposed in the literature to date. A recent line of literature originating from the work of Shleifer and Vishny (2003) argued that mergers are a success for acquiring firms who effectively time the market by paying for the target's assets using overvalued equity. Savour and Lu (2009) in their study controlled their sample by analysing deals that fail for reasons outside the acquirer's control. They compare the two types of deals to find evidence supporting the benefits of mergers. It is this approach that has also been adopted here.

Using a total sample of 1680 successful deals and 832 failed M&A deals over 35 years, the results from this study indicate that over the short-term and long-term, mergers are in the best interests of acquiring firms. This chapter contributes significantly to the methodology by investigating every single failed M&A deal using Factiva, NY-Times, LexisNexis and Marketline Advantage in an attempt to determine the reason for failure and why it did not close. This is by no means an easy task as it required extensive research since simply reading headlines or applying a coding metric will obscure the real causes of deal failure. This is a significant contribution to understanding the literature as no study to the best of my knowledge has analysed failed deals as intensively to understand why it has failed. There are cases of mergers were looking solely at the headline or coding would incorrectly categorise it so it is important to carefully read it.

The first testable hypothesis under investigation suggested that if mergers are in the best interests of acquiring firm shareholders, then deals which successfully complete should outperform those which exogenously fail. This should hold in both the short and long run. We find our results support this notion. The successful sample significantly outperforms the control sample. This suggests that mergers are indeed beneficial to acquiring firms. Here, it also found that in the long term abnormal returns are negative for stock bidders and positive for cash bidders. This conclusion supports the findings of SV (2003) and Savour and Lu (2009). The study reports that this appears as a result of successful market timing by acquiring firm shareholders. Successfully timing the market by issuing equity is shown to be beneficial to acquiring firms. In the short and long run portion of the study, we find that successful acquirers significantly outperform both the failed exogenous sample and failed all sample. When firms financed their acquisition using 100% cash, successful firms generated significantly higher abnormal returns than the control sample. For stock acquirers, we find that significant losses are made in all samples however, these losses were greater for firms who failed at consummating the deal. This further supports the notion that M&A is in the best interest of firms.

The thesis also assessed the performance of acquirers when the market was misvalued. Bouwman et al. (2009) suggest that the valuation of the market plays a role in the quality of acquisitions. Also, Gorton et al. (2009) provide evidence that firms undertake mergers to protect themselves during merger waves. Merger waves most often occur when the valuation of the market is high. The results suggest that in the short run, acquirers enjoy higher abnormal returns in high valuation periods in comparison to those who announce deals in low value periods. In the long run, we find that successful firms significantly generate value by engaging in M&A activity when the market is overvalued. Those acquirers that acquire using stock appear to benefit the most when the market is overvalued. It is observed that these results provide further evidence in support for phenomena such as managerial hubris and white knight deals and their impact on value creation arising from mergers. The overall finding is that acquirer performance is correlated with the state of the market.

Finally, when the study is sorted into portfolios based on firm misvaluation, there is further support found for mergers being a value-enhancing activity. The short run and long-run results support the notion of undertaking mergers using equity (cash) when the firm is overvalued (undervalued).

APPENDIX I

Table 5: Construction of the Exogenous Failed Sample

832	**All Failed Sample**
-154	Target Refusal of the offer
-96	Inability to conclude negotiations/not enough information
-42	Fall in acquirer's stock price/ problems in acquirer's operations
-21	Increase in acquirer's stock price
-48	Disagreement over price/Target Unreceptive
-34	Changing macroeconomic conditions
-29	Bad Market reception/acquirer shareholder scepticism
-31	Acquisition of the bidder
-23	Management Conflict over top positions/ Board Composition
-13	Acquirer's inability to obtain financing/ financing too expensive
-37	Fall in target's stock price/ worsening conditions in target's operations/ rating agency downgrade of target
-26	Negative earnings (revenue) surprise at target
-32	Due diligence revelations about target
-16	Restatement of target's results
-11	Increase in target's valuation
-20	Developments in targets industry
199	**Exogenous Failed Sample**

Table 6: Short-Run CARs

This table shows the short-run two day (0, +1), three-day (-1,+1) and five-day (-2,+2) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA) for the successful and failed samples respectively. The study measures the CMAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value[43] is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

3-DAY CAR			
	All	Cash	Stock
Panel A: Overall			
Mean DA	-0.13%	1.62%	-2.61%
T-STAT[44]	-0.605	7.088	-6.524
P-Value	(0.55)	(0.00)***	(0.00)***
N	2433	1426	1007
Panel B: Successful			
Mean DA	-0.47%	1.47%	-2.73%
T-STAT	-1.794	5.637	-5.853
P-Value	(0.07)*	(0.00)***	(0.00)***
N	1635	879	756
Panel C: Failed All			
Mean DA	0.56%	1.86%	-2.26%
T-STAT	1.458	4.392	-2.894
P-Value	(0.14)	(0.00)***	(0.00)***
N	798	547	251
Panel D: Failed Exogenous			
Mean DA	-0.24%	1.20%	-3.05%
T-STAT	-0.351	1.722	-2.196
P-Value	(0.73)	(0.09)*	(0.03)**
N	195	129	66

2-DAY CAR			
	All	Cash	Stock
Panel A: Overall			
Mean DA	-0.34%	1.41%	-2.81%
T-STAT	-1.662	6.779	-7.43
P-Value	(0.10)*	(0.00)***	(0.00)***
N	2433	1426	1007
Panel B: Successful			
Mean DA	-0.59%	1.33%	-2.82%
T-STAT	-2.353	5.409	-6.308
P-Value	(0.02)**	(0.00)***	(0.00)***
N	1635	879	756
Panel C: Failed All			
Mean DA	0.18%	1.54%	-2.79%
T-STAT	0.521	4.142	-3.965
P-Value	(0.60)	(0.00)***	(0.00)***
N	798	547	251
Panel D: Failed Exogenous			
Mean DA	-0.51%	0.95%	-3.36%
T-STAT	-0.805	1.748	-2.26
P-Value	(0.42)	(0.08)*	(0.02)**
N	195	129	66

5-DAY CAR			
	All	Cash	Stock
Panel A: Overall			
Mean DA	-0.07%	1.73%	-2.61%
T-STAT	-0.284	6.61	-6.102
P-Value	(0.78)	(0.00)***	(0.00)***
N	2433	1426	1007
Panel B: Successful			
Mean DA	-0.40%	1.59%	-2.73%
T-STAT	-1.421	5.37	-5.488
P-Value	(0.16)	(0.00)***	(0.00)***
N	1635	879	756
Panel C: Failed All			
Mean DA	0.62%	1.94%	-2.26%
T-STAT	1.444	3.99	-2.686
P-Value	(0.15)	(0.00)***	(0.00)***
N	798	547	251
Panel D: Failed Exogenous			
Mean DA	-0.40%	0.97%	-3.08%
T-STAT	-0.528	1.235	-1.931
P-Value	(0.60)	(0.22)	(0.05)**
N	195	129	66

[43] **Please use t-statistic (this is really Student t-statistic) and similarly I would use p-value here and in all tables. Also explain as to how this statistic is calculated.**

Table 7: Long-Run BHARs

This table shows the long-run 12-Month (-1, +264), 24-Month (-1, +528) and 36-Month (-1, +792) BHARs for the samples at announcement (DA) for the successful and failed samples respectively. The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

12-Month BHAR			
	All	Cash	Stock
Panel A: Overall			
Mean DA	-2.07%	6.74%	-14.54%
T-STAT	-1.655	4.202	-7.561
P-Value	(0.10)*	(0.00)***	(0.00)***
N	2435	1427	1008
Panel B: Successful			
Mean DA	-2.59%	4.09%	-10.37%
T-STAT	-1.899	2.635	-4.513
P-Value	(0.06)*	(0.01)***	(0.00)***
N	1636	880	756
Panel C: Failed All			
Mean DA	-1.00%	10.99%	-27.04%
T-STAT	-0.387	3.282	-8.204
P-Value	(0.70)	(0.00)***	(0.00)***
N	799	547	252
Panel D: Failed Exogenous			
Mean DA	-1.86%	7.96%	-21.06%
T-STAT	-0.448	1.59	-3.045
P-Value	(0.65)	(0.11)	(0.00)***
N	195	129	66

24-Month BHAR			
	All	Cash	Stock
Panel A: Overall			
Mean DA	-3.43%	9.30%	-21.46%
T-STAT	-1.239	2.247	-6.864
P-Value	(0.22)	(0.02)**	(0.00)***
N	2436	1428	1008
Panel B: Successful			
Mean DA	-7.76%	0.36%	-17.21%
T-STAT	-3.724	0.168	-4.625
P-Value	(0.00)***	(0.87)	(0.00)***
N	1636	880	756
Panel C: Failed All			
Mean DA	5.43%	23.65%	-34.22%
T-STAT	0.747	2.32	-6.135
P-Value	(0.45)	(0.02)**	(0.00)***
N	800	548	252
Panel D: Failed Exogenous			
Mean DA	3.60%	22.77%	-34.17%
T-STAT	0.363	1.6	-4.929
P-Value	(0.72)	(0.11)	(0.00)***
N	196	130	66

36-Month BHAR			
	All	Cash	Stock
Panel A: Overall			
Mean DA	-3.10%	9.64%	-21.15%
T-STAT	-1.11	2.876	-4.468
P-Value	(0.27)	(0.00)***	(0.00)***
N	2436	1428	1008
Panel B: Successful			
Mean DA	-4.42%	3.25%	-13.34%
T-STAT	-1.385	1.123	-2.219
P-Value	(0.17)	(0.26)	(0.03)**
N	1636	880	756
Panel C: Failed All			
Mean DA	-0.40%	19.92%	-44.59%
T-STAT	-0.074	2.697	-8.069
P-Value	(0.94)	(0.01)***	(0.00)***
N	800	548	252
Panel D: Failed Exogenous			
Mean DA	-1.92%	18.97%	-43.08%
T-STAT	-0.271	2.101	-4.507
P-Value	(0.79)	(0.04)**	(0.00)***
N	196	130	66

Table 8: 3-Day CARs by Firm Valuation

This table shows the short run three-day (-1, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-0.56%	1.33%	-1.97%	Mean DA	-0.20%	3.56%	-3.62%
T-STAT	-0.787	1.94	-1.765	T-STAT	-0.358	5.476	-4.35
P-Value	(0.43)	(0.05)**	(0.08)*	P-Value	(0.72)	(0.00)***	(0.00)***
N	409	175	234	N	565	269	296
Panel B: Successful				**Panel B: Successful**			
Mean DA	-0.38%	1.68%	-1.76%	Mean DA	-1.59%	3.05%	-4.28%
T-STAT	-0.458	2.161	-1.376	T-STAT	-2.207	3.068	-4.59
P-Value	(0.65)	(0.03)**	(0.17)	P-Value	(0.03)**	(0.00)***	(0.00)***
N	332	133	199	N	316	116	200
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-1.31%	0.21%	-3.13%	Mean DA	1.57%	3.96%	-2.24%
T-STAT	-1.218	0.146	-1.991	T-STAT	1.832	4.583	-1.339
P-Value	(0.22)	(0.88)	(0.05)**	P-Value	(0.07)*	(0.00)***	(0.18)
N	77	42	35	N	249	153	96
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-1.84%	3.04%	-5.10%	Mean DA	0.78%	4.32%	-4.28%
T-STAT	-0.927	2.441	-1.724	T-STAT	0.418	2.549	-1.179
P-Value	(0.35)	(0.01)***	(0.08)*	P-Value	(0.68)	(0.01)***	(0.24)
N	25	10	15	N	51	30	21

Table 9: 2-Day CARs by Firm Valuation

This table shows the short run two-day (0, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CAARs using the formula$CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-0.78%	1.41%	-2.41%	Mean DA	-0.71%	2.78%	-3.88%
T-STAT	-1.157	2.069	-2.308	T-STAT	-1.395	5.06	-4.9
P-Value	(0.25)	(0.04)**	(0.02)**	P-Value	(0.16)	(0.00)***	(0.00)***
N	409	175	234	N	565	269	296
Panel B: Successful				**Panel B: Successful**			
Mean DA	-0.61%	1.59%	-2.09%	Mean DA	-1.72%	2.59%	-4.21%
T-STAT	-0.776	2.018	-1.738	T-STAT	-2.459	2.912	-4.517
P-Value	(0.44)	(0.04)**	(0.08)*	P-Value	(0.01)***	(0.00)***	(0.00)***
N	332	133	199	N	316	116	200
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-1.47%	0.84%	-4.25%	Mean DA	0.57%	2.92%	-3.19%
T-STAT	-1.43	0.613	-2.936	T-STAT	0.769	4.213	-2.148
P-Value	(0.15)	(0.54)	(0.00)***	P-Value	(0.44)	(0.00)***	(0.03)**
N	77	42	35	N	249	153	96
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-2.64%	2.99%	-6.40%	Mean DA	-0.36%	2.89%	-5.02%
T-STAT	-1.416	2.403	-2.457	T-STAT	-0.195	2.542	-1.234
P-Value	(0.16)	(0.02)**	(0.01)***	P-Value	(0.85)	(0.01)***	(0.22)
N	25	10	15	N	51	30	21

Table 10: 5-Day CARs by Firm Valuation

This table shows the short run five-day (-2,+2) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-0.76%	1.70%	-2.59%	Mean DA	0.53%	3.96%	-2.58%
T-STAT	-1.063	2.088	-2.42	T-STAT	0.851	5.401	-2.703
P-Value	(0.29)	(0.04)**	(0.02)**	P-Value	(0.39)	(0.00)***	(0.01)***
N	409	175	234	N	565	269	296
Panel B: Successful				**Panel B: Successful**			
Mean DA	-0.56%	2.14%	-2.37%	Mean DA	-0.87%	3.51%	-3.41%
T-STAT	-0.679	2.358	-1.938	T-STAT	-0.998	2.965	-2.948
P-Value	(0.50)	(0.02)**	(0.05)**	P-Value	(0.32)	(0.00)***	(0.00)***
N	332	133	199	N	316	116	200
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-1.60%	0.28%	-3.85%	Mean DA	2.31%	4.30%	-0.87%
T-STAT	-1.263	0.156	-2.217	T-STAT	2.624	4.635	-0.512
P-Value	(0.21)	(0.88)	(0.03)**	P-Value	(0.01)***	(0.00)***	(0.61)
N	77	42	35	N	249	153	96
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-2.47%	4.10%	-6.86%	Mean DA	2.08%	4.87%	-1.90%
T-STAT	-1.211	2.934	-2.479	T-STAT	1.01	2.815	-0.447
P-Value	(0.23)	(0.00)***	(0.01)***	P-Value	(0.31)	(0.00)***	(0.66)
N	25	10	15	N	51	30	21

Table 11: 12-Month BHARs by Firm Valuation

This table shows the long run 12-Month (-1, +264) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-5.11%	3.54%	-11.58%	Mean DA	-2.00%	13.09%	-15.66%
T-STAT	-1.932	0.947	-3.187	T-STAT	-0.608	3.253	-3.163
P-Value	(0.05)**	(0.34)	(0.00)***	P-Value	(0.54)	(0.00)***	(0.00)***
N	409	175	234	N	566	269	297
Panel B: Successful				**Panel B: Successful**			
Mean DA	-5.15%	3.58%	-10.98%	Mean DA	2.21%	12.77%	-3.91%
T-STAT	-1.747	0.882	-2.709	T-STAT	0.464	2.02	-0.597
P-Value	(0.08)*	(0.38)	(0.01)***	P-Value	(0.64)	(0.04)**	(0.55)
N	332	133	199	N	316	116	200
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-4.97%	3.40%	-15.01%	Mean DA	-7.32%	13.33%	-39.89%
T-STAT	-0.821	0.383	-1.926	T-STAT	-1.692	2.553	-6.406
P-Value	(0.41)	(0.70)	(0.05)**	P-Value	(0.09)*	(0.01)***	(0.00)***
N	77	42	35	N	250	153	97
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-22.98%	-11.47%	-30.66%	Mean DA	6.55%	28.97%	-25.48%
T-STAT	-2.468	-0.691	-2.807	T-STAT	0.575	2.114	-1.442
P-Value	(0.01)***	(0.49)	(0.01)***	P-Value	(0.57)	(0.03)**	(0.15)
N	25	10	15	N	51	30	21

Table 12: 24-Month BHARs by Firm Valuation

This table shows the long run 24-Month (-1, +528) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-10.51%	9.16%	-25.22%	Mean DA	-6.00%	18.52%	-28.30%
T-STAT	-2.75	1.542	-5.282	T-STAT	-1.218	2.274	-5.137
P-Value	(0.01)***	(0.12)	(0.00)***	P-Value	(0.22)	(0.02)**	(0.00)***
N	409	175	234	N	567	270	297
Panel B: Successful				**Panel B: Successful**			
Mean DA	-11.13%	9.28%	-24.78%	Mean DA	-7.64%	10.15%	-17.96%
T-STAT	-2.611	1.371	-4.69	T-STAT	-1.4	1.285	-2.487
P-Value	(0.01)***	(0.17)	(0.00)***	P-Value	(0.16)	(0.20)	(0.01)***
N	332	133	199	N	316	116	200
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-7.82%	8.78%	-27.74%	Mean DA	-3.95%	24.83%	-49.63%
T-STAT	-0.903	0.702	-2.528	T-STAT	-0.449	1.912	-6.584
P-Value	(0.37)	(0.48)	(0.01)***	P-Value	(0.65)	(0.06)**	(0.00)***
N	77	42	35	N	251	154	97
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-30.72%	-10.59%	-44.15%	Mean DA	24.93%	76.53%	-51.25%
T-STAT	-2.274	-0.404	-3.157	T-STAT	0.717	1.36	-4.505
P-Value	(0.02)**	(0.69)	(0.00)***	P-Value	(0.47)	(0.17)	(0.00)***
N	25	10	15	N	52	31	21

Table 13: 36-Month BHARs by Firm Valuation

This table shows the long run 36-Month (-1, +792) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. .The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-3.63%	13.99%	-16.80%	Mean DA	-7.74%	14.55%	-28.01%
T-STAT	-0.417	1.727	-1.209	T-STAT	-1.538	2.106	-3.953
P-Value	(0.68)	(0.08)*	(0.23)	P-Value	(0.12)	(0.04)**	(0.00)***
N	409	175	234	N	567	270	297
Panel B: Successful				**Panel B: Successful**			
Mean DA	-2.02%	15.60%	-13.80%	Mean DA	-4.77%	12.90%	-15.01%
T-STAT	-0.196	1.755	-0.856	T-STAT	-0.668	1.221	-1.596
P-Value	(0.84)	(0.08)*	(0.39)	P-Value	(0.50)	(0.22)	(0.11)
N	332	133	199	N	316	116	200
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-10.55%	8.88%	-33.87%	Mean DA	-11.49%	15.80%	-54.81%
T-STAT	-0.837	0.473	-2.185	T-STAT	-1.643	1.724	-5.943
P-Value	(0.40)	(0.64)	(0.03)**	P-Value	(0.10)*	(0.08)*	(0.00)***
N	77	42	35	N	251	154	97
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-41.72%	-23.21%	-54.05%	Mean DA	7.29%	46.80%	-51.04%
T-STAT	-2.969	-0.817	-3.908	T-STAT	0.401	1.781	-3.106
P-Value	(0.00)***	(0.41)	(0.00)***	P-Value	(0.69)	(0.08)*	(0.00)***
N	25	10	15	N	52	31	21

Table 14: 3-Day CARs by Market Valuation

This table shows the short run five-day (-1, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CMAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-0.28%	2.69%	-3.77%	Mean DA	0.15%	1.18%	-2.39%
T-STAT	-0.526	3.966	-4.924	T-STAT	0.379	2.8	-2.946
P-Value	(0.60)	(0.00)***	(0.00)***	P-Value	(0.70)	(0.01)***	(0.00)***
N	566	306	260	N	429	305	124
Panel B: Successful				**Panel B: Successful**			
Mean DA	-0.60%	2.84%	-3.69%	Mean DA	-0.07%	0.94%	-2.50%
T-STAT	-1.007	3.436	-4.716	T-STAT	-0.179	2.281	-2.903
P-Value	(0.31)	(0.00)***	(0.00)***	P-Value	(0.86)	(0.02)**	(0.00)***
N	390	185	205	N	293	207	86
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	0.43%	2.47%	-4.06%	Mean DA	0.62%	1.69%	-2.14%
T-STAT	0.402	2.117	-1.881	T-STAT	0.701	1.716	-1.182
P-Value	(0.69)	(0.03)**	(0.06)*	P-Value	(0.48)	(0.09)*	(0.24)
N	176	121	55	N	136	98	38
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	0.84%	3.70%	-4.21%	Mean DA	1.52%	2.40%	-0.87%
T-STAT	0.506	1.863	-1.619	T-STAT	0.638	1.193	-0.118
P-Value	(0.61)	(0.06)*	(0.11)	P-Value	(0.52)	(0.23)	(0.91)
N	47	30	17	N	26	19	7

Table 15: 2-Day CARs by Market Valuation

This table shows the short run five-day (0, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CMAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-0.54%	2.33%	-3.91%	Mean DA	-0.19%	0.86%	-2.78%
T-STAT	-1.1	3.613	-5.656	T-STAT	-0.536	2.454	-3.326
P-Value	(0.27)	(0.00)***	(0.00)***	P-Value	(0.59)	(0.01)***	(0.00)***
N	566	306	260	N	429	305	124
Panel B: Successful				**Panel B: Successful**			
Mean DA	-0.75%	2.53%	-3.71%	Mean DA	-0.28%	0.75%	-2.78%
T-STAT	-1.341	3.164	-5.156	T-STAT	-0.729	1.896	-3.259
P-Value	(0.18)	(0.00)***	(0.00)***	P-Value	(0.47)	(0.06)*	(0.00)***
N	390	185	205	N	293	207	86
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-0.07%	2.02%	-4.67%	Mean DA	0.01%	1.09%	-2.79%
T-STAT	-0.074	1.867	-2.479	T-STAT	0.008	1.553	-1.43
P-Value	(0.94)	(0.06)*	(0.01)***	P-Value	(0.99)	(0.12)	(0.15)
N	176	121	55	N	136	98	38
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-0.93%	1.87%	-5.89%	Mean DA	0.19%	0.89%	-1.71%
T-STAT	-0.625	1.354	-1.94	T-STAT	0.079	0.619	-0.204
P-Value	(0.53)	(0.18)	(0.05)**	P-Value	(0.94)	(0.54)	(0.84)
N	47	30	17	N	26	19	7

Table 16: 5-Day CARs by Market Valuation

This table shows the short run five-day (-2, +2) cumulative abnormal returns (CARs) for the samples at announcement (DA). The study measures the CARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-0.01%	2.70%	-3.21%	Mean DA	0.25%	1.37%	-2.51%
T-STAT	-0.021	3.429	-3.899	T-STAT	0.625	3.292	-2.923
P-Value	(0.98)	(0.00)***	(0.00)***	P-Value	(0.53)	(0.00)***	(0.00)***
N	566	306	260	N	429	305	124
Panel B: Successful				**Panel B: Successful**			
Mean DA	-0.38%	3.01%	-3.44%	Mean DA	0.09%	1.05%	-2.22%
T-STAT	-0.574	3.107	-3.997	T-STAT	0.211	2.423	-2.114
P-Value	(0.57)	(0.00)***	(0.00)***	P-Value	(0.83)	(0.02)**	(0.03)**
N	390	185	205	N	293	207	86
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	0.81%	2.24%	-2.35%	Mean DA	0.58%	2.02%	-3.16%
T-STAT	0.695	1.67	-1.059	T-STAT	0.721	2.231	-2.114
P-Value	(0.49)	(0.09)*	(0.29)	P-Value	(0.47)	(0.03)**	(0.03)**
N	176	121	55	N	136	98	38
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	0.76%	2.54%	-2.38%	Mean DA	0.28%	1.37%	-2.66%
T-STAT	0.488	1.639	-0.731	T-STAT	0.152	0.691	-0.594
P-Value	(0.63)	(0.10)*	(0.46)	P-Value	(0.88)	(0.49)	(0.55)
N	47	30	17	N	26	19	7

Table 17: 12-Month BHARs by Market Valuation

This table shows the long run 12-Month (-1, +264) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	6.12%	13.66%	-2.75%	Mean DA	-4.71%	0.54%	-17.64%
T-STAT	1.924	3.755	-0.509	T-STAT	-2.602	0.265	-5.007
P-Value	(0.05)**	(0.00)***	(0.61)	P-Value	(0.01)***	(0.79)	(0.00)***
N	566	306	260	N	429	305	124
Panel B: Successful				**Panel B: Successful**			
Mean DA	5.47%	8.57%	2.66%	Mean DA	-2.78%	2.21%	-14.80%
T-STAT	1.404	2.059	0.417	T-STAT	-1.309	0.922	-3.62
P-Value	(0.16)	(0.04)**	(0.68)	P-Value	(0.19)	(0.36)	(0.00)***
N	390	185	205	N	293	207	86
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	7.58%	21.44%	-22.92%	Mean DA	-8.88%	-3.00%	-24.06%
T-STAT	1.374	3.247	-2.606	T-STAT	-2.605	-0.791	-3.544
P-Value	(0.17)	(0.00)***	(0.01)***	P-Value	(0.00)***	(0.43)	(0.00)***
N	176	121	55	N	136	98	38
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	4.06%	12.04%	-10.03%	Mean DA	-6.88%	0.53%	-27.00%
T-STAT	0.403	1.098	-0.501	T-STAT	-0.86	0.058	-1.8
P-Value	(0.69)	(0.27)	(0.62)	P-Value	(0.39)	(0.95)	(0.07)*
N	47	30	17	N	26	19	7

Table 18: 24-Month BHARs by Market Valuation

This table shows the long run 24-Month (-1, +528) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	6.83%	22.90%	-12.08%	Mean DA	-5.59%	-0.11%	-19.13%
T-STAT	1.826	4.716	-2.164	T-STAT	-1.906	-0.038	-2.672
P-Value	(0.07)*	(0.00)***	(0.03)**	P-Value	(0.06)*	(0.97)	(0.01)***
N	566	306	260	N	430	306	124
Panel B: Successful				**Panel B: Successful**			
Mean DA	3.60%	14.51%	-6.24%	Mean DA	-4.53%	-0.47%	-14.31%
T-STAT	0.786	2.379	-0.931	T-STAT	-1.323	-0.155	-1.582
P-Value	(0.43)	(0.02)**	(0.35)	P-Value	(0.19)	(0.88)	(0.11)
N	390	185	205	N	293	207	86
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	7.58%	35.72%	-33.86%	Mean DA	-7.86%	0.65%	-30.04%
T-STAT	1.374	4.536	-4.278	T-STAT	-1.406	0.104	-2.68
P-Value	(0.17)	(0.00)***	(0.00)***	P-Value	(0.16)	(0.92)	(0.01)***
N	176	121	55	N	137	99	38
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	3.90%	23.44%	-30.57%	Mean DA	-3.17%	12.16%	-46.94%
T-STAT	0.398	1.874	-2.524	T-STAT	-0.297	1.046	-2.988
P-Value	(0.69)	(0.06)*	(0.01)***	P-Value	(0.77)	(0.30)	(0.00)***
N	47	30	17	N	27	20	7

Table 19: 36-Month BHARs by Market Valuation

This table shows the long run 36-Month (-1, +792) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	6.60%	22.33%	-11.91%	Mean DA	-4.80%	2.84%	-23.64%
T-STAT	1.523	4.086	-1.769	T-STAT	-1.1	0.738	-2.03
P-Value	(0.13)	(0.00)***	(0.08)*	P-Value	(0.27)	(0.46)	(0.04)**
N	566	306	260	N	430	306	124
Panel B: Successful				**Panel B: Successful**			
Mean DA	2.90%	10.84%	-4.26%	Mean DA	-5.19%	-0.56%	-16.35%
T-STAT	0.553	1.701	-0.522	T-STAT	-0.983	-0.145	-1.058
P-Value	(0.58)	(0.09)*	(0.60)	P-Value	(0.33)	(0.88)	(0.29)
N	390	185	205	N	293	207	86
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	14.80%	39.91%	-40.43%	Mean DA	-3.96%	9.93%	-40.15%
T-STAT	1.933	4.148	-4.718	T-STAT	-0.51	1.132	-2.707
P-Value	(0.05)**	(0.00)***	(0.00)***	P-Value	(0.61)	(0.26)	(0.01)***
N	176	121	55	N	137	99	38
Panel D: Failed Exogenous				**Panel D: Failed Exogenous**			
Mean DA	-0.91%	25.98%	-48.37%	Mean DA	14.11%	40.36%	-60.91%
T-STAT	-0.075	1.573	-5.11	T-STAT	0.827	2.253	-2.319
P-Value	(0.94)	(0.12)	(0.00)***	P-Value	(0.41)	(0.02)**	(0.02)**
N	47	30	17	N	27	20	7

Figure 3: Cash-Financed Mergers

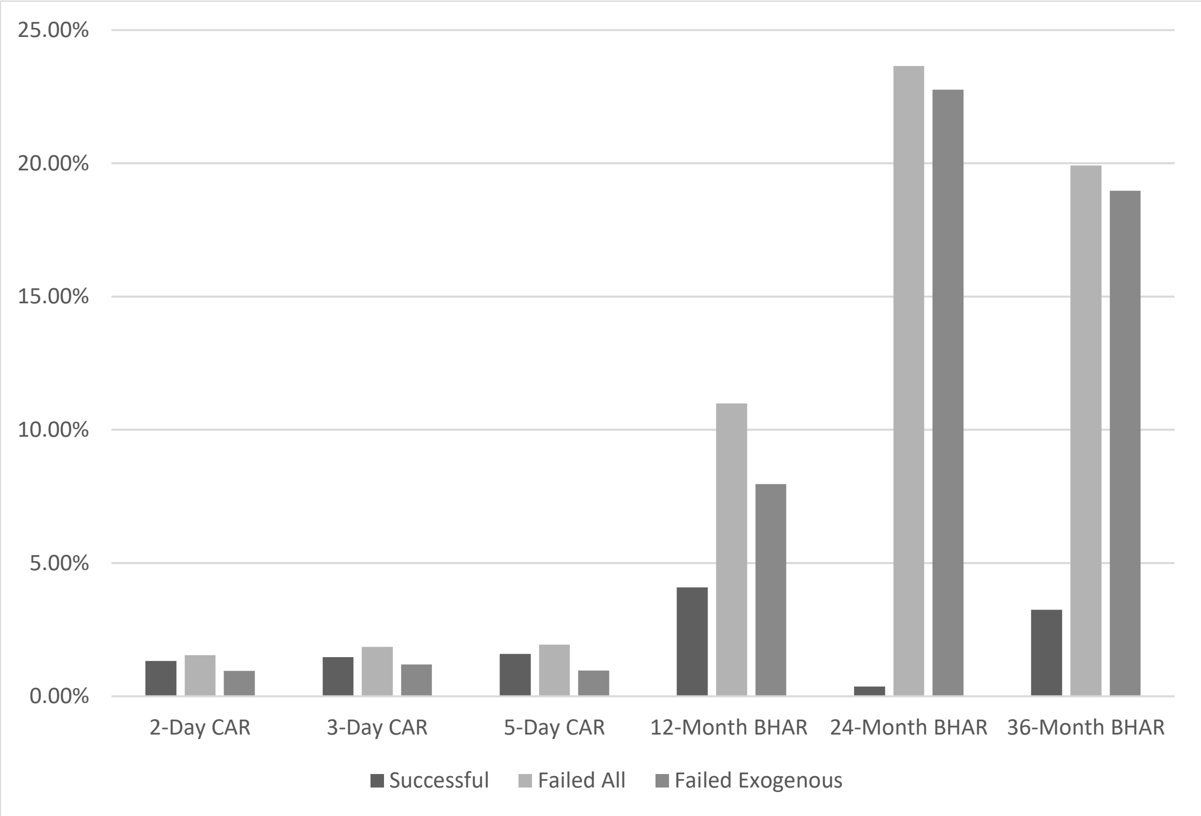

Figure 4: Stock-Financed Mergers

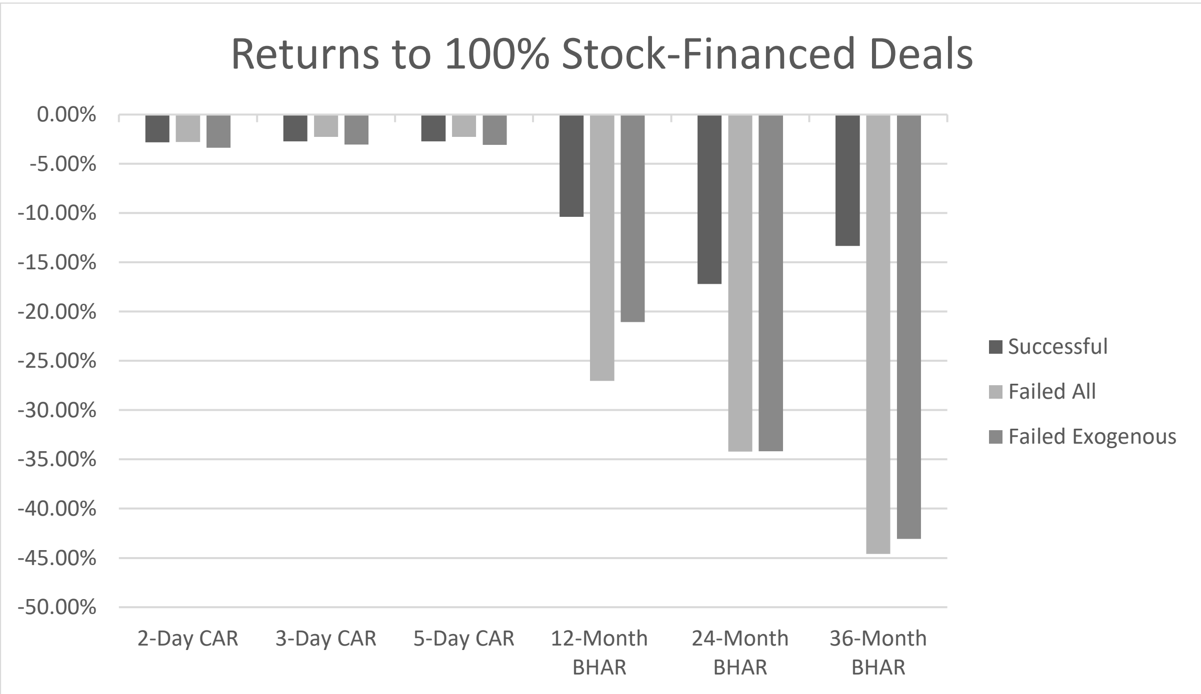

Table 20: Long and Short Run Mean Differentials by Deal Outcome

The table below shows the mean differentials between deals that were successful (Panel B) and deals which exogenously failed (Panel D) for the whole sample. This is reported for all event windows discussed in Table 4 and 5. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

		3-Day CAR				**2-Day CAR**				**5-Day CAR**		
		All	Cash	Stock		All	Cash	Stock		All	Cash	Stock
CARS	Mean Diff	0.23%	-0.27%	-0.32%	Mean Diff	0.08%	-0.38%	-0.54%	Mean Diff	0.00%	-0.62%	-0.35%
	P-value	(0.96)	(0.95)	(0.96)	P-value	(0.99)	(0.93)	(0.93)	P-value	(1.00)	(0.88)	(0.95)
		12 month				**24 Month**				**36 Month**		
		All	Cash	Stock		All	Cash	Stock		All	Cash	Stock
BHARS	Mean Diff	0.73%	3.87%	-10.69%	Mean Diff	11.36%	22.41%	-16.96%	Mean Diff	2.50%	15.72%	-29.74%
	P-value	(0.89)	(0.49)	(0.03)**	P-value	(0.03)**	(0.00)***	(0.00)***	P-value	(0.63)	(0.00)***	(0.00)***

Table 21: Mean Valuation Differentials by Deal Outcome I

The table below shows the mean differentials between deals that were successful (Panel B) and deals which exogenously failed (Panel D) stratified by firm and market misvaluation. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

			Overvalued				Undervalued		
			All	Cash	Stock		All	Cash	Stock
Firm Valuation	12 Month	Mean Diff	-17.83%	-15.05%	-19.68%	Mean Diff	4.34%	16.20%	-21.57%
		P-value	(0.00)***	(0.00)***	(0.00)***	P-value	(0.55)	(0.00)***	(0.01)***
	24 Month	Mean Diff	-19.59%	-19.87%	-19.37%	Mean Diff	32.57%	66.38%	-33.29%
		P-value	(0.00)***	(0.00)***	(0.00)***	P-value	(0.00)***	(0.00)***	(0.00)***
	36 Month	Mean Diff	-39.70%	-38.81%	-40.25%	Mean Diff	12.06%	33.90%	-36.03%
		P-value	(0.00)***	(0.00)***	(0.00)***	P-value	(0.10)*	(0.00) ***	(0.00) ***
			High Valuation				Low Valuation		
			All	Cash	Stock		All	Cash	Stock
Market Valuation	12 Month	Mean Diff	-1.41%	3.47%	-12.69%	Mean Diff	-4.10%	-1.68%	-12.20%
		P-value	(0.82)	(0.50)	(0.09)*	P-value	(0.32)	(0.67)	(0.01)***
	24 Month	Mean Diff	0.30%	8.93%	-24.33%	Mean Diff	1.36%	12.63%	-32.63%
		P-value	(0.96)	(0.09)*	(0.00)***	P-value	(0.74)	(0.00)***	(0.00)***
	36 Month	Mean Diff	-3.81%	15.14%	-44.11%	Mean Diff	19.30%	40.92%	-44.56%
		P-value	(0.55)	(0.00)***	(0.00)***	P-value	(0.00)***	(0.00)***	(0.00)***

Table 22: Mean Valuation Differentials by Deal Outcome II

Sub-Table A below shows the difference in abnormal returns for overvalued and undervalued stratified by deal outcome. Sub-Table B below shows the difference in abnormal returns for high valuation and low valuation deals stratified by deal outcome. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Sub-Table A: Differential: Overvalued – Undervalued

			Panel B: Successful				**Panel D: Failed Exogenous**		
			All	Cash	Stock		All	Cash	Stock
Firm Valuation	12 Month	Mean Diff	-7.36%	-9.19%	-7.07%	Mean Diff	-29.53%	-40.44%	-5.18%
		P-value	(0.28)	(0.07)*	(0.36)	P-value	(0.00)***	(0.00)***	(0.44)
	24 Month	Mean Diff	-3.49%	-0.87%	-6.82%	Mean Diff	-55.65%	-87.12%	7.10%
		P-value	(0.61)	(0.86)	(0.37)	P-value	(0.00)***	(0.00)***	(0.29)
	36 Month	Mean Diff	2.75%	2.70%	-1.21%	Mean Diff	-49.01%	-70.01%	-3.01%
		P-value	(0.69)	(0.59)	(0.87)	P-value	(0.00)***	(0.00)***	(0.65)

Sub-Table B: Differential: High Valuation - Low Valuation

			Panel B: Successful				**Panel D: Failed Exogenous**		
			All	Cash	Stock		All	Cash	Stock
Market Valuation	12 Month	Mean Diff	8.25%	6.36%	17.46%	Mean Diff	10.94%	11.51%	16.97%
		P-value	(0.13)	(0.14)	(0.01)***	P-value	(0.04)***	(0.02)***	(0.00)***
	24 Month	Mean Diff	8.13%	14.98%	8.07%	Mean Diff	7.07%	11.28%	16.37%
		P-value	(0.14)	(0.00)***	(0.22)	P-value	(0.18)	(0.02)**	(0.00)***
	36 Month	Mean Diff	8.09%	11.40%	12.09%	Mean Diff	-15.02%	-14.38%	12.54%
		P-value	(0.14)	(0.01)***	(0.06)*	P-value	(0.00)***	(0.00)***	(0.03)**

Figure 5: Merger Bids by Method of Payment over Time (Holdout Period : 2015-2019)

The upper bar plots the number of stock-financed merger bids over time. The lower bar plots the number of cash-financed merger bids over time

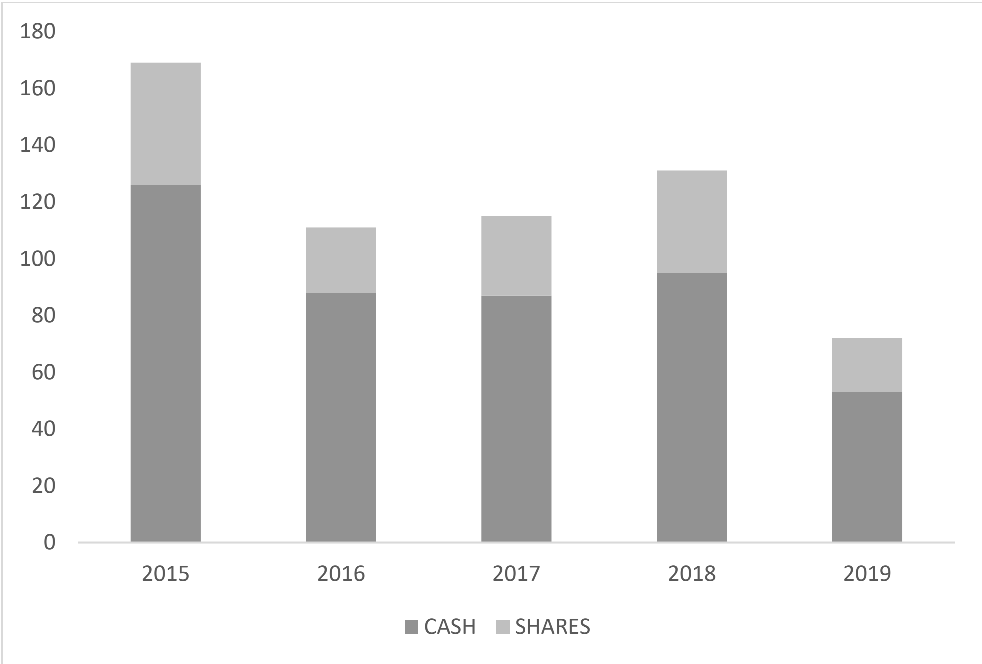

Table 23: Robustness Checks for Short-Run CARs

This table shows the short-run two day (0, +1), three-day (-1,+1) and five-day (-2,+2) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA) for the successful and failed samples respectively (Time Period = 2015-2019). The study measures the CMAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

3-DAY CAR				2-DAY CAR				5-DAY CAR			
	All	Cash	Stock		All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**				**Panel A: Overall**			
Mean DA	0.94%	1.17%	-0.19%	Mean DA	0.89%	1.17%	-0.48%	Mean DA	1.09%	1.25%	0.30%
T-STAT	2.18	2.17	0.50	T-STAT	2.14	2.16	0.42	T-STAT	2.41	2.35	0.68
P-Value	(0.03)**	(0.03)**	0.62	P-Value	(0.03)**	(0.03)**	0.67	P-Value	(0.02)**	(0.02)**	0.50
N	467	374	93	N	467	374	93	N	467	374	93
Panel B: Successful				**Panel B: Successful**				**Panel B: Successful**			
Mean DA	0.96%	0.19%	0.28%	Mean DA	0.86%	2.58%	1.21%	Mean DA	2.58%	2.76%	1.96%
T-STAT	1.94	1.74	0.657	T-STAT	1.84	1.97	0.567	T-STAT	2.34	2.16	0.901
P-Value	(0.05)**	(0.08)*	0.51	P-Value	(0.06)*	(0.05)**	0.57	P-Value	(0.02)**	(0.03)**	0.37
N	370	309	93	N	370	309	93	N	402	309	93
Panel C: Failed				**Panel C: Failed**				**Panel C: Failed**			
Mean DA	-0.21%	-0.31%	0.41%	Mean DA	1.52%	1.80%	-0.28%	Mean DA	1.82%	2.31%	-1.24%
T-STAT	-0.94	-1.29	0.65	T-STAT	2.01	2.34	-0.11	T-STAT	1.91	2.22	-0.57
P-Value	0.35	0.19	0.51	P-Value	(0.05)**	(0.02)**	0.91	P-Value	(0.05)**	(0.03)**	0.57
N	101	87	14	N	101	87	14	N	101	87	14

Table 24: Robustness Checks for Long-Run BHARs

This table shows the long-run 12-Month (-1, +264), 24-Month (-1, +528) and 36-Month (-1, +792) BHARs for the samples at announcement (DA) for the successful and failed samples respectively (Time Period = 2015-2019). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

12-Month BHAR				**24-Month BHAR**				**36-Month BHAR**			
	All	Cash	Stock		All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**				**Panel A: Overall**			
Mean DA	-8.85%	-8.80%	-16.80%	Mean DA	-18.88%	-25.17%	-28.99%	Mean DA	-28.91%	-41.40%	-45.49%
T-STAT	-5.22	-4.47	-3.97	T-STAT	-6.25	-6.43	-4.48	T-STAT	-4.70	-4.84	-4.88
P-Value	(0.00)***	(0.00)***	(0.00)***	P-Value	(0.00)***	(0.00)***	(0.00)***	P-Value	(0.00)***	(0.00)***	(0.00)***
N	467	374	93	N	467	374	93	N	467	374	93
Panel B: Successful				**Panel B: Successful**				**Panel B: Successful**			
Mean DA	0.96%	-27.80%	-30.35%	Mean DA	-339.96%	-417.94%	-80.85%	Mean DA	-886.55%	<-999.9%	-116.52%
T-STAT	1.94	-2.53	-3.19	T-STAT	-1.21	-1.14	-2.09	T-STAT	-1.13	-1.1	-2.85
P-Value	(0.05)**	(0.01)***	(0.00)***	P-Value	0.22	0.25	(0.04)**	P-Value	0.26	0.27	(0.00)***
N	370	309	93	N	402	309	93	N	402	309	93
Panel C: Failed				**Panel C: Failed**				**Panel C: Failed**			
Mean DA	-28.83%	-28.94%	-28.14%	Mean DA	-585.14%	-651.82%	-170.77%	Mean DA	<-999.9%	<-999.9%	-343.95%
T-STAT	-1.22	-1.07	-0.89	T-STAT	-1.08	-1.03	-1.21	T-STAT	-1.01	-1	-1.28
P-Value	0.22	0.28	0.38	P-Value	0.28	0.3	0.23	P-Value	0.31	0.32	0.2
N	101	87	14	N	101	87	14	N	101	87	14

Table 25: Robustness Check for 3-Day CARs by Firm Valuation

This table shows the short run three-day (-1, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA) (Time Period = 2015-2019). The study measures the CAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	1.83%	1.84%	1.79%	Mean DA	-0.46%	0.02%	-3.50%
T-STAT	1.63	1.54	0.57	T-STAT	-0.59	0.37	-2.23
P-Value	(0.05)**	(0.06)*	0.28	P-Value	0.28	0.36	(0.03)**
N	90	78	12	N	90	78	12
Panel B: Successful				**Panel B: Successful**			
Mean DA	2.90%	3.01%	1.80%	Mean DA	0.47%	1.18%	-1.50%
T-STAT	1.77	1.73	0.36	T-STAT	0.36	0.85	-1.71
P-Value	(0.08)*	0.08	0.72	P-Value	0.72	0.4	(0.09)*
N	49	44	5	N	70	49	21
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	1.80%	1.86%	-2.41%	Mean DA	0.53%	0.69%	2.34%
T-STAT	1.69	1.79	-0.5	T-STAT	0.89	1.61	1.04
P-Value	(0.09)*	(0.08)*	0.62	P-Value	0.37	0.11	0.3
N	28	27	1	N	62	48	8

Table 26: Robustness Check for 2-Day CARs by Firm Valuation

This table shows the short run two-day (0, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA) (Time Period = 2015-2019). The study measures the CAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	1.45%	1.65%	-1.04%	Mean DA	-0.37%	0.09%	-3.26%
T-STAT	1.3	1.39	-0.42	T-STAT	-0.5	0.43	-2.07
P-Value	(0.09)*	(0.08)*	0.33	P-Value	0.31	0.33	(0.04)**
N	90	78	12	N	90	78	12
Panel B: Successful				**Panel B: Successful**			
Mean DA	1.06%	1.32%	-1.22%	Mean DA	-0.53%	0.08%	-3.33%
T-STAT	0.86	0.92	-0.31	T-STAT	-0.72	0.16	-2.14
P-Value	0.39	0.36	0.76	P-Value	0.47	0.87	(0.03)**
N	50	45	5	N	64	52	12
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	1.57%	1.73%	-4.23%	Mean DA	0.20%	0.20%	NA
T-STAT	0.38	0.51	-0.92	T-STAT	0.74	0.74	NA
P-Value	0.7	0.61	0.36	P-Value	0.46	0.46	NA
N	16	15	1	N	26	26	NA

Table 27: Robustness Check for 5-Day CARs by Firm Valuation

This table shows the short run two-day (-2, +2) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA) (Time Period = 2015-2019). The study measures the CAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	1.90%	1.84%	3.50%	Mean DA	-0.68%	0.07%	-3.46%
T-STAT	1.64	1.45	0.95	T-STAT	-0.83	0.07	-2.01
P-Value	0.11	(0.07)*	0.17	P-Value	0.2	0.47	(0.04)**
N	90	78	12	N	90	78	12
Panel B: Successful				**Panel B: Successful**			
Mean DA	1.53%	1.36%	2.92%	Mean DA	-0.98%	-0.38%	-3.76%
T-STAT	1.06	0.93	0.61	T-STAT	-1.09	-0.23	-2.05
P-Value	0.29	0.35	0.54	P-Value	0.28	0.82	(0.04)**
N	50	45	5	N	64	52	12
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	1.90%	1.88%	2.46%	Mean DA	0.06%	0.06%	NA
T-STAT	0.7	0.63	0.12	T-STAT	0.55	0.55	NA
P-Value	0.48	0.53	0.9	P-Value	0.58	0.58	NA
N	16	15	1	N	26	26	NA

Table 28: Robustness Check for 12-Month BHARs by Firm Valuation

This table shows the long run 12-Month (-1, +264) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Overvalued				Undervalued			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-9.81%	-8.76%	-17.4%	Mean DA	-8.84%	-8.34%	-12.0%
T-STAT	-2.44	-1.78	-1.13	T-STAT	-2.21	-1.92	-1.13
P-Value	(0.01)***	(0.04)**	0.13	P-Value	(0.01)***	(0.03)**	0.25
N	90	78	12	N	90	78	12
Panel B: Successful				**Panel B: Successful**			
Mean DA	-20.4%	-20.0%	-12.9%	Mean DA	-15.7%	-14.4%	-21.7%
T-STAT	-3.04	-2.93	-1.44	T-STAT	-4.69	-3.99	-2.48
P-Value	(0.00)***	(0.00)***	0.15	P-Value	(0.00)***	(0.00)***	(0.01)***
N	50	45	5	N	64	52	12
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	12.38%	13.1%	-14.0%	Mean DA	-7.0%	-8.9%	NA
T-STAT	1.55	1.72	-0.39	T-STAT	-1.21	-1.31	NA
P-Value	0.12	(0.09)*	0.7	P-Value	0.22	0.19	NA
N	16	15	1	N	26	26	NA

Table 29: Robustness Check for 24-Month BHARs by Firm Valuation

This table shows the long run 24-Month (-1, +528) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Overvalued				Undervalued			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-16.1%	-19.7%	-27.5%	Mean DA	-15.9%	-13.5%	-30.4%
T-STAT	-3.12	-2.7	-1.33	T-STAT	-2.76	-2.13	-2.23
P-Value	(0.00)***	(0.00)***	(0.09)*	P-Value	(0.00)***	(0.02)**	(0.03)**
N	90	78	12	N	90	78	12
Panel B: Successful				**Panel B: Successful**			
Mean DA	-51.4%	-47.4%	-11.4%	Mean DA	-32.9%	-32.9%	-32.5%
T-STAT	-2.9	-2.68	-2.22	T-STAT	-5.1	-4.27	-3.18
P-Value	(0.00)***	(0.01)***	(0.03)**	P-Value	(0.00)***	(0.00)***	(0.00)***
N	50	45	5	N	64	52	12
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	8.7%	9.4%	-18.6%	Mean DA	-15.6%	-25.5%	NA
T-STAT	0.21	0.31	-0.49	T-STAT	-1.47	-1.83	NA
P-Value	0.83	0.76	0.62	P-Value	0.14	0.07	NA
N	16	15	1	N	26	26	NA

Overvalued				Undervalued			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-16.1%	-19.7%	-27.5%	Mean DA	-15.9%	-13.5%	-30.4%

T-STAT	-3.12	-2.7	-1.33	T-STAT	-2.76	-2.13	-2.23
P-Value	(0.00)***	(0.00)***	(0.09)*	P-Value	(0.00)***	(0.02)**	(0.03)**
N	90	78	12	N	90	78	12
Panel B: Successful				**Panel B: Successful**			
Mean DA	-51.4%	-47.4%	-11.4%	Mean DA	-32.9%	-32.9%	-32.5%
T-STAT	-2.9	-2.68	-2.22	T-STAT	-5.1	-4.27	-3.18
P-Value	(0.00)***	(0.01)***	(0.03)**	P-Value	(0.00)***	(0.00)***	(0.00)***
N	50	45	5	N	64	52	12
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	8.7%	9.4%	-18.6%	Mean DA	-15.6%	-25.5%	NA
T-STAT	0.21	0.31	-0.49	T-STAT	-1.47	-1.83	NA
P-Value	0.83	0.76	0.62	P-Value	0.14	0.07	NA
N	16	15	1	N	26	26	NA

Table 30: Robustness Check for 36-Month BHARs by Firm Valuation

This table shows the long run 36-Month (-1, +792) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. .The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For all samples, the study examines those deals for which the acquirer was either over or undervalued during the acquisition process. The included deals in the overvalued (undervalued) sample are those in which the acquirer is classified as overvalued (undervalued). The acquirer's PE on the month of announcement is compared with the firm's historical firm P/E averages of 12 months, 24 months and 36 months around the deal announcement. If the announcement month P/E is higher (lower) than the historical averages, the firm is classified as highly-valued (lowly-valued). We then take the top (bottom) 30% of these firms as Overvalued (Undervalued). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively

Overvalued				**Undervalued**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-19.4%	-26.9%	-51.2%	Mean DA	-16.1%	-14.3%	-26.2%
T-STAT	-3.31	-3.02	-1.68	T-STAT	-2.28	-1.82	-1.66
P-Value	(0.00)***	(0.00)***	(0.05)**	P-Value	(0.01)***	(0.03)**	(0.10)*
N	90	78	12	N	90	78	12

Panel B: Successful				Panel B: Successful			
Mean DA	-98.8%	-81.9%	-35.7%	Mean DA	-43.8%	-46.5%	-32.6%
T-STAT	-2.07	-1.84	-2.51	T-STAT	-3.77	-3.3	-3
P-Value	(0.04)**	(0.07)*	(0.01)***	P-Value	(0.00)***	(0.00)***	(0.00)***
N	50	45	5	N	64	52	12
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-2.6%	-0.9%	74.4%	Mean DA	19.2%	-31.5%	NA
T-STAT	0.21	-0.68	-0.94	T-STAT	-1.92	-2.17	NA
P-Value	0.83	0.5	0.35	P-Value	(0.06)*	0.03	NA
N	16	15	1	N	26	26	NA

Table 31: Robustness Check for 3-Day CARs by Market Valuation

This table shows the short run five-day (-1, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CMAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				Low Valuation			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	2.83%	2.95%	1.4%	Mean DA	1.11%	1.69%	-1.1%
T-STAT	2.14	2.14	0.21	T-STAT	0.95	1.28	-0.74
P-Value	(0.03)**	(0.03)**	0.83	P-Value	0.34	0.2	0.46
N	64	58	6	N	91	68	23
Panel B: Successful				**Panel B: Successful**			
Mean DA	2.9%	3.0%	1.8%	Mean DA	0.5%	1.2%	-1.5%
T-STAT	1.77	1.73	0.36	T-STAT	0.36	0.85	-1.71
P-Value	(0.08)*	0.08	0.72	P-Value	0.72	0.4	(0.09)*

N	49	44	5	N	70	49	21
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	1.80%	1.9%	-2.4%	Mean DA	0.5%	0.7%	2.34%
T-STAT	1.69	1.79	-0.5	T-STAT	0.89	1.61	1.04
P-Value	(0.09)*	(0.08)*	0.62	P-Value	0.37	0.11	0.30
N	28	27	1	N	62	48	8

Table 32: Robustness Check for 2-Day CARs by Market Valuation

This table shows the short run five-day (0, +1) cumulative market adjusted abnormal returns (CMAARs) for the samples at announcement (DA). The study measures the CMAARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	2.54%	2.88%	-1.4%	Mean DA	1.10%	1.66%	-1.0%
T-STAT	1.97	2.09	-0.99	T-STAT	0.88	1.23	-0.83
P-Value	(0.05)**	(0.03)**	0.32	P-Value	0.38	0.21	0.41
N	64	58	6	N	91	68	23
Panel B: Successful				**Panel B: Successful**			
Mean DA	2.4%	2.8%	-1.1%	Mean DA	0.5%	1.2%	-1.4%
T-STAT	1.52	1.59	-0.59	T-STAT	0.29	0.77	-1.74
P-Value	0.12	0.11	0.55	P-Value	0.77	0.44	(0.08)*
N	49	44	5	N	70	49	21

Panel C: Failed All				Panel C: Failed All			
Mean DA	2.10%	2.2%	-4.2%	Mean DA	0.6%	1.0%	1.60%
T-STAT	2.17	2.38	-0.92	T-STAT	0.98	2.17	0.84
P-Value	(0.03)**	(0.02)**	0.36	P-Value	0.32	(0.03)**	0.40
N	28	27	1	N	62	48	8

Table 33: Robustness Check for 5-Day CARs by Market Valuation

This table shows the short run five-day (-2, +2) cumulative abnormal returns (CARs) for the samples at announcement (DA). The study measures the CARs using the formula $CMAAR_{T_1T_2} = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} AR_{jt}$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				Low Valuation			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	2.80%	2.85%	2.3%	Mean DA	1.53%	2.53%	-2.3%
T-STAT	2.17	2.09	0.65	T-STAT	1.02	1.61	-1.74
P-Value	(0.03)**	(0.04)**	0.52	P-Value	0.31	0.11	(0.08)*
N	64	58	6	N	91	68	23
Panel B: Successful				**Panel B: Successful**			
Mean DA	2.6%	2.6%	2.3%	Mean DA	0.5%	1.5%	-2.3%
T-STAT	1.6	1.54	0.48	T-STAT	0.32	0.9	-1.74
P-Value	0.11	0.12	0.63	P-Value	0.75	0.37	(0.08)*
N	49	44	5	N	70	49	21
Panel C: Failed All				**Panel C: Failed All**			

Mean DA	2.57%	2.6%	2.5%	Mean DA	108.0%	1.4%	2.25%
T-STAT	1.97	1.91	0.12	T-STAT	1.29	1.9	1.18
P-Value	(0.05)**	(0.06)*	0.9	P-Value	0.2	(0.06)*	0.24
N	28	27	1	N	62	48	8

Table 34: Robustness Check for 12-Month BHARs by Market Valuation

This table shows the long run 12-Month (-1, +264) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	2.80%	2.85%	2.3%	Mean DA	1.53%	2.53%	-2.3%
T-STAT	2.17	2.09	0.65	T-STAT	1.02	1.61	-1.74
P-Value	(0.03)**	(0.04)**	0.52	P-Value	0.31	0.11	(0.08)*
N	64	58	6	N	91	68	23
Panel B: Successful				**Panel B: Successful**			
Mean DA	2.6%	2.6%	2.3%	Mean DA	0.5%	1.5%	-2.3%
T-STAT	1.6	1.54	0.48	T-STAT	0.32	0.9	-1.74
P-Value	0.11	0.12	0.63	P-Value	0.75	0.37	(0.08)*
N	49	44	5	N	70	49	21
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	2.57%	2.6%	2.5%	Mean DA	108.0%	1.4%	2.25%
T-STAT	1.97	1.91	0.12	T-STAT	1.29	1.9	1.18
P-Value	(0.05)**	(0.06)*	0.9	P-Value	0.2	(0.06)*	0.24
N	28	27	1	N	62	48	8

	High Valuation				Low Valuation		
	All	Cash	Stock		All	Cash	Stock
	Panel A: Overall				**Panel A: Overall**		
Mean DA	-5.5%	-7.8%	-7.1%	Mean DA	-9.7%	-3.4%	-21.2%
T-STAT	-1.75	-1.99	-0.88	T-STAT	-1.7	-0.46	-2.63
P-Value	(0.08)*	(0.05)**	0.38	P-Value	(0.09)*	0.65	(0.00)***
N	64	58	6	N	91	68	23
	Panel B: Successful				**Panel B: Successful**		
Mean DA	-15.1%	-16.0%	-6.2%	Mean DA	-9.6%	-6.0%	-21.0%
T-STAT	-2.86	-2.82	-0.56	T-STAT	-1.17	-0.49	-2.37
P-Value	(0.00)***	(0.00)***	0.57	P-Value	0.24	0.62	(0.02)**
N	49	44	5	N	70	49	5
	Panel C: Failed All				**Panel C: Failed All**		
Mean DA	5.49%	5.8%	-14.0%	Mean DA	-1.9%	1.0%	-17.18%
T-STAT	1.04	1.14	-0.39	T-STAT	-0.45	0.49	-1.38
P-Value	0.3	0.26	0.7	P-Value	0.66	0.62	0.17
N	28	27	1	N	62	48	8

	High Valuation				Low Valuation		
	All	Cash	Stock		All	Cash	Stock
	Panel A: Overall				**Panel A: Overall**		
Mean DA	-5.5%	-7.8%	-7.1%	Mean DA	-9.7%	-3.4%	-21.2%
T-STAT	-1.75	-1.99	-0.88	T-STAT	-1.7	-0.46	-2.63
P-Value	(0.08)*	(0.05)**	0.38	P-Value	(0.09)*	0.65	(0.00)***
N	64	58	6	N	91	68	23
	Panel B: Successful				**Panel B: Successful**		
Mean DA	-15.1%	-16.0%	-6.2%	Mean DA	-9.6%	-6.0%	-21.0%
T-STAT	-2.86	-2.82	-0.56	T-STAT	-1.17	-0.49	-2.37
P-Value	(0.00)***	(0.00)***	0.57	P-Value	0.24	0.62	(0.02)**
N	49	44	5	N	70	49	5
	Panel C: Failed All				**Panel C: Failed All**		
Mean DA	5.49%	5.8%	-14.0%	Mean DA	-1.9%	1.0%	-17.18%
T-STAT	1.04	1.14	-0.39	T-STAT	-0.45	0.49	-1.38
P-Value	0.3	0.26	0.7	P-Value	0.66	0.62	0.17
N	28	27	1	N	62	48	8

Table 35: Robustness Check for 24-Month BHARs by Market Valuation

This table shows the long run 24-Month (-1, +264) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-17.5%	-27.7%	-7.6%	Mean DA	-27.1%	-23.6%	-23.4%
T-STAT	-2.79	-3.33	0.03	T-STAT	-3.09	-2.16	-2.53
P-Value	(0.01)***	(0.00)***	0.97	P-Value	(0.00)***	(0.03)**	(0.01)***
N	64	58	6	N	91	68	23
Panel B: Successful				**Panel B: Successful**			
Mean DA	-38.5%	-41.9%	-0.3%	Mean DA	-23.8%	-33.1%	-22.4%
T-STAT	-3.58	-3.72	0.41	T-STAT	-2.47	-2.47	-2.12
P-Value	(0.00)***	(0.00)***	0.68	P-Value	(0.01)***	(0.01)***	(0.03)**
N	49	44	5	N	49	49	5
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-1.88%	-1.7%	-18.6%	Mean DA	-6.5%	-1.0%	0.59%
T-STAT	-0.28	-0.21	-0.49	T-STAT	-0.8	0.3	-0.40
P-Value	0.78	0.84	0.62	P-Value	0.42	0.77	0.69
N	28	27	1	N	62	48	8

Table 36: Robustness Check for 36-Month BHARs by Market Valuation

This table shows the long run 12-Month (-1, +792) BHARs for the samples at announcement (DA). The study measures the ACARs using the formula $BHAR_{it} = \prod_{t=0}^{T}(1 + R_{it}) - \prod_{t=0}^{T}(1 + R_{mt})$. The Overall sample contains all deals in the full dataset. The Successful sample contains all deals which were subsequently completed so that the acquirer gained control of the target with a holding of +51%. The Failed All sample contains all deals which were subsequently withdrawn so that the acquirer did not gain control of the target. The Failed Exogenous sample contains all deals which failed for reasons exogenous to acquirer. For classification of the market's valuation, please see the Data and Methodology section or the work by Bouwman, Fuller and Nain (2009). Cash deals refer to those which were financed 100% using cash. Stock deals refer to those which were financed 100% using equity. The P-value is shown in parentheses. Statistical significance at the 1% level, 5% level and 10% level is denoted ***, ** and * respectively.

High Valuation				**Low Valuation**			
	All	Cash	Stock		All	Cash	Stock
Panel A: Overall				**Panel A: Overall**			
Mean DA	-29.6%	-48.0%	-51.6%	Mean DA	-42.6%	-40.8%	-25.9%
T-STAT	-2.41	-2.68	-2.45	T-STAT	-3.63	-2.91	-1.63
P-Value	(0.02)**	(0.00)***	(0.01)***	P-Value	(0.00)***	(0.00)***	(0.10)*
N	64	58	6	N	91	68	23
Panel B: Successful				**Panel B: Successful**			
Mean DA	-63.8%	-65.3%	-28.1%	Mean DA	-34.8%	-53.4%	-25.0%
T-STAT	-2.74	-2.59	-1.22	T-STAT	-2.95	-2.87	-1.35
P-Value	(0.01)***	(0.01)***	0.22	P-Value	(0.00)***	(0.00)***	0.18
N	49	44	5	N	70	49	5
Panel C: Failed All				**Panel C: Failed All**			
Mean DA	-16.40%	-15.7%	-74.4%	Mean DA	-13.0%	-2.8%	- 16.97%
T-STAT	-1.29	-1.15	-0.94	T-STAT	-1.77	-0.09	-1.22
P-Value	0.2	0.25	0.35	P-Value	(0.08)*	0.93	0.22
N	28	27	1	N	62	48	8

3. Discrete Choice Models in the Prediction of Acquisitions

3.1 Introduction

Existing literature can be split in two-fold; there are the papers that have attempted to explain the motives that generate acquisition and the papers which have investigated the characteristics of the firms that become involved in the takeovers. This chapter has two purposes when are both connected with the datasets used later on for analysis; the first of these is to analyse the various approaches used in sample construction whilst the second 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.

The articles concerning the motives for acquisition activity in existing literature 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. This thesis attempts to examine mergers over a long time period in order to draw proper conclusions on the characteristics. This is the only study in the literature that analyses mergers over a long duration.

This chapter has two distinct purposes. The first of these serves to utilise a methodology that has not been tested on a large dataset over a long time horizon in the analysis of companies that become either bidders or targets in acquisition activity. The hazard function has some advantages over the alternative methodology i.e. the binary choice models such as logit and probit. Importantly, 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 of 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 explain the characteristics of 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 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 centers on the use of binary choice approaches. The timing element has been incorporated into the analysis unlike in Dietrich and Sorensen (1984) where logit models were used to examine the types of companies that become acquisition targets compared to firms that were not involved in the takeover process. Fairclough and Hunter (1998) employ a timing element to their analysis by subtracting the cohort means from the data as the primary approach adopted was non-standard (ANN). In relation to corporate failure, which has also been analysed using survival models, Hunter and Isachenkova (2006) adopt the within mean transformation to pool the data in order to incorporate the timing element. [45]

The rest of this chapter is organised as follows. Section 3.2 is concerned with the literature review, Section 3.3 examines the methodology used, Section 3.4 deals with the data Section 3.5 contains the empirical results and finally, Section 3.6, the conclusion.

3.2 Literature Review

3.2.1 Motives for Acquisition Activity

There are numerous motives as to why firms decide to merge. Although a lot of research has been conducted to tackle this question, it still drives merger research. Theoretical conjecture relating to merger motives notes the evidence showing that merger activity appears to come in waves, with each wave having its own key motivator, such as disturbance, efficiency, monopoly, empire-building, asymmetric information, valuation, market-timing and market catering to name a few.

Haddoud et al. (2021) investigate the motives for mergers and acquisitions in the European banking sector. The study finds that strategic motives related to market power, diversification, and efficiency are the most important. More specifically, the study finds that banks engage in mergers and acquisitions to gain market power and improve their competitive position. Diversification motives are also important, as banks seek to expand their product offerings and customer base. Efficiency motives, such as cost savings and economies of scale, are also significant factors driving mergers and acquisitions in the European banking sector. The authors find that regulatory factors, such as the Basel III capital requirements, play a role in motivating banks to engage in mergers and acquisitions. In particular, the study finds that banks with lower capital ratios are more likely to engage in

[45] The authors also include unique macro data that is related to the month of failure lagged by a year from the failure date, they also for purpose of comparison apply the Hazard model to the same corrected data series.

mergers and acquisitions, possibly due to a need to increase their capital buffers in response to regulatory requirements.

Pichlak and Chidlow (2020) analyse the determinants of success and failure in mergers and acquisitions, finding that motives related to strategic fit and complementary resources are important for success, while motives related to diversification and financial considerations are associated with failure. This was after a comprehensive review of various studies published between 1980 and 2019.

Wang et al. (2021) analyses existing studies on the impact of merger motives on post-merger performance. The authors identify six hypotheses about the relationships between different merger motives (strategic, financial, managerial, synergy-related, diversification-related, and hubris-related) and post-merger performance, and conduct a meta-analysis of 116 studies to test these hypotheses. The study finds that different motives for mergers and acquisitions have varying effects on post-merger performance. Strategic motives, such as gaining market share or improving competitiveness, have a positive effect on performance. Financial motives, such as cost reduction or financial gain, have a negative impact on performance. Managerial motives, such as gaining expertise or increasing innovation, have a positive effect on performance. Synergy-related motives, such as improving operational efficiency or creating value, have a positive effect on performance. Diversification-related motives, such as reducing risk or entering new markets, have a negative effect on performance. Hubris-related motives, such as overconfidence or ego-driven decisions, have a negative effect on performance. These studies highlight the importance of considering the underlying motives for mergers and acquisitions when evaluating their impact on performance. The authors also identify moderating factors that may influence the relationship between merger motives and performance, such as the type of acquisition or the industry context. Overall, they provide valuable insights into the impact of merger motives on post-merger performance and has implications for practitioners and researchers in the field of mergers and acquisitions

The next section will try to tackle the most frequently discussed motives and theories alongside their validity within financial research.

Synergy

The most popular motive in the current literature is synergy (Boisi and Essig, 1994). The word is derived from the Greek word *'Sunergos'* which translates to *'working together'.* Synergy can be defined as the *'interaction or cooperation of two or more agents to produce a combined effect greater than the sum of their separate effects'* (Oxford English Dictionary: Compact). In essence, synergy relates to the idea that "one plus one equals three". The term synergy is used to incorporate a great many motives, everything from the combining of research and development departments to risk reduction via diversification. Synergy can be extracted from three main sources - operations, finances or managerial improvements. With operational synergy, gains can be achieved through the removal of duplicated operations between a target and acquirer, in manufacturing processes for example (Lubatkin, 1983). This type of synergy usually exists when there is a degree of relatedness between the bidder and the target firm. A vertical merger could lead to synergies between a supplier and retailer through less expropriation (Weston and Chung, 1983). It is important to note that synergies are not only confined to related deals. Larsson and Finkelstein (1999) present two sources of gains from either *'economies of sameness'* as discussed above, or *'economies of fitness'*. Economies of fitness refers to those synergies available from the merger of two operationally complementary firms. These firms may not be involved in the same line of business but their operations can and will complement each other. Even in deals where the two firms are not particularly alike, synergies can still be sought. In a conglomerate merger for example, diversification is often cited as the major motive (Kitching, 1967). This lowering of risk leads to what is known as financial synergy. Trautwein (1990) posits that a company can gain financial synergies through lowering the systematic risk faced by the firm resulting in lower overall costs of capital. The larger size of the combined firm can allow for heightened bargaining power, increased debt capacity, greater cashflows and tax benefits. Managerial synergies are posited as a result of a better manager assuming control over the target after the corporate marriage. The superiority of the acquiring firm management team raises the efficiency of the target and thus benefits the shareholders involved. Jensen's Management Competition model implies that efficiencies are discovered through the improved disciplinary forces upon the acquiring management team (Jensen and Ruback, 1983). The pursuit for corporate control within the market is presented as a way in which managers can compete with one another for the assumption of rights to manage available corporate resources. In essence, managerial competition within the model '*limits divergence from shareholder wealth maximisation by managers and provides the mechanism through which … synergies … are realized'* (Jensen and Ruback, 1983:6)

Two motives which will be tackled separately, competitive position and tax advantages, fall under the synergy umbrella. Numerous authors in the acquisition literature consider synergy to be the sole motive. For example, Spatt (1993) whilst not concentrating specifically on acquisition motives, made it known that the only motive he considered is the synergistic one. The literature from Spatt (1993) would be discussed 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) hypothesised that the perceived value of the synergy gains would be fundamental in determining whether an acquisition took place. Their paper used no data but instead used game theory to replicate the effects of merger activity and tender offers. The authors 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. The authors fail 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 paper which supports the importance of synergy above all factors is Achtmeyer (1994) that explains how the synergistic benefits of an acquisition can be maximised. He 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 advising the need for a definite plan and not to improvise as problems arise.[46] 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 estimated the proportion of takeovers that each motive generated. Using a sample from 1968 to 1988, the authors examined three hundred and thirty American companies involved in acquisitions. They hypothesised that the total gains in the acquisition would be positive only if synergy was the motive. They calculated cumulative abnormal returns (CARs) for each of the involved firms based on share price changes around the announcement. The authors found the total gain to the target firm to be 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 study, the authors found synergy to be the primary motive, accounting for seventy-five percent of the acquisitions they examined. Unfortunately, they fail to address the possibility that an acquisition could be a combination of several motives rather than just one. Equally, they also fail to consider the possibility that the result of an acquisition might not always be as they predict. For example, a takeover

[46] Achtmeyer was a corporate lawyer who spent many years advising companies on how to get the best out of their proposed acquisitions.

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. So this begs the question: are synergies actually realised? Kitching (1967) writes that whilst firms announce merger synergies, they are seldom realized. However, the key to a successful deal is the effective post-acquisition management. He calls these individuals *'managers of change'* (Kitching, 1967: 91). The author posits that the effectiveness of the managerial team in combining the two corporations into one ultimately sows the seeds of increased wealth.

Agency Issues as an Acquisition Motive

As mentioned above, synergy is not the only motive. The agency motive is one which is discussed in a lot of papers. The agency motive needs to be examined in two parts: issues connected with the managers of the acquiring firm and those concerning the managers of the target firm.

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. This is considered as one of the most important motives (Lev, (1992) ; Shleifer and Vishny (2019)). There is more prestige in being the manager of a large firm than a small one and involvement in the corporate control market as a bidder creates a very positive impression. This gives managers the incentive to acquire other firms. How then is this an agency problem? The issue arises because shareholders prefer to have the company's profits issued in the form of dividends than for a potentially expensive acquisition of another corporation. The conflict of interest that arises explains the agency problem. Theoretically, managers have no option but to comply with the demands of shareholders. However, 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 take place. Numerous authors have examined this point in the literature and this thesis will review some of them.

Larcker (1992) hypothesised that the level of control the shareholders are able to exert is reflected in the type of acquisition activity that the company is engaged in. The author 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 financial statements, then managers are likely to concentrate on cash-based transactions. In particular, Larcker believed 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. This makes managerial accountability difficult as there's virtually little to no effective way of controlling them. Researchers have blamed shareholder lassitude for the development of this situation. Jensen (1988, 1992) addresses this situation. In his earlier work, he concurs with Larcker (1992), but has mentioned that as a key focus of shareholders at the Annual General Meeting (AGM) is dividends then they are only likely to be worried about managerial activities when problems arise with the dividend payout. This led to the development of the *"Control Hypothesis of Debt"* by Jensen. He suggested that managers can still maintain control of the firm's funds whilst issuing dividends to shareholders. This can be done by substituting debt for equity and interest for dividends:

Debt reduces the agency cost of free cash flow by reducing the cashflow available for spending at the discretion of managers. By issuing debt in exchange for stock, managers bond their promise to pay out future cash flows in a way that simple dividend increases do not. In doing so, thy give shareholder-recipient's of the debt the right to take the firm into bankruptcy court if they do not keep their promise to make the interest and principal payments" – (Jensen, 1988: 29)

He suggested that shareholders would be satisfied since they will receive compensation due to them even if the company fails. This leaves the management free to use the retained earnings to finance an acquisition without any issues. The control function of debt works best in firms that generate large cash flows but have low growth prospects. Jensen (1988) also notes its importance in organisations who must shrink as the pressure to waste cash flows by investing in uneconomic projects is high.

Jensen (1992), then focussed on the problem with funding acquisitions in the face of shareholder disapproval. He called this extended hypothesis the “Free-Cash Flow Theory”. He believed that there are instances where the managers of a company are wrong in their approach however the market corrects them by lowering the company's share price. If the managers do not change their strategy, the share price will remain low making it apparent that the only way to force the necessary changes in the company will be via takeover by another group of managers. 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 combined the Control Hypothesis of Debt with the Free-Cash Flow theory. In essence, if the firm is to maximise shareholder value, then excess cash must be paid out as dividends. Paying shareholders reduces the resources available for expansion but a large dividend pay-out signals to the market that the firm is doing well. This is usually rewarded with an increase in the firm’s share price on the stock market. When managers are given control of the "free cash" instead of it being issued as dividends, this may result in the company's share price dropping thus making it difficult to attempt a takeover.

Jensen (1992) used data from other papers to test the effectiveness of issuing debt as an acceptable substitute for dividends. The results demonstrated that a large proportion of the observable behaviour of these companies is consistent with his theory. This substitution 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. The author however 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.

Managers of the Acquired Company and the Issue of Managerial Control

The other side of the agency problem exists for the acquired firm. It is well documented that the ambitious nature of the managers of a successful firm might encourage them to acquire other firms however how do these firms get in a position to be acquired? One suggestion emanating from the literature is that incumbent managers have ignored the shareholders wishes for so long that the firm's owners are now prepared to consider selling to a potential acquirer to rid themselves of the undesirable management (Schleifer and Vishny, 1988). The authors observed that controlling the actions of managers can be difficult. In order for the company owners to make managers 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 however these contracts do not cover every eventuality and are very costly. In essence, 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. Schleifer and Vishny (1988) suggested that takeovers could be used 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 shareholder.

Some researchers maintain that the threat of a takeover alone should be sufficient to bring disobedient managers back in line (Dodd, 1992). Dodd (1992) examined the share price of both the acquiring and target firm for several years prior to the acquisition. He found that in most cases, target firms earn negative abnormal return of up to 15% below average which then turns positive when the takeover announcement is made. Comparatively, the acquiring firm's shares drop in value as they earn negative abnormal returns. The author using these results concluded that acquisitions were used as a mechanism by dissatisfied shareholders to get rid of managers once 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.

Managerial Inefficiency as an Acquisition Motive

Managerial incompetence has been discussed extensively in the literature. If 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. Boisi and Essig (1994) found 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 view is shared by Franks and Harris (1993) who said 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 in explaining this considered the impact of a referral to the MMC. Something, which has happened to a 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 believed that managerial incompetence 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 authors (Palepu (1986); Gianmmarino and Heinkel 1986); Schliefer and Vishny (1988); Jensen(1988,1992); Cosh, Hughes, Lee and Singh (1989); Frank and Harris (1993); Jenkinson and Mayer (1994); Boisi and Essig (1994)) . It is possible, however, that companies can become undervalued without the mangers being particularly inept, this phenomena is caused by incomplete information on stock market rather than anything specific to the company.

Acquisition Motives Based on Asymmetric Information

Scherer (1988) analysed the impact of informational disparity between the stock market and the target firm. He noted that since stock market prices follow a random walk (which is only semi-strong efficient) then 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 naturally leads to the acquisition motives which happen due to informational differences. If managers of the acquiring firm believe that they have information that the rest of the market does not know then this may be their opportunity to undertake an acquisition. In general, these informational differences refer to the perceived value or the potential of the involved companies. This motive is particularly popular in the papers that use game theory to model the action of firms in takeovers. Hart (1977) used informational inequalities as the primary takeover motive in his paper. Hart modelled 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. The author concluded 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 game theory to replicate contested acquisitions. They defined a contested acquisition 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 bid 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, the authors were able to replicate scenarios in which there are sequential bidding patterns, overbidding, managerial resistance and white knight. 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, game theory applications are based on so many assumptions that their findings are difficult to translate to practical applications in the real world.

There are other articles which discuss this motive that use more practicable methodologies. The main issue with this motive is, as Boisi and Essig (1994) observed it is impossible for the management of the bidding 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 key 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 is also discussed by Frank and Harris (1993) who discuss 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 view is shared by Eckbo, Giammarino and Heinkel (1990) who claim 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 much detail in Section 1.7 which discusses the medium of exchange during takeovers.

Acquisition Motives Based on Tax Advantages

The next factor that causes acquisitions is the potential tax advantages gained from the process. This was mentioned briefly earlier in the chapter under the synergy heading. The concept behind this motive is that the acquiring firm 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 acquisition makes it possible for the acquiring company to place itself in a higher tax band. This allows the firm to increase the value of the depreciation that it can write off for tax. Finally, there is the idea that a takeover enables the acquiring company to increase its debt capacity if the acquired firm has not utilised it. The interest on this debt is sometimes tax-deductible. Most articles within the literature used American data where the tax laws are such that eligible tax deductions are large enough to make acquisitions worthwhile. In the UK, these benefits from a tax perspective is far smaller than in the USA making it marginal whether it be a significant motivate to determine an acquisition. Nevertheless, this is a frequently mentioned motive in the recent literature although the empirical investigations of this topic are very limited. Copeland and Weston (1988) pointed that it is possible to use one firm's tax position to offset the other firm, 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 of 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 this aspect has not been the subject of empirical analysis.

Diversification

Some firms use acquisitions as a means to gaining access into new markets or countries. Using an acquisition is considered one of the fastest ways a company can make this sort of change in its business practices. The acquiring firm would not have to break into a new market or build a brand name as this has already been done by the target firm. Expenses such as buildings and new production plants for examples will not be needed as the target firm would already have this. Apparent from the commercial advantages, barriers to entering a certain industry due to political reasons will no longer exist. It is well documented that 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 takeover. The heyday of diversification mergers was in the 1960s, and there is evidence to suggest many of those mergers ultimately did not succeed. Transnational acquisition that forms an element of Foreign Direct Investment (FDI) is often seen as motivated by similar concerns and thus provides a substitute for foreign trade.

Market Share and Competitive Position as an Acquisition Motive

A logical motive for acquisition is to increase the market share of the acquiring firm hence placing it in an advantageous position in the market. This motive, like tax, sometimes falls under the synergy umbrella. A takeover can increase market share of an acquiring firm quicker than it could through internal growth (Copeland and Weston, 1988). Creehan and Leger (1994) provide huge support in their analysis for this motive. They posit that provided the sources of potential risk is minimised and the post-takeover integration carried out smoothly, it is easy to induce an increase in the competitive position of the acquiring firm via the takeover. They suggested that this gain is born from the existence of a high level of strategic fit between the acquiring and acquired companies, aiding the smooth integration of the two firms. It then becomes important to evaluate the potential strengths and weaknesses of the resulting conglomerate before initiating the takeover.

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 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.

Managerial ambition

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 manager’s 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 firm’s 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 firm's 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 a situation where they will lose 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 arose in the article by Jarrell, Brickley and Netter (1988) amongst others. The tax motive is a sub-set of the restructuring idea. Here it is suggested that the bidding firm wishes to undertake some form of radical restructuring and acquisitions 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.

Diversification motive

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 target firms are smaller than the average company in their industry. Conversely, the acquiring 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 is 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. However, this does not necessarily mean that the target firms are less profitable than the average company in their industry. 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 39, 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 37: Characteristics of Companies Involved in Acquisition Activity Based on Literature

<table>
<tr><th>Bidding Companies</th><th>Target Companies</th></tr>
<tr><td>Ambitious Management</td><td>Inefficient Management</td></tr>
<tr><td>Expanding/ Diversifying</td><td rowspan="3">Occupying a complementary position</td></tr>
<tr><td>Looking to restructure</td></tr>
<tr><td>Possess unused tax advantages</td></tr>
<tr><td>Performing better than average</td><td>Underperforming</td></tr>
<tr><td>Possibly undervalued</td><td>Undervalued</td></tr>
<tr><td>Larger than average</td><td>Smaller than average</td></tr>
<tr><td>Above average profitability</td><td>Less than average profitability</td></tr>
<tr><td></td><td>Possess potential</td></tr>
</table>

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 these features 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 (NPV) 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 concerning institutional investors, makes no difference to the probability that a company will become involved in takeover activity.

The hazard function methodology is a methodology that has appeared 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. Audretsch and Mahmood (1995) used hazard functions to examine the survival rates of companies within the first ten years of their existence. Hunter and Komis (2000) employ both the logit and maximum score estimator to analyse the behaviour of bidders and targets, and targets and non-targets involved in the M&A process. In relation to corporate failure, which has also been analysed using survival models, Hunter and Isachenkova (2006) adopt the within mean transformation to pool the data in order to incorporate the timing element. The importance of the timing element makes this approach superior to the logit model for the analysis so this study employs the with-in mean transformation on the data.

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.

3.2.2 Methodology

The sampling methodology that will be used in the creation of these data sets is the choice-based approach. 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 proportions of the population that these companies represent.

3.2.3 Data

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 appears 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 38 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 rationale that each author gave for using that variable.

The first group of variables is the efficiency terms. These have been featured in previous papers to represent the manner in which the target firm's 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. 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 firm's profits provides 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 is 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 firm's 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 relatively undervalued will be more suitable acquisition targets than correctly or overvalued companies as authors such as Dietrich & Sorensen (1984) and Ambrose & 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 denote 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 terms 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, two terms appear in 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. Lecraw's (1984) paper discussed the probability that a firm will diversify and analysed this phenomenon 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 motive 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 different definitions that they have. There is no consensus about which variables should be used or how many of them are important instead each paper uses its 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.

Table 39 draws together all of the motives for acquisition activity that are given in previous literature. The motives are grouped together based on the broad subject areas that they refer to. In each case, the author's name is given and a brief rationale of the motive is given as presented in each of their papers.

Managerial motives cover a diverse set of theories making it very popular in previous literature as it is concerned with the notion that in most firms, 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 in preventing managers from doing whatever they want. A slight variation on this theme is provided by Jensen (1988, 1992) in his "Free Cash Flow" theory. He suggested that companies could pay debt to the shareholders instead 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 popular theory concerning managers is the theory that acquisitions correct 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 all concerned with the idea that there are informational disparities between firms and the market. This can lead to inaccurate pricing hence making some firms become likely targets. For example, if the bidding company believes 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 acquisition 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 as 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. Ergun & Karanfil (2018) investigate the impact of managerial inefficiency on merger performance in the banking industry. The study finds that mergers involving inefficient banks result in improved post-merger performance. This suggests that acquisitions can be used as a corrective mechanism for managerial inefficiencies in the banking sector. The authors use a measure of managerial inefficiency based on cost inefficiency and revenue inefficiency, and find that banks with higher levels of managerial inefficiency are more likely to engage in mergers. The study finds that mergers involving inefficient banks tend to create more synergy gains compared to mergers involving efficient banks. This implies that acquiring inefficient banks can result in greater cost savings and revenue enhancements, potentially correcting managerial inefficiencies. The authors find that mergers involving inefficient banks lead to an increase in market power, suggesting that acquisitions can be used to mitigate managerial inefficiencies and achieve market dominance.

Munkin et al. (2019) investigates the impact of acquisitions on managerial efficiency in the insurance industry. The authors find that acquisitions result in improvements in both cost efficiency and underwriting efficiency of acquiring firms in the insurance industry. This suggests that acquisitions can be used as a strategy to correct managerial inefficiencies and enhance operational performance. The authors also find that acquisitions are more effective in improving managerial efficiency for acquiring firms that have lower pre-acquisition performance. This implies that acquisitions may be particularly beneficial for poorly performing firms seeking to enhance their operational efficiency through consolidation. They also find that acquisitions of smaller targets are more likely to result in improvements in managerial efficiency compared to acquisitions of larger targets. This suggests that smaller acquisitions may be more effective in achieving operational synergies and improving managerial efficiency in the insurance industry.

Chen et al. (2020) use a sample of family firms and conduct empirical analysis to investigate the relationship between managerial inefficiency and acquisition activity. They find that family firms with lower managerial efficiency, as measured by lower return on assets (ROA), are more likely to engage in acquisitions. Furthermore, the authors find that the effect is more pronounced in family firms where the controlling family has a higher ownership stake, indicating that family ownership concentration may exacerbate the tendency to use acquisitions to address managerial inefficiencies. This study contributes to the literature on family firms and acquisitions by providing empirical evidence that acquisitions can be used as a corrective mechanism for addressing managerial inefficiencies in family firms. It suggests that family firms with less efficient managers may resort to acquisitions as a strategic option to improve firm performance and correct inefficiencies in their management practices.

Li et al. (2020) examines whether acquisitions are used as a mechanism for correcting managerial inefficiencies resulting from CEO power. The authors find that firms with powerful CEOs are more likely to engage in acquisitions, and the effect is more pronounced when CEO power is excessive.

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, research and development. According to Berkovitch and Narayanan (1993), synergy is responsible for almost 75% 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 39. 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 Holdemess 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 (1988) observed and also in Capital Gains Tax after selling shares, as Higson (1991) noted. Auerbach and Reishus (1988) noted that these gains are rarely very large meaning they may be a secondary motive for acquisition activity rather than the primary cause for a bid. Table 40 in the appendix, lists the variables that will be used in this empirical chapter 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.

3.2.4 Discussion of Variables Used in the Thesis

The first three variables in the data sets refer to firm efficiency. The first variable is the ratio of turnover to fixed assets which Dietrich and Sorensen (1984) used to measure the efficiency with which a firm's assets are being used and to represent the potential cash flows of the firm. The efficient use of fixed assets is very important in the analysis of acquisitions as they are a constant source of funds for the bidding firm. This is because they can always sell off any unutilised factory space or other buildings after the takeover. The second variable is 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 acts as the link between efficiency and performance in the market place. The final variable in this section represents 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. This term can be linked to five aspects of the theory concerning the motives for acquisition activity i.e. the ambitions of the bidding firm's managers, the influence that takeovers can have on total market efficiency, the correction of poor managerial performance, the expected synergy gains resulting from 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 three terms each represent efficiency in slightly different ways and analysing all of them will 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 the variable was used to investigate the theory that acquired firms are less profitable than average whilst bidding companies are more profitable than average. This term also represents the efficiency with which firm managers are using assets to produce profits and this measure of operating efficiency can be directly linked to the inefficient manager 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 net profit margin was used by Cosh and Hughes (1995) to represent a firm's profitability. It looks at how much of each dollar in revenue collected by a company translates into profit. The pre-tax profit margin was used previously by Dietrich and Sorensen (1984) as an indicator of future cash flows and by Cosh, Hughes, Lee and Singh (1989) as a measure of profitability. These two terms are very similar however 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 40 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 firm's profits and, as with the efficiency terms, examining several of them should clarify which of these terms are the most informative as there is no clear precedent for their selection in the previous empirical work on this subject.

The investment ratios represent two different aspects of the firm's 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 satisfaction with the policies adopted by the firm's managers. The 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 Price Earnings (P/E)ratio. This appears in several previous papers by authors such as Levine and Aaronovitch (1981), Dietrich and Sorensen (1984), Palepu (1986) and Ambrose and Megginson (1992). In these papers, the P/E ratio represents 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 firms are more likely to be purchased than the more expensive alternatives. Finally, Berkovitch & Narayanan (1993) and Jenkinson & Mayer (1994) suggested that the synergistic gains created by a takeover could lead to more effective allocation of funds and assets in the future. Similar findings to the Dietrich and Sorensen (1984) article can be found in Fairclough and Hunter (1998) who using UK data find M&A to be NPV enhancing. The authors find that their measure of investment i.e. Tobin Q to increase the risk of acquisition. The number of theories connected with these terms makes it clear that such variables must be included. However, 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 many of the previous empirical studies on this subject for 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. Thompson, Wright and Robbie (1992) also found it could be used to correct other problems within the firm. This makes it 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 firm's 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.

The liquidity variables also appear in various 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 claimed that this term could be used to distinguish between targets and bidders. Dietrich and Sorensen (1984) claimed that excess liquidity indicates potential for future investment, managerial inefficiency and unused debt capacity. Auerbach and Reishus (1988) suggested the current ratio is an indicator for firm potential in the future whilst Cosh and Hughes (1995) believed this value would be distinctly different for acquired and acquiring firms. Sawyer and Shrieves (1994) in their analysis, referred to the importance of liquidity but did not clarify which variable they used. There are relatively few measures of long term liquidity in the previous literature. Higson and Elliot (1994) used measures of debt and credit to investigate financial restructuring via a takeover. Furthermore, Datta and Iskandar-Datta (1995) found 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 Linunack (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 38 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 found. Secondly smaller firms are cheaper to purchase which supports the reasons given in the empirical articles. 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 the reasons stated suggests some measure of size (here we use market value, book value, total assets, total sales) be included 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.[47]

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. Inefficiency can be observed in the Dietrich and Sorensen (1984) analysis. Low asset turnover for example represents an inefficient use of assets and may indicate that the current management has undertaken heavy investment however unable to generate sales growth, which the new management could reverse. Alternatively, high turnover tends to increases cash flows.

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 Tables 38 to 40, 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 1985 to December 2017 and the companies that acquired them (Acquiring firms and Acquired Firms). 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 (Acquired Firms and Non-Involved Firms). Lastly, the third combination pairs companies that were not involved in the corporate control market with the acquiring firms (Acquiring Firms and Non-Involved Firms).

[47] In the UK, this would lead to issues with the MMC. It would be typical were concentration an issue for such acquisitions to be investigated and as was discussed in the previous chapter acquisitions that were referred generally fell through Hasbro (1999). The competitions litereature on acquisitions since the 1990s has moved against second best solutions and typically tried to avoid this type of market interference in the UK. Sutton(1990)

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 firms that are active in the corporate control market are substantially different from the rest, 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 on DataStream

In total it was possible to gather data on seven hundred and thirty-two 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 how 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 deviations from the industry average as in Dietrich and Sorensen (1984).

3.3 Methodology

The first type of probability model to consider is a logit model (binary response model). It is imperative to explain this model in order to extend the methodology to Hazard function models.

3.3.1 Binary Responses and Logit Models

The derivation of the binary logit model starts with the assumption that there can only be two possible outcomes (usually denoted as 0 and 1) for the event under consideration.

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

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

In the existing literature, there are several observed variables that are deemed to change the condition of the response variable. These variables are usually represented as a vector of covariates **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 $\mathbf{x} = (x_1,\ldots..,x_p)$." (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 & 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

$$\pi = \alpha_0 + \sum_{j=1}^{p} x_{ij}\,\beta_j \qquad (4.3)$$

where

π represents the alteration in the probability π generated by a change in the vector x_{ij}(the explanatory variables), and

β_j represents a vector of coefficients

The problem with this expression is that it can take any value on the real line unless the coefficient terms are restricted. Since all probabilities must lie between 0 and 1, equation 4.3 violates the laws of probability hence cannot be accepted. To avoid this problem, equation 4.3 needs to be transformed using a link function g(π). This ensures the output from equation 4.3 lies between the interval 0 and 1 without imposing any constraints on the coefficients. The logistic link function is given below in equation 4.4 and takes the form of a log odds ratio:

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

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

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

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

$$\pi = \frac{\exp(\alpha_0 + \sum_{j=1}^{p} x_{ij}\,\beta_j)}{1+\exp(\alpha_0 + \sum_{j=1}^{p} x_{ij}\,\beta_j)} \tag{4.6}$$

Any methodology comes with caveats/disadvantages however effective it may appear. The first issue is that the logit model does not involve any terms that represent how long each firm occupies their first state before the event occurs (acquisition), as can been seen from equations 4.5 and 4.6. [48]

For every company the takeover process 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. The second 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 younger firms. It is therefore reasonable 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. Without a 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 mentioned earlier. 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 i.e. 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

[48] A time variable could be appropriately scaled and included as a regressor. The estimator has typically been seen as inconsistent but in finite samples is less of an issue. This can effectively be bounded at 1 (at the upper end). A further more suble way of dealing with this is to use a variable which captures experience such as total assets or the assets ratio. The Cox model deals with event time and is similar to logit except for the duration term that appears in the likelihood as the sum of Xjβ over J the process time. This requires for identification at least one observation for each point on the survival function.

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 the earlier chapter. 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.

3.3.2 Survival Models

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, 1984, 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 4.7 and represents the fraction of the population that dies by time ***t***.

$$F(t) = \int_{\infty}^{t} f(s)ds \qquad (4.7)$$

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 to the other terms it is necessary to extend the survival methodology to a probability model i.e. the hazard function model which relates the conditional probability that a firm will be acquired to a given set of variables.

3.3.3 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:

$$h(t) = \lim_{\partial t \to 0+} \frac{P(t \leq T < t + \partial t | t \leq T)}{\partial t} \qquad (4.8)$$

where T is the survival time.

Equation 4.8 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).

$$P(Survival\ to\ t + \partial t) = P(Survival\ to\ t) \times P(Survival\ for\ \partial t | Survival\ to\ t) \qquad (4.9)$$

$$1 - F(t + \partial t) = \{1 - F(t)\}.\{1 - h(t)\partial t\} \qquad (4.10)$$

$$1 - F(t + \partial t) = 1 - F(t) - h(t)\partial t + F(t)h(t)\partial t \qquad (4.11)$$

$$F(t) - F(t + \partial t) = h(t)\partial t\ [F(t) - 1] \qquad (4.12)$$

$$-\partial t F^1(t) = h(t)\partial t\,[F(t) - 1] \qquad (4.13)$$

$$\frac{\boldsymbol{f(t)}}{\boldsymbol{1-F(t)}} = \boldsymbol{h(t)} \qquad (4.14)$$

Where 1- F(t) is the probability of survival to time *t* (the point 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 second considering survival models and F(t) is the distribution function corresponding to the survival time.

Expressing the hazard function in the form shown in equation 4.14 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 (covariates) into the probability expression for equation 4.8. The hazard function is simply re-written so that it is conditional on the vector of explanatory variables **x**.

$$h(t) = \lim_{\partial t \to 0+} \frac{P(t \leq T < t + \delta t \mid t \leq T, x)}{\partial t} \qquad (4.15)$$

There are two problems 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).

3.3.4 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 x = x_i,..., 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:

$$h(t;x) = \gamma(x\beta)h_0(t) \tag{4.16}$$

where β 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 **x** = 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 (4.17), then becomes the usual form of Cox's proportional hazard function.

$$h(t;x) = exp(x\beta)h_0(t) \tag{4.17}$$

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 4.15). In particular, there are three reasons for using this form of the model. Firstly, the most usual form of the model is the exponential equation (4.17) 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 4.17 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 (see Greene (2018)), as follows

$$\log L(\beta) = \sum_{i-1}^{n} \left\{ x_1\beta - \ln\left[\sum_{j=i}^{n} \exp(x_j\beta)\right]\right\} \tag{4.18}$$

This means that Cox's version of the proportional hazards model is only semi parametric, as the baseline function does not appear in the likelihood function (4.18).[49] Typically when modelled the Hazard formula defines a smooth function related to survival time. In practice this is a step function that is stepped and does not necessarily decline in a smooth manner. The x_j define the covariate

[49] It is clear that the baseline hazard cancels from terms of the following form: $\frac{h_0(t)\exp(x_j\beta)}{\sum h_0(t)\exp(x_j\beta)}$.

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

$$\frac{\exp(x_j\beta)}{\sum \exp(x_j\beta)} \tag{4.19}$$

where the summation extends over the entire set of companies that have not been acquired. It is clear 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 the hazard that is then particular to underlying distribution selected. 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. They examined Cox's model both theoretically and empirically and concluded that the proportional hazard model is as efficient an estimator of 13 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. It seems, then, that Cox's form of the Hazard function model is an appropriate development from logit.

Using Cox's Proportional Hazard Function in Practice

The theory behind the proportional hazard function is discussed above. However, this does not explain how the model is used in practice. The theory uses 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.

In the Cox model, the dependent variable is constructed as a combination of two components: the event indicator and the event time. The event indicator, also known as the "failure indicator" or "status variable," is a binary variable that takes on a value of 1 if the event of interest (e.g., death, failure, merger) occurs for a subject, and 0 if the event has not occurred or the subject is censored (i.e., their event time is unknown or not observed). The event time is the time at which the event occurs for a subject, if it does occur, or the time at which the subject is censored.[50]

By using this construction of the dependent variable, the Cox model accounts for censoring, as subjects who have not experienced the event of interest are included in the analysis until the time of censoring, at which point their event time is considered as "unknown" or "missing." This allows for appropriate statistical inference on the hazard rates and survival probabilities in the presence of censoring in time-to-event data.

Consider the equation below which is the usual form of Proportional Hazard function. This equation appears previously as 4.17 but is repeated here for convenience.

$$\boldsymbol{h}(\boldsymbol{t};\boldsymbol{x}) = \boldsymbol{exp}(\boldsymbol{x\beta})\boldsymbol{h_0}(\boldsymbol{t}) \tag{4.20}$$

The left-hand side of this equation is the probability of a firm exiting (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.

[50] Dependent variable = (δ_i, t_i) ; where δ_i is the event indicator for subject i (0 or 1), and t_i is the event time for subject i, which is the time-to-event or censoring time

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 (1984) 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, which is undated, in their analysis. Ravenscraft and Scherer (1991) examined corporate divestitures following acquisition and as is typical in the literature is based on financial ratios developed from company accounts based on the year after the divestiture. To this is added further factors that are not given a date index for the years considered appropriate for the time frame analysed; common data used includes changes in the senior managerial team. 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 evolves as the years go by 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.

3.3.5 Developing Empirical Models Using the General to Specific Methodology

The models featured in the following empirical section are all created using the general to specific methodology introduced at the beginning of the chapter. This is used because the previous literature/empirical studies suggest 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 sequential 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. They argued that these remaining variables represented all the important information that was required to analyse bankruptcy using their model. A similar analysis is undertaken by Hunter and Isachenkova (2006) and this is considered preferable to seeking factors where the elements of the characteristic vector are not always easy to interpret. Testing down follows from a sequence of independent chi-squared test and the likelihood ratio test statistic is the key determinant of the final model specification.

3.3.6 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, 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 that determine whether the classical regression criteria are satisfied are not so easy to specify. The Logit log likelihood following substitution for the log odds ratio by the linear model:

$$L(\alpha, \beta | y_i, X_i) = \sum_{i=1}^{n}(y_i\,(\alpha + X_i\beta) - log(\,1 + e^{\alpha + X_i\beta})$$

As was mentioned above this satisfies the same moment criteria as regression except they are non-linear. This implies that for correct specification the errors are orthogonal to the covariates, which implies the Maximum Likelihood estimator imposes such criteria meaning the sum of the errors is zero and they should also be exogenous or independent of the errors. [51] The likelihood ratio (LR) test measures the joint significance of the variables in the model. This is distributed chi-squared with k' degree of freedom. The LR test can also be used to compare the specification of any nested alternative model and thus are an appropriate way to test multiple exclusion restrictions, linear

[51] The maximum of L(.|.) with respect to α:

$$\frac{dL(\alpha,\beta|y_i X_i)}{d\alpha} = \sum_{i=1}^{n}(y_i - \frac{1}{1+e^{-\alpha - X_i\beta}}) = \sum_{i=1}^{n}(y_i - \pi_i) = \sum_{i=1}^{n} \epsilon_i$$

Where $E(y_i) = \pi_i = 1/1 + e^{-\alpha - X_i\beta}$, and a similar result exists for β:

$$\frac{dL(\alpha,\beta|y_i X_i)}{d\beta} = \sum_{i=1}^{n} X_i(y_i - \pi_i) = \sum_{i=1}^{n} X_i \epsilon_i$$

For this derivation see Kmenta (1997) among others and for the second derivative Hunter (2014):

constraints across variable coefficients (unit coefficients) and also non-linear ones. Individual significance might be tested in this way, but it can also be tested using a large same sample t-test.[52]

It is also possible to use the LR test to determine whether the model is stable across sub periods, this can be variously be seen as a predictive failure test (Hunter and Komis, 2000) or a test for the pooling of data across sub-periods. It is a variant of the sample splitting test derived by Chow which is found in various econometrics texts (see Kmenta, 1997). This might also be used to test a holdout sample.

As in the earlier section, the general to specific methodology will be used to reduce the relatively large number of explanatory terms 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:

H_0: the coefficients of the variables left in the model are equal to zero

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 goodness of fit test. Maddala (1996) defines the goodness of fit as "a summary statistic indicating the accuracy with which a model

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52 $t_\alpha = \frac{\alpha *}{\sqrt{d^2L(\alpha,.|.)/d\alpha^2}} = \frac{\alpha *}{\sqrt{\sum_{i=1}^{N}(\pi_i(1-\pi_i))}}$ and $t_\beta = \frac{\beta *}{\sqrt{d^2L(\beta,.|.)/d\beta^2}} = \frac{\beta *}{\sqrt{\sum_{i=1}^{N}X_i(\pi_i(1-\pi_i))}}$

Hunter (2014) Lecture notes Modelling Financial Decisions. Where with a large sample t_α and $t_\beta \sim N(0,1)$. The statistical package computes these sums using the Maximum Likelihood estimates of α, β and π. Alternatively, especially where the sample size is not large, the bootstrap might be adopted (for the Logit case see Hunter and Isachenkova, 2001).

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.[53]

3.4 Data

The data used in this chapter is drawn from three sources. In the first instance, it is necessary to identify the names of companies that were involved in acquisition activity and the dates of each of the takeovers. For this purpose, Thomson One Banker (T.1) was used. Datastream was 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 then used to access the appropriate accounting data. All of these variables are considered in detail in the previous section[54].

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

[53] Fairclough and Hunter (1998) use this to select their models with a test sample and further check specification on a further holdout. The test adopted is using sample proportions as the final ANN specification is semi-parametric and has no likelihood function to use for this purpose. Hunter and Isachenkova (2006) use similar methods to evaluate the specification of their models with a holdout and the method developed by Efron (1986) to evaluate performance of the model in terms of the apparent error rate.

[54] Also see Tables 38-40

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-nine (29) variables are examined. The selection of these terms is based on the prevailing theories on acquisition activity and the characteristics that identify the companies that are involved in acquisitions see Chapter 4.3 and the Appendix section of this chapter 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 these theories are more difficult to relate as the information comes from company accounts. Komis (1995) specifically considers the different dimensions of acquisition that can be represented by a range of variables. Such dimensions and associated variables represent the efficiency, profitability, investment and liquidity aspects characteristics of the firm.

Added to these groups of variables there are also some terms that are included to measure 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. The financial ratios selected are chosen to analyse the hypothesis discussed earlier. In this section, we examine the financial characteristics of acquired firms relative to non-acquired firms. Results are presented based on the binomial logit for the time period 1980 – 2017. Variables are dropped using sequential likelihood ratio tests to test down from a model which includes twenty-nine variables to more specific models with considerably fewer variables. The General to Specific Methodology derives from the LSE tradition of Econometrics that started with estimation of error correction models by Sargan (1964) and was developed further by Sir David Hendry with the well-known DHSY model of consumption that is discussed in some detail in Davidson et al (1978).[55] Komis (1995) investigated a range of factor model to identify specific factors to explain such dimensions, but as is explained in Hunter and Komis (2000) preference was given to the General to Specific approach for his study of the UK. They broadly followed Deitrich and

[55] Further discussion of these ideas and their link to error correction models and cointegration an be found in Chapter 1 of Burke and Hunter (2005).

Sorensen (1984) in what then became known in the literature on fixed effects (see Green, 2018) as the within mean transformation. In addition to the mean transformation smoothing out yearly variation in industry performance, this had also been seen as a control for potential non-stationarity in relation to financial ratios. For some further discussion of the likely non-stationarity of financial ratios see Ioannidis and Peel (2003).

3.4.1 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, 1984, 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 in the Appendix section.

3.4.2 Summary Statistics

Once the data has been gathered and the data sets constructed, some summary statistics for the variables have been created. A simple examination of these terms may reveal some interesting features of the data sets. The first step is composing descriptive statistics associated with the data sets so as 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 T-statistics found are based on the mean values for each of the variables in the data sets which indicates whether there are significant differences between the datasets analysed. The three tables that follow the null and alternative hypothesis are always as below:

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

H_1: The two groups of firms are not drawn from the same population and the mean values are different

Table 41 (in the appendix) gives the calculated values for the acquired and acquiring firms and denotes, by means of asterisks when the null hypothesis can be rejected and at 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.

The second table (Table 42) 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.

The third table (Table 43) 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 the next chapter.

The results given in these three tables strongly suggest 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 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 the next chapter.

3.5 Empirical Findings

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 the firms that were not involved in the market for corporate control during the sample period and finally there are the results for the acquiring firms modelled against an equivalent number of companies that were also not involved in acquisitions between January 1980 and December 2017.

3.5.1 Acquiring and Acquired Firms

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 5.9% 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.

Table 61 presents the first set of results for the logit models. For each of the data sets, several models were estimated to ensure that the highly correlated terms were separated, as explained in the earlier section. 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.

The first term to consider are the efficiency variables. The first of these variables is the Total Sales to Fixed Assets ratio. The results suggest that the variable is positively linked to the probablility of a firm becoming a target. The Total Sales to Total Asset variable however is insignificant in the first few years leading up to the merger but then becomes negatively linked to the probability of being acquired from Yr 3 to Yr 5. With the exception of the impact on firm survival as a result of any difference between debtor days and creditor days that can have an impact on firms cashflow, then sales will be indicative of the underlying strength of the firm with high relative sales figures indicating strong cash flow that can help to pay for the acquisition. The negative coefficient relative to total assest suggests a liquidity argument by which inflows of cash can be used to protect the target firm from acquisition. Otherwise, the Total Sales to Total Employees variable is positive and statistically significant at the 1% level for all years leading up to the merger. This suggests acquiring firms may look at this ratio as they look to benefit from economies of scale and when the merger is horizontal such gains may arise in the manufacturing processes when they merge (Morck, Schliefer and Vishny, 1988). In the years closest to the takeover, these terms are positively linked to the probability of a firm becoming a target. [56] The positive sign suggest that the acquired firms is more effectively run than the acquiring companies. This result is consistent with findings in recent academic literature who find that more efficient firms are more likely to be acquired (Engelen et al. (2016); Dudu et al. (2019); Zhao and Tyagi (2019)). The negative terms that also appear here 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, it is suggested that acquisitions occur because the company that is created as the result of the combination of the acquiring 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 internal

[56] In the literature on corporate failure, total sales to total assets is seen as an indicator of firm survival. Especially, noticeable in the analysis of Russian firms that are compared with a similar sized analysis for the UK (Hunter and Isachenkova, 2001) for which total sales to total assets has a similar effect for both studies even when bootstrap inference is applied. In particular, a key argument in the case of Russia for this study was the availability of long and medium term debt. White knight acquisition are a further motive that may be aligned with such findings on sales as firms that are otherwise profitable may have run into constraints in their capacity to role over debt. This may suggest sales ratios may reflect the underlying economic strenght of the firm that will be resolved when the corporate structure adjust in response to the acquisition.

restructuring alone.[57] 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. This may be the only way in which these inefficiencies can be removed from the bidding company.

The second term to consider are the profitability variables. These terms have both a negative and positive significant relationship with the probablity of a firm becoming a target. Thus suggests that the profitability of acquired firms is not generally different from the profitability of the bidding companies. Profitbale firms are attractive targets for acquiring firm shareholders as it means should they choose to payout dividends as opposed to investing in the future, shareholders will have a higher payout. The relationship between profitability and the probability of acquisition has generally been found to be positive in the academic literature (similar to the T statistic results in Table 42). However, for the logit results, some terms are found to negative and positive. Gounopoulos et al. (2019) investigating the probability of being acquired in European firms find that more profitable firms are more likely to be acquired. This suggests that profitability plays a positive role in determining the probability of being acquired (Dedoussopoulos et al. (2017); Nygard et al. (2017))

There're also synergistic gains that arise which will increase profitability for the acquiring firms. The Return on Capital Employed (ROCE) has a significant negative relationship with the probability of being acquired suggesting that target firms are not effectively using their capital to generate profits. This supports the reasons developed in the literature as to why these firms become merger targets. When the study subdivides the sources of capital, the Return on Equity is found to be positively linked to the probability of being acquired. Lev (1992) states 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

[57] Synergy arises as a result of gains in general when two firms merge and this is irrespective of any economies that may arise by merging productive capacity. It arises as a result of being able to gain from combining all aspects of the two entities. Certain firms are well known for customer service, marketing and sales while other firms may be more effective in terms of production and product design. The combined entity may gain disproportionately from combining across two operational entities.

company to be relatively inefficient and still be profitable, although in the long term it would be likely that any such inefficiencies would eventually impact the sales share of the firm in the market and their profitability. 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 coefficient of ROE is smaller the further back in time we go from the merger annoncement date and this coefficient is 3.20 (significant at 1%) one year before the acquistion and 1.99 (significant at 1%) four years before the acquistion. This supports the managerial and market myopia hypothesis by Jensen (1988, 1992) and Jarrell et al (1988) as the fear of takeover makes managers increase short term profits in order to protect themselves from acquisition. This may enhance funds, but one year of further profits is unlikely to enhance a fighting fund, it may suggest to the shareholders that they are better off with the current management, but this suggests acquirers are targetting firms which have profitable projects/initiatives in the pipeline. This result is consistent when we also look at ROA and EBITDA.

The third dimension to consider relates to investment. These variables are generally negatively linked to the probability of becoming a takeover target except for the market-to-book value and DPS, which is also not insignificant for the logit model. EPS and PE ratio are negatively linked to the probability of a firm becoming an acquisition target, thus high earnings per share reduces the risk of acquisition as is similarly the case for the PE ratio when they are high. Suggesting that acquisitions respond to the target firm shares being undervalued relative to the earnings of that company. This result is linked to one of the characteristics given for acquired firms in the recent literature, that these companies are undervalued. This also has the advantage of minimising the costs of the purchase and ensures that the acquiring firm makes a purchase that can be regarded as good value for money Palepu (1986). The undervaluation of the target also fits in with the market-timing hypothesis discussed in the earlier chapter. That a PE ratio is indicative of a company being a bargain does not mean that the acquisition is appropriate as the firm may not be easily combined with the purchasing company or that it will enhance the value of any new entity. Tobin's Q is often seen as measured by the market value relative to the book value. This can be considered in a number of ways, but based on the discussion above this cannot be seen as indicative of value in terms of a bargain. However, when this measure is seen to indicate Investment potential then that would explain the positive coefficient. The study by Blundell et al (1992) is indicative of an overwhelmingly positive relationship between I/K and the Q variable from a dynamic model.[58] Hence, the positive relationship between any internal investment decision and Tobin's Q. A further issue is that market to book value is viewed as large Q as compared with marginal Q or other such measures (Kaldor's v). That implies that there may be inaccuracies that arise when considered at the level of the firm so it is more accurate at the level of the economy. In addition, during periods of inflation a wedge may arise especially for historic figures for which there was a significant downward bias to cost accounting. While the numerator may be increasing with prices, the numerator was doing that with a lag. Further, the figures may not evaluate appropriately the intellectual capital of the organisation and as such the ratio may be biased downwards. This result is consistent with findings in recent academic literature which find that firms with higher investment levels are more likely to be acquired (Wu and Yan (2021) ; Tsiaras and Tselepidakis (2021) ; Wilson and Nguyen (2022))

The gearing ratios are positvely linked to the probability of a firm becoming the target of an acquisition attempt with the exception of long-term debt to shareholder equity. 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. Palepu (1986) proxied long term debt to shareholder funds to be available financial resources. This term being negative suggests that there isn't much resources available to the target firm making it an acquisition target.

[58] Blundell et al. (1992) expresss the ratio of Investment to Capital Stock as I/K and Q as Market Value to Book Value

The liquidity ratios refer to the ease with which a firm can meet its financial commitments. In the short term, this is represented by the current and quick ratio. The results suggest that acquired firms are less liquid than the acquiring companies in the short term as the negative sign on the current ratio terms imply. 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. However, the infrequency with which it occurs suggests that there is little difference between the liquidity ratios for the acquired and acquiring companies which greatly reduces the weight that can be given to this motive at this juncture.

The size terms have shown in literature to have a relationship with the probability of a firm becoming a target. Dietrich and Sorensen (1984) posit that target firms should be smaller than the acquiring ones, this is because smaller firms are easier to acquire. The results in this study are contrary to that theory since the size terms generally have a positive relationship with the probability of being acquired. 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. This is likely because firms are more interested in positive NPV projects as opposed to acquiring based on the relative size of the firm. Firms with bigger size tend to be performing better than their smaller counterparts.

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-seven percent of the acquiring companies correctly but, after accounting for the 5.9% 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, Table 62, 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 somewhat different from the logit results for the same data sets. Nevertheless, they are consistent with the earlier results as is demonstrated in the Appendix section of this chapter.

The first terms in the hazard models represent the efficiency of the acquired companies when compared to the acquiring firms. Apart from the Sales to Fixed Asset ratio, the sign here is the opposite to the logit models. The Sales to Total Assets suggests that these target companies are able to effectively make the most of their assets hence this variable been positively linked with the probability of been acquired. The Sales to Employees variable however tells an interesting story. The variable reports insignificant and negative results for years further away from the acquisition. Acquirers will target companies with inefficient employees who have high growth potential in order to reap from effectively managing them. 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 next term to consider are the profitability variables. These terms are both positively and negatively linked with the probability of been acquired. The theories concerning the motives for acquisition activity, for example Lev (1992), state that target companies are generally significantly less profitable than the acquiring firms, however this 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. Also acquired companies tend to be young profitable companies with high growth potential. Eliminating the effects of financing and capital expenditure, suggests that acquired firms are more profitable than acquiring firms. This can be seen in the EBITDA ratio showing a positive coefficient.

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. 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 a whole those items that refer to the company’s earnings. Companies that have high earnings have high potential and are good performers. The earnings can be used 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, items relating to dividend have a negative relationship with the probability of a firm becoming an acquisition target. Dividends may either be reinvested into the business for future growth opportunities or paid out to shareholders. Certain companies may choose not to pay shareholders dividends as growth is more important to them.

On the whole, the capital structure variables for the hazard results are negatively linked with the probability of a merger. 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. The first term (Total Debt/Shareholder Equity) is negative and significant for most years leading up to the acquisition however insignificant when you observe the logit results.

The liquidity variables here have the opposite sign to the logit results. Here, it appears that acquired firms are more liquid than the acquiring companies in the short term as the positive signs on the current and quick ratio imply. This becomes an incentive for acquisition because the acquiring firm could easily sell off the assets at market value when they acquire. There are also transactions “liquidity mergers” which occur in order to reallocate liquidity to firms that are otherwise inefficiently terminated. Liquidity could also be linked to the financial restructuring motive of firms.

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 relate to the size of the firm. Dietrich and Sorensen (1984) hold that the target firms should be smaller than the bidding ones. The book value and total assets variable support this notion as they are consistently negative. The other size terms total sales and market value however are consistently positive and opposite to the theory. This could be a reflection on the merger waves during this period. The market value variable captures other information such as profitability, intangibles and future growth prospects.

With the 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 about seventy-four 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 proportional hazard function is able to produce results that correspond to the motives for acquisitions, the characteristics of the companies that are involved in this process and the determinants of acquisitions. The acquiring companies appear to be run more efficiently than the acquired counterparts. This supports Jensen's notion of removing inefficient managers from firms which aren't performing as well as they should be. This is indicated by the continued presence of terms such as the ratio of sales to fixed assets and sales to employees. The fact that sales to total assets is negatively linked with the probability of been acquired further suggests that acquired firms are not efficiently using their current assets. The profitability ratios although significant do not have consistent signs for all the variables. 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. The gearing ratios are 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. This can be seen in the positive link that these variables have with the probability of been acquired. The size terms appear to provide mixed results for the hazard model.

3.5.2 Acquiring and Non-Involved

The first terms to discuss here are the efficiency variables. Like we saw in the acquired and acquiring, acquiring companies are more efficient than firms which choose not to be involved in the market for corporate control. This can be seen in the positive relationship shown by the Sales/Fixed Asset and Sales/Employees variables. However, there is also a negative relationship when sales is scaled by total assets. The positive terms are more prevalent for this term and their continued presence indicates that the acquiring firms are more efficient than the firms that do not become involved in takeovers. The idea that acquiring firms 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 second terms to look at are the profitability terms. Here ROE, and Pre-tax Income scaled by Sales are negatively linked with the probability of been acquired whereas ROCE, Net Income scaled by sales are positively linked. The literature suggests that acquiring companies are usually large in nature and more profitable so we expect these firms to have a positive link with the probability of been acquired. These companies are been matched against firms which could be bigger however didn't partake in a merger, therefore there is an expectation to see mainly positive signs. Once again, the sign changes when tax is accounted for when we look at the companies net income. The investment ratios here have the same relationship with non-involved companies that was discussed in the acquired firm's section. The key difference here is that 5 years before the acquisition takes place, the market to book value has a negative relationship with probability of been acquired when paired with the non-involved sample. 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.

The gearing ratios 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 constitute a majority of these variables. They are mainly 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 when compared to non-involved firms. For example, the term total debt scaled by total assets suggests that acquiring firms are utilizing their debt capacity in order to finance assets/projects more than non-involved firms will do.

The liquidity variables also provide very interesting results. The current ratio appears to have a positive relationship with the probability of been acquired. Acquiring firms appear to be more liquid than firms not involved in the takeover process. This relationship becomes significant the further away we move from the acquisition. However, the opposite sign is observed for the quick ratio. This might due to the fact that it excludes inventory and other current assets that are more difficult to liquidate. By excluding inventory, and other less liquid assets, the quick ratio focuses on the company's more liquid assets which would lend support to the managerial inefficiency motive.

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 are positively linked 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 majority of the profitability terms are positively related to the probability that the company will become the acquirer in a takeover. This corresponds to the idea that the bidding firms are more lucrative than the average company on the stock market as suggested in the literature. Such a result supports the idea that the bidding companies in the market for corporate control are in a stable and successful financial position before they select to purchase another firm. The investment ratios here, show mixed results. The term with the positive probability of been an acquirer is the P/E ratio. Its presence 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 dividend per share is the other term which appears negative. This result is contrary to what is expected.

The next group of terms to consider are the gearing ratios. Here, the majority of the terms are negatively related to the probability that a firm will become the bidder in a future acquisition attempt. Acquiring firms have lower levels of leverage than those which do not partake in the acquisition process. As mentioned earlier, this is due to the tax and unused debt capacity advantages they could gain post-merger. This is why firms with lower gearing ratios make better acquirers. The next terms to discuss are the liquidity ratios. Here, all 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 acquiring companies are meant to be profitable.

The next term to discuss in this section are the size terms. Here, these terms have both positive and negatives links with the probability that a firm will become the bidder in an acquisition. The positive links suggest that the acquiring firms are larger than firms which choose not to partake in the takeover process. These are the market value and book value of the company. They only appear in the years closest to the acquisition. 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. These terms are represented by total assets and total sales. The negative links suggest that the acquiring firms are smaller than firms which choose not to partake in the takeover process. This however is not a feature needed to be an acquiror as it is possible that some larger firms might choose not to engage in mergers because its not beneficial to them at that stage. They might wish to pay shareholders dividends instead of re-investing into the business. This might explain the negative dividend per share variable earlier found. The last variables to analyse are the growth terms. These are the first time that these terms appear with significance in the results. Here, these terms appear to have a positive link with the probability that a firm will become a bidder. Firms which are consistently engaging in positive NPV projects will have high growth prospects in the future especially if their path is via mergers and acquisitions.

In these results it is possible to distinguish some patterns that develop over time as can be seen in most of the 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 company's 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.

3.5.3 Acquired and Non-involved Companies

The data sets used for this section comprises acquired firms and companies that were not involved in the acquisition process during the sample period. It was difficult to create models using data drawn from five years before the acquisition with either the logit or hazard function methodologies due to missing observations in the dataset to produce reliable results. Using these data sets, 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 approximately 21%. The results of the logit models for the five data sets can be found in the appendix section.

The first terms to discuss are the efficiency variables. Acquired companies appear more efficient than firms that did not become involved in takeovers. The key variables sales/total asset however has a negative relationship with the probability of been involved in a takeover. This sort of finding can be 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. This result suggests that it's the non-fixed assets which are causing inefficiency in acquired firms so ambitious managers can look solve this puzzle via a merger.

There isn't a clear consensus as to the correct sign for the profitability variables; ROCE, Pre-tax Income scaled by sales are negatively linked to the probability of being acquired whereas ROE, Net Income scaled by Sales, EBITDA are positively linked with the probability of being acquired. One thing to note here is that the sign changes when tax is accounted for in the profitability variables. The pre-tax income (scaled by sales) suggests that acquired firms are less profitable than firms not involved in the merger whereas net income suggests the opposite. The study was unable to obtain enough observations on tax information in order to draw conclusions on this point. Most of the investment terms have a negative relationship with the probability of been acquired. This sign is contrary to what the literature suggests as we expect the terms to be positive. Managerial incompetence could be the reason why terms some of the terms are negative. The negative values for the P/E ratios also correspond to another of the observed characteristics of acquired companies, that they are relatively low in value. The p/e ratio looks at the market price of a company compared to the earnings it can generate. This is a good measure of whether or not the company is accurately valued. These terms appear 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. The only term which has a positive sign is the market to book ratio. This term is only significant and positive 5 years before the acquisition takes place. Target firms are expected to have greater growth potential than those not involved in acquisitions and considering merger programs and plans are initiated years before it takes place this sign is consistent with the theory.

The capital structure 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 constitute a majority of these variables with only 2 out of 7 terms been negative. These terms suggest that acquired firms are in a better position for corporate restructuring in comparison to those which are not involved. The sign is in line with the restructuring motive as these firms later get acquired by the acquiring companies.

The last interesting characteristic of the target companies that can be seen in the liquidity variable results. The 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.

The hazard results offer a rather different set of results when compared to the logit models. The first terms to discuss are 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 an acquired 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 second term to discuss are the profitability terms which again show mixed results. The negative terms that appear in these model's imply that acquired firms 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 a target company in the recent literature on the subject, as typified by Lev (1992). The terms which appear contrary to the literature are ROCE and Net Income/Sales. As mentioned earlier, tax might have a significant impact on why the Net Income scaled by Sales term appears to be positive. The return on equity term is negative and significant the further we move away from the acquisition implying that when these corporate decisions are made, the acquired firms appear less profitable. The Pre-tax income (scaled by sales) is more informative closer to the acquisition date as acquirers would look to benefit from the acquisition via tax synergies.

The investment terms are less informative in comparison to the logit models however an interesting result is seen here as dividend per share appears to be negative. This means that the probability that of a company becoming an acquisition target decreases as the level of dividends per share goes up. This suggests that acquired firms are not in a better position in terms of making decisions on new investments in the future than the companies which remain uninvolved in the market for corporate control. Shareholders might be more interested in dividends as opposed to reinvestment which might be a reason for this. The P/E ratio is positive and relates to one of the observed characteristics.

The majority of the gearing terms are negatively related with the probability that a company will become acquired in the future. Acquired firms have lower leverage ratios than firms which are not involved in the acquisition process. Firms involved in the acquisition process tend to have lower levels of financial leverage because increases leverage is linked with increasing the probability of bankruptcy (Lewellen (1971) ; Robinson & Sensoy, (2019) ; Lim and Lee (2021)) . Lewellen (1971) postulates that merged firms can increase their financial leverage without increasing the pre-merger level of riskiness because of an increase in debt capacity that results from mergers. An increase in financial leverage benefits shareholders of merging firms through the tax deductibility of interest payments on corporate debt. Although the evidence on changes in financial leverage or the associated tax motivation is inconclusive, studies other than mergers provide evidence supporting tax-based theories of financial leverage (Mackie-Mason; 1990, Givoly et al. ;1992).

The last term to discuss are the size terms. The majority of these terms have a negative link with the probability of been acquired. As mentioned earlier, acquired firms tend to be smaller in nature. 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 firms not involved in the acquisition process.

3.6 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. Over a long horizon study that covers multiple merger waves, the results found in this study suggest that there is no clear superior model. Both models offer results that are 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. A complete set of all of these results can be found in Appendix II.

The acquired firms were examined twice, firstly against the companies that 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 acquiring firms or the firms that are not involved in the acquisition process. This supports the managerial inefficiency theory for takeovers, as suggested by many authors including Wen and Chen (2020) and McMillan and Gargett (2021), 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 (Boateng et al. (2017); Nigro and Winton (2020)). 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 the table.

The second group of variables are the profitability terms. These terms when the acquired firms are modelled against the acquiring companies show mixed results. Some terms are consistent with the prevailing notions concerning the nature of target companies, thus, they are less profitable than the average firm (Jain and Dasgupta (2020); Feng et. al (2021); Zhang and Zhang (2021)). 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 relate 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 on a whole are mostly negatively linked to the probability that the firms will be acquired. 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. The p/e ratios for acquiring firms are higher than those of the companies that do not take part in the takeover process. This means that acquiring firms are relatively over-valued which may make it easier for them to raise the funding necessary for the purchase of another firm (Zhang and Tucker (2017); Jenter and Lewellen (2017); Kim et al. (2018)).

The liquidity of the target firms is poor in the results generated when matched against both the acquiring and the non-involved firms. When the bidders are used in the models, the liquidity variables suggest that target firms 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 results remain consistent and convey the same impression about the financial condition of the targets (Lu, (2018); Chen and Ovtchinnikov (2020)). 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 and growth. When the acquired firms are modelled against the acquiring companies, the size variable becomes significant however the results are mixed. In the literature it is often observed that the targets of acquisition activity are smaller than the bidders. This is not always the case here as some terms representing size such as Market Value and Total Sales show positive and significant signs. These signs can be positive as some target firms have large market values relative to book values due to the nature of their business. Considering Total Sales is in line with the market value, then it is of no surprise that the firm's market value is correcting reflecting the business's level of sales. The opposite sign could also be due to the long time period used as large companies could also become the targets of acquisition activity when they would normally be safe from takeover attempts. 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.

The last point that needs to be made here is a note of the future developments that might be needed in this section. 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 1980 to 2017. If these models are estimated over the boom and recession data sets separately they might produce potentially different results. 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. Also splitting the sample by industry might offer some insights into predicting acquisition behaviour in different industries.

APPENDIX II

Table 38: Variables Used in the Analysis of Acquisition Activity in the Previous Literature

Variable Name	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
Ratio of Sales to Total Assets	Altman (1984)*	Decreasing sales is an indicator of financial distress
Operating Efficiency	Kim (1994)	Poor management creates operating inefficiency and financial slack
Asset Turnover	Spindt, Tarhan & Sung (1996)	To measure changes in firm performance
	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
Return on equity over 3 and 10 Year Periods	Sawyer & Shrieves (1994)	Profitability trends can distinguish acquir4ed 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 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 between 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 (1984)*	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
3 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 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 may be safe from acquisition attempts
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 have an influence on target share price
Total Sales	Sridharan & Reinganum (1995)	During hostile takeovers, acquired and acquiring firms differ in size
Logarithm of Total Assets	Cosh & Hughes (1995)	Acquired firms may be smaller than the industry average
Total Sales	Altman, Haldeman & Narayanan (1984)*	Smaller firms are more likely to face financial difficulties
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

Table 39: Motives for Acquisition Activity in Previous Literature

Theory	Author(s)	Rationale
	Managerial Theories	
Managerial Ambition (Agency Problem)	Jensen and Ruback (1983)	Managers compete for the right to control firm assets and increase their influence
	Schleifer and Vishny (1988)	An acquisition expands a firms interests and the scope of the managers influence
	Jensen (1988, 1992)	Free Cash flow Theory suggests that bidders prefer to invest in takeovers than pay dividends
	Larcker (1992)	Agency problems allow managers to attempt takeovers for their own needs
	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
Positive NPV Project	Dietrich & Sorensen (1984)	Managers will attempt projects that increase the NPV (expected) 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
Managerial and Market Myopia	Jensen (1988, 1992)	Fear of takeover makes managers increase short term profits to protect themselves

	Jarrell, Brickley and Netter (1988)	The stock market likes short term performance making takeovers raise bidder profiles
Correcting Target Managerial Inefficiency	Palepu (1986)	Managers failing to maximise shareholders gains will be replaced in an acquisition
	Giammarion and Heinkel (1986)	Takeovers are a mechanism of correcting and discipline 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
	Frank and Harris (1993)	Acquisitions ensure more effective allocation of the target firms assets
	Jenkinson and Mayer (1994)	Takeovers serve as a means of transferring 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
	Giammarion 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
	Frank 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 than expensive companies
	Jarrell, Brickley and Netter (1988)	An incorrect undervaluation of the target leads to a gain for the bidding firm during a takeover
	Weston, Chung and Hoag (1990)	Markets ignore long term investing and undervalues such firms i.e. making targets
	New Markets, Diversification and Expansion Theories	
Entry to New Markets	McCradle and Viswanathan (1994)	Sometimes it is only possible to enter to enter a markets by purchasing a firm in that field
	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 grow and develop via diversification
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 of 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
	Morck, Schliefer and Vishny (1988)	A motivation 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
	Lev (1992)	Takeovers can improve earnings stability and financial performance
	Bertovitch and Narayanan (1993)	Combining acquirer and target firms maximises shareholder wealth
	Bertovitch and Khanna (1993)	Acquisitions are only viable if they lead to 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 acquisitions 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 acquisitions 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

Table 40: 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 Variable	Theory(ies) Supporting the Use of Such Variables and Selected References
See Table 38 and 39 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 & Sung (1996)		• Ambitious acquirer managers will seek to expand their influence (market share) through takeovers. Jensen & Ruback (1983), Schliefer & Vishny (1988), Parkinson & Dobbins (1993) • Takeovers increase total market efficiency. Scherer (1986), Jensen (1988,1992), Lev (1982) • Acquisitions correct for managerial inefficiency by removing ineffective managers. Palepu (1986), Jensen (1988), Frank and Harris (1993), Boisi & Essig (1994) • Synergy gains increase efficiency. Bradley, Desai & Kim (1988), Morck, Schliefer & Vishny (1988), Berkovitch & Khanna (1993), Jenkinson & Mayer (1994) • Operational efficiency is increased by a takeover. Lev (1992), Achtmeyer (1994)
	Altman (1984)*		
Ratio of Turnover to Fixed assets	Dietrich & Sorensen (1984)		
Sales per Employee		Kim (1994)	
Stock Ratio		Kim (1994)	
Profitability Variables		**Motives Related to Profitability Variables**	
Return on Capital Employed	Cosh & Hughes (1995)	Cosh, Hughes, Lee and Singh (1989)	• Ambitious acquirer managers with high profits use those funds for their own benefit. Jensen (1988, 1992), Lev (1992), Berkovitch & Narayanan (1993) • Market myopia may force managers to increase short term profits through acquisitions. Jensen (1988, 1992), Jarell, Brickley, Netter (1988)
		Spindt, Tarhan & Sung (1996)	
Return on Shareholders Equity	Palepu (1986)		
Pre-tax Profit Margin	Agrawal & Walkling (1994)		
	Sawyer and Shrieves (1994)		
	Spindt, Tarhan & Sung (1996)		
	Dietrich & Sorensen (1984)		

	Cosh, Hughes, Lee and Singh (1989)		• Acquisitions should only be selected by managers if they increase the future NPV of the firm. Dietrich & Sorensen (1984), Parkinson & Dobbins (1993) • Managerial inefficiency results in low profits. Gimmarino & Heinkel (1986), Cosh, Hughes, Lee and Singh (1989), Jenkinson & Mayer (1994) • Large market increase profits. Creehan & Leger (1994) • Synergistic gains can increase profitability. Weston, Chung & Hoag (1990), Lev (1992), Limmack (1994)
Net Profit Margin	Cosh & Hughes (1995)		
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 (1988, 1992), Larcker(1992), Berkovitch & Narayanan (1993) • Managers attempt to increase future NPV. Dietrich & Sorensen (1984), Parkinson & Dobbins (1993) • Acquisitions correct managerial inefficiency which leads to more suitable investments. Gimmarino & Heinkel (1986), Cosh, Hughes, Lee and Singh (1989), Frank & 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 & Narayanan (1993), Jenkinson & 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 (1992)		
Gearing		**Motives Related to Gearing Variables**	
Capital Gearing	Levine and Aaronovitch (1981)	Dietrich & Sorensen (1984)	• Financial restructuring occurs during a takeover. Franks and Meyer (1993) • Financial restructuring can be a solution for firm problems. Thompson, wright and Robbie (1992)
	Dietrich & Sorensen (1984)		
	Palepu (1986)		
	Ambrose & Megginson (1992)		
	Sawyer and Shrieves (1994)		
	Cosh & Hughes (1995)		
Liquidity Ratios		**Motives Related to Liquidity Variables**	
Current Ratio	Levine and Aaronovitch (1981)	Sawyer and Shrieves (1994)	• Acquisitions correct managerial inefficiency which leads to the appropriate use of firm funds. Gimmarino & Heinkel (1986), Jensen (1988, 1992), Frank and Harris (1993) • Economies of scale can improve the financial condition of a firm. Weston, Chung & Hoag (1990), Lev (1992), Limmack (1994) • Ambitious managers choose targets with potential. Lev (1992), Larcker (1992)
	Dietrich & Sorensen (1984)		
	Auerbach & Reishus (1988)		
	Cosh & Hughes (1995)		
Acid Test Ratio	Levine and Aaronovitch (1981)	Kim (1994)	
	Palepu (1986)		

	Ambrose & Megginson (1992)		
	Cosh & Hughes (1995)		
Debtor Days	Higson and Elliot (1994)	Datta & Iskandar – Datta (1995)	
Creditor Days	Higson and Elliot (1994)	Datta & Iskandar – Datta (1995)	
Size Variable		**Motives Related to Size Variables**	
Total Sales	Sawyer and Shrieves (1994)		• Size is linked to manager's bonuses so purchasing another firm benefits the managers. Jensen and Ruback (1983), Lev (1992), Larcker (1992), Berkovitch & Narayanan (1993) • Smaller firms are cheaper to buy. Palepu (1986), Jarell, Brickley, Netter (1988) • Larger firms are less likely to be acquired. Palepu (1986)
	Sridharan & Reinganum (1995)		
Measures of Propensity to Diversity		**Motives Related to Diversification**	
Ratio of Managers to Employees	Lecraw (1984) *		• Entry to some markets is only possible viia takeover. McCardle and Viswanathan (1994), Hughes (1993) • Diversification is a quick way to increase managerial influence and firm size. Lev 91992) • Managers with little to do diversify in order to secure their jobs. Lecraw (1984) • A firms market power can be increased via a takeover. Levy & Sarnat (1970), Hughes (1993) • A 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. Jarell, Brickley, Netter (1988), Higson (1991)

*Indicates an article that does not refer directly to the acquisition activity but deals with a similar or related area
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.

Table 41: T-Statistics for the Differences between Acquired and Acquiring Firms

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	0.00***	0.00***	0.00***	0.00***	0.00***
T Statistic	5.38	4.60	4.95	4.70	4.48
P Value	0.00	0.00	0.00	0.00	0.00
Sales/Total Asset	0.00***	0.00***	0.00***	0.00***	0.00***
T Statistic	3.44	3.57	3.38	2.08	2.49
P Value	0.00	0.00	0.00	0.04	0.01
Sales/Employees	0.24***	0.21***	0.18***	0.16***	0.13***
T Statistic	7.08	6.45	6.11	5.75	5.17
P Value	0.00	0.00	0.00	0.00	0.00
Profitability					
ROCE	0.01***	0.01***	0.01***	0.01***	0.01***
T Statistic	3.78	3.85	4.55	4.87	4.63
P Value	0.00	0.00	0.00	0.00	0.00
ROE	0.01***	0.01***	0.00	0.00	0.00*
T Statistic	3.14	3.32	0.77	0.28	1.64
P Value	0.00	0.00	0.44	0.78	0.10
Net Income/Sales	2.65	3.87	0.23	6.01*	7.59*
T Statistic	0.80	1.11	0.06	1.63	1.79
P Value	0.42	0.27	0.95	0.10	0.07
Pre-tax Income/Sales	3.21	4.54	0.96	13.79**	16.43**
T Statistic	0.60	0.74	0.14	2.08	2.16
P Value	0.55	0.46	0.89	0.04	0.03
Investment					
Dividend per share	0.00***	0.00***	0.00***	0.00**	0.00**
T Statistic	2.66	2.46	2.40	2.66	2.41
P Value	0.01	0.01	0.02	0.02	0.02
Earnings per share	6.45***	5.32***	4.72***	3.62***	2.54***
T Statistic	2.99	3.80	4.19	3.98	3.58
P Value	0.00	0.00	0.00	0.00	0.00
Dividend Yield	0.14*	0.04	0.08	0.16**	0.18**
T Statistic	1.90	0.50	0.98	2.05	2.40
P Value	0.06	0.62	0.33	0.04	0.02
Price Earnings Ratio	0.73	1.48**	1.65*	1.50**	0.75
T Statistic	0.51	2.13	1.88	2.42	0.90
P Value	0.61	0.03	0.06	0.02	0.37
Gearing					
Total Debt/Shareholder Equity	0.01	0.01	0.03**	0.03*	0.03*
T Statistic	0.72	0.70	1.95	1.88	1.87
P Value	0.47	0.49	0.05	0.06	0.06
EBIT/Interest Expense Total	1.24***	1.25***	1.14***	1.04***	1.01***
T Statistic	7.56	7.48	7.31	6.79	6.44
P Value	0.00	0.00	0.00	0.00	0.00

Shareholder's Equity/Total Assets	0.01***	0.01***	0.01***	0.01***	0.01***
T Statistic	2.48	3.65	4.04	3.55	4.48
P Value	0.01	0.00	0.00	0.00	0.00
Total Debt/Total Assets	0.00*	0.00***	0.00	0.00	0.00
T Statistic	1.82	2.49	1.10	1.06	1.16
P Value	0.07	0.01	0.27	0.29	0.25
Long Term Debt/Shareholder's Equity	0.00	0.00	0.01	0.00	0.00
T Statistic	0.10	0.13	0.98	0.17	1.16
P Value	0.92	0.89	0.33	0.86	0.25
Long Term Debt/Total Assets	0.00	0.00**	0.00**	0.00**	0.00**
T Statistic	1.18	1.94	2.32	2.44	1.94
P Value	0.24	0.05	0.02	0.02	0.05
Short Term Debt/Total Assets	0.00	0.00	0.00**	0.00***	0.00***
T Statistic	1.96	1.31	2.03	2.71	3.26
P Value	0.92	0.19	0.04	0.01	0.00
Liquidity					
Current Ratio	0.49	0.27*	0.07	68.16	0.49
T Statistic	1.37	1.67	0.40	1.00	1.37
P Value	0.17	0.09	0.69	0.32	0.17
Quick Ratio	0.49	0.27*	0.07	68.16	0.10
T Statistic	1.37	1.67	0.40	1.00	0.37
P Value	0.17	0.09	0.69	0.32	0.71
Size					
Market Value	0.41	0.22	0.00	0.18	0.07
T Statistic	1.15	1.38	0.01	0.95	0.24
P Value	0.25	0.17	0.99	0.34	0.81
Book Value	1.30***	1.11***	1.00***	0.88***	0.72***
T Statistic	9.85	9.37	9.05	8.17	7.60
P Value	0.00	0.00	0.00	0.00	0.00
Total Assets	2.03**	1.16**	0.61	0.78	0.42
T Statistic	2.42	2.33	0.98	0.98	1.01
P Value	0.02	0.02	0.33	0.33	0.31
Total Sales	1.33***	1.15***	0.98***	0.84***	0.70***
T Statistic	7.53	6.82	6.72	6.70	6.56
P Value	0.00	0.00	0.00	0.00	0.00
Growth					
Change in Sales	0.24	1.44	0.06	0.13	0.53
T Statistic	0.48	0.88	0.76	0.49	0.85
P Value	0.63	0.38	0.45	0.63	0.39
Change in Total Assets	0.85	0.10	10.38	0.06	0.13
T Statistic	0.98	1.73	0.99	1.35	1.56
P Value	0.33	0.08	0.32	0.18	0.12
Reject the null hypothesis that the differences between the means is equal to zero at 1%***, 5%**, 10%*					

Table 42: T-Statistics for the Differences between Acquired and Non-involved Firms

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	0.00	0.00	0.00	0.00	0.00
T Statistic	1.28	0.45	0.50	0.17	0.74
P Value	0.20	0.65	0.61	0.86	0.46
Sales/Total Asset	0.00	0.00	0.00	0.00	0.00
T Statistic	0.45	0.37	0.50	0.17	0.74
P Value	0.65	0.71	0.61	0.86	0.46
Sales/Employees	0.03	0.02	0.01	0.00	0.00
T Statistic	1.26	1.13	0.30	0.17	0.74
P Value	0.21	0.26	0.76	0.86	0.46
Profitability					
ROCE	0.00***	0.00***	0.00***	0.00**	0.00
T Statistic	3.24	2.96	2.64	1.96	1.13
P Value	0.00	0.00	0.01	0.05	0.26
ROE	0.00	0.00*	0.01***	0.01***	0.00**
T Statistic	0.28	1.66	3.10	3.23	2.07
P Value	0.78	0.10	0.00	0.00	0.04
Net Income/Sales	4.85*	4.28*	7.16**	7.63**	8.03**
T Statistic	1.81	1.69	2.35	2.29	2.24
P Value	0.07	0.09	0.02	0.02	0.03
Pre-tax Income/Sales	7.76*	6.57	13.72***	13.07**	16.35***
T Statistic	1.70	1.48	2.50	2.14	2.47
P Value	0.09	0.14	0.01	0.03	0.01
Investment					
Dividend per share	0.00	0.00	0.00	0.00	0.00
T Statistic	0.64	0.69	0.32	0.44	0.26
P Value	0.52	0.49	0.75	0.66	0.79
Earnings per share	4.02***	3.99***	2.76***	1.73	1.69***
T Statistic	2.54	3.35	2.82	1.10	2.65
P Value	0.01	0.00	0.00	0.27	0.01
Dividend Yield	0.92***	0.81***	0.65***	0.54***	0.46***
T Statistic	10.01	9.06	7.45	6.32	5.73
P Value	0.00	0.00	0.00	0.00	0.00
Price Earnings Ratio	4.37***	4.06***	3.35***	2.18*	3.75***
T Statistic	4.42	6.48	3.60	1.81	5.13
P Value	0.00	0.00	0.00	0.07	0.00
Gearing					
Total Debt/Shareholder Equity	0.01	0.01	0.02*	0.02*	0.01
T Statistic	0.91	0.54	1.84	1.64	0.94
P Value	0.37	0.59	0.07	0.10	0.35
EBIT/Interest Expense Total	0.25***	0.31***	0.38***	0.35***	0.37***
T Statistic	2.96	3.57	4.49	4.13	4.18
P Value	0.00	0.00	0.00	0.00	0.00

Shareholder's Equity/Total Assets	0.00**	0.00***	0.00***	0.00*	0.00**
T Statistic	2.19	2.84	2.84	1.84	2.26
P Value	0.03	0.00	0.00	0.07	0.02
Total Debt/Total Assets	0.00	0.00	0.00	0.00	0.00*
T Statistic	0.31	0.46	0.81	0.89	1.89
P Value	0.75	0.64	0.42	0.37	0.06
Long Term Debt/Shareholder's Equity	0.00	0.00	0.01*	0.01*	0.00
T Statistic	0.18	0.21	1.92	1.65	1.01
P Value	0.86	0.83	0.06	0.10	0.31
Long Term Debt/Total Assets	0.00	0.00	0.00	0.00	0.00
T Statistic	0.93	1.05	0.51	0.07	0.61
P Value	0.35	0.29	0.61	0.95	0.54
Short Term Debt/Total Assets	0.00	0.00	0.00	0.00	0.00***
T Statistic	0.96	0.26	0.39	0.57	2.73
P Value	0.34	0.79	0.69	0.57	0.01
Liquidity					
Current Ratio	0.62***	0.38***	0.49***	68.86	0.06
T Statistic	3.90	3.47	2.74	1.01	0.16
P Value	0.00	0.00	0.01	0.31	0.87
Quick Ratio	0.35***	0.35***	0.22**	0.34***	0.06
T Statistic	4.16	4.16	1.96	3.19	0.17
P Value	0.00	0.00	0.05	0.00	0.87
Size					
Market Value	1.29***	1.37***	0.62	0.85**	0.88***
T Statistic	2.87	3.03	1.51	2.11	2.46
P Value	0.00	0.00	0.13	0.03	0.01
Book Value	0.79	0.67	1.85*	1.35**	0.34**
T Statistic	0.62	0.53	1.82	2.02	2.32
P Value	0.53	0.60	0.07	0.04	0.02
Total Assets	1.32***	1.14***	1.03***	0.87***	0.65***
T Statistic	5.88	7.45	7.28	5.94	5.27
P Value	0.00	0.00	0.00	0.00	0.00
Total Sales	1.23***	1.32***	0.71**	0.87***	0.87***
T Statistic	3.48	3.71	2.24	2.82	3.11
P Value	0.00	0.00	0.03	0.00	0.00
Growth					
Change in Sales	0.21**	1.81	0.01	0.11	2.20
T Statistic	2.00	1.14	0.26	0.72	1.18
P Value	0.05	0.26	0.79	0.47	0.24
Change in Total Assets	0.01	0.01	10.38	0.04	0.07
T Statistic	1.11	0.19	0.99	0.71	0.93
P Value	0.27	0.85	0.32	0.48	0.35
Reject the null hypothesis that the differences between the means is equal to zero at 1%***, 5%**, 10%*					

Table 43: T-Statistics for the Differences between Acquiring and Non-involved Firms

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	0.00***	0.00***	0.00***	0.00**	0.00*
T Statistic	3.41	2.66	2.48	2.28	1.84
P Value	0.06	0.01	0.01	0.02	0.07
Sales/Total Asset	0.00**	0.00*	0.00*	0.00	0.00
T Statistic	1.95	1.83	1.87	1.15	1.15
P Value	0.05	0.07	0.06	0.25	0.25
Sales/Employees	0.22***	0.18***	0.17***	0.17***	0.14***
T Statistic	4.38	3.93	3.88	3.81	3.35
P Value	0.00	0.00	0.00	0.00	0.00
Profitability					
ROCE	0.00	0.00*	0.01***	0.01***	0.01***
T Statistic	1.52	1.77	2.71	3.13	3.33
P Value	0.13	0.08	0.01	0.00	0.00
ROE	0.01**	0.01***	0.01**	0.01**	0.01**
T Statistic	2.09	3.18	2.28	2.09	2.40
P Value	0.04	0.00	0.02	0.04	0.02
Net Income/Sales	7.51*	8.15*	7.40	13.64***	15.62***
T Statistic	1.79	1.80	1.48	2.57	2.72
P Value	0.07	0.07	0.14	0.01	0.01
Pre-tax Income/Sales	10.96	11.10	12.77	26.86***	32.78***
T Statistic	1.60	1.41	1.42	2.75	3.04
P Value	0.11	0.16	0.16	0.01	0.00
Investment					
Dividend per share	0.00**	0.00*	0.00*	0.00**	0.00*
T Statistic	1.94	1.86	1.82	2.06	1.86
P Value	0.05	0.06	0.07	0.04	0.06
Earnings per share	10.47	9.30	7.48	5.35	4.23
T Statistic	0.41	0.33	0.28	0.21	0.18
P Value	0.68	0.74	0.78	0.83	0.86
Dividend Yield	0.78	0.77	0.72	0.70	0.64
T Statistic	0.36	0.36	0.38	0.46	0.50
P Value	0.72	0.72	0.70	0.65	0.62
Price Earnings Ratio	3.64	5.54	5.01	3.68	4.50
T Statistic	0.14	0.16	0.11	0.06	0.07
P Value	0.89	0.87	0.91	0.95	0.94
Gearing					
Total Debt/Shareholder Equity	0.00	0.01	0.01	0.01	0.02
T Statistic	0.09	0.19	0.42	0.49	0.77
P Value	0.92	0.85	0.67	0.63	0.44
EBIT/Interest Expense Total	1.49***	1.55***	1.52***	1.39***	1.38***
T Statistic	5.05	5.71	6.21	5.75	5.98
P Value	0.00	0.00	0.00	0.00	0.00

Shareholder's Equity/Total Assets	0.00	0.01*	0.01*	0.01*	0.01***
T Statistic	1.03	1.63	2.08	2.05	2.66
P Value	0.30	0.10	0.04	0.04	0.01
Total Debt/Total Assets	0.00	0.00	0.00	0.00	0.00
T Statistic	1.03	1.42	0.97	0.97	1.38
P Value	0.30	0.16	0.33	0.33	0.17
Long Term Debt/Shareholder's Equity	0.00	0.00	0.00	0.01	0.00
T Statistic	0.15	0.01	0.24	0.73	0.33
P Value	0.88	0.99	0.81	0.47	0.74
Long Term Debt/Total Assets	0.00	0.00	0.00	0.00*	0.00
T Statistic	0.48	0.96	1.53	1.90	1.25
P Value	0.63	0.33	0.13	0.06	0.21
Short Term Debt/Total Assets	0.00	0.00	0.00	0.00	0.00
T Statistic	0.75	0.61	0.98	0.99	0.77
P Value	0.45	0.54	0.33	0.32	0.44
Liquidity					
Current Ratio	1.11***	0.65**	0.42**	0.70***	0.16
T Statistic	2.52	2.28	1.97	2.85	0.35
P Value	0.01	0.02	0.05	0.00	0.72
Quick Ratio	0.76*	0.47*	0.22	0.52**	0.01
T Statistic	1.83	1.69	1.08	2.17	0.02
P Value	0.07	0.09	0.28	0.03	0.99
Size					
Market Value	1.29***	1.13***	0.96***	0.87**	0.73**
T Statistic	3.02	2.82	2.48	2.31	1.97
P Value	0.00	0.00	0.01	0.02	0.05
Book Value	1.76	1.05	0.88	0.90	0.41
T Statistic	1.30	0.85	0.74	0.78	0.45
P Value	0.19	0.39	0.46	0.44	0.65
Total Assets	1.33	1.15	0.99	0.85	0.69
T Statistic	2.22	2.05	1.95	1.88	1.66
P Value	0.03**	0.04**	0.05**	0.06**	0.10*
Total Sales	1.28***	1.13***	0.97***	0.88**	0.74**
T Statistic	3.01	2.84	2.53	2.35	2.03
P Value	0.00	0.00	0.01	0.02	0.04
Growth					
Change in Sales	0.45	0.38	0.05	0.23	2.73
T Statistic	0.89	0.81	0.62	1.03	1.46
P Value	0.37	0.42	0.54	0.30	0.14
Change in Total Assets	0.86	0.10**	0.00	0.02	0.06
	1.00	1.97	0.11	0.29	1.35
	0.32	0.05	0.91	0.77	0.18
Reject the null hypothesis that the differences between the means is equal to zero at 1%***, 5%**, 10%*					

Table 44: Key to Correlation Matrix

Abbreviation	Variable
EFF1	Sales/Fixed Asset
EFF2	Sales/Total Asset
EFF3	Sales/Employees
PRF1	ROCE
PRF2	ROE
PRF3	Net Income/Sales
PRF4	Pre-tax Income/Sales
PRF5	EBITDA
INV1	Dividend per share
INV2	Earnings per share
INV3	Dividend Yield
INV4	Price Earnings Ratio
INV5	Market Value/Book Value
GER1	Total Debt/Shareholder Equity
GER2	EBIT/Interest Expense Total
GER3	Shareholder's Equity/Total Assets
GER4	Total Debt/Total Assets
GER5	Long Term Debt/Shareholder's Equity
GER6	Long Term Debt/Total Assets
GER7	Short Term Debt/Total Assets
LIQ1	Current Ratio
LIQ2	Quick Ratio
SZ1	Market Value
SZ2	Book Value
SZ3	Total Assets
SZ4	Total Sales
SZ5	Enterprise Value
GW1	Change in Sales
GW2	Change in Total Assets

Table 45: Correlation Coefficients for Acquired and Acquiring Firms One Year before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.71	1																								
EFF3	0.61	0.36	1																							
PRF1	-0.19	-0.12	-0.22	1																						
PRF2	0.00	0.15	-0.20	0.54	1																					
PRF3	-0.40	-0.38	-0.31	0.36	0.31	1																				
PRF4	-0.40	-0.39	-0.31	0.34	0.28	0.97	1																			
INV1	-0.10	-0.03	-0.14	0.09	0.10	0.13	0.13	1																		
INV2	0.43	0.55	0.15	-0.15	0.08	-0.33	-0.33	0.02	1																	
INV3	0.04	0.18	-0.20	0.32	0.47	0.21	0.19	0.23	0.19	1																
INV4	0.01	0.14	-0.20	0.17	0.30	0.09	0.08	0.14	0.17	0.74	1															
GER1	0.59	0.58	0.31	-0.03	0.21	-0.26	-0.25	-0.05	0.49	0.18	0.17	1														
GER2	0.12	0.11	0.09	0.23	0.42	0.12	0.12	-0.05	-0.07	0.23	-0.02	0.18	1													
GER3	-0.36	-0.47	0.01	0.17	-0.30	0.12	0.10	-0.06	-0.37	-0.30	-0.28	-0.62	-0.25	1												
GER4	0.51	0.46	0.36	-0.05	0.05	-0.32	-0.33	-0.09	0.47	0.04	0.02	0.67	0.01	-0.20	1											
GER5	0.30	0.24	0.11	0.05	0.13	-0.09	-0.08	-0.06	0.27	0.14	0.15	0.74	0.07	-0.46	0.51	1										
GER6	-0.05	-0.23	0.05	0.02	-0.15	0.03	0.03	-0.14	-0.03	-0.22	-0.15	0.10	-0.18	0.15	0.38	0.43	1									
GER7	0.64	0.70	0.44	-0.17	0.10	-0.38	-0.37	-0.07	0.55	0.11	0.08	0.71	0.20	-0.41	0.73	0.28	-0.13	1								
LIQ1	0.02	0.05	-0.02	-0.11	-0.12	-0.10	-0.09	-0.02	0.20	-0.05	0.06	0.05	-0.20	-0.07	0.03	0.07	0.09	0.00	1							
LIQ2	0.06	0.08	-0.02	-0.14	-0.14	-0.13	-0.12	-0.06	0.25	-0.06	0.07	0.07	-0.25	-0.10	0.05	0.09	0.10	0.02	0.89	1						
SZ1	-0.59	-0.27	-0.72	0.37	0.41	0.39	0.39	0.24	-0.05	0.37	0.35	-0.18	-0.04	-0.18	-0.35	0.03	-0.06	-0.43	0.06	0.07	1					
SZ2	0.02	-0.13	0.28	-0.24	-0.36	-0.11	-0.10	-0.06	-0.10	-0.26	-0.43	-0.22	-0.13	0.38	-0.09	-0.25	-0.05	-0.07	0.10	0.03	-0.40	1				
SZ3	-0.16	0.14	-0.51	0.29	0.47	0.21	0.20	0.24	0.28	0.62	0.54	0.19	0.03	-0.51	-0.02	0.27	-0.05	-0.06	0.09	0.14	0.78	-0.57	1			
SZ4	-0.59	-0.27	-0.72	0.37	0.41	0.39	0.38	0.24	-0.05	0.37	0.35	-0.18	-0.03	-0.19	-0.35	0.03	-0.06	-0.43	0.06	0.07	1.00	-0.40	0.78	1		
GW1	0.03	0.04	0.02	-0.02	0.00	0.02	0.01	0.03	0.00	-0.01	-0.01	-0.01	0.01	-0.02	-0.01	0.00	0.01	-0.03	0.00	0.00	-0.02	0.00	0.00	-0.02	1	
GW2	0.03	0.05	-0.02	0.06	0.03	0.01	0.01	0.02	-0.04	0.01	0.01	-0.03	-0.03	0.05	-0.02	-0.04	-0.03	-0.01	0.00	0.00	0.03	-0.01	0.02	0.03	0.00	1

Table 46:Correlation Coefficients for Acquired and Acquiring Firms Two Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.73	1																								
EFF3	0.59	0.38	1																							
PRF1	-0.19	-0.13	-0.18	1																						
PRF2	0.06	0.14	-0.10	0.48	1																					
PRF3	-0.43	-0.45	-0.34	0.29	0.23	1																				
PRF4	-0.43	-0.45	-0.34	0.27	0.20	0.98	1																			
INV1	-0.16	-0.07	-0.15	0.11	0.15	0.14	0.14	1																		
INV2	0.49	0.59	0.22	-0.20	0.07	-0.40	-0.42	0.01	1																	
INV3	0.04	0.16	-0.19	0.29	0.41	0.20	0.17	0.20	0.16	1																
INV4	0.09	0.16	-0.11	0.07	0.19	0.01	-0.01	0.07	0.09	0.65	1															
GER1	0.62	0.53	0.34	-0.09	0.16	-0.31	-0.31	-0.12	0.50	0.16	0.18	1														
GER2	0.14	0.08	0.13	0.14	0.32	0.10	0.08	-0.03	-0.09	0.14	-0.06	0.17	1													
GER3	-0.37	-0.45	0.00	0.20	-0.24	0.15	0.15	0.01	-0.35	-0.30	-0.29	-0.58	-0.20	1												
GER4	0.52	0.46	0.39	-0.05	0.05	-0.39	-0.38	-0.11	0.49	0.04	0.08	0.66	0.00	-0.16	1											
GER5	0.32	0.22	0.11	-0.04	0.03	-0.13	-0.12	-0.10	0.26	0.14	0.14	0.71	0.06	-0.44	0.45	1										
GER6	-0.03	-0.20	0.03	0.00	-0.19	0.00	0.01	-0.13	-0.05	-0.16	-0.11	0.13	-0.20	0.17	0.36	0.45	1									
GER7	0.64	0.69	0.47	-0.18	0.12	-0.45	-0.46	-0.10	0.57	0.07	0.13	0.68	0.18	-0.39	0.74	0.24	-0.14	1								
LIQ1	0.01	0.09	-0.08	-0.11	-0.10	-0.10	-0.09	-0.02	0.32	-0.05	0.00	0.09	-0.26	-0.17	0.04	0.13	0.11	-0.01	1							
LIQ2	0.03	0.09	-0.07	-0.11	-0.11	-0.11	-0.09	-0.04	0.33	-0.05	-0.01	0.09	-0.25	-0.15	0.05	0.13	0.11	0.00	0.99	1						
SZ1	-0.58	-0.31	-0.72	0.32	0.29	0.39	0.38	0.24	-0.13	0.37	0.24	-0.25	-0.11	-0.15	-0.40	-0.03	-0.07	-0.47	0.21	0.19	1					
SZ2	-0.03	-0.14	0.25	-0.15	-0.27	-0.08	-0.07	-0.07	-0.08	-0.47	-0.58	-0.19	0.04	0.34	-0.07	-0.21	0.01	-0.07	0.03	0.04	-0.36	1				
SZ3	-0.15	0.11	-0.52	0.22	0.36	0.20	0.19	0.21	0.22	0.64	0.45	0.15	-0.09	-0.49	-0.06	0.25	-0.03	-0.10	0.30	0.28	0.78	-0.57	1			
SZ4	-0.57	-0.31	-0.72	0.32	0.29	0.39	0.38	0.24	-0.13	0.37	0.24	-0.25	-0.11	-0.16	-0.40	-0.03	-0.08	-0.47	0.21	0.19	1.00	-0.36	0.78	1		
GW1	0.00	0.03	0.04	0.00	-0.03	0.01	0.01	-0.03	-0.02	-0.01	-0.01	-0.02	0.00	0.01	0.03	0.01	0.03	0.02	0.00	0.00	-0.03	0.01	-0.02	-0.03	1	
GW2	0.08	0.00	0.06	0.12	0.01	0.04	0.03	0.02	0.03	0.02	0.01	0.05	0.10	0.01	0.02	0.01	-0.09	0.05	-0.03	-0.02	-0.07	-0.01	-0.05	-0.07	-0.01	1

Table 47:Correlation Coefficients for Acquired and Acquiring Firms Three Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.75	1																								
EFF3	0.60	0.43	1																							
PRF1	-0.23	-0.17	-0.21	1																						
PRF2	0.00	0.11	-0.11	0.42	1																					
PRF3	-0.48	-0.48	-0.36	0.28	0.16	1																				
PRF4	-0.47	-0.48	-0.36	0.26	0.13	0.98	1																			
INV1	-0.15	-0.05	-0.19	0.07	0.10	0.10	0.10	1																		
INV2	0.51	0.56	0.28	-0.23	0.03	-0.44	-0.45	0.01	1																	
INV3	0.03	0.12	-0.17	0.26	0.36	0.18	0.16	0.22	0.07	1																
INV4	0.18	0.26	0.05	0.05	0.16	-0.10	-0.14	0.07	0.01	0.46	1															
GER1	0.61	0.55	0.35	-0.13	0.14	-0.36	-0.36	-0.13	0.49	0.12	0.21	1														
GER2	0.15	0.10	0.17	0.05	0.25	0.05	0.04	-0.08	-0.03	0.12	-0.06	0.16	1													
GER3	-0.35	-0.42	-0.01	0.27	-0.18	0.17	0.16	-0.03	-0.30	-0.26	-0.18	-0.56	-0.22	1												
GER4	0.54	0.46	0.44	-0.06	0.05	-0.42	-0.42	-0.10	0.49	0.00	0.16	0.67	0.00	-0.14	1											
GER5	0.30	0.19	0.12	-0.06	0.01	-0.09	-0.08	-0.10	0.20	0.12	0.10	0.68	0.03	-0.45	0.38	1										
GER6	-0.03	-0.21	0.03	0.10	-0.20	0.06	0.07	-0.12	-0.09	-0.14	-0.09	0.08	-0.25	0.23	0.33	0.38	1									
GER7	0.65	0.68	0.50	-0.25	0.09	-0.51	-0.50	-0.09	0.59	0.02	0.22	0.71	0.21	-0.37	0.75	0.23	-0.17	1								
LIQ1	0.00	0.07	-0.10	-0.05	-0.02	-0.04	-0.03	0.01	0.23	0.02	0.01	0.07	-0.20	-0.13	0.02	0.12	0.08	-0.03	1							
LIQ2	0.01	0.07	-0.10	-0.07	-0.04	-0.05	-0.04	0.00	0.28	0.01	0.01	0.07	-0.21	-0.13	0.02	0.11	0.10	-0.03	0.84	1						
SZ1	-0.61	-0.36	-0.73	0.31	0.27	0.42	0.41	0.26	-0.24	0.34	0.05	-0.30	-0.18	-0.12	-0.47	-0.04	-0.09	-0.53	0.20	0.20	1					
SZ2	-0.03	-0.13	0.24	-0.12	-0.23	-0.06	-0.06	-0.13	-0.08	-0.31	-0.24	-0.17	0.11	0.33	-0.05	-0.21	0.00	-0.04	-0.02	0.00	-0.35	1				
SZ3	-0.17	0.06	-0.52	0.21	0.33	0.21	0.20	0.26	0.09	0.61	0.26	0.09	-0.18	-0.46	-0.12	0.23	-0.05	-0.17	0.27	0.28	0.77	-0.60	1			
SZ4	-0.60	-0.36	-0.73	0.31	0.27	0.41	0.41	0.26	-0.23	0.34	0.06	-0.30	-0.18	-0.12	-0.46	-0.03	-0.09	-0.53	0.20	0.20	1.00	-0.35	0.77	1		
GW1	-0.01	0.02	-0.06	-0.03	0.06	0.11	0.11	0.03	-0.03	0.03	0.02	-0.09	-0.03	-0.02	-0.14	-0.06	-0.04	-0.13	0.01	0.02	0.09	-0.04	0.09	0.09	1	
GW2	0.00	-0.04	-0.02	-0.07	0.03	0.02	0.02	0.00	0.02	0.01	0.01	-0.03	-0.02	-0.03	-0.04	-0.04	-0.03	-0.01	0.01	0.00	0.03	-0.01	0.02	0.03	-0.01	1

Table 48: Correlation Coefficients for Acquired and Acquiring Firms Four Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.74	1																								
EFF3	0.62	0.44	1																							
PRF1	-0.24	-0.17	-0.22	1																						
PRF2	-0.03	0.13	-0.12	0.43	1																					
PRF3	-0.50	-0.52	-0.38	0.26	0.15																					
PRF4	-0.50	-0.52	-0.37	0.23	0.12	0.99	1																			
INV1	-0.14	-0.07	-0.16	0.02	0.07	0.08	0.07	1																		
INV2	0.46	0.51	0.26	-0.25	-0.01	-0.42	-0.40	0.00	1																	
INV3	0.01	0.08	-0.19	0.19	0.27	0.15	0.13	0.12	0.05	1																
INV4	0.27	0.33	0.12	0.02	0.16	-0.26	-0.30	0.01	-0.07	0.32	1															
GER1	0.60	0.52	0.36	-0.12	0.15	-0.37	-0.37	-0.12	0.43	0.07	0.25	1														
GER2	0.13	0.09	0.12	0.03	0.25	0.03	0.03	-0.17	0.01	0.02	-0.02	0.20	1													
GER3	-0.29	-0.37	0.01	0.31	-0.19	0.13	0.12	-0.02	-0.26	-0.23	-0.17	-0.52	-0.30	1												
GER4	0.54	0.48	0.47	-0.06	0.02	-0.46	-0.46	-0.10	0.42	-0.04	0.26	0.68	0.02	-0.10	1											
GER5	0.26	0.16	0.11	-0.06	0.07	-0.06	-0.05	-0.05	0.18	0.10	0.08	0.67	0.10	-0.46	0.36	1										
GER6	-0.04	-0.22	0.03	0.12	-0.16	0.06	0.06	-0.06	-0.10	-0.10	-0.07	0.10	-0.18	0.21	0.32	0.38	1									
GER7	0.64	0.67	0.53	-0.25	0.10	-0.55	-0.55	-0.11	0.50	-0.03	0.33	0.68	0.21	-0.34	0.77	0.20	-0.16	1								
LIQ1	0.04	0.03	0.02	0.00	0.00	-0.01	-0.01	-0.01	0.02	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.02	1							
LIQ2	0.02	0.03	-0.01	-0.09	-0.08	-0.05	-0.04	0.00	0.15	-0.06	-0.04	0.02	-0.15	-0.03	0.00	0.03	0.04	-0.01	0.00	1						
SZ1	-0.65	-0.39	-0.77	0.33	0.29	0.42	0.42	0.25	-0.23	0.31	-0.08	-0.33	-0.10	-0.12	-0.48	-0.05	-0.08	-0.55	-0.03	0.04	1					
SZ2	0.02	-0.10	0.30	-0.19	-0.31	-0.09	-0.08	-0.12	-0.09	-0.46	-0.23	-0.17	-0.02	0.36	-0.04	-0.23	-0.02	-0.03	0.00	0.15	-0.42	1				
SZ3	-0.25	0.00	-0.56	0.24	0.34	0.23	0.22	0.25	0.06	0.57	0.11	0.03	-0.10	-0.42	-0.17	0.20	-0.03	-0.21	0.00	0.08	0.79	-0.66	1			
SZ4	-0.65	-0.38	-0.77	0.33	0.29	0.42	0.41	0.25	-0.22	0.31	-0.08	-0.33	-0.10	-0.12	-0.48	-0.05	-0.08	-0.54	-0.03	0.04	1.00	-0.42	0.79	1		
GW1	0.02	0.00	-0.01	-0.06	0.01	0.01	-0.02	0.01	-0.01	0.00	0.08	-0.05	0.06	-0.04	-0.05	-0.06	-0.03	-0.02	0.00	0.01	0.00	0.00	0.01	0.00	1	
GW2	-0.01	-0.01	0.04	0.06	0.01	0.03	0.02	-0.06	0.01	0.02	0.01	0.04	0.07	0.02	0.02	0.01	-0.01	-0.01	0.01	-0.01	-0.03	-0.02	-0.03	-0.03	-0.02	1

Table 49: Correlation Coefficients for Acquired and Acquiring Firms Five Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.78	1																								
EFF3	0.64	0.48	1																							
PRF1	-0.22	-0.21	-0.17	1																						
PRF2	0.03	0.09	-0.04	0.45	1																					
PRF3	-0.52	-0.56	-0.38	0.22	0.09	1																				
PRF4	-0.52	-0.56	-0.38	0.18	0.06	0.98	1																			
INV1	-0.16	-0.09	-0.18	0.06	0.10	0.10	0.09	1																		
INV2	0.33	0.39	0.12	-0.28	-0.09	-0.23	-0.21	0.02	1																	
INV3	-0.02	0.04	-0.15	0.20	0.28	0.15	0.14	0.18	0.08	1																
INV4	0.31	0.35	0.21	-0.04	0.12	-0.38	-0.40	0.02	-0.10	0.11	1															
GER1	0.61	0.53	0.42	-0.12	0.17	-0.40	-0.39	-0.12	0.31	0.01	0.28	1														
GER2	0.17	0.11	0.21	-0.01	0.24	0.01	0.02	-0.13	-0.07	0.10	0.01	0.18	1													
GER3	-0.33	-0.40	-0.06	0.33	-0.12	0.16	0.14	-0.01	-0.31	-0.14	-0.11	-0.50	-0.30	1												
GER4	0.52	0.46	0.46	-0.04	0.08	-0.45	-0.46	-0.11	0.25	-0.07	0.31	0.70	0.00	-0.08	1											
GER5	0.25	0.16	0.13	-0.01	0.09	-0.10	-0.08	-0.05	0.15	0.08	0.10	0.66	0.06	-0.40	0.37	1										
GER6	-0.08	-0.25	-0.02	0.17	-0.05	0.10	0.09	-0.06	-0.06	-0.09	-0.06	0.11	-0.24	0.23	0.32	0.41	1									
GER7	0.63	0.69	0.55	-0.25	0.08	-0.55	-0.55	-0.13	0.32	-0.07	0.36	0.72	0.20	-0.35	0.77	0.21	-0.17	1								
LIQ1	-0.01	0.03	-0.09	-0.05	-0.03	-0.03	-0.02	-0.05	0.18	0.02	0.01	0.08	-0.15	-0.13	0.04	0.14	0.11	0.00	1							
LIQ2	0.03	0.06	-0.06	-0.06	-0.04	-0.04	-0.03	-0.07	0.20	0.01	0.01	0.09	-0.13	-0.13	0.05	0.13	0.11	0.02	0.99	1						
SZ1	-0.66	-0.44	-0.76	0.28	0.19	0.42	0.42	0.28	-0.06	0.26	-0.18	-0.40	-0.17	-0.05	-0.50	-0.07	-0.03	-0.59	0.15	0.10	1					
SZ2	0.01	-0.09	0.26	-0.14	-0.23	-0.07	-0.07	-0.13	-0.11	-0.26	-0.07	-0.14	0.03	0.32	-0.02	-0.20	-0.02	-0.01	0.02	0.03	-0.36	1				
SZ3	-0.25	-0.04	-0.54	0.15	0.20	0.20	0.21	0.26	0.23	0.47	-0.03	-0.03	-0.19	-0.38	-0.19	0.18	0.00	-0.25	0.22	0.20	0.78	-0.62	1			
SZ4	-0.66	-0.44	-0.76	0.27	0.19	0.42	0.41	0.28	-0.06	0.26	-0.18	-0.40	-0.16	-0.05	-0.49	-0.07	-0.04	-0.59	0.15	0.10	1.00	-0.36	0.78	1		
GW1	0.05	0.03	0.04	0.05	0.04	0.03	0.03	0.02	0.00	0.00	-0.01	-0.01	0.00	0.02	0.00	0.01	0.01	-0.03	0.00	0.00	-0.03	0.00	-0.01	-0.03	1	
GW2	-0.02	-0.01	-0.01	-0.03	-0.04	0.00	0.00	-0.05	0.02	0.02	0.01	-0.02	0.04	-0.03	-0.02	-0.05	-0.03	-0.01	-0.01	0.00	0.01	-0.01	0.00	0.01	-0.51	1

Table 50: Correlation Coefficients for Acquired and Non-Involved Firms One Year before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.76	1																								
EFF3	0.63	0.39	1																							
PRF1	-0.11	0.00	-0.16	1																						
PRF2	-0.05	0.14	-0.28	0.61	1																					
PRF3	-0.48	-0.46	-0.37	0.33	0.32	1																				
PRF4	-0.47	-0.45	-0.36	0.32	0.29	0.97	1																			
INV1	-0.11	0.01	-0.15	0.07	0.12	0.09	0.09	1																		
INV2	0.50	0.62	0.15	-0.05	0.11	-0.42	-0.43	0.03	1																	
INV3	0.05	0.19	-0.21	0.34	0.50	0.22	0.20	0.26	0.20	1																
INV4	0.02	0.16	-0.24	0.16	0.31	0.11	0.09	0.15	0.17	0.74	1															
GER1	0.63	0.67	0.36	0.05	0.22	-0.34	-0.33	-0.04	0.53	0.19	0.17	1														
GER2	0.04	0.09	0.01	0.51	0.59	0.23	0.21	0.03	-0.08	0.26	-0.02	0.17	1													
GER3	-0.32	-0.52	0.09	0.01	-0.40	0.11	0.12	-0.13	-0.41	-0.37	-0.36	-0.65	-0.20	1												
GER4	0.64	0.57	0.49	-0.03	0.01	-0.44	-0.44	-0.11	0.53	0.03	0.02	0.76	0.06	-0.30	1											
GER5	0.38	0.37	0.14	0.03	0.15	-0.16	-0.14	-0.03	0.32	0.15	0.15	0.78	0.10	-0.57	0.55	1										
GER6	0.04	-0.20	0.09	-0.10	-0.20	-0.02	-0.02	-0.19	-0.02	-0.25	-0.18	0.17	-0.12	0.08	0.33	0.46	1									
GER7	0.70	0.74	0.51	-0.03	0.09	-0.47	-0.47	-0.06	0.59	0.11	0.08	0.77	0.17	-0.40	0.86	0.38	-0.06	1								
LIQ1	0.02	0.04	-0.06	-0.17	-0.14	-0.10	-0.09	-0.02	0.22	-0.04	0.06	0.04	-0.24	-0.09	0.02	0.06	0.09	0.00	1							
LIQ2	0.06	0.08	-0.07	-0.21	-0.16	-0.13	-0.12	-0.07	0.29	-0.05	0.07	0.06	-0.31	-0.13	0.04	0.09	0.11	0.01	0.86	1						
SZ1	-0.61	-0.28	-0.78	0.31	0.47	0.42	0.41	0.24	-0.06	0.38	0.37	-0.21	0.09	-0.29	-0.45	-0.03	-0.14	-0.47	0.07	0.08	1					
SZ2	0.00	-0.16	0.30	-0.30	-0.43	-0.12	-0.11	-0.08	-0.11	-0.27	-0.45	-0.24	-0.19	0.46	-0.08	-0.29	-0.04	-0.08	0.10	0.02	-0.42	1				
SZ3	-0.14	0.17	-0.54	0.29	0.54	0.23	0.22	0.26	0.28	0.63	0.56	0.21	0.11	-0.65	-0.06	0.29	-0.09	-0.06	0.09	0.16	0.80	-0.60	1			
SZ4	-0.61	-0.28	-0.78	0.31	0.47	0.42	0.41	0.24	-0.06	0.38	0.37	-0.21	0.09	-0.29	-0.45	-0.03	-0.14	-0.46	0.07	0.08	1.00	-0.42	0.80	1		
GW1	0.06	0.07	0.02	0.02	-0.02	0.05	0.05	0.00	0.08	0.01	0.01	0.01	-0.02	-0.02	0.00	-0.02	-0.04	0.02	0.00	0.01	-0.01	0.01	0.01	-0.01	1	
GW2	0.06	0.09	0.04	-0.02	0.01	0.04	0.03	-0.04	0.00	0.01	0.00	-0.03	0.02	0.02	-0.02	0.00	0.01	0.00	-0.01	-0.01	-0.04	-0.01	-0.01	-0.04	0.00	1

Table 51: Correlation Coefficients for Acquired and Non-Involved Firms Two Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.77	1																								
EFF3	0.66	0.42	1																							
PRF1	-0.15	-0.04	-0.17	1																						
PRF2	0.01	0.11	-0.24	0.56	1																					
PRF3	-0.57	-0.58	-0.47	0.29	0.23	1																				
PRF4	-0.55	-0.56	-0.45	0.26	0.20	0.98	1																			
INV1	-0.14	-0.04	-0.17	0.10	0.15	0.11	0.10	1																		
INV2	0.56	0.67	0.26	-0.12	0.08	-0.56	-0.57	0.01	1																	
INV3	0.04	0.17	-0.20	0.34	0.49	0.22	0.19	0.19	0.15	1																
INV4	0.10	0.20	-0.14	0.10	0.25	-0.02	-0.05	0.06	0.09	0.65	1															
GER1	0.71	0.65	0.42	-0.03	0.20	-0.45	-0.44	-0.08	0.57	0.16	0.18	1														
GER2	0.05	0.05	0.05	0.45	0.51	0.20	0.17	0.05	-0.13	0.19	-0.08	0.12	1													
GER3	-0.37	-0.54	0.08	0.07	-0.32	0.17	0.17	-0.05	-0.44	-0.37	-0.32	-0.65	-0.13	1												
GER4	0.70	0.60	0.57	-0.05	0.05	-0.57	-0.56	-0.11	0.58	0.01	0.09	0.80	0.03	-0.30	1											
GER5	0.42	0.34	0.16	-0.05	0.08	-0.19	-0.18	-0.07	0.32	0.15	0.14	0.75	0.02	-0.60	0.51	1										
GER6	0.07	-0.17	0.12	-0.13	-0.22	-0.01	0.00	-0.15	-0.04	-0.20	-0.14	0.23	-0.19	0.02	0.31	0.56	1									
GER7	0.71	0.75	0.57	-0.05	0.10	-0.62	-0.61	-0.08	0.65	0.08	0.14	0.78	0.14	-0.39	0.87	0.35	-0.06	1								
LIQ1	0.01	0.10	-0.16	-0.24	-0.12	-0.09	-0.07	0.00	0.35	0.00	0.07	0.11	-0.36	-0.27	0.02	0.17	0.12	0.00	1							
LIQ2	0.04	0.11	-0.14	-0.24	-0.12	-0.10	-0.08	-0.01	0.37	0.00	0.06	0.11	-0.36	-0.26	0.04	0.17	0.12	0.01	0.98	1						
SZ1	-0.61	-0.31	-0.83	0.28	0.39	0.48	0.46	0.22	-0.15	0.36	0.23	-0.30	-0.01	-0.27	-0.53	-0.08	-0.19	-0.51	0.25	0.22	1					
SZ2	-0.03	-0.15	0.29	-0.21	-0.34	-0.10	-0.08	-0.08	-0.08	-0.44	-0.55	-0.21	0.00	0.42	-0.06	-0.25	0.01	-0.07	-0.06	-0.04	-0.37	1				
SZ3	-0.14	0.14	-0.58	0.22	0.45	0.24	0.23	0.21	0.23	0.63	0.44	0.16	-0.04	-0.64	-0.11	0.28	-0.08	-0.09	0.37	0.37	0.79	-0.58	1			
SZ4	-0.60	-0.31	-0.82	0.28	0.39	0.48	0.46	0.22	-0.15	0.36	0.23	-0.30	-0.01	-0.27	-0.53	-0.08	-0.19	-0.50	0.25	0.22	1.00	-0.37	0.79	1		
GW1	-0.01	0.03	0.04	0.01	-0.02	0.00	0.00	-0.04	-0.02	-0.01	-0.01	-0.03	0.00	0.02	0.04	0.01	0.03	0.03	-0.01	0.00	-0.03	0.01	-0.02	-0.03	1	
GW2	0.05	0.03	0.03	0.13	0.07	-0.02	-0.02	0.07	0.05	0.07	0.03	0.01	0.10	-0.01	0.03	-0.07	-0.06	0.03	-0.05	-0.04	-0.04	-0.05	-0.03	-0.04	-0.01	1

Table 52:Correlation Coefficients for Acquired and Non-Involved Firms Three Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.78	1																								
EFF3	0.66	0.45	1																							
PRF1	-0.16	-0.07	-0.19	1																						
PRF2	0.01	0.10	-0.22	0.53	1																					
PRF3	-0.57	-0.58	-0.47	0.25	0.19	1																				
PRF4	-0.56	-0.57	-0.45	0.23	0.17	0.98	1																			
INV1	-0.14	-0.03	-0.19	0.09	0.11	0.11	0.10	1																		
INV2	0.57	0.65	0.29	-0.13	0.08	-0.57	-0.57	0.00	1																	
INV3	0.03	0.15	-0.20	0.33	0.46	0.21	0.18	0.20	0.11	1																
INV4	0.16	0.25	-0.03	0.13	0.23	-0.11	-0.15	0.06	0.04	0.54	1															
GER1	0.71	0.65	0.41	-0.04	0.18	-0.47	-0.46	-0.09	0.56	0.14	0.21	1														
GER2	0.05	0.05	0.07	0.40	0.46	0.17	0.15	0.03	-0.10	0.20	-0.07	0.11	1													
GER3	-0.37	-0.51	0.08	0.08	-0.30	0.17	0.17	-0.08	-0.40	-0.35	-0.25	-0.63	-0.10	1												
GER4	0.70	0.59	0.58	-0.06	0.04	-0.59	-0.58	-0.11	0.57	0.00	0.16	0.80	0.02	-0.28	1											
GER5	0.41	0.31	0.15	-0.04	0.06	-0.17	-0.16	-0.06	0.28	0.15	0.13	0.73	0.00	-0.59	0.48	1										
GER6	0.07	-0.18	0.13	-0.09	-0.23	0.00	0.02	-0.14	-0.06	-0.20	-0.09	0.20	-0.20	0.05	0.30	0.54	1									
GER7	0.72	0.74	0.59	-0.07	0.08	-0.63	-0.62	-0.09	0.64	0.05	0.20	0.78	0.14	-0.37	0.88	0.33	-0.06	1								
LIQ1	0.01	0.08	-0.15	-0.17	-0.07	-0.06	-0.05	0.00	0.29	0.01	0.03	0.09	-0.29	-0.22	0.02	0.14	0.09	0.00	1							
LIQ2	0.02	0.08	-0.15	-0.20	-0.09	-0.07	-0.06	-0.01	0.33	0.00	0.03	0.09	-0.32	-0.22	0.02	0.14	0.10	-0.01	0.87	1						
SZ1	-0.62	-0.34	-0.84	0.28	0.36	0.48	0.47	0.23	-0.20	0.35	0.12	-0.33	-0.04	-0.25	-0.55	-0.08	-0.19	-0.54	0.20	0.20	1					
SZ2	-0.03	-0.14	0.29	-0.20	-0.32	-0.09	-0.08	-0.10	-0.08	-0.37	-0.36	-0.20	0.02	0.41	-0.05	-0.25	0.01	-0.06	-0.05	-0.04	-0.36	1				
SZ3	-0.15	0.11	-0.60	0.22	0.42	0.24	0.23	0.23	0.16	0.61	0.33	0.13	-0.08	-0.62	-0.14	0.28	-0.09	-0.13	0.31	0.33	0.79	-0.58	1			
SZ4	-0.62	-0.34	-0.84	0.28	0.36	0.48	0.46	0.23	-0.20	0.35	0.12	-0.32	-0.04	-0.25	-0.55	-0.08	-0.20	-0.53	0.21	0.21	1.00	-0.36	0.79	1		
GW1	-0.01	0.02	-0.04	-0.02	0.02	0.05	0.05	0.03	0.00	0.03	0.01	-0.06	-0.03	-0.01	-0.07	-0.03	-0.02	-0.07	0.02	0.02	0.05	-0.02	0.05	0.05	1	
GW2	0.00	-0.04	-0.03	-0.08	0.03	0.02	0.02	0.00	0.02	0.01	0.01	-0.03	-0.02	-0.03	-0.04	-0.04	-0.04	-0.01	0.01	0.01	0.03	-0.01	0.02	0.03	-0.01	1

Table 53: Correlation Coefficients for Acquired and Non-Involved Firms Four Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.79	1																								
EFF3	0.69	0.49	1																							
PRF1	-0.18	-0.10	-0.22	1																						
PRF2	-0.03	0.09	-0.23	0.50	1																					
PRF3	-0.59	-0.61	-0.49	0.19	0.14	1																				
PRF4	-0.59	-0.61	-0.48	0.16	0.12	0.99	1																			
INV1	-0.12	-0.03	-0.17	0.02	0.10	0.09	0.09	1																		
INV2	0.54	0.61	0.32	-0.15	0.01	-0.52	-0.51	0.00	1																	
INV3	0.01	0.11	-0.19	0.27	0.38	0.18	0.16	0.17	0.06	1																
INV4	0.25	0.33	0.11	0.13	0.20	-0.27	-0.31	0.04	-0.04	0.38	1															
GER1	0.70	0.62	0.43	-0.06	0.16	-0.48	-0.48	-0.07	0.51	0.09	0.26	1														
GER2	0.06	0.05	0.06	0.31	0.40	0.11	0.09	-0.04	-0.05	0.14	-0.03	0.12	1													
GER3	-0.33	-0.47	0.09	0.12	-0.27	0.14	0.13	-0.12	-0.34	-0.32	-0.19	-0.60	-0.12	1												
GER4	0.69	0.59	0.62	-0.07	0.03	-0.61	-0.60	-0.11	0.54	-0.04	0.26	0.79	0.05	-0.23	1											
GER5	0.37	0.27	0.16	-0.05	0.06	-0.13	-0.12	-0.03	0.24	0.13	0.10	0.70	0.03	-0.58	0.43	1										
GER6	0.05	-0.19	0.15	-0.06	-0.23	0.03	0.04	-0.10	-0.07	-0.17	-0.08	0.17	-0.16	0.08	0.27	0.51	1									
GER7	0.71	0.72	0.61	-0.10	0.08	-0.65	-0.64	-0.09	0.59	0.00	0.31	0.78	0.15	-0.34	0.89	0.30	-0.07	1								
LIQ1	0.04	0.03	0.02	0.00	0.00	-0.01	-0.01	-0.01	0.02	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.01	1							
LIQ2	0.00	0.05	-0.11	-0.11	-0.04	-0.04	-0.03	0.03	0.22	-0.02	-0.02	0.05	-0.20	-0.15	0.00	0.09	0.06	-0.02	0.00	1						
SZ1	-0.66	-0.38	-0.86	0.29	0.36	0.48	0.48	0.23	-0.25	0.32	-0.04	-0.37	-0.05	-0.23	-0.59	-0.08	-0.20	-0.56	-0.02	0.15	1					
SZ2	-0.01	-0.13	0.30	-0.21	-0.34	-0.09	-0.09	-0.11	-0.08	-0.40	-0.24	-0.19	0.01	0.44	-0.04	-0.26	0.01	-0.04	0.00	0.04	-0.39	1				
SZ3	-0.21	0.05	-0.61	0.23	0.41	0.26	0.25	0.25	0.07	0.59	0.17	0.06	-0.08	-0.59	-0.20	0.25	-0.10	-0.19	0.00	0.24	0.79	-0.64	1			
SZ4	-0.66	-0.38	-0.86	0.28	0.36	0.48	0.47	0.23	-0.25	0.32	-0.03	-0.36	-0.05	-0.23	-0.59	-0.08	-0.21	-0.55	-0.02	0.15	1.00	-0.39	0.79	1		
GW1	0.03	0.00	-0.06	-0.09	-0.05	0.00	-0.05	0.03	0.00	0.02	0.11	-0.05	0.10	-0.05	-0.08	-0.05	-0.04	-0.05	0.00	0.01	0.03	-0.01	0.04	0.03	1	
GW2	0.07	0.02	0.05	-0.10	0.04	-0.02	-0.01	-0.04	0.02	0.04	0.01	0.02	0.08	-0.03	0.03	-0.01	-0.01	0.00	0.01	-0.02	-0.05	-0.03	-0.05	-0.05	-0.02	1

Table 54: Correlation Coefficients for Acquired and Non-Involved Firms Five Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.81	1																								
EFF3	0.69	0.50	1																							
PRF1	-0.17	-0.14	-0.18	1																						
PRF2	0.01	0.05	-0.19	0.51	1																					
PRF3	-0.60	-0.63	-0.49	0.14	0.09	1																				
PRF4	-0.59	-0.62	-0.48	0.10	0.06	0.99	1																			
INV1	-0.13	-0.04	-0.18	0.04	0.12	0.10	0.10	1																		
INV2	0.47	0.54	0.25	-0.21	-0.03	-0.41	-0.38	-0.01	1																	
INV3	0.00	0.09	-0.18	0.27	0.39	0.18	0.16	0.19	0.08	1																
INV4	0.27	0.34	0.16	0.09	0.20	-0.35	-0.38	0.03	-0.06	0.27	1															
GER1	0.68	0.62	0.47	-0.04	0.19	-0.49	-0.48	-0.07	0.46	0.07	0.26	1														
GER2	0.08	0.06	0.13	0.27	0.41	0.10	0.08	0.00	-0.08	0.18	-0.02	0.11	1													
GER3	-0.34	-0.48	0.06	0.16	-0.24	0.14	0.14	-0.12	-0.38	-0.30	-0.14	-0.57	-0.11	1												
GER4	0.67	0.57	0.61	-0.04	0.08	-0.61	-0.60	-0.11	0.44	-0.06	0.27	0.81	0.04	-0.23	1											
GER5	0.37	0.26	0.18	-0.02	0.10	-0.16	-0.13	-0.03	0.24	0.10	0.09	0.70	0.00	-0.54	0.45	1										
GER6	0.02	-0.21	0.11	0.01	-0.15	0.04	0.05	-0.10	-0.05	-0.18	-0.09	0.19	-0.19	0.08	0.28	0.52	1									
GER7	0.69	0.72	0.62	-0.10	0.07	-0.65	-0.64	-0.09	0.49	-0.02	0.33	0.80	0.14	-0.34	0.88	0.31	-0.08	1								
LIQ1	-0.03	0.04	-0.16	-0.10	-0.01	-0.02	-0.01	0.00	0.22	0.04	0.02	0.06	-0.23	-0.20	0.00	0.13	0.06	-0.02	1							
LIQ2	0.02	0.06	-0.12	-0.10	-0.02	-0.03	-0.02	-0.02	0.24	0.04	0.02	0.07	-0.22	-0.19	0.01	0.12	0.07	0.00	0.98	1						
SZ1	-0.67	-0.41	-0.85	0.26	0.31	0.48	0.47	0.24	-0.17	0.31	-0.10	-0.41	-0.09	-0.20	-0.59	-0.11	-0.17	-0.58	0.21	0.16	1					
SZ2	-0.01	-0.12	0.29	-0.17	-0.30	-0.08	-0.08	-0.12	-0.09	-0.31	-0.15	-0.17	0.05	0.42	-0.03	-0.24	0.00	-0.03	-0.03	-0.02	-0.36	1				
SZ3	-0.21	0.03	-0.60	0.19	0.36	0.25	0.24	0.24	0.14	0.56	0.09	0.03	-0.13	-0.58	-0.22	0.23	-0.08	-0.21	0.30	0.27	0.78	-0.61	1			
SZ4	-0.67	-0.40	-0.85	0.26	0.31	0.48	0.47	0.24	-0.17	0.31	-0.09	-0.40	-0.09	-0.20	-0.59	-0.11	-0.18	-0.58	0.21	0.16	1.00	-0.36	0.78	1		
GW1	0.03	0.00	0.01	0.07	0.05	0.03	0.03	0.02	-0.01	0.00	0.00	-0.01	0.00	0.04	0.00	0.03	0.03	-0.04	-0.01	0.00	0.00	0.00	0.01	0.00	1	
GW2	0.00	0.01	-0.01	-0.10	-0.05	-0.02	-0.02	-0.01	0.03	0.02	0.01	-0.03	0.04	-0.05	-0.03	-0.05	-0.04	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.85	1

Table 55: Correlation Coefficients for Acquiring and Non-Involved Firms One Year before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.71	1																								
EFF3	0.61	0.36	1																							
PRF1	-0.19	-0.12	-0.22	1																						
PRF2	0.00	0.15	-0.20	0.54	1																					
PRF3	-0.40	-0.38	-0.31	0.36	0.31	1																				
PRF4	-0.40	-0.39	-0.31	0.34	0.28	0.97	1																			
INV1	-0.10	-0.03	-0.14	0.09	0.10	0.13	0.13	1																		
INV2	0.43	0.55	0.15	-0.15	0.08	-0.33	-0.33	0.02	1																	
INV3	0.04	0.18	-0.20	0.32	0.47	0.21	0.19	0.23	0.19	1																
INV4	0.01	0.14	-0.20	0.17	0.30	0.09	0.08	0.14	0.17	0.74	1															
GER1	0.59	0.58	0.31	-0.03	0.21	-0.26	-0.25	-0.05	0.49	0.18	0.17	1														
GER2	0.12	0.11	0.09	0.23	0.42	0.12	0.12	-0.05	-0.07	0.23	-0.02	0.18	1													
GER3	-0.36	-0.47	0.01	0.17	-0.30	0.12	0.10	-0.06	-0.37	-0.30	-0.28	-0.62	-0.25	1												
GER4	0.51	0.46	0.36	-0.05	0.05	-0.32	-0.33	-0.09	0.47	0.04	0.02	0.67	0.01	-0.20	1											
GER5	0.30	0.24	0.11	0.05	0.13	-0.09	-0.08	-0.06	0.27	0.14	0.15	0.74	0.07	-0.46	0.51	1										
GER6	-0.05	-0.23	0.05	0.02	-0.15	0.03	0.03	-0.14	-0.03	-0.22	-0.15	0.10	-0.18	0.15	0.38	0.43	1									
GER7	0.64	0.70	0.44	-0.17	0.10	-0.38	-0.37	-0.07	0.55	0.11	0.08	0.71	0.20	-0.41	0.73	0.28	-0.13	1								
LIQ1	0.02	0.05	-0.02	-0.11	-0.12	-0.10	-0.09	-0.02	0.20	-0.05	0.06	0.05	-0.20	-0.07	0.03	0.07	0.09	0.00	1							
LIQ2	0.06	0.08	-0.02	-0.14	-0.14	-0.13	-0.12	-0.06	0.25	-0.06	0.07	0.07	-0.25	-0.10	0.05	0.09	0.10	0.02	0.89	1						
SZ1	-0.59	-0.27	-0.72	0.37	0.41	0.39	0.39	0.24	-0.05	0.37	0.35	-0.18	-0.04	-0.18	-0.35	0.03	-0.06	-0.43	0.06	0.07	1					
SZ2	0.02	-0.13	0.28	-0.24	-0.36	-0.11	-0.10	-0.06	-0.10	-0.26	-0.43	-0.22	-0.13	0.38	-0.09	-0.25	-0.05	-0.07	0.10	0.03	-0.40	1				
SZ3	-0.16	0.14	-0.51	0.29	0.47	0.21	0.20	0.24	0.28	0.62	0.54	0.19	0.03	-0.51	-0.02	0.27	-0.05	-0.06	0.09	0.14	0.78	-0.57	1			
SZ4	-0.59	-0.27	-0.72	0.37	0.41	0.39	0.38	0.24	-0.05	0.37	0.35	-0.18	-0.03	-0.19	-0.35	0.03	-0.06	-0.43	0.06	0.07	1.00	-0.40	0.78	1		
GW1	0.03	0.04	0.02	-0.02	0.00	0.02	0.01	0.03	0.00	-0.01	-0.01	-0.01	0.01	-0.02	-0.01	0.00	0.01	-0.03	0.00	0.00	-0.02	0.00	0.00	-0.02	1	
GW2	0.03	0.05	-0.02	0.06	0.03	0.01	0.01	0.02	-0.04	0.01	0.01	-0.03	-0.03	0.05	-0.02	-0.04	-0.03	-0.01	0.00	0.00	0.03	-0.01	0.02	0.03	0.00	1

Table 56: Correlation Coefficients for Acquiring and Non-Involved Firms Two Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.74	1																								
EFF3	0.61	0.39	1																							
PRF1	-0.23	-0.16	-0.22	1																						
PRF2	0.04	0.12	-0.13	0.53	1																					
PRF3	-0.49	-0.50	-0.39	0.33	0.24	1																				
PRF4	-0.49	-0.50	-0.38	0.30	0.20	0.99	1																			
INV1	-0.15	-0.07	-0.16	0.14	0.15	0.15	0.14	1																		
INV2	0.50	0.59	0.23	-0.22	0.07	-0.48	-0.49	0.01	1																	
INV3	0.05	0.16	-0.19	0.31	0.43	0.21	0.19	0.20	0.15	1																
INV4	0.09	0.17	-0.12	0.09	0.21	-0.01	-0.04	0.07	0.09	0.65	1															
GER1	0.65	0.56	0.34	-0.12	0.16	-0.37	-0.37	-0.11	0.53	0.16	0.18	1														
GER2	0.13	0.08	0.13	0.18	0.35	0.12	0.11	-0.03	-0.09	0.16	-0.07	0.16	1													
GER3	-0.39	-0.48	0.01	0.18	-0.26	0.15	0.14	0.02	-0.36	-0.30	-0.28	-0.61	-0.20	1												
GER4	0.56	0.47	0.40	-0.09	0.03	-0.46	-0.46	-0.09	0.51	0.04	0.08	0.71	-0.01	-0.18	1											
GER5	0.35	0.23	0.12	-0.03	0.05	-0.14	-0.13	-0.07	0.28	0.14	0.14	0.72	0.06	-0.47	0.49	1										
GER6	-0.01	-0.20	0.04	0.01	-0.20	-0.01	-0.01	-0.11	-0.04	-0.16	-0.11	0.15	-0.20	0.16	0.36	0.49	1									
GER7	0.66	0.69	0.49	-0.20	0.09	-0.52	-0.52	-0.09	0.58	0.07	0.13	0.72	0.15	-0.40	0.76	0.28	-0.13	1								
LIQ1	0.00	0.08	-0.12	-0.13	-0.11	-0.10	-0.08	-0.02	0.32	-0.06	-0.03	0.09	-0.29	-0.17	0.03	0.14	0.11	-0.02	1							
LIQ2	0.02	0.09	-0.10	-0.14	-0.12	-0.11	-0.09	-0.03	0.34	-0.07	-0.03	0.09	-0.28	-0.16	0.04	0.14	0.12	-0.01	0.99	1						
SZ1	-0.59	-0.31	-0.75	0.36	0.32	0.43	0.43	0.24	-0.13	0.36	0.23	-0.27	-0.09	-0.15	-0.42	-0.05	-0.10	-0.48	0.22	0.19	1					
SZ2	-0.02	-0.14	0.26	-0.17	-0.29	-0.09	-0.08	-0.08	-0.07	-0.45	-0.56	-0.19	0.03	0.35	-0.07	-0.22	0.00	-0.06	0.03	0.05	-0.36	1				
SZ3	-0.15	0.12	-0.55	0.25	0.38	0.22	0.22	0.21	0.21	0.63	0.44	0.15	-0.08	-0.49	-0.06	0.26	-0.04	-0.10	0.30	0.29	0.78	-0.57	1			
SZ4	-0.59	-0.31	-0.75	0.36	0.32	0.43	0.42	0.24	-0.13	0.36	0.23	-0.27	-0.09	-0.15	-0.42	-0.05	-0.10	-0.48	0.22	0.19	1.00	-0.36	0.78	1		
GW1	0.04	0.04	0.02	-0.01	-0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.03	0.02	0.01	-0.03	0.01	0.00	-0.02	0.00	0.00	-0.01	1	
GW2	0.08	0.01	0.07	0.09	0.03	0.04	0.03	0.01	0.03	0.03	0.01	0.04	0.10	0.01	0.03	0.03	-0.11	0.06	-0.04	-0.03	-0.06	-0.01	-0.05	-0.06	0.01	1

Table 57: Correlation Coefficients for Acquiring and Non-Involved Firms Three Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.76	1																								
EFF3	0.63	0.44	1																							
PRF1	-0.27	-0.21	-0.26	1																						
PRF2	-0.03	0.09	-0.17	0.45	1																					
PRF3	-0.53	-0.53	-0.41	0.30	0.15	1																				
PRF4	-0.53	-0.54	-0.41	0.27	0.12	0.99	1																			
INV1	-0.14	-0.05	-0.19	0.09	0.13	0.11	0.10	1																		
INV2	0.51	0.57	0.30	-0.25	0.00	-0.50	-0.50	0.01	1																	
INV3	0.03	0.13	-0.17	0.28	0.40	0.19	0.17	0.22	0.07	1																
INV4	0.18	0.26	0.05	0.04	0.17	-0.13	-0.17	0.07	0.01	0.46	1															
GER1	0.63	0.57	0.38	-0.17	0.15	-0.42	-0.41	-0.11	0.51	0.12	0.22	1														
GER2	0.15	0.09	0.17	0.06	0.26	0.06	0.05	-0.07	-0.02	0.13	-0.06	0.14	1													
GER3	-0.37	-0.46	-0.01	0.28	-0.19	0.17	0.15	-0.03	-0.31	-0.26	-0.19	-0.57	-0.22	1												
GER4	0.57	0.48	0.47	-0.11	0.03	-0.49	-0.49	-0.08	0.52	0.00	0.16	0.71	0.00	-0.17	1											
GER5	0.33	0.21	0.15	-0.07	0.04	-0.11	-0.09	-0.08	0.23	0.12	0.10	0.69	0.03	-0.48	0.43	1										
GER6	-0.01	-0.20	0.05	0.09	-0.22	0.05	0.06	-0.10	-0.07	-0.15	-0.10	0.10	-0.25	0.22	0.32	0.40	1									
GER7	0.65	0.68	0.52	-0.28	0.06	-0.57	-0.57	-0.08	0.60	0.02	0.23	0.74	0.19	-0.39	0.77	0.28	-0.16	1								
LIQ1	-0.03	0.06	-0.14	-0.06	-0.02	-0.03	-0.01	0.04	0.24	0.03	0.02	0.06	-0.25	-0.15	0.01	0.13	0.10	-0.05	1							
LIQ2	0.01	0.07	-0.11	-0.06	-0.03	-0.04	-0.02	0.02	0.27	0.03	0.02	0.07	-0.23	-0.14	0.02	0.13	0.10	-0.03	0.98	1						
SZ1	-0.62	-0.36	-0.76	0.34	0.33	0.46	0.45	0.26	-0.24	0.33	0.05	-0.33	-0.16	-0.12	-0.49	-0.06	-0.12	-0.53	0.26	0.21	1					
SZ2	-0.03	-0.13	0.25	-0.14	-0.26	-0.07	-0.06	-0.13	-0.08	-0.33	-0.26	-0.18	0.12	0.35	-0.05	-0.22	0.00	-0.04	-0.03	0.00	-0.35	1				
SZ3	-0.18	0.06	-0.54	0.24	0.38	0.23	0.23	0.26	0.08	0.61	0.26	0.08	-0.17	-0.46	-0.14	0.22	-0.05	-0.17	0.33	0.30	0.77	-0.61	1			
SZ4	-0.61	-0.35	-0.76	0.34	0.33	0.46	0.45	0.26	-0.24	0.33	0.05	-0.33	-0.16	-0.12	-0.49	-0.06	-0.12	-0.53	0.26	0.21	1.00	-0.35	0.77	1		
GW1	0.01	0.03	-0.06	0.01	0.05	0.06	0.06	0.03	-0.02	0.04	0.02	-0.09	-0.04	-0.04	-0.16	-0.02	-0.06	-0.15	0.02	0.02	0.10	-0.05	0.10	0.10	1	
GW2	0.11	0.02	0.07	-0.10	0.00	-0.02	-0.01	-0.02	0.03	0.03	0.01	0.03	0.13	-0.09	0.03	0.01	-0.02	0.02	-0.05	-0.03	-0.09	-0.02	-0.08	-0.09	0.03	1

Table 58: Correlation Coefficients for Acquiring and Non-Involved Firms Four Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.76	1																								
EFF3	0.64	0.45	1																							
PRF1	-0.28	-0.20	-0.25	1																						
PRF2	-0.04	0.08	-0.19	0.45	1																					
PRF3	-0.54	-0.55	-0.42	0.31	0.16	1																				
PRF4	-0.53	-0.55	-0.41	0.27	0.12	0.99	1																			
INV1	-0.15	-0.06	-0.18	0.08	0.12	0.10	0.09	1																		
INV2	0.50	0.55	0.29	-0.24	-0.01	-0.51	-0.50	0.01	1																	
INV3	0.01	0.11	-0.17	0.25	0.36	0.17	0.15	0.17	0.06	1																
INV4	0.22	0.29	0.10	0.01	0.18	-0.20	-0.25	0.04	-0.04	0.38	1															
GER1	0.62	0.56	0.39	-0.16	0.15	-0.42	-0.41	-0.11	0.49	0.09	0.24	1														
GER2	0.12	0.07	0.15	0.06	0.27	0.05	0.05	-0.10	-0.02	0.08	-0.02	0.17	1													
GER3	-0.33	-0.43	0.01	0.32	-0.19	0.16	0.14	-0.02	-0.30	-0.25	-0.20	-0.55	-0.26	1												
GER4	0.57	0.49	0.49	-0.10	0.01	-0.50	-0.50	-0.09	0.49	-0.02	0.22	0.73	0.02	-0.15	1											
GER5	0.32	0.21	0.13	-0.07	0.10	-0.11	-0.09	-0.06	0.22	0.11	0.10	0.69	0.06	-0.48	0.42	1										
GER6	0.00	-0.20	0.05	0.11	-0.18	0.05	0.05	-0.06	-0.08	-0.13	-0.08	0.13	-0.21	0.19	0.33	0.41	1									
GER7	0.65	0.68	0.55	-0.27	0.06	-0.59	-0.59	-0.10	0.56	0.00	0.28	0.72	0.20	-0.38	0.78	0.26	-0.14	1								
LIQ1	-0.01	0.03	-0.07	-0.09	-0.05	-0.04	-0.02	0.03	0.17	0.03	0.00	0.02	-0.22	-0.08	-0.01	0.07	0.05	-0.03	1							
LIQ2	0.02	0.04	-0.04	-0.09	-0.06	-0.05	-0.03	0.01	0.18	0.03	0.01	0.03	-0.20	-0.07	0.00	0.06	0.05	-0.01	0.98	1						
SZ1	-0.64	-0.37	-0.79	0.36	0.35	0.46	0.45	0.26	-0.24	0.32	-0.03	-0.35	-0.12	-0.13	-0.50	-0.07	-0.11	-0.55	0.12	0.08	1					
SZ2	0.00	-0.12	0.29	-0.18	-0.31	-0.09	-0.08	-0.12	-0.08	-0.37	-0.23	-0.17	0.04	0.36	-0.04	-0.23	-0.01	-0.03	0.06	0.08	-0.38	1				
SZ3	-0.22	0.04	-0.56	0.26	0.39	0.24	0.23	0.26	0.07	0.58	0.17	0.05	-0.13	-0.46	-0.16	0.22	-0.04	-0.19	0.19	0.16	0.78	-0.63	1			
SZ4	-0.64	-0.36	-0.79	0.36	0.35	0.45	0.44	0.26	-0.23	0.32	-0.02	-0.35	-0.12	-0.13	-0.49	-0.07	-0.11	-0.55	0.13	0.08	1.00	-0.38	0.78	1		
GW1	0.01	0.01	0.00	-0.02	0.07	0.02	0.02	0.02	0.00	0.01	0.04	-0.06	0.00	-0.03	-0.05	-0.05	-0.02	-0.03	0.01	0.01	0.01	-0.01	0.02	0.01	1	
GW2	0.02	-0.02	0.05	0.04	-0.03	0.02	0.02	-0.06	0.00	0.02	0.01	0.05	0.10	0.00	0.03	0.04	0.00	-0.02	-0.02	-0.01	-0.04	-0.01	-0.04	-0.04	0.00	1

Table 59: Correlation Coefficients for Acquiring and Non-Involved Firms FIVE Years before the Acquisition as Used in Chapter 4

	EFF1	EFF2	EFF3	PRF1	PRF2	PRF3	PRF4	INV1	INV2	INV3	INV4	GER1	GER2	GER3	GER4	GER5	GER6	GER7	LIQ1	LIQ2	SZ1	SZ2	SZ3	SZ4	GW1	GW2
EFF1	1																									
EFF2	0.78	1																								
EFF3	0.66	0.47	1																							
PRF1	-0.27	-0.22	-0.23	1																						
PRF2	-0.02	0.08	-0.16	0.47	1																					
PRF3	-0.55	-0.57	-0.42	0.31	0.14	1																				
PRF4	-0.54	-0.57	-0.41	0.27	0.10	0.99	1																			
INV1	-0.15	-0.06	-0.19	0.10	0.14	0.11	0.10	1																		
INV2	0.44	0.50	0.22	-0.22	-0.05	-0.43	-0.41	0.03	1																	
INV3	0.00	0.09	-0.15	0.25	0.37	0.18	0.16	0.20	0.08	1																
INV4	0.25	0.31	0.15	-0.05	0.14	-0.27	-0.31	0.05	-0.06	0.28	1															
GER1	0.64	0.56	0.42	-0.17	0.15	-0.44	-0.43	-0.11	0.42	0.07	0.27	1														
GER2	0.15	0.08	0.18	0.04	0.26	0.03	0.03	-0.09	-0.09	0.11	0.01	0.16	1													
GER3	-0.36	-0.46	-0.03	0.31	-0.15	0.19	0.15	-0.01	-0.32	-0.21	-0.16	-0.55	-0.25	1												
GER4	0.57	0.49	0.50	-0.11	0.03	-0.49	-0.50	-0.10	0.41	-0.03	0.26	0.73	0.01	-0.14	1											
GER5	0.32	0.21	0.12	-0.05	0.08	-0.12	-0.11	-0.06	0.20	0.11	0.11	0.68	0.03	-0.45	0.42	1										
GER6	-0.02	-0.22	0.04	0.11	-0.14	0.09	0.08	-0.06	-0.05	-0.12	-0.06	0.13	-0.25	0.20	0.32	0.44	1									
GER7	0.65	0.68	0.57	-0.27	0.05	-0.59	-0.58	-0.11	0.46	-0.02	0.31	0.74	0.20	-0.39	0.79	0.25	-0.15	1								
LIQ1	-0.01	0.04	-0.11	-0.06	-0.03	-0.02	-0.02	-0.01	0.20	0.05	0.01	0.08	-0.18	-0.14	0.03	0.14	0.11	-0.01	1							
LIQ2	0.02	0.06	-0.08	-0.07	-0.03	-0.04	-0.03	-0.02	0.21	0.04	0.02	0.09	-0.16	-0.14	0.04	0.14	0.11	0.00	0.99	1						
SZ1	-0.64	-0.39	-0.79	0.33	0.29	0.46	0.45	0.27	-0.15	0.30	-0.09	-0.38	-0.15	-0.10	-0.51	-0.07	-0.09	-0.57	0.17	0.13	1					
SZ2	-0.01	-0.11	0.27	-0.15	-0.27	-0.08	-0.07	-0.12	-0.09	-0.30	-0.15	-0.16	0.07	0.34	-0.03	-0.22	0.00	-0.02	-0.01	0.00	-0.36	1				
SZ3	-0.21	0.02	-0.56	0.21	0.32	0.23	0.22	0.26	0.16	0.54	0.10	0.03	-0.17	-0.44	-0.17	0.22	-0.03	-0.21	0.25	0.23	0.78	-0.62	1			
SZ4	-0.64	-0.39	-0.79	0.33	0.29	0.45	0.44	0.27	-0.15	0.30	-0.08	-0.38	-0.15	-0.10	-0.51	-0.07	-0.10	-0.57	0.17	0.13	1.00	-0.36	0.78	1		
GW1	0.05	0.05	0.04	0.02	0.02	0.01	0.01	0.02	0.01	0.00	-0.01	-0.03	0.00	0.00	-0.02	-0.01	-0.02	-0.02	0.00	0.00	-0.03	0.00	-0.01	-0.03	1	
GW2	0.03	-0.03	0.04	0.01	-0.02	0.02	0.02	-0.08	0.01	0.02	0.01	0.03	0.08	-0.02	0.04	0.01	0.02	-0.02	-0.02	-0.01	-0.03	-0.01	-0.04	-0.03	0.01	1

Table 60: Logit Results for Acquired and Acquiring Companies

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	0.59***	0.38**	0.61***	0.72***	0.60***
	2.91	2.01	3.47	4.17	3.53
Sales/Total Asset	0.05	-0.12	-0.30**	-0.42***	-0.50***
	0.28	-0.76	-2.03	-3.16	-3.88
Sales/Employees	1.31***	1.26***	1.12***	1.19***	1.05***
	9.17	9.21	8.47	9.02	7.92
Profitability					
ROCE	-8.01***	-12.03***	-8.61***	-9.32***	-9.02***
	-3.58	-5.41	-4.52	-5.12	-4.91
ROE	3.20***	3.61***	2.62***	1.81**	1.99**
	2.78	3.44	2.82	2.04	2.17
Net Income/Sales	0.04	0.07**	0.09***	0.04	0.05*
	1.05	2.25	2.91	1.57	1.78
Pre-tax Income/Sales	-0.08***	-0.08***	-0.08***	-0.06***	-0.07***
	-3.36	-4.20	-4.35	-3.19	-3.73
EBITDA	0.02***	0.02***	0.02***	0.02***	0.03***
	5.08	4.28	4.14	4.88	5.45
Investment					
Dividend per share	0.22	-0.82	3.01	5.01	2.20
	0.07	-0.23	0.84	1.26	0.65
Earnings per share	-0.11***	-0.10***	-0.03**	-0.06***	-0.07***
	-7.16	-6.62	-2.10	-3.75	-4.70
Dividend Yield	-0.10***	-0.15***	-0.22***	-0.36***	
	-5.61	-7.79	-7.99	-6.37	
Price Earnings Ratio	-0.02***				-0.01***
	-4.79				-3.33
MV/BV	0.01	0.01			
	1.04	0.93			
Gearing					
Total Debt/Shareholder Equity	0.50	-0.38	-0.39	-0.04	0.23
	1.16	-1.08	-1.35	-0.16	0.82
EBIT/Interest Expense Total		-0.02	-0.01	0.02	0.01
		-1.34	-0.51	1.45	0.61
Shareholder's Equity/Total Assets	9.38***	4.79**	7.21***	10.57***	11.60***
	4.42	2.36	3.86	6.06	6.63
Total Debt/Total Assets	17.61***	6.07*	9.04***	7.78***	6.14**

	4.29	1.67	3.00	2.87	2.35
Long Term Debt/Shareholder's Equity	-2.09**	0.52	1.22*	1.26**	0.85
	-2.17	0.66	1.87	2.04	1.35
Long Term Debt/Total Assets	61.61***	53.24***	34.51***	27.56***	35.70***
	7.35	6.85	5.01	4.12	5.32
Short Term Debt/Total Assets	2.58	18.50***	15.13***	17.58***	20.71***
	0.50	4.18	4.15	5.33	6.49
Liquidity					
Current Ratio	-0.13**	-0.37***			
	-2.36	-5.69			
Quick Ratio		0.01			
		0.64			
Size					
Market Value	-0.02***	-0.01		0.01*	0.03***
	-3.45	-1.18		1.63	2.79
Book Value	0.10***	0.12***	0.17***	0.19***	0.23***
	3.95	4.20	6.61	7.19	9.45
Total Assets	2.38***	2.42***	2.32***	1.95***	1.99***
	23.63	24.99	26.60	25.31	26.42
Total Sales	0.02	0.14**	0.13**	0.15***	0.18***
	0.27	2.06	2.10	2.67	3.26
Enterprise Value		0.02***	0.02***	0.03***	0.04***
		4.65	7.74	6.58	7.93
Growth					
Change in Sales					
Change in Total Assets					
Wald Chi^2	20815.01***	17983.04***	16923.28***	15955.63***	15084.97***
No of Variables	24	26	22	23	23
Log Likelihood	-871.86	-922.51	-1021.44	-1055.06	-1014.23

Note: Number of Years before Acquisition = 1 (1 year before the acquisition took place), Number of Years before Acquisition = 2 (2 years before the acquisition took place), Number of Years before Acquisition = 3 (3 years before the acquisition took place), Number of Years before Acquisition = 4 (4 years before the acquisition took place), Number of Years before Acquisition = 5 (5 years before the acquisition took place). Dependent Variable is a binary number which equals 1 for firms involved in the acquisition and 0 otherwise.

Table 61: Hazard Results for Acquired and Acquiring Companies

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	0.11***	0.14***	0.20***	0.18***	0.19***
	3.52	3.69	5.32	5.03	5.74
Sales/Total Asset	0.04**	0.04	0.05*	0.11***	0.11***
	2.09	1.09	1.74	3.81	4.07
Sales/Employees		0.06***	0.03	-0.01	-0.05**
		2.74	1.18	-0.39	-2.22
Profitability					
ROCE	1.56*	2.98***	2.34***	0.48	1.75***
	1.9	3.75	3.34	0.73	2.86
ROE	0.83**	-0.22	-0.46	-0.59**	-0.60**
	2.1	-0.60	-1.42	-2.06	-2.23
Net Income/Sales	0.07***	0.06***	0.01		0.03***
	2.98	4.06	0.91		2.95
Pre-tax Income/Sales	-0.05***	-0.04***	-0.01		-0.01***
	-3.46	-4.15	-1.38		-2.47
EBITDA	-0.01***	-0.01***	-0.01	-0.01***	-0.01***
	-9.00	-11.09	-1.38	-14.36	-14.65
Investment					
Dividend per share	-0.51**	-0.62***	-0.51**	-0.48**	-0.42*
	-2.40	-2.81	-2.24	-2.07	-1.73
Earnings per share	0.02***	0.02***	-0.03***	-0.03***	-0.02***
	6.97	9.03	-6.23	-5.92	-3.34
Dividend Yield	-0.01**				
	-2.09				
Price Earnings Ratio	0.01***		0.01***	0.01***	
	12.23		4.03	7.59	
MV/BV	0.01***				
	2.53				
Gearing					
Total Debt/Shareholder Equity	-0.15	-0.35***	-0.23**	-0.14	-0.22***
	-1.11	-3.10	-2.24	-1.56	-2.74
EBIT/Interest Expense Total		0.01**	0.01***	0.02***	0.01***
		2.17	4.03	6.40	3.99
Shareholder's Equity/Total Assets	-2.06***	-2.07***	-1.64***	-0.72*	-1.18***
	-3.80	-4.10	-3.59	-1.64	-2.89
Total Debt/Total Assets	0.40	-0.78	-0.47	1.74**	2.10***
	0.40	-0.87	-0.54	2.225	2.98
Long Term Debt/Shareholder's Equity	0.47	1.02***	0.60***	0.69***	0.88***
	1.56	4.20	2.59	3.46	4.90

Long Term Debt/Total Assets	-14.94***	-15.53***	-9.87***	-12.31***	-14.16***
	-6.94	-8.51	-5.34	-7.15	-8.95
Short Term Debt/Total Assets	-4.35***	0.66	-0.68	-3.15***	-2.47***
	-3.23	0.63	-0.64	-3.53	-3.16
Liquidity					
Current Ratio	-0.10***	0.03***	0.04***	0.06***	0.08***
	-7.22	2.78	3.23	4.27	6.33
Quick Ratio	0.01**		0.02***	0.02***	0.01***
	2.34		7.55	5.83	4.20
Size					
Market Value	0.02***	0.02***	0.02***	0.02***	0.02***
	15.21	16.15	18.20	19.89	20.78
Book Value	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***
	-7.57	-7.22	-6.86	-6.51	-6.21
Total Assets	-0.13***	-0.17***	-0.17***	-0.18***	-0.17***
	-11.67	-16.67	-17.78	-22.11	-22.26
Total Sales	0.07***	0.07***	0.06***	0.06***	0.05***
	14.30	13.15	12.19	11.20	10.31
Enterprise Value					
Growth					
Change in Sales					
Change in Total Assets		-0.01***			
		-4.76			
LR Chi^2	3782.40***	4113.65***	4477.53***	4666.02***	4698.86***
No of Variables	24	23	24	22	23
Log Likelihood	-72943.34	-72897.12	-72834.61	-72859.76	-72944.31

Note: Number of Years before Acquisition = 1 (1 year before the acquisition took place), Number of Years before Acquisition = 2 (2 years before the acquisition took place), Number of Years before Acquisition = 3 (3 years before the acquisition took place), Number of Years before Acquisition = 4 (4 years before the acquisition took place), Number of Years before Acquisition = 5 (5 years before the acquisition took place). Dependent Variable is a binary number which equals 1 for firms involved in the acquisition and 0 otherwise.

Table 62: Logit Results for Acquiring and Non-Involved Companies

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	1.37***	1.16***	1.57***	1.43***	2.80***
	4.72	3.48	3.96	4.54	5.08
Sales/Total Asset	-34.40***	-35.34***	-37.69***	-25.03***	-38.50***
	-15.64	-14.45	-13.43	-12.20	-10.60
Sales/Employees	2.94***	3.12***	2.98***	1.93***	2.70***
	14.77	13.86	11.90	10.31	8.75
Profitability					
ROCE	-2.84	4.92	10.47***	6.92***	15.93***
	-0.83	1.35	2.70	2.69	3.79
ROE	-2.66	-2.84	-6.12***	-3.32**	-4.78*
	-1.56	-1.53	-2.85	-2.08	-1.90
Net Income/Sales	0.44***	0.32***	0.29***	0.09*	0.09
	5.57	3.80	3.18	1.76	1.37
Pre-tax Income/Sales	-0.31***	-0.27***	-0.23***	-0.10***	-0.11***
	-7.27	-5.82	-4.81	-3.66	-3.19
EBITDA					
Investment					
Dividend per share	-9.44***	-11.79***	-17.98***	-13.41***	-21.94***
	-3.01	-3.44	-4.60	-4.54	-4.47
Earnings per share		-0.01***	-0.02***	-0.02***	-0.03***
		-3.70	-7.74	-10.20	-9.70
Dividend Yield	-0.02***	-0.02***	-0.02***	-0.01***	-0.01***
	-7.81	-7.39	-7.27	-4.82	-4.01
Price Earnings Ratio	-0.04***	-0.03***	-0.03***	-0.03***	-0.08**
	-5.93	-5.61	-5.55	-8.66	-12.14
MV/BV	-1.74	-0.12	0.13	-1.03	-2.31*
	-1.50	-0.11	0.12	-1.01	-1.69
Gearing					
Total Debt/Shareholder Equity	0.56	0.16	0.56	1.09**	1.23*
	1.04	0.27	0.86	2.16	1.74
EBIT/Interest Expense Total	0.08***	0.07***	0.06**	0.04*	0.08**
	3.43	3.04	2.16	1.85	2.36
Shareholder's Equity/Total Assets	3.66	-0.34	0.09	0.29	2.19
	1.35	-0.11	0.02	0.11	0.50
Total Debt/Total Assets	9.87*	12.28**	10.32	10.31**	12.35
	1.91	2.05	1.35	1.94	1.37
Long Term Debt/Shareholder's Equity	-4.04***	-4.15***	-3.98***	-3.06***	-4.63***

	-3.50	-3.31	-2.86	-2.87	-2.82
Long Term Debt/Total Assets	-22.83**	-19.14*	-23.26*	-21.37**	-38.47***
	-2.13	-1.64	-1.72	-2.16	-2.60
Short Term Debt/Total Assets	38.69***	41.97***	51.53***	30.69***	64.31***
	7.03	6.42	5.85	5.13	5.80
Liquidity					
Current Ratio	-0.14	0.02	0.21*	0.22**	0.48***
	-1.37	0.14	1.65	2.07	2.94
Quick Ratio	-0.21	-0.18	-0.41**	-0.45***	-0.84***
	-1.29	-1.00	-1.94	-2.60	-3.09
Size					
Market Value	1.24***	1.64***	1.66***	0.86***	1.46***
	9.59	11.03	10.75	12.57	9.54
Book Value	0.18***	0.18***	0.23***	0.15***	0.40***
	8.37	7.31	8.31	7.48	11.19
Total Assets	-1.37***	-1.55***	-1.76***	-1.10***	-2.05***
	-18.41	-17.98	-17.81	-26.08	-20.70
Total Sales	0.83***	0.74***	0.94***	0.62***	1.08***
	5.99	4.62	5.43	7.50	6.26
Enterprise Value					
Growth					
Change in Sales	-1.64***	-1.06***	-0.65**	-0.47**	-0.72**
	-6.53	-4.09	-2.38	-2.38	-2.43
Change in Total Assets	-3.79***	-3.24***	-3.01***	-1.02*	-0.86
	-5.61	-4.39	-3.92	-1.76	-1.05
Wald Chi^2	3291.56***	2705.88***	2665.99***	7594.99***	2626.51***
No of Variables	26	27	27	27	27
Log Likelihood	-2581.51	-2454.21	-2318.23	-2264.49	-2088.66

Note: Number of Years before Acquisition = 1 (1 year before the acquisition took place), Number of Years before Acquisition = 2 (2 years before the acquisition took place), Number of Years before Acquisition = 3 (3 years before the acquisition took place), Number of Years before Acquisition = 4 (4 years before the acquisition took place), Number of Years before Acquisition = 5 (5 years before the acquisition took place). Dependent Variable is a binary number which equals 1 for firms involved in the acquisition and 0 otherwise.

Table 63: Hazard Results for Acquiring and Non-Involved Companies

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	-0.03	0.05	0.12***	0.15***	0.13***
	-0.64	1.32	3.05	3.74	3.70
Sales/Total Asset	3.40***	2.58***	1.30***	0.94***	0.82***
	9.36	7.56	3.90	2.98	2.76
Sales/Employees	0.01	0.03	0.05**	0.03	
	0.44	1.38	2.15	1.61	
Profitability					
ROCE	3.31***	2.90***	3.00***	2.50***	2.45***
	4.45	4.75	4.69	4.25	4.80
ROE	-0.40	-0.60**	-0.38	-0.15	0.28
	-1.15	-1.97	-1.19	-0.49	1.04
Net Income/Sales	0.13***	0.14***	0.05***	0.01***	
	6.75	8.81	2.76	3.74	
Pre-tax Income/Sales	-0.08***	-0.08***	-0.02**		0.01***
	-6.96	-8.43	-2.34		5.45
EBITDA					
Investment					
Dividend per share	-1.47***	-1.43***	-1.45***	-1.43***	-1.26***
	-5.94	-5.56	-5.42	-5.18	-4.47
Earnings per share					
Dividend Yield					
Price Earnings Ratio	0.01***		0.01***	0.01***	
	7.56		10.44	8.81	
MV/BV	1.25	-0.12	0.13	-0.03	-0.20
	1.35	-0.22	0.33	-0.09	-0.76
Gearing					
Total Debt/Shareholder Equity	0.02	0.02	-0.14	-0.16**	-0.17**
	0.25	0.19	-1.53	-2.41	-2.11
EBIT/Interest Expense Total	-0.01***		0.01***	0.02***	
	-2.87		4.18	5.01	
Shareholder's Equity/Total Assets	-2.66***	-2.95***	-2.92***	-2.97***	-3.30***
	-5.78	-6.87	-7.02	-7.54	-8.68
Total Debt/Total Assets	-0.18	0.36	-1.88**	-2.27***	-1.85***
	-0.21	0.45	-2.37	-3.05	-2.59
Long Term Debt/Shareholder's Equity	0.01	0.08	-0.02		0.09
	0.07	0.40	-0.12		0.53

Long Term Debt/Total Assets	-10.34***	-12.36***	-3.63**	-2.92**	-5.75***
	-5.76	-7.45	-2.09	-1.93	-3.65
Short Term Debt/Total Assets	-1.30	-0.49	-1.23	-1.12	-0.99
	-1.46	-0.58	-1.50	-1.44	-1.33
Liquidity					
Current Ratio	0.03	0.05**	0.02		0.01
	1.39	2.38	0.80		0.49
Quick Ratio	0.01	0.09***	0.19***	0.19***	0.17***
	0.32	2.97	5.91	9.40	5.65
Size					
Market Value	0.40***	0.36***	0.16***	0.04	-0.04*
	10.93	10.76	5.35	1.48	-1.88
Book Value	0.04***	0.03***		-0.02***	-0.04***
	9.72	7.35		-4.32	-9.27
Total Assets	-0.18***	-0.18***	-0.13***	-0.12***	-0.12***
	-17.52	-19.68	-13.04	-12.39	-13.49
Total Sales	-0.50***	-0.45***	-0.24***	-0.12***	-0.03
	-14.02	-14.09	-8.07	-4.34	-1.17
Enterprise Value					
Growth					
Change in Sales	0.01	0.14***	0.22***	0.27***	0.19***
	0.23	2.60	4.34	5.52	4.03
Change in Total Assets	0.82***	0.80***	-0.14	-0.21*	0.10
	6.17	6.65	-1.06	-1.70	0.83
LR Chi^2	5515.16***	5536.03***	5639.88***	5535.03***	5450.52***
No of Variables	25	23	24	22	21
Log Likelihood	-59018.23	-59007.80	-58955.87	-59008.30	-59050.55

Note: Number of Years before Acquisition = 1 (1 year before the acquisition took place), Number of Years before Acquisition = 2 (2 years before the acquisition took place), Number of Years before Acquisition = 3 (3 years before the acquisition took place), Number of Years before Acquisition = 4 (4 years before the acquisition took place), Number of Years before Acquisition = 5 (5 years before the acquisition took place). Dependent Variable is a binary number which equals 1 for firms involved in the acquisition and 0 otherwise.

Table 64: Logit Results for Acquired and Non-Involved Companies

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	1.00***	0.80***	0.79***	0.87***	1.29***
	7.05	5.91	6.39	6.24	9.51
Sales/Total Asset	-21.37***	-21.42***	-22.63***	-22.27***	-22.16***
	-18.97	-19.73	-23.14	-20.19	-22.27
Sales/Employees	2.14***	2.29***	2.17***	2.21***	2.03***
	22.58	23.87	24.36	22.08	21.60
Profitability					
ROCE	-11.34***	-11.74***	-9.23***	-8.51***	-5.13***
	-6.37	-7.11	-6.37	-5.47	-3.48
ROE	-0.85	-0.05	-1.40**	-2.06***	-3.74***
	-1.03	-0.06	-1.96	-2.69	-5.06
Net Income/Sales	0.10***	0.12***	0.13***	0.10***	0.11***
	3.53	3.96	4.30	3.10	3.40
Pre-tax Income/Sales	-0.13***	-0.14***	-0.14***	-0.12***	-0.12***
	-7.69	-7.60	-7.71	-6.52	-6.23
EBITDA					
Investment					
Dividend per share	-5.44***	-4.80***	-3.65***	-5.28***	-4.21***
	-3.51	-3.00	-2.52	-2.91	-2.49
Earnings per share	-0.01***	-0.01***	-0.01***	-0.02***	-0.02***
	-5.79	-9.51	-11.79	-15.61	-17.69
Dividend Yield	-0.02***	-0.02***	-0.02***	-0.02***	-0.01***
	-18.26	-18.51	-17.71	-15.17	-14.07
Price Earnings Ratio	-0.02***	-0.01***	-0.01***	-0.03***	-0.03***
	-6.51	-3.97	-6.23	-10.21	-12.13
MV/BV	0.92	0.30	-0.23	0.93	0.73***
	1.22	0.16	-0.18	1.21	2.49
Gearing					
Total Debt/Shareholder Equity	1.11***	0.83***	0.80***	0.83***	0.42*
	3.78	3.10	3.31	3.23	1.72
EBIT/Interest Expense Total	0.09***	0.08***	0.07***	0.06***	0.13***
	8.54	6.97	7.14	5.50	12.17
Shareholder's Equity/Total Assets	8.12***	5.64***	3.14***	3.04**	1.54
	6.25	4.46	2.70	2.42	1.26
Total Debt/Total Assets	6.67***	4.05*	7.78***	8.90***	8.11***
	2.57	1.67	3.55	3.84	3.66
Long Term Debt/Shareholder's Equity	-3.61***	-2.80***	-2.47***	-2.18***	-1.43***
	-5.37	-4.66	-4.58	-3.82	-2.63

Long Term Debt/Total Assets	-5.67	-13.08***	-31.31***	-34.28***	-32.41***
	-1.07	-2.59	-6.71	-6.61	-6.71
Short Term Debt/Total Assets	12.49***	19.25***	18.35***	23.61***	28.74***
	4.06	6.78	7.31	8.86	11.28
Liquidity					
Current Ratio	-0.79***	-0.64***	-0.56***	-0.38***	
	-19.03	-15.92	-15.14	-9.37	
Quick Ratio	0.01	0.01	0.01	0.01	
	0.98	0.87	0.97	1.17	
Size					
Market Value	0.19***	0.29***	0.37***	0.36***	0.37***
	2.95	4.59	6.51	5.45	6.32
Book Value	0.04***	0.06***	0.06***	0.11***	0.14***
	3.56	4.80	5.71	8.83	10.99
Total Assets	-0.62***	-0.63***	-0.82***	-0.69***	-0.78***
	-21.60	-22.15	-33.63	-22.65	-33.53
Total Sales	0.81***	0.72***	0.60***	0.73***	0.61***
	11.58	10.40	10.05	10.33	9.87
Enterprise Value					
Growth					
Change in Sales					-0.01
					-1.22
Change in Total Assets	-0.01	-0.01			
	-1.20	-0.74			
Wald Chi^2	9882.09***	7858.17***	3497.51***	6763.02***	6760.51***
No of Variables	26	26	25	25	24
Log Likelihood	-6451.83	-6538.36	-6526.52	-6302.45	6069.89

Note: Number of Years before Acquisition = 1 (1 year before the acquisition took place), Number of Years before Acquisition = 2 (2 years before the acquisition took place), Number of Years before Acquisition = 3 (3 years before the acquisition took place), Number of Years before Acquisition = 4 (4 years before the acquisition took place), Number of Years before Acquisition = 5 (5 years before the acquisition took place). Dependent Variable is a binary number which equals 1 for firms involved in the acquisition and 0 otherwise.

Table 65: Hazard Results for Acquired and Non-Involved Companies

Variable	Number of Years before Acquisition				
	1	2	3	4	5
Efficiency					
Sales/Fixed Asset	-0.07*		0.07**	0.14***	0.07*
	-1.83		2.01	3.55	1.89
Sales/Total Asset	0.49	-0.13	-0.72**	-0.94***	-0.73***
	1.47	-0.49	-2.33	-3.19	-2.62
Sales/Employees	-0.14***	-0.07***		-0.04	-0.02
	-5.35	-2.93		-1.24	-0.62
Profitability					
ROCE	6.97***	7.61***	7.99***	7.69***	7.10***
	7.76	10.14	11.60	12.41	12.98
ROE	0.49	0.06	-1.11***	-0.87***	-1.16***
	1.36	0.19	-3.56	-3.02	-4.46
Net Income/Sales	0.11***	0.11***	0.03***	0.03***	0.02***
	7.25	9.50	9.75	11.15	9.20
Pre-tax Income/Sales	-0.06***	-0.05***			
	-6.06	-7.03			
EBITDA					
Investment					
Dividend per share	-0.42***	-0.62***	-0.72***	-0.85***	-0.92***
	-2.48	-3.56	-3.96	-4.53	-4.76
Earnings per share					
Dividend Yield					
Price Earnings Ratio	0.01***		0.01***		
	10.28		8.27		
MV/BV	0.19	0.17	0.07	0.12	0.04
	0.81	0.70	0.25	0.52	0.18
Gearing					
Total Debt/Shareholder Equity	-1.05***	-1.26***	-0.99***	-1.02***	-0.83***
	-7.54	-10.97	-8.75	-10.20	08.72
EBIT/Interest Expense Total	-0.03***	-0.03***	-0.02***	-0.01***	-0.01***
	-11.89	-11.36	-5.48	-4.74	-5.59
Shareholder's Equity/Total Assets	-5.68***	-6.17***	-6.73***	-6.22***	-5.80***
	-10.80	-13.00	-17.44	-13.73	-13.96
Total Debt/Total Assets	3.20***	3.77***	4.78***	4.90***	4.27***
	3.13	3.93	4.55	4.92	4.49
Long Term Debt/Shareholder's Equity	2.28***	2.91***	1.92***	2.13***	1.60***
	7.99	12.26	7.57	9.58	7.50

Long Term Debt/Total Assets	-27.41***	-33.45***	-26.60***	-29.01***	-23.99***
	-12.92	-17.58	-13.13	-15.16	-13.17
Short Term Debt/Total Assets	-2.89***	-0.77	-4.94***	-3.42***	-3.95***
	-2.45	-0.73	-4.25	-3.17	-3.93
Liquidity					
Current Ratio	-0.13***	-0.05***	0.04***	0.06***	0.08***
	-11.78	-5.07	3.16	5.13	7.13
Quick Ratio	0.03***	0.03***	0.03***	0.03***	0.02***
	17.77	20.43	13.46	14.22	11.36
Size					
Market Value	0.21***	0.18***	0.11***	0.08***	0.03**
	8.02	8.40	6.29	5.18	2.37
Book Value	0.01***			-0.01***	-0.04***
	3.65			-4.82	-12.64
Total Assets	-0.03***	-0.03***	-0.02***	-0.03***	-0.02***
	-4.45	-4.63	-3.78	-4.28	-2.62
Total Sales	-0.26***	-0.23***	-0.16***	-0.13***	-0.07***
	-9.72	-10.52	-8.60	-7.88	-5.36
Enterprise Value					
Growth					
Change in Sales					
Change in Total Assets		-0.01***			
		-5.86			
LR Chi^2	6812.09***	6827.53***	6983.83	6886.13***	7108.93
No of Variables	23	21	20	21	21
Log Likelihood	-124500	-124492	-124414	-124463	-124351

Note: Number of Years before Acquisition = 1 (1 year before the acquisition took place), Number of Years before Acquisition = 2 (2 years before the acquisition took place), Number of Years before Acquisition = 3 (3 years before the acquisition took place), Number of Years before Acquisition = 4 (4 years before the acquisition took place), Number of Years before Acquisition = 5 (5 years before the acquisition took place). Dependent Variable is a binary number which equals 1 for firms involved in the acquisition and 0 otherwise.

4. Dynamic Investment Models and the Investment-Q Relationship

4.1 Introduction

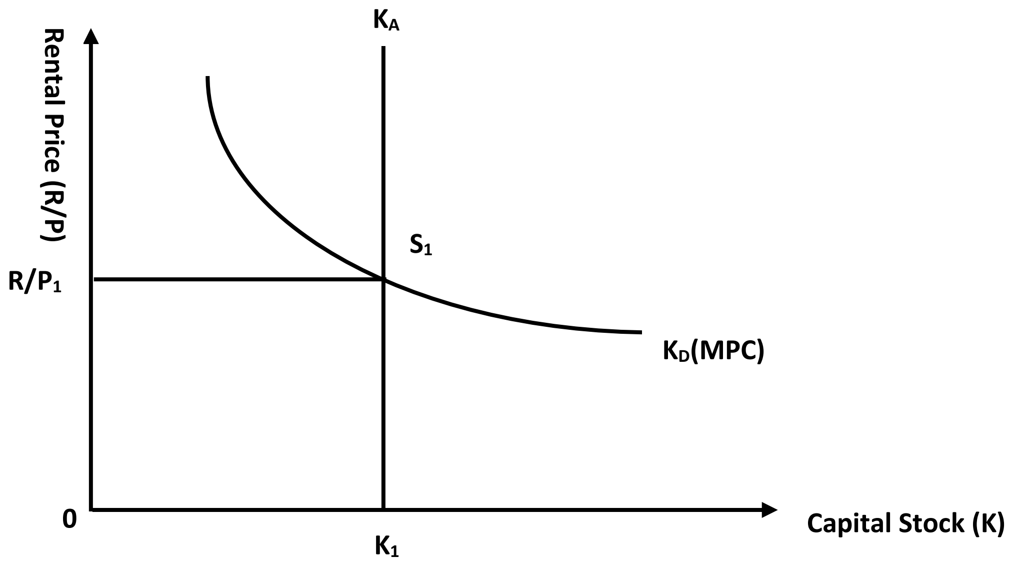
At the level of the firm, the literature on investment is primarily dominated by two theories; the neoclassical theory by Dale Jorgenson and the "q" theory suggested by James Tobin[59]. The neoclassical theory of investment starts from a firm's optimization behaviour. According to the neoclassical theory of capital, as illustrated by Irving Fisher, a production plan for the firm is chosen so as to maximize utility over time. Under certain well-known conditions this leads to maximization of the net worth of the enterprise as the criterion for optimal capital accumulation. Capital is accumulated to provide capital services, which are inputs to the productive process.

For convenience the relationship between inputs, including the input of capital services, and output is summarized in a production function. The central feature of the neoclassical theory is the response of the demand for capital to changes in relative factor prices or the ratio of factor prices to the price of output. The firm, operating in a pure competitive model, is guided by the neo-classical marginalist rule of profit maximisation. The key concept in the neo-classical theory is the rental price of capital. A profit-seeking firm compares the cost and benefit of each unit of capital in order to make decisions on how much capital to lease by paying a fixed rental per period. Consider the case of a construction company which has the contract to construct a multi-storeyed building within a year's time. It requires an earth-moving equipment for three months. There is no point in buying this machine at a high cost. It gains by hiring this machine from another company (the rental firm) by paying a lease rental. The rental price of capital is the periodic payment that has to be made by the construction company to the leasing firm (which specialises in leasing out the machine) for a certain period to hire the earthmoving equipment. The construction company obtains the equipment by

[59] At the macro level, Keynes derived a theory based on the Marginal Efficiency of Capital in which the price is considered to be the interest rate and this corresponds to the value of a long-dated asset such as a government bond. Other often used theories relate to the accelerator model that links accelerations in investment to output. The latter model follows from it often being difficult to relate quantities such as capital or investment data to prices. The benefit of the Q theory is that the theory and reality seem to yield a better fit. In the macro case Investment and Output are generally I(1) which would explain the capacity to find dynamic specifications that work

paying a rental of R per period and it sells its output at a price of P. Hence, the real cost of a unit of capital to the production firm is R/P. The real benefit of a unit of capital to a producing firm is its marginal product. The marginal product of capital (MPC) is the addition made to the total product of the firm by one extra unit of real capital. Figure 1 shows the equilibrium in the rental market for capital. The demand curve of capital is the MPC curve. It slopes downward from left to right because as more and more units of capital are used, MPC falls. Thus, MPC is low when the level of capital is high. The aggregate supply of real capital remains fixed in the short run.

Figure 6: Equilibrium in the Rental Market for capital



It seems useful to divide the neoclassical theory into two stages. The earlier version of the neoclassical approach developed by Jorgenson (1963) derives the optimal capital stock under constant returns to scale and exogenously given output. To make the rate of investment determinate, the model is completed by a distributed lag function for net investment. This earlier version of the neoclassical investment theory has a couple of drawbacks. The assumption of exogenously given output (which makes the optimal capital stock determinate) is inconsistent with perfect competition. The theory itself cannot determine the rate of investment; rather, it relies on an ad hoc stock adjustment mechanism. Some sort of adjustment costs are introduced implicitly through the distributed lag function for investment.

The adjustment costs solution offered was installing of new investment goods in the firm's optimization problem (Lucas, 1967; Gould 1968; Uzawa, 1969; Treadway, 1969). m. In this formulation, capital stock is given to the firm at each moment of time because of the adjustment costs in changing capital stock. What the firm can control at each moment of time is the rate of investment, not the stock of capital. This modification of the earlier version of neoclassical theory was in fact recommended by Jorgenson (1972) who wrote:

> A derivation of this model incorporating installation costs explicitly with constant returns to scale in both production and installation is obviously much more satisfactory than the original derivation. (Jorgenson [1972, pp. 223-224]).

The alternative theory, by James Tobin (1969), posits that the rate of investment is a function of q, the ratio of the market value of new additional investment goods to their replacement cost. Here again, some sort of adjustment costs lie behind the theory. If a firm can freely change its capital stock, then it will continue to increase or decrease its capital stock until q is equal to unity. Also, the role of the production function is never clear in Tobin's (1969) exposition. One may wonder if the "q" theory can be derived from the firm's optimization. There is a similarity between the modified neoclassical investment theory with instalment costs and the "q" theory are equivalent. Lucas and Prescott (1971) were the first to recognize this, although they never indicated the connection to the "q" theory. Later Abel (1980) showed that the optimal rate of investment is the rate for which q - 1 is equal to the marginal cost of instalment. However, his discussion is focused primarily on the Cobb-

Douglas technology. Yoshikawa (1980) arrived at the same conclusion as Abel did, but his model is characterized by static expectations.

A large literature investigates the potential reasons why Tobin’s q does not explain investment well in the data, pointing to the existence of financial constraints, decreasing returns to scale, inefficient equity-market valuations, and measurement problems, among other things. Kaplan and Bernadette A. Minton (1994) argue that Tobin's q may not be a good predictor of investment for firms that face financial constraints. The authors find that for firms with high leverage or low cash flows, Tobin's q is a weak predictor of investment decisions, suggesting that financial constraints may play a role in firms' investment behaviour. Baker and Wurgler (2006) argue that Tobin's q may not be a reliable predictor of investment because of inefficient equity-market valuations. The authors find that firms with high q ratios tend to be overvalued by the stock market, while firms with low q ratios tend to be undervalued, leading to a weak relationship between q and investment. Ongena and Smith (2001) argue that Tobin's q may not be a good predictor of investment for firms that face decreasing returns to scale. The authors find that for firms in industries with low economies of scale, Tobin's q is a weak predictor of investment decisions.

Brown (2018) investigates the relationship between Tobin's q and investment under varying levels of uncertainty. The author uses a sample of US manufacturing firms from 1970 to 2014 and finds that the relationship between Tobin's q and investment is affected by the level of uncertainty faced by firms. The study finds that Tobin's q has a stronger predictive power for investment in periods of low uncertainty, while its explanatory power weakens as uncertainty increases. The author argues that this finding suggests that Tobin's q may not be an accurate measure of investment opportunities in periods of high uncertainty, as firms may face difficulties in assessing investment opportunities and may be more cautious in their investment decisions. The study also finds that the investment-uncertainty relationship is stronger for financially constrained firms, suggesting that these firms are more sensitive to uncertainty in their investment decisions. The author suggests that policymakers may need to consider the impact of uncertainty on investment when designing policies aimed at promoting investment and economic growth.

Hou et al. (2019) investigate the relationship between Tobin's q and investment in Chinese firms. The study uses a sample of Chinese listed firms from 2004 to 2016 and finds that Tobin's q has limited explanatory power for investment in Chinese firms. The study finds that the low explanatory power of Tobin's q is due to the presence of state ownership and government policies that distort market incentives. The authors argue that the state ownership of many Chinese firms can lead to a misallocation of resources, with investment decisions being influenced more by political considerations than by market fundamentals. In addition, the authors suggest that government policies, such as subsidies and tax incentives, can also distort the relationship between Tobin's q and investment by artificially boosting investment in certain sectors. The study also finds that other factors, such as cash flow, profitability, and market sentiment, have a stronger impact on investment in Chinese firms than Tobin's q. The authors suggest that policymakers may need to consider these factors when designing policies aimed at promoting investment and economic growth in China.

Feng and Yan (2020) investigate the relationship between firm investment and stock liquidity. The study uses a sample of Chinese listed firms from 2003 to 2016 and finds that Tobin's q is a poor predictor of investment for firms with low stock liquidity. The authors argue that this finding is due to market imperfections that affect the relationship between Tobin's q and investment. Specifically, the authors suggest that low stock liquidity can lead to higher transaction costs and information asymmetries, which can make it more difficult for firms to raise capital and invest in profitable projects. In addition, the authors suggest that the low liquidity of some stocks may be due to restrictions on trading imposed by regulators or the controlling shareholders of firms. The study also finds that other factors, such as profitability and growth opportunities, have a stronger impact on investment for firms with low stock liquidity. The authors suggest that policymakers may need to consider the impact of market imperfections on investment when designing policies aimed at promoting economic growth and development.

Chemmanur et al. (2022) investigate the relationship between Tobin's q and firm investment in the presence of market frictions and agency problems. The study argues that Tobin's q may not fully capture the investment opportunities of firms due to factors such as market frictions, agency problems, and the presence of intangible assets. The authors suggest that these factors can lead to a misallocation of resources and a divergence between Tobin's q and the actual investment opportunities of firms. The study develops a model in which Tobin's q affects firm investment through its impact on the cost of capital, investment incentives, and agency costs. The model predicts that Tobin's q has a positive effect on investment in the absence of market frictions and agency problems, but this effect weakens as market frictions and agency problems increase. Empirical results from a sample of US manufacturing firms support the model's predictions, showing that Tobin's q has a limited impact on investment for firms with high levels of market frictions and agency problems. The authors suggest that policymakers and researchers may need to consider the role of market frictions and agency problems when analyzing the relationship between Tobin's q and investment.

Curiously, even as this literature has continued to grow, the stylized fact has changed. Using data from the Fed's Flow of Funds and the Bureau of Economic Analysis's (BEA) National Income and Product Accounts (NIPA) tables, Andrei et al. (2019) show that the aggregate investment-q regression has worked remarkably well in recent years. The simple regression achieves an R^2 of 70% during 1995–2015, comparable to the empirical performances of the bond price q regression proposed in Philippon (2009) and the total tangible and intangible investment-q regression in Peters and Taylor (2017). If one were to test the simple theory using data from recent years, one would conclude that the q theory of investment is in fact an empirical success. Yet this recent development only deepens the puzzle, as problems with q theory highlighted by the literature seem to have worsened in recent years. For example, Peters and Taylor (2017) focus on the failure to measure intangible assets, which have grown substantially in the aggregate, and Philippon (2009) focuses on measuring q via bond markets to avoid relying on equity market valuations, which are increasingly volatile and may seem unreliable. The authors show that, counterintuitively, it is precisely the growing volatility in valuations, especially in intangible-intensive industries, that has contributed to the revived empirical performance of the classic regression.

The main investigation of this chapter is to assess the extent to which Q models of investment provide an empirically fruitful framework for the behaviour of individual firms involved in the market for corporate control.[60] These models have shown to have attractive features which explains its popularity over the last 30 years for the analysis of investment behaviour. The models can be computed from an explicit optimisation framework and justify why future expectations play a crucial role. The Q theory of investment relates the company's investment rate to the shadow value of capital and the unit price of investment goods. The shadow value is a forward-looking function of future expectations hence making it unobservable. The empirical attraction of the Q model stems from a simple relationship between this ratio of shadow value to price, known as marginal Q, and the observable ratio of market valuation to replacement cost value of capital, known as average Q. To obtain this relationship, the additional assumptions of perfect competition, perfect capital markets, and linear homogeneity of the (gross) production and adjustment cost functions, are required. Under these assumptions, unobservable expectations about the flow of profits generated by new investment are summarised conveniently by the observable average market value of capital (Hayashi, (1982)). Despite these assumptions, average Q is still deemed to contain information concerning expectations relevant to investment decisions that is not otherwise available in econometric models that rely on output and user cost variables alone.

[60] Big Q is defined as an approximation based on Market Value relative to Book Value. Little q is as defined above

Hayashi (1982) provides justification for measuring marginal q with a valuation ratio, average q (also known as Tobin's q), so that a simple regression of investment on Tobin's q should have a strong fit. Researchers have found this regression to perform poorly. While the Hayashi model assumptions may not perfectly hold in the data, the stark disconnect between investments and valuations has piqued the interest of financial economists. From an accounting perspective, Q models have not been noticeably successful for the time series variation in aggregate investment [see Von Furstenberg (1977), Summers (1981), Poterba and Summers (1983), and Poret and Torres (1989)]. Their explanatory power is low and serial correlation or dynamic structures including the lagged dependent variable are common. In addition, other variables reflecting liquidity constraints or the state of demand are often significant in the equations even though the standard formulation of Q models does not provide a satisfactory rationale for their inclusion. Their R squared is low and serial correlation/dynamic structures including the lagged dependent variable are common. In addition, other variables reflecting liquidity constraints or the state of demand are often significant in the equations even though the standard formulation of Q models does not provide a satisfactory rationale for their inclusion (Dixit and Rubinfeld, 1994)

A large majority of existing literature use panel data to investigate the potential reasons why Tobin's q does not explain investment well in the data. They tend to focus on inefficient equity-market valuations, the existence on financial constraints, decreasing returns to scale and measurement problems among other things [Fazzari, Hubbard, and Petersen (1988), Hayashi and Inoue (1991), Salinger and Summers (1983), and Chappell and Cheng (1982), Blundell et al. (1992)].

Blundell et al. (1992) investigate the importance of Tobin's Q in the determination of investment decisions at the company level. Using a sample of 532 UK manufacturing companies from 1975 to 1986, the authors estimate a standard Q model on disaggregated panel data. They find sensitivity in parameter estimates when dealing with such models to the choice of dynamic specification, exogeneity assumptions and measurement errors in Q. The magnitude of the Q coefficient was found to be small and significant. The authors found the investment rate is relatively unresponsive, at least in the short run, to variations in equity values. The authors used the Generalised Method of Moments type estimator and placed structural restrictions on the average Q model. They found that this measure of Q did not completely reflect all the determinants of investment decisions in the way that the theory predicts of marginal Q, as a result two additional factors were added (cashflow and output). The first factor, cash flow, has been suggested by a number of authors to be a key influence for investment. The results confirmed this assertion and pointed to the importance of correctly dealing with the endogeneity of cash flow and its dynamic specification. The role for average Q also remained unaffected by the inclusion of the second factor, output, which although significant did not eliminate the importance of either Q or cash flow. The negative term found for this factor was attributed to monopoly effects as opposed to an accelerator model.

Salinger and Summers (1983) draw on the earlier work by Summers (1981), Abel (1982) and Hayashi (1982). They attempt to examine the impact of alternative tax reforms on the investment decisions of individual firms They make two critical assumptions for the estimated investment function which appears in their paper; the assumption of stable adjustment cost function of a certain form and the assumption of homogeneity of degree one in both production and demand. The function used does not depend on any assumption of a stable production function, demand function, factor supply function, or expectation function. This makes it entirely consistent with the investment function estimated that these functions may jump around erratically and that even the discount rate used by the market to capitalize dividends may be erratic. They posit the work of Shiller in that stock prices are very volatile and need to be accounted for in terms of information regarding future dividends. The authors find that the q theory approach has substantial predictive power at the microlevel. The econometric results suggest that explanatory power is enhanced even further when tax effects are recognized. The simulation results confirm that tax policies can have large effects on both stock market valuations and investment incentives in both the short and the long run. They also indicate that the effects of investment incentives are likely to differ very substantially across firms. The differences arise from variations both in the magnitude of tax effects on firms' incentives to invest and in the responsiveness of firms' investment to changes in investment incentives. The latter are due, according to the model, to differing adjustment cost functions. Although these results are informative, the authors noted that a great deal still needs to be done before it will be possible to make accurate predictions of the impact of tax reforms on individual corporate or even industry investment decisions. They find that the coefficient of Q in time series regressions for individual firms takes the expected sign in almost all cases but is statistically insignificant nearly half of the time.

Hayashi and Inoue (1991) investigate a model of investment with multiple capital goods a one-one relation between the growth rate of the capital aggregate and the stock market-based Q. Using a panel of Japanese based firms spanning a ten-year period from 1977 to 1986, the authors estimate the growth-Q relation by forming two industry groups (heavy and light) taking into account the endogeneity of Q. The heavy industry consisted of primary metal, metal products, machinery, electrical appliances and transportation equipments whereas the light industry consists of food, textile, paper, chemical and other. The authors find a tax-adjusted Q variable to be a significant determinant of investment. However, a cash flow variable is also significant in some years when added to the model. This indicates that profits enter importantly in a Q model of investment. They point out, however, that when shocks to firm cash flow are correlated with shocks to the adjustment cost function, a positive coefficient on cash flow could just reflect a bias in the estimate of the Q coefficient. They find that for the light industry, cash flow coefficients are very large and significant which suggests that the light industry may not be competitive as assumed by the theory. They also find that if the sample period is restricted to the last three years of the data, the period in which Japanese financial markets had been substantially deregulated, then cash flow is no longer significant for the heavy industry and there is no sign of mis-specification.

Similarly, for a panel of US companies, Fazzari et al. (1988) find that cash flow has an important effect on investment in addition to Q variables. Fazzari et al. (1988) work within the framework of the q-theory of investment to show that imperfect information can create financing hierarchies over the use of internal and external finance. They used data on manufacturing firms from the Value Line database from 1970 to 1984. They find that these created financing hierarchies accentuates hierarchies created solely from tax considerations. The authors focus on the importance of using micro data to consider issues of firm heterogeneity in capital markets. To test the effects of financing constraints on q and investment, they identified differences in q, financing behaviour and investment across firms classified by their retention behaviour. If the cost disadvantage of external finance is slight, then retention behaviour should contain little or no information about q or investment. Firms will simply use external finance to smooth investment when internal finance fluctuates. On the other hand, if there is a pronounced financing hierarchy, then firms retaining all of their income may effectively be at a corner solution, where investment is limited by available internal cash flow. In this case, leading to two predictions of the theoretical model. First, firms with high retention ratios may have no low-cost marginal source of finance for investment to drive q down to its conventional equilibrium level. Second, the investment behaviour of firms paying no dividends should be driven by fluctuations in cash flow. The authors divided firms into classes based on their Dividends and Incomes. In summary, the results suggest important impacts of fluctuations in the availability of internal finance on investment. These effects are magnified by the fact that cash flow is highly variable for the rapidly growing firms in class 1, while mature firms in class 4 experience very small variation in cash flow. Internal funds contribute to explaining investment in all classes even for firms that have much more cash flow than investment. This most likely indicates the pitfalls in using average Q in empirical studies. Their main result looks at the substantial difference across classes when assessing the impact of cash flow on investment. These differences are consistent with the cost differential between internal and external equity finance predicted by their models and the differences in q values across classes.

All of the above literature have not investigated the Investment-Q relationship in regards to the literature on acquisitions. While the microeconomics literature on firms has made some considerations on investment (Blundell et. al, 1990), the two have not been drawn together. This forms the contribution of the final empirical chapter as we attempt to determine whether such decisions are heterogeneous.

To guide this empirical chapter, the study begins with a theory of a firm that invests optimally in physical capital over time. The theory is a standard neoclassical investment-q theory in the spirit of Hayashi (1982) and Abel and Eberly (1994). Following on from the literature on the market for corporate control, this chapter tests the standard Q model of investment under different assumptions concerning the stochastic properties of Q at the firm level using the same firms discussed in the previous chapter. The study tests for further heterogeneity between the firms in the sample. Are the acquiring firms infact different from the other firms? The theory underlying the Q model implies reasonably strong restrictions on the stochastic properties of the model suggesting that careful treatment of the dynamic structure of the model and the choice of instruments used may be critical to the recovery of consistent estimates of the parameters. With the notable exception of Hayashi and Inoue (1991) and Blundell et al. (1992), previous micro-econometric studies have adopted estimators which do not fully acknowledge these restrictions and as a result may not be consistent. These issues are confirmed in the empirical application on a panel of UK companies where the sensitivity to alternative stochastic assumptions is highlighted. This structure is more complex in nature than usual dynamic structures show. These important dynamic effects turn out to be consistent with average Q theory only under a strong autoregressive restriction on the error process which, perhaps surprisingly, does appear to be data-coherent. In the stochastic specification, the chapter allows for company-specific effects in the error term and for the endogeneity of regressors. This is achieved using a heteroskedasticity robust Generalised Method of Moments (GMM) estimator due to Hansen (1982) and White (1982). The GMM estimates are used as Blundell et al. (1992) find this estimator to provide the most consistent and reliable results.

In principle, there are distinct advantages in exploiting data on individual firms. In the first place it allows the theory, developed in the context of a 'representative' firm, to be tested at the level at which it is formulated, so reducing econometric problems introduced by aggregation across firms. Aggregation problems may be important here since the standard Q model is specified in ratios and there are clear nonlinearities in the corporate tax system. Secondly, the estimates are obtained by using both the time-series and cross-sectional variation in the data. This should contribute to their precision and also allow consistent estimation in the presence of correlated company-specific effects. Finally, some variables can be measured more accurately at the individual firm level. This is certainly true for the market value of the firm and also for the effective factor prices it faces. In particular, the widespread occurrence of tax exhaustion in the UK since the mid-1970s alters the effective price of investment goods, inclusive of tax incentives, according to the tax position in which the firm finds itself. Due to the complexities in regards to the calculation of tax in the UK for individual firms, this doesn't play a role in the study.

In section 2, the chapter discusses the market for corporate control and outlines the main features of the theoretical model that provides the starting point for empirical analysis. Although the theoretical issues are not new, this chapter utilises this discussion to indicate the appropriate way to construct the firm-specific variables used in the empirical model and to assess precisely what stochastic restrictions are placed on the model by the optimising theory. Section 3 contains the empirical results and begins with a description of the data. Following from this some econometric issues are discussed and the results of our specification search for an appropriate Q model are presented. Having chosen what appears to provide the best description of the relationship between Q and the investment rate for our sample of companies, this chapter then assess the degree to which other factors, in particular cash flow and debt, contain additional explanatory power. Finally, section 4 concludes with a summary of the main findings.

4.2 Literature Review

4.2.1 The Market for Corporate Control

The market disciplines producers by rewarding them with profits when they create value for consumers and punishes them with losses when they fail to create enough value for the consumer. The disciplinarians are the consumers. The market for corporate control in principle is no different. Here, it disciplines firm managers of corporations with publicly traded stock to act in the best interest of shareholders. The disciplinaries are shareholders. Many articles discuss the trends in the corporate control market but many fail to support with any empirical analysis.

It has been well-established that mergers appear in waves throughout time. There have been six key waves of merger activity, as evidenced in the existing literature. These waves have predominantly happened in the US since the late 1890s. Our sample includes mergers from recent waves, and also because most previous studies address specific characteristics and abnormal returns of recent takeover waves, this literature review generally focuses on recent merger waves. This section will provide a brief insight into the first three waves. Table I shows a summary of key attributes of different merger waves and average acquisition performance found by prior studies during each wave since the 1890s.

The first merger wave, which started in the late 1890s, is characterised by horizontal consolidation of industrial production. The wave followed radical changes in technology after the electrification of industries. Incidentally, this period became known as an era of economic expansion and innovation. Stigler (1950) proposes that development of modern corporations with limited liability and also modern capital markets triggered the potential of profitable monopolistic gains through mergers. The takeover wave resulted in monopolistic power for many giant firms in their respective

Table 66 MERGER WAVES

Wave Period	Main Industries	Key Attributes
1897-1904	Textiles	*Merging to form monopolies*
	Steel Production	*Horizontal consolidation of production*
	Hydraulic Power	
1916-1929	Food	*Move towards oligopolies*
	Steel	
	Steam Engines	
	Railways	
1965-1969	Electricity	*Diversification*
	Chemicals	
	Combustion engines	
1981-1989	Oil & Gas	*Leveraged takeovers using bank debt and junk bonds*
	Textiles	*Split up 1960s conglomerates*
	Non-depository	*Hostile*
	Credit	*Efficiency gains*
	Food	
	Misc. manufacturing	
1993-2000	Banking	*Related mergers*
	Metal mining	*Consolidation of major industries*
	Media & Telecom	*Response to deregulation*
	Real Estates	*Stock payments*
	Hotels	
2003-2007	Banking	*Global scope*
	Media & Telecom	*Cross-border acquisitions*
	Utilities	*Cash payments*
		Friendly negotiations

industries. The era of mergers for monopoly ended in 1904 when a decision on Northern Securities made it clear that monopolistic mergers were prohibited by anti-trust laws.

The second merger wave commenced in the late 1910s after a period of little takeover activity in the market, which was affected by the First World War. Stigler (1950) argues that the new goal of mergers in this period was oligopoly. As the evidence shows, the formation of oligopolies was mostly affected by the second-class firms who took the opportunity to use anti-trust legislation to reduce the market power of the dominant firms in almost every industry. The author suggests that Sherman Law was “the fundamental cause for the shift from merger for monopoly to merger for oligopoly” in the USA. Moreover, he argues that the capital requirements of mergers, and the tendency of rivals to grow in number and size, became barriers for dominant firms that could continue to engage in monopoly mergers. This takeover wave ended at the start of the great economic recession in 1929.

The third merger wave took place in the 1960s. Diversification by firms was the main attribute of this wave as companies aimed to benefit from growth opportunities in new product markets through building large conglomerates. By this time, anti-trust regulations had become even tighter in the USA. During the 1960s, rightly or wrongly, the market viewed conglomerates more favourably than we do today (Holmstrom and Kaplan, 2001). Indeed, stock markets reacted positively to most conglomerates in the 1960s (Matsusaka, 1993). Diversification could reduce earnings volatility and risk. It introduced the internal capital market as an alternative to imperfect external capital markets. Acquisition activity, however, declined in the early 1970s when the oil crisis led the global economy into recession and did not return for more than a decade.

The fourth takeover wave emerged in 1981. This wave is generally characterised as highly leveraged and hostile. There was the emergence of new financing methods, which were mainly based on bank debt and junk bonds, changes in anti-trust policies and the deregulations in the financial services industry along with innovations in the electronics industry, which triggered the takeover activity that occurred during the 1980s. Hughes (1993) provides a comprehensive review of the important papers in this area and collates their results in a coherent/clear picture of the development of the corporate control market. The author found considerable evidence that merger activity increased greatly in the 1950s and 1960s. Using UK data, Hughes demonstrated that out 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 unusual considering the general business climate at the time. Hughes explained this behaviour in terms of the incentives and encouragement offered by the Industrial Reorganisation Corporation in the UK at that time. Hughes makes no mention of 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. Hughes demonstrated that the level of activity from 1974 to 1981 was approximately half that exhibited in the late 1960s. 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 1960s 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 1980s 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) focused on the pattern of activity in the 1980s using US data. However, this did not stop the authors from discussing several interesting points about the UK market. They claim that the number of acquisitions did not alter during the 1980s despite popular belief that activity peaked in the years 1988 and 1989. According to Boisi and Essig (1994), the value of the acquisitions is what increased enormously during those years. Both authors worked in the market for corporate control suggesting their perspective is accurate despite their failure to provide empirical backing for this statement. The most important contribution of this paper is current attitudes in this field. However, this was based on the author's observation and experience. Boisi and Essig (1994) claim that, after the extravagant behaviour of the 1980s, the takeover market in the 1990s is far more cautious than previously. In the late 1980s, they noted, acquisitions began to take place that was 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.

Holmstrom and Kaplan (2001) find that the use of leverage was so huge that from 1984 to 1990, more than $500 billion of equity was retired net as corporations repurchased their own shares, borrowed to finance takeovers and were taken into private hands in leveraged buyouts. Although this merger wave of the 1980s is generally characterised as hostile, Andrade et al. (2001a) report that only fourteen per cent of their sample in the 1980s were hostile bids. This amount is still significantly more than the four per cent share of hostile bids in their sample of 1990s takeovers, but less than the twenty-three per cent portion of hostile bids reported by Mitchell and Mulherin (1996). These authors used a sample from the Value Line Investment Survey, which usually reports acquisitions by generally larger and better-known firms. Jensen (1986a, 1988, 1993) suggests the 1980s takeovers were ultimately driven by a failure in the internal governance mechanisms of US corporations. According to Jensen (1993), corporate mismanagement in the 1970s finally caused capital markets to react. The large windfall gains from the oil crisis that were spent on excessive oil exploration and diversification were a concrete trigger. Nevertheless, changes in technology and regulation more broadly had led to a large amount of excess capacity in many US industries. Managers were unwilling to cut down their operations or simply to exit as long as they had the financial resources to continue. In the early and mid-1980s, the capital markets finally found the instruments to reduce excess capacity. Leveraged acquisitions, leveraged buyouts, hostile takeovers and stock buybacks were successful in eliminating free cashflow because the debt service requirements that usually accompanied them prodded managers to find ways to generate cash to make interest payments.

The fifth wave of merger activity commenced in the early 1990s. Andrade et al. (2001a) describe the picture of mergers in the 1990s as takeovers where merging parties, often in closely related industries, negotiate a friendly stock swap. During this wave of takeover activity, major industries became more consolidated through related acquisitions, which were paid for by stocks. Andrade et al. (2001a) suggest that mergers in the 1990s were responses to deregulation in major industries. Holmstrom and Kaplan (2001) argue that corporations in the 1990s began to emulate many of the beneficial attributes of leveraged buyouts of the 1980s. However, they suggest two reasons for the decline in the number of hostile takeovers. First, hostile takeovers were no longer needed, as companies voluntarily restructured and adopted a shareholder value perspective with prodding from time to time of institutional shareholders. The fear of the 1980s-style hostile takeovers likely played a part in this development. Moreover, the researchers explain that managers became aware of the potential benefits of pursuing shareholder value by observing the success of leveraged buy-outs (LBOs) and takeovers in the 1980s. Helped along by generous stock option programmes, management came to endorse shareholder value in the 1990s and pursued it with vigour.

The sixth wave of takeovers commenced in 2003 after the economic downturn at the beginning of the twenty-first century. A unique characteristic of this recent wave is the large number of cross-border acquisitions. There was also the continuation of international consolidation of industries during the takeover wave of the 2000s. The method of acquiring was mostly friendly, and cash payments backed by corporate cash-holdings were used to finance these deals. Debt was also popular as a method of acquisition during this time. This last wave of takeover activity ended with the start of the global economic recession in 2008.

Frydman and Dirk Jenter (2010) finds that merger waves are driven by changes in market structure, such as the entry of new firms or the exit of old ones. Specifically, the authors find that merger waves tend to occur when the number of potential acquirers in the market increases, or when the market becomes less fragmented. The study also finds that during merger waves, the structure of the M&A market changes in important ways. For example, the authors find that during merger waves, the market becomes more concentrated, with a few large acquirers dominating the market. They also find that during merger waves, the market becomes more efficient, with a greater proportion of M&A transactions being successful.

Penaranda (2012) examines the determinants of merger waves over time, and finds that they are driven by factors such as market valuations, interest rates, and economic uncertainty. The author finds that merger waves tend to occur when market valuations are high, suggesting that firms are more likely to pursue mergers when their stock prices are elevated. The author also finds that merger waves are negatively related to interest rates, suggesting that firms are less likely to pursue mergers when interest rates are high. The study finds that economic uncertainty is positively related to merger waves, suggesting that firms may pursue mergers as a way of mitigating uncertainty. Finally, the author finds that cross-border mergers can trigger merger waves, as they provide a signal to firms that global market opportunities exist.

Bharath et al. (2018) investigates the relationship between merger waves and firm investment, using a sample of U.S. firms from 1980 to 2015. The study finds that firms tend to increase their investment levels during merger waves, with the effect being particularly strong for firms in industries experiencing positive shocks. The study finds that industry shocks, such as changes in regulation or technological innovation, are an important determinant of merger waves. Firms in industries experiencing positive shocks are more likely to engage in mergers and acquisitions. Also, the study finds that firm-level characteristics, such as cash holdings and financial constraints, also play a role in determining investment levels during merger waves. Finally, the study finds that the effect of merger waves on investment varies across industries, with the effect being stronger for industries with higher levels of product market competition.

4.2.2 Q Models of Investment and The Market for Corporate Control

The seminal paper by Jensen and Ruback (1983) examines the relationship between the market value of a company and the quality of its acquisitions. The authors use Tobin's Q as a measure of a firm's market value relative to its book value, and argue that high Q ratios can be used as a signal of a firm's quality in the context of mergers and acquisitions (M&A). The authors argue that a high Q ratio indicates that the market values a firm's assets and future growth opportunities more highly than its book value, which suggests that the firm is of higher quality and has better investment opportunities than firms with lower Q ratios. This can make high-Q firms attractive targets for M&A

activity, as acquiring these firms can be a way for acquirers to gain access to these high-quality assets and growth opportunities. Jensen and Ruback use empirical evidence to support their argument, analyzing a sample of 118 M&A transactions that occurred between 1971 and 1981. They find that acquiring firms pay a premium for high-Q targets, and that the premiums paid are positively correlated with the target firm's Q ratio. They also find that targets with high-Q ratios tend to have better post-merger performance than targets with low-Q ratios.

Fazzari et al. (2000) use Q models of investment to examine the relationship between financing constraints and investment behaviour. The Q model of investment relates investment decisions to the market value of a firm's assets relative to their replacement cost. According to the Q model, firms will invest when the market value of their assets exceeds their replacement cost, indicating that investment opportunities are profitable. The authors find that investment-cash flow sensitivities, which measure the responsiveness of investment to cash flows, are an imperfect measure of financing constraints. They argue that Q models of investment provide a more accurate measure of financing constraints, as they capture the extent to which investment opportunities are profitable and the availability of external financing. The authors find that financing constraints are an important determinant of investment behaviour, with constrained firms investing less than unconstrained firms. They also find that the effects of financing constraints are more pronounced for small firms and for firms with high growth opportunities.

Bekaert et al. (2001) use the Q model to examine the relationship between stock prices and investment opportunities in emerging markets. The Q model suggests that stock prices are positively related to the present value of future cash flows, and that this relationship is driven by the market value of a firm's assets relative to their replacement cost (i.e., Tobin's Q). Q models of investment suggest that firms will invest more when the market value of their assets exceeds the replacement cost of those assets (i.e., when Q is greater than 1), and will invest less when Q is below 1. The authors find that the Q model is a useful framework for understanding the behaviour of stock prices in emerging markets, and that changes in Tobin's Q are positively related to changes in stock prices. The authors also find that the Q model is more relevant in emerging markets than in developed markets, due to the relatively underdeveloped nature of emerging market financial systems. In emerging markets, Tobin's Q may be a more important metric for assessing investment opportunities, as firms may be more reliant on external financing and less able to rely on internal resources.

Kim, and Zhang (2007) examine the role of Tobin's q in merger and acquisition (M&A) activity. Tobin's q is used as a metric to determine whether a firm's stock is undervalued or overvalued, with a high Tobin's q suggesting that the market values the firm's assets highly compared to their replacement cost. The authors find that Tobin's q plays a significant role in M&A activity, with firms with high Tobin's q values more likely to engage in M&A activity. The authors also find that the role of Tobin's q in M&A activity varies depending on the type of M&A transaction, with horizontal acquisitions (between firms in the same industry) more likely to be driven by Tobin's q than vertical acquisitions (between firms in different stages of the same industry) or diversifying acquisitions (between firms in unrelated industries). Additionally, the authors find that Tobin's q is positively related to the likelihood of M&A success. Firms with high Tobin's q values are more likely to have successful M&A transactions, as measured by factors such as post-acquisition stock returns and operating performance.

Gottesman and Lyle (2018) examines the relationship between Tobin's q and corporate control using a sample of US firms involved in mergers and acquisitions (M&A) transactions. The Tobin's q argument suggests that higher q values indicate that a firm's assets are undervalued by the market and that investing in those assets would create value for shareholders. This argument has been used as a framework for understanding investment behaviour and corporate control decisions.

The study finds that higher Tobin's q values are associated with a lower probability of being a target firm in an acquisition and a higher probability of being an acquirer. This suggests that firms with higher q values are less likely to be acquired by other firms, as their assets are perceived to be undervalued, and more likely to engage in acquisitions themselves to create value for their shareholders. The authors also find that the relationship between q and corporate control is stronger for firms with high levels of cash reserves, suggesting that these firms may be more willing and able to engage in acquisitions when q values are high. However, the authors caution that the relationship between q and corporate control may be influenced by other factors, such as firm size, industry characteristics, and market conditions.

Akkus and Köse (2021) investigate the relationship between Tobin's q and mergers and acquisitions (M&A) using panel data for firms in the US market. The study finds that higher q values are associated with a higher likelihood of M&A activity, indicating that Tobin's q can be a useful predictor of M&A activity. In particular, the authors find that a 1% increase in q is associated with a 0.3% increase in the likelihood of M&A activity. The study also finds that q values predict the probability of successful M&A transactions. Firms with higher q values are more likely to successfully complete M&A transactions, while firms with lower q values are less likely to do so. Specifically, the authors find that a 1% increase in q is associated with a 0.5% increase in the probability of a successful M&A transaction.

4.2.3 Definitions and Basic Model

This chapter considers a firm whose net present value at the start of period t in the absence of taxes is given by

$$V_t(K_{t-1}) = \max_{L_t, I_t}\{ \prod(K_t, L_t, I_t) + \ \beta_{t+1}^{t}\ E_t[V_{t+1}(K_t)]\} \qquad 2.1$$

In (2.1), $\prod(\cdot)$ is the net revenue function in which L_t represents costlessly adjustable factors. Gross investment I_t occurs at the start of the period and is immediately productive, but the firm faces strictly convex adjustment costs in changing its capital stock. The capital stock K_t evolves according to the equation of motion $K_t = (1-\delta)K_{t-1} + I_t$, where δ is the depreciation rate. The expectation operator E_t [·] is conditional on information available at the start of period t and expectations are taken over future interest rates, input and output prices and technologies. The study assumes symmetric information and that the firm's objective is to maximise the wealth of the marginal shareholder. Defining r_t to be the firm's nominal required rate of return between periods *t* and *t*+1, $\beta_{t+1}^{t} = 1/(1+ r_t)$ is the firm's discount factor. The model assumes that the marginal shareholder is risk neutral, so that with no taxes r_t equals the interest rate on default free bonds and is given exogenously to the firm.

Using the envelope theorem, the Euler equation characterising the optimal path of investment is then given by

$$\lambda_t = (1-\delta)\,(\frac{\partial\Pi}{\partial K_t}) + (1-\delta)\,\beta_{t+1}^{t} E_t[\lambda_{t+1}] \qquad 2.2a$$

where $\lambda_t = \partial V_t/\partial K_{t-1}$ is the shadow value of capital. Moreover, from the first order condition for investment we can obtain that

$$(1-\delta)\,(\frac{\partial\Pi}{\partial I})_t + \lambda_t = 0 \qquad 2.2b$$

Given 2.2b there are several different ways of obtaining empirical investment models. First, one can solve forward the stochastic difference equation (2.2b) and estimate λ_t, using forecasts of the marginal revenue product of capital. This is the approach followed by Abel and Blanchard (1986), Bond and Meghir (1994) and relies on a forecasting model for $(\partial\prod/\partial K)_t$. Since this imposes an auxiliary hypothesis concerning the formation of expectations which is not implied by the structural model, the approach is potentially subject to the Lucas (1976) critique. Alternatively, one can recognize that (2.2b) is equivalent to the Q model of investment (Summers (1981); Hayashi (1982); Bond and Meghir (1994)) and use financial market information to measure λ_t. This method relies on the auxiliary assumption of linear homogeneity of $\prod$. Moreover, as discussed in Blanchard, Rhee and Summers (1990), this requires the further assumption that the stock market valuation of the company correctly reveals the fundamental net present value V_t as in (2.1). If these extra assumptions are invalid then λ, will be measured with an error, and no obvious instruments are available to correct for such measurement error.

An alternative approach is simply to combine (2.2a) and (2.2b) to eliminate λ, and write the Euler equation in terms of observables, giving

$$-(1-\delta)\,\beta_{t+1}^{t}E_t[\left(\frac{\partial\Pi}{\partial I}\right)_{t+1}] = -((\frac{\partial\Pi}{\partial I})_t - (\frac{\partial\Pi}{\partial I})_t \qquad 2.3$$

Equation (2.3) can be estimated by evaluating the expectation at realized values. This introduces an expectational error and under the assumption of rational expectations an appropriate method of moments estimator can be used to obtain consistent parameter estimates. The expression in (2.3) controls for expectations without modelling them explicitly. This approach to the empirical modelling of investment has also been used by Abel (1980), Hayashi (1982), Shapiro (1986), Bond and Meghir (1994) and forms the basis of all the models specified in this chapter.

4.2.4 Investment and Financial Policy

The standard model of investment presented above has no applicable role for financial policy. For an equity financed firm, net revenue $\prod$, equals the net distribution to shareholders, i.e. dividend payments net of any new share issues. The choice between retained earnings and new share issues as sources of investment finance is irrelevant to the maximization of (2.1) since each unit of new equity issued allows the firm to pay out dividends valued at one unit, and has no effect on net present value. If the firm can raise finance by issuing risk-free debt at an interest rate i_t, then the only internal solution for debt policy requires $i_t = r_t$,. This renders debt policy irrelevant even in the presence of bankruptcy risk, so long as there are no deadweight costs of bankruptcy hence satisfying the Modigliani-Miller (1958, 1961, 1963) propositions given the standard assumptions of this model.

The company's financial policy may play a substantive role in the investment decision if the firm finds it advantageous to use one source of investment finance in preference to another. A preference for retained earnings over new share issues will arise if the tax system favours capital gains over dividend income or if significant transaction charges must be paid when placing new shares. The presence of bankruptcy costs makes debt finance increasingly expensive as the probability of bankruptcy rises, although tax advantages may make debt finance attractive at low levels of borrowing. In this situation, the company faces a financial "pecking order" (Myers 1984)), or hierarchy of costs associated with different sources of investment finance. The availability of low-cost internal finance may then be a significant factor in its investment decision. In the next section, the previous model is extended to incorporate this hierarchy and derive the implications for empirical models of investment. The assumption of value maximization under symmetric information is also retained and introducing asymmetric information may generate a similar financial hierarchy, with less well-informed subscribers to new issues of equity and risky debt requiring a premium against the risk that the firm will turn out to be a lemon, and the potential for rationing to occur (Myres and Majluf (1984), Stiglitz and Weiss (1981)). However, in this case the appropriate objective for the company's investment decisions becomes less obvious. Dow and Han (2021) investigate the role of the Euler equation in explaining the dynamics of takeover bidding. The study develops a theoretical model based on the Euler equation, which relates the expected rate of return to the expected growth rate of a firm's cash flows, to explain the dynamics of takeover bidding. The model predicts that the expected growth rate of cash flows is a key driver of takeover bids, as bidders are willing to pay more for firms with high expected growth rates.

Empirical results from a sample of US takeover data support the model's predictions, showing that the expected growth rate of cash flows is a significant predictor of takeover bids. The authors suggest that the Euler equation can provide a useful framework for analysing the dynamics of takeover bidding and for estimating the expected growth rate of cash flows for target firms.

Edmans et al. (2012) develop a model of the market for corporate control based on the Euler equation and test the model's predictions using empirical data on US mergers and acquisitions (M&A). The authors argue that the Euler equation, which relates the expected return on investment to the cost of capital and the expected future cash flows, can be used to explain the dynamics of takeover bidding and the allocation of resources in the market for corporate control. The model predicts that bidders with a higher cost of capital are more aggressive in their takeover bids and are more likely to win the bidding contest. In addition, the model predicts that takeover premiums are higher for targets with more investment opportunities and lower for targets with more free cash flow. Empirical results from a sample of US M&A deals support the model's predictions, showing that the cost of capital is an important determinant of takeover bidding and that takeover premiums are higher for targets with more investment opportunities.

Malmendier et al. (2020), the authors investigate the role of learning in the market for corporate control by examining the behaviour of mutual funds in making acquisitions. The study finds that mutual funds use the Euler equation to update their beliefs about the value of target firms over time. The Euler equation relates the price of an asset to its expected future cash flows and the discount rate. The authors show that mutual funds use the Euler equation to estimate the cost of capital and the investment opportunities of target firms, and that their beliefs about these variables evolve as they acquire more information about the target firm. The study also finds that mutual funds are more likely to make acquisitions when they have a greater information advantage, such as when they have a larger ownership stake in the target firm or when they have a prior relationship with the target firm. In addition, the study shows that mutual funds are more likely to make acquisitions when the target firm is undervalued, suggesting that they use the Euler equation to identify mispricings in the market.

Roger (2020) investigate the use of the Euler equation in the market for corporate control. The study develops a theoretical model of the market for corporate control that incorporates heterogeneous beliefs among bidders, and shows that the Euler equation can be used to estimate the value of the target firm and the expected value of the bidder's investment. The model also predicts that bidders with more optimistic beliefs will bid more aggressively for target firms, and that the market for corporate control will be more active when bidders have more heterogeneous beliefs. Empirical results from a sample of US takeover data support the model's predictions, showing that bidders with more optimistic beliefs are more likely to win takeover auctions and that the market for corporate control is more active when bidders have more heterogeneous beliefs. The study also discusses the implications of the model for the regulation of the market for corporate control. The author argues that regulations that restrict the ability of bidders to obtain private information or to bid aggressively may reduce the efficiency of the market for corporate control and harm the interests of target firm shareholders.

Colonnello and Palomba (2021) investigate the role of financial frictions in the market for corporate control and how they affect the Euler equation. The study develops a model of the market for corporate control that incorporates financial frictions, such as asymmetric information, agency costs, and financing constraints, and shows that these frictions can affect the cost of capital and the investment opportunities of firms. The authors argue that the Euler equation can be used to estimate these factors and help explain the dynamics of takeover bidding. The study uses a sample of US takeover data from 1985 to 2015 and finds that the Euler equation can explain a significant portion of the variation in takeover premiums, particularly for targets with high levels of financial frictions. The authors suggest that this finding supports the use of the Euler equation in estimating the investment opportunities of firms and identifying mispricings in the market for corporate control.

4.2.5 Hierarchy of Finance Model

Bond and Meghir (1994) introduce two sources of discrimination between retained earnings and new share issues into their model which is worth discussing. These are differential personal taxation on capital gains and dividend income, and transactions charges associated with new issues. For the marginal shareholder, m_t, to be the rate of personal income tax on dividend and interest income in period t, and θ_t to be the dividend received (before personal income tax liability) when the firm distributes one unit of post-corporate tax earnings.[61] The effective capital gains tax rate (z_t) is the present value in period *t* of the tax paid by the marginal shareholder on a unit of capital gains made between periods *t* and *t + 1*, with ζ_{t+1} being the value of that tax in period *t* + 1. ι_t is the interest rate on bonds between period *t* and period *t+1*[62]. Given the above, the cum-dividend value of the firm's shares V, is obtained from the capital market arbitrage condition

$$(1 + (1- m_{t+1})\, \iota_t)(V_t - (1- m_t)\, \theta_t D_t + N_t) = E_t[V_{t+1}] - \zeta_{t+1}(E_t[V_{t+1}] - V_t - N_t \qquad 2.4$$

Where D_t is dividends paid in period *t* and N_t is the value of new shares issued in period *t*. The left-hand side of equation 2.4 is the opportunity cost of holding shares in the firm and the right-hand side is the shareholder's expected wealth (net of capital gains tax at the start of the next period). This leads to the company value being:

$$V_t = E_t[\textstyle\sum_{j=0}^{\infty} \beta_{t+j}^{t} \, (\gamma_{\mathrm{t+j}} D_{t+j} - N_{t+j})] \qquad 2.5$$

Where $\gamma_{\mathrm{t}} = ((1- m_t)\, \theta_t/(1\text{-}z_t)$ is the tax discrimination parameter that determines the relative tax advantage of dividend income against capital gains. The j-period discount factor, $\beta_{t+j}^{t} =$

[61] Under an imputation relationship between corporate and personal taxes, the parameter $\theta_t = (1 - s_t)^{-1}$, where s_t is the rate of imputation. Under a classic relationship θ_t is simply unity

[62] Here, $z_t = \zeta_{t+1}/(1 + (1\text{-} m_{t+1})\, \iota_t$. If capital gains tax is charged on realizations rather than accruals, then ζ_{t+1} is itself an accruals-equivalent rate. This study implicity assumes like in Bond & Meghir (1994) that these tax rates are known one period ahead.

$\prod_{i=1}^{J}(1+r_{t+i-1})^{-1}$ for j ≧ 1 and $\beta_t^t = 1$, is analogous to that in the section above (Definitions and Basic Model), but with $r_t = (1-m_{t+1})\iota_t/(1-\zeta_{t+1})$

For the sources/uses of funds related to company's that issue (single-period) debt (B_t):

$$\mathrm{D}_t = \prod_t + (1-f_t)N_t + B_t - (1+(1-\tau_t)i_{t-1})B_{t-1} \qquad 2.6$$

where $\prod_t$ represents net revenue generated in period *t*, f_t is a transactions charge that has to be paid per unit of new share issues, i_{t-1} is the interest rate payable on bonds issued in period *t-1*, and τ_t , is the rate of corporate income tax in period *t*, against which these interest payments are assumed to be deductible.

The presence of debt implies that the firm can go bankrupt. Both the probability of bankruptcy and the interest rate charged by lenders will depend on the amount borrowed. In the event of bankruptcy the study assumes that ownership of the company will be transferred from the shareholders to the creditors, although the bankruptcy process in period I may involve deadweight costs denoted by X_t.

In the Appendix, this thesis shows that in this case the value of the firm's equity can be written as:

$$V_t = E_t\left[\sum_{j=0}^{\infty}\beta_{\mathrm{t+j}}^{\mathrm{t}}(\gamma_{\mathrm{t+j}}\prod\nolimits_{\mathrm{t+j}} + \gamma_{\mathrm{t+j}}(1-\mathrm{f}_{\mathrm{t+j}})-1)N_{\mathrm{t+j}})\right] - \gamma_{\mathrm{t}}(1+(1-\tau_t)i_{t-1})B_{t-1} -$$
$$E_{\mathrm{t}}\left[\sum_{j=1}^{\infty}\beta_{t+j}^{t}q_{\mathrm{t+j}}^{t+j-1}\gamma_{\mathrm{t+j}}X_{\mathrm{t+j}}\right] + E_{\mathrm{t}}\left[\sum_{j=1}^{\infty}\beta_{t+j}^{t}(1-q_{\mathrm{t+j}}^{t+j-1})\gamma_{\mathrm{t+j}}(\tau_{\mathrm{t+j}} - m_{\mathrm{t+j}}^{B})i_{t+j-1}\beta_{t+j-1}^{t}\right] +$$
$$E_{\mathrm{t}}\left[\sum_{j=1}^{\infty}\beta_{t+j-1}^{t}\gamma_{\mathrm{t+j-1}} - \beta_{t+j}^{t}\gamma_{\mathrm{t+j}}\,(1+(1-m_{\mathrm{t+j}}^{B})\iota_{t+j-1}))\beta_{t+j-1}^{t}\right] \qquad 2.7$$

Here $q_{\mathrm{t+1}}^{t}$ denotes the probability perceived in period t that the firm will go bankrupt in period *t + 1*, and m_{t}^{B} is the income tax rate paid on interest income by the marginal lender (not necessarily equal to m_t).

The components of equation 2.7 have the following interpretation. The first term gives the value of the firm if it issues no debt from period t onwards, or the value of an unlevered firm. The second term is the cost of repaying debt inherited from the previous period, which is predetermined and irrelevant to the maximization of V_t. The third term is the present value of expected bankruptcy costs, whilst the last two terms give the present value of the net tax advantages that result from issuing debt. The firm's optimal borrowing policy trades off these tax gains against expected bankruptcy costs. This value function is maximized subject to non-negativity constraints on dividend payments and new share issues, with associated Kuhn-Tucker multipliers denoted by ${\lambda_t}^D$, and ${\lambda_t}^N$ respectively. To obtain a convenient form for the Euler equation describing the firm's optimal investment path, we assume that both the bankruptcy probability q^I_{t+1} and the interest rate it depend on the amount borrowed B_t, and the size of the firm K_t, only through the ratio $(B_t/p^I_t K_t)$, where p^I_t is the price of a unit of capital goods in period t. It's important to note that bankruptcy costs depend on B_t, but not on K_t, and that they are homogeneous of degree one in K_t.

The Euler equation optimizing the path for investment becomes:

$$(1-\delta)\beta^t_{t+1}E_t[(\gamma_{t+1} + {\lambda_{t+1}}^D)(\frac{\partial\Pi}{\partial I})_{t+1}] = -(\gamma_t + {\lambda_t}^D)(\frac{\partial\Pi}{\partial I})_t - (\gamma_t + {\lambda_t}^D)(\frac{\partial\Pi}{\partial K})_t - v_t(\frac{B_t^2}{p^I_t K_t^2}) \quad 2.8$$

Where both v_t and the first-order condition characterizing the optimal debt policy are presented in the Appendix. The first-order condition characterizing the optimal level of new share issues is:

$$ {\lambda_t}^N = -(\gamma_t + {\lambda_t}^D)(1-f_t) + 1 \quad 2.9$$

4.2.6 Empirical Implications

It's imperative to consider the empirical implications of equation 2.7. The first is to look at a firm that issues no debt. This will mean increasing new share issues by $(1-f_t)^{-1}$ units. This allows an additional unit of dividends to be paid to shareholders, which is valued at γ_t. The firm's preferred source of investment finance will become retained earnings provided that $\gamma_t < (1-f_t)^{-1}$, and the firm will only issue new equity when internal funds have been depleted. This leads to three possible financial regimes in the model

Option 2: $\mathrm{D}_t > 0, \mathrm{N}_t = 0$

The company generates sufficient net revenue to finance its investment from retained earnings and pay positive dividends. The Kuhn-Tucker multiplier ${\lambda_t}^D$, which measures the shadow value of internal finance, is zero.

Option 1: $\mathrm{D}_t = 0, \mathrm{N}_t = 0$

The company generates insufficient net revenue to finance all the investment it would like to make at the cost of retentions, but also finds it optimal not to issue new shares given their higher cost. The firm's investment expenditure is constrained by the availability of internal finance

Option 3: $\mathrm{D}_t = 0, \mathrm{N}_t > 0$

The company again depletes its net revenue to finance investment, but in this scenario has sufficiently attractive investment opportunities remaining that it issues shares to finance a higher level of investment. The level of new issues satisfies (2.9), implying that that $\gamma_\mathrm{t} + {\lambda_t}^D = (1 - f_t)^{-1}$

The investment expenditure of firms in Option 2 may be described as liquidity constrained in the sense that a windfall addition to current earnings, which conveys no information about the firm's future prospects, will result in an increase in investment. As noted by Hayashi (1985a), the presence of companies in this position may account for findings of excess sensitivity of investment to measures of internal finance. Moreover, there is an expectation that dividend payments and new share issues will be significant in models of investment that do not control for the presence of these financial regimes. However, for investment models estimated from microeconomic data the model has much richer empirical implications.

For companies in Option 1 in both period *t* and period *t+ 1*, the Euler equation (2.8) reduces to the basic form of (2.3) provided that the tax discrimination parameter γ is constant across these periods. The same applies for firms in Option 3 in both periods, provided unit transactions costs f are constant. In all other cases, investment depends on the unobservable ${\lambda_t}^D$ and the basic Euler equation should be rejected. Observations can be allocated to regimes according to the observed dividend and new issue behaviour. Thus, with micro data, tests can be performed for the empirical significance of these financial regimes against the null model in the earlier section (Section 2.1), and potentially identify the structural parameters of the model under the alternative.

The aim here is to estimate the basic Euler equation model allowing all coefficients to be different for observations where the basic specification is predicted not to hold, and to test the significance of these additional coefficients.[63]

4.2.6.1 Debt Finance

The introduction of debt finance into the model may or may not require these predictions to be modified, depending on whether debt finance offers a perfect substitute for retained earnings. In the present model, this occurs when there are no bankruptcy costs and no tax advantage (net) to borrowing. In this case the expression for the value of the firm's equity simplifies, and the final term in the Euler equation for investment (2.8) is eliminated. More importantly, the value of the firm is in this case invariant to the choice of B_t, which is a manifestation of the Modigliani-Miller theorem. Since the non-negativity constraint on dividend payments can be re-written using (2.6) as the requirement

$$B_t \geqq (1 + (1 - \tau_t)i_{t-1})B_{t-1} - \prod_t - (1 - f_t)N_t \qquad 2.10$$

it follows that in this case ${\lambda_t}^D = 0$ in all periods. Thus, the basic form of the Euler equation holds for all observations where the tax discrimination parameter γ is constant, whether positive dividends

[63] Notice that the rule allocating observations to regimes depends on current financial choices that are endogenous, and this must be taken into account in the econometric tests.

are paid or not. The first-order condition for new share issues (2.9) then reveals that no new issues will be observed in this situation whenever $\gamma_{\mathrm{t}} < (1 - f_t)^{-1}$. The presence of financial regimes thus requires the introduction of bankruptcy costs and a tax advantage for borrowing into the model. In this case, firms in Option 2 will finance investment partly using debt. Thus, borrowing according to the optimal debt policy described in the Appendix (see A1) up to the point where they are indifferent between one extra unit of debt and one extra unit of retentions. Given this optimal use of debt, the firm exhausts its earnings at some rate of investment. Firms in Option 1, can finance a higher level of investment only by borrowing, and the optimal level of debt from (A1) here determines the level of investment directly through the sources and uses identity (2.6). If this increases the cost of borrowing sufficiently we may also observe firms in Option 3 issuing new shares to finance part of their marginal investment.

In this more general model the financial regime is still identified by the observed financial policy. The shadow value $\lambda_t{}^D$ again drops out of the Euler equation (2.8) only for firms that are in Option 2 in both *t* and *t+ 1* or in Option 3 in both these periods. Besides, the investment of companies in Option 1 continues to be liquidity constrained in the sense defined above. A windfall increase in earnings implies that a higher level of investment can be funded before internal finance is exhausted. A given level of investment in Option 1 can then be financed at a lower cost of borrowing and the firm finds it optimal to increase investment above the level previously chosen.

It is imperative to know that this optimal borrowing policy with an increasing cost of borrowing is not the only case in which the presence of debt finance may be consistent with these conclusions. In the presence of bankruptcy costs and a tax advantage to debt, the firm will borrow until these tax advantages have been fully exploited. This is true even when there is no hierarchy of financial costs discriminating between retained earnings and new share issues (i.e. when $\gamma = (1 - f_t)^{-1}$. In this case, equation (2.9), together with the restriction that the shadow value of dividends and new share issues have to be non-negative, implies that $\lambda_t{}^D = 0$ in all periods. Imposing this restriction in equation (2.8), we see that debt still affects the time-path of investment. The parameter will only be zero when there are no bankruptcy costs and no net tax advantage to debt. Thus, the basic null hypothesis of no financial regimes does not exclude debt from the Euler equation. A more restrictive null hypothesis would be that there are neither financial regimes nor bankruptcy costs, in which case the basic Euler equation in equation 2.3 should describe the investment behaviour of all companies. The treatment of debt here has not ruled out the firm choosing to lend rather than borrow, although if there is a net tax advantage to borrowing the firm's optimal choice will involve positive debt. If the firm can hold financial assets other than corporate debt then it may simultaneously borrow and hold assets if the post-tax return on these assets is sufficiently high. It is easy to prove that if this return equals the firm's discount rate then the firm would accumulate financial assets and would only choose to pay positive dividends if it expects ${\lambda_{t+s}}^{D} = 0$ in all future periods. This would restrict the incidence of liquidity constraints on investment expenditure to those firms that have exhausted both their current earnings and their inherited stock of financial assets. In contrast, if the post-tax return on financial assets is less than the firm's discount rate then the firm will only choose to hold assets if it expects ${\lambda_{t+s}}^{D} > 0$, i.e. to be liquidity constrained. In this case, it's likely to observe firms in each of the three financial regimes described above.

To summarize, the empirical implications of the hierarchy of finance model, Bond and Meghir (1994) find significant differences in the investment behaviour of firms across different financial regimes. If the regimes are not controlled for, then we should find excess sensitivity of investment to measures of internal finance, due to the presence of liquidity constraints for firms in Option 1. There is also an expectation that dividends and new share issues will contain significant information for investment behaviour, contrary to the prediction of the standard neoclassical model. Controlling for financial regimes, the standard Euler equation should be seen as a valid model for a subset of the data, and that the excess sensitivity to financial variables is concentrated outside this subset.

4.2.7 Observed Financial Policy & The Hierarchy of Finance Model

The pure hierarchy of finance model predicts that if the tax discrimination parameter (γ) is smaller than $(1 - f_t)^{-1}$, firms should not simultaneously issue new shares and pay out dividends because the tax and transaction costs of doing so would reduce the value of the firm to its shareholders. Bond and Meghir (1994) show that it is quite common for companies to issue new shares and pay out dividends in the same accounting year. Besides, companies rarely pay no dividend at all. The most straightforward explanation would be that the effective tax discrimination parameter is heterogeneous across firms and not uniformly lower than one. In the United Kingdom, the tax system (since 1973) has only favoured capital gains over dividend income for higher rate tax payers. If the marginal shareholder is a pension fund which is not liable for income tax then $\gamma > 1$, and the company may want to pay out dividends and finance its investment using external sources. If bankruptcy costs are high relative to the costs of issuing new shares, the company would issue new shares (rather than debt) to finance dividend payments up to the point where a legal restriction on the benefit of the imputation system is encountered (Edwards and Keen; 1985). This point is consistent with the model and implies that the standard Euler equation should only be expected to describe the investment behaviour of firms who either pay positive dividends and issue no shares or pay zero dividends and issue shares; the firms with $\gamma > (1 - f_t)^{-1}$ will reveal themselves by simultaneously issuing new shares and paying out dividends.

The thesis also considers two further explanations for the "dividend puzzle" and its effects on the empirical strategy. The first is based on the transaction costs of trading shares and the signalling role of dividends.[64]

[64] If transaction costs are high, shareholders may prefer to receive dividend income rather than realising capital gains by trading in the financial markets. The data also covers periods were the transaction costs were high. Its imperative to note that events such as the stock market liberalization known as “big bang” in October 1986, Dotcom Bubble 2000, Financial Crisis 2007-2009 among a long list of events took place during the sample period.

4.2.7.1 Transaction Costs

Suppose the marginal shareholder has a requirement for post-tax disposable income in period *t* which is satisfied when the company pays gross dividends of $\ddot{D}_t$, which for simplicity is assumed to be exogenously given[65]. If the company pays cash dividends less than $\ddot{D}_t$, the shareholder must sell shares to obtain the additional income. If this involves a transaction cost of $\ddot{\psi}_t$ per unit of shares sold,[66] the amount of shares that must be sold to obtain the required income net of tax and transaction costs is given by: $(1 - m_t)\theta_t(\ddot{D}_t - D_t) / 1 - \ddot{\psi}_t)$.

This imposes a transaction cost of $\psi_t\ (\ddot{D}_t - D_t)$ where $\psi_t = \ddot{\psi}_t\ (1 - m_t)\theta_t / (1 - \ddot{\psi}_t)$. The capital market arbitrage condition now implies a value function for the (unlevered) firm of the form:

$$V_t = \gamma_t D_t - N_t - \Psi_t(\ddot{D}_t - D_t)\,\beth\,(D_t < \ddot{D}_t) + \beta_{t+1}^t E_t[V_{t+1}]$$

Where $\beth\,(\cdot)$ is the indicator function and where $\Psi_t = \psi_t/(1 - z_t)$ The implication of this is that the Euler equation model will be valid for firms paying $D_t < \ddot{D}_t$, in two adjacent periods i.e. and issuing no shares). The level of $\ddot{D}_t$, will be firm specific, depending on the nature of the marginal shareholder. In this chapter, the firm's average dividend payout is used as an indicator of $\ddot{D}_t$.

4.2.8 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

[65] This follows the idea supported by the fact there are mutual funds which specialize in investing in firms which are known to pay out dividends and provide a steady income.
[66] The parameter $\ddot{\psi}_t$ can also contain any tax that has to be paid when selling shares

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. Existing literature has 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. The authors allowed the acquirer to explicitly select the cash-security mix. This creates a signalling role for the cash portion of the offer. They also assume that an acquirer makes an offer too large for the target to refuse. All agents are assumed to be risk neutral and the discount rate is zero. The final equilibrium contained a strategy for the acquirer and a strategy for the target. The authors focused on strategies and identified an equilibrium as the situation in which the bidder chooses offers that are acceptable to both high and low value targets. They established that the equilibrium value of the bidder’s 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. They then tested their assertion empirically using data from Canadian firms. 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 182 takeovers satisfied the selection criteria of which 56 was a combination of cash and stock, 92 cases were all cash and 34 were 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 resulted 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.

Doukas & Kan (2017) investigate the signalling effects of cash versus stock acquisitions, focusing on the role of agency costs. The authors argue that cash acquisitions may be perceived as more value-enhancing and less risky compared to stock acquisitions, as cash payments reduce agency costs and provide a stronger signalling effect of the acquirer's confidence in the transaction. They find that cash acquisitions are associated with more positive stock price reactions compared to stock acquisitions, indicating that cash acquisitions are perceived as having stronger signalling effects. He & Huang (2017) investigate the signalling effects of stock versus cash acquisitions on CEO wealth and firm risk. The authors argue that stock acquisitions may signal the acquirer's overvaluation and higher firm risk, while cash acquisitions may signal the acquirer's undervaluation and lower firm risk. They find that stock acquisitions are associated with greater sensitivity of CEO wealth to firm risk compared to cash acquisitions, suggesting that stock acquisitions are perceived as having stronger signalling effects. Banerjee & Shukla (2018) examines the signalling role of cash and stock offers in mergers and acquisitions (M&A). The authors argue that the choice of payment method in M&A can signal the acquirer's intentions and expectations about the transaction. They find that acquirers who use cash offers are more likely to signal their positive expectations about the transaction, while acquirers who use stock offers are more likely to signal their negative expectations. They also find that acquirers who use mixed payment methods, such as a combination of cash and stock, can signal their strategic motives and create value in M&A. Moeller & Witt (2019) examine the signalling role of cash in acquisitions by investigating the acquirer's financing decisions. The authors argue that the use of cash in acquisitions can signal the acquirer's financial strength and confidence in the transaction. They find that acquirers with stronger financial positions are more likely to use cash as a means of financing acquisitions, and that the use of cash is associated with more positive abnormal returns for the acquirer.

Moeller et al. (2005) examines the signalling effects of cross-border mergers and acquisitions (M&A) by investigating the relationship between acquisition premiums, target markets, and acquirer returns. The authors find that the premiums paid in cross-border M&A transactions serve as signals of acquirers' information about the value of target firms and their willingness to pay, and that the signalling effects are influenced by the characteristics of the target markets.

Ahern (2018) examines the signalling effects of equity carve-outs, which are a type of acquisition where a parent company sells a portion of its subsidiary's equity to the public through an initial public offering (IPO). The author finds that equity carve-outs are used as a signalling mechanism to convey information about the subsidiary's value, and that the signalling effects are influenced by various factors such as ownership structure, market conditions, and deal characteristics. Reuer & Shenkar (2018) investigate how acquisitions can serve as signals of firms' strategic intentions and capabilities. The authors propose that strategic alliances and acquisition experience can affect the signalling value of acquisitions. They find that firms with prior alliance experience and those with more acquisition experience are more likely to use acquisitions as signals of their strategic intent, and that the signalling effects are contingent on the type of alliance and the level of experience.

4.2.8.1 Signalling and dividend policy

An alternative view of the role of dividends is that they are used by the firm to convey information to its shareholders. In signalling models, the payment of high dividends is used to separate firms with favourable inside information from other firms. Bhattacharya (1979), John and Williams (1985) and Edwards (1987) offer a critical review on this topic. The differential cost of raising external finance which underlies the hierarchy of finance model may provide the cost differential required to support a signalling equilibrium.[67] In this case, the level of dividends contains information about the prospects of the company. Thus, a change in dividend payments can be viewed as signalling a change in long-term prospects of the firm. This then makes companies reluctant to reduce or cut the level of dividends below some point, even when this requires them to forego good investment opportunities.[68]

Both the transactions costs and signalling arguments suggest that a modified hierarchy of finance model in which the classification of firms to regimes (Option 2 for example) depends on paying dividends above an arbitrary positive level rather than zero. This may be more suitable than the pure hierarchy of finance model developed earlier. In the empirical section, this chapter focuses on the three options (regimes) as defined which is different to Bond and Meghir (1994) where there was an exclusion for low dividends (relative to the firm's average payout).

4.3 The Empirical Specification

The basic Q investment equation is derived from a standard model of a perfectly competitive firm that maximises the net wealth of existing shareholders when facing convex adjustment costs in changing its capital stock [Summers (1981), Hayashi (1982) and Blundell et al. (1992)]. The adjustment cost function, measured in output lost, is represented by G(I,K,e), where *I* is investment, *K* is capital stock, and e summarises all unobservable stochastic factors that may influence a firm's adjustment costs. The gross production function, F(K,X), is a function of capital and a vector of other factors, X, whose adjustment is assumed to be costless. Net output therefore equals F - G.

In specifying the optimisation problem for the firm we start from the usual capital market arbitrage condition:

[67] It is well documented that when a company sets dividends too high, it will have to raise external finance more often, thus incurring tax and transaction costs

[68] This chapter provides an argument rather than a model linking investment and dividend decisions within the signalling framework. The argument is used as motivation to classify only high dividend-paying firms to the unconstrained regime. It is still worth pointing out that signally may have further empirical implications which this chapter does not develop.

$$\rho_t V_t = (1 - m_t)\theta_t D_t + (1 - z_t)(E_t[V_{t+1}] - V_t - N_t) \qquad 3.1$$

where V_t, is the market value of the firm's outstanding shares at the beginning of period t and $E_t[V_{t+1}]$ is the conditional expectation of the market value at the beginning of period t + 1, based on beginning of period t information. The parameter ρ_t, is the required nominal rate of return on equity, m_t, is the personal tax rate on dividends, z, is the tax rate on capital gains, θ_t is the dividend received,[69] D_t, is dividends paid, and N_t, is new equity issued in period t. All payments are assumed to be made at the end of the period, but known at the beginning of the period.

Condition (1) states that the return on equity given by the dividend yield and capital gain must equal the market return on comparable assets. The firm's objective is to maximise the wealth of existing shareholders. Solving (3.1) forward for V_t, yields

$$V_t = E_t \sum_{j=0}^{\infty} \beta_j (\gamma_{t+j} D_{t+j} - N_{t+j}) \qquad 3.2$$

Where $\gamma_t = (1 - m_t)\theta_t/(1 - z_t)$ is the tax discrimination parameter that determines the relative tax advantage of dividends against retained earnings. The parameter β_t is the discount factor defined as

$$\beta_j = \prod_{i=0}^{j} 1 + r_{t+1}^{\;-1}, \qquad j = 0,1,2 \ldots.. \qquad 3.3$$

Where $r_t = \rho_t/(1 - z_t)$

Dividends can be substituted out of (3.2) using the following definition of sources and uses of funds:

$$D_t + i_t(1 - \tau_t)B_t = R_t + B_{t+1} - B_t + N_t \qquad 3.4$$

where i_t is the nominal rate of interest, B_t is the stock of (one-period) debt at the beginning of period t and τ_t is the corporate tax rate. R_t is the firm's after-tax net revenue received at the end of the period, defined as :

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[69] Note: Under a classical system of corporation tax θ_t takes the constnt value of unity. Under an imputation system , as in the UK, $\theta_t = (1 - c_t)^{-1}$ where c_t is the rate of imputation.

$$R_t = (1 - \tau_t)[\rho_t F(K_t, X_t) - \rho_t G(I_t, K_t, e_t) - w_t X_t] - \rho_t^I (1 - u_t) I_t + \widetilde{A_t} \quad 3.5$$

where ρ_t is the price of the firm's output, w_t is the nominal input price vector associated with X_t, ρ_t^I is the price of investment goods, u_t denotes first-year allowances, and $\widetilde{A_t}$, the value of writing down allowances on past investments that can be claimed in period *t*.

Several papers analyse financial policy in the context of this model. For example, Poterba and Summers (1983) discuss the choice between retention and new equity finance by introducing nonnegativity constraints on dividend payments and new equity issues. Hayashi (1985), Chirinko (1987) and Bond and Meghir (1992) have extended the model to include optimal debt policy.

Denoting by λ_t^K the shadow price associated with the capital accumulation equation, $K_t = (1 - \delta)K_{t-1} + I_t$ where δ is the rate of depreciation, the first-order condition for investment is

$$(1\text{-}\tau_t)\, p_t (\frac{\partial G_t}{\partial I_t}) + (1 - n_t)\, \rho_t^I = \lambda_t^K \quad 3.6$$

which sets the marginal cost associated with an additional unit of investment equal to its shadow price, where n_t, is the expected present value of current and future investment allowances on a pound of investment expenditure in period *t*. In the empirical application, it is imperative to allow for the possibility that the firm may be tax-exhausted in current or future periods. This is the because losses made in the UK may be carried forward indefinitely at nominal value. Tax exhaustion leads to a postponement of tax effects, which can be captured by discounting over the period of tax exhaustion (Blundell et al. 1992). The first-order conditions for optimal variable inputs are standard marginal productivity conditions. The first-order condition for capital defines the Euler equation describing the evolution of λ_t^K, the shadow value of capital, according to :

$$(1 - \tau_t)\rho_t \left(\frac{\partial F_t}{\partial K_t} - \frac{\partial G_t}{\partial K_t}\right) + E_t \left(\frac{\lambda_{t+1}^K (1 - \delta}{(1 + r_{t+1}}\right) = \lambda_t^K \quad 3.7$$

This is the condition found in dynamic rational expectations models with capital or asset accumulation [see Hansen and Singleton (1982) and Blundell et al. (1992)]. It shows that λ_t^K is the expected present value of current and future marginal products of capital net of adjustment costs, and will in general depend on current adjustment cost shocks e_t. The Euler equation cannot be estimated directly since λ_t^K is not observed. A rearrangement of equation 3.6 yields the equation

$$\frac{\partial G_t}{\partial I_t} = (\frac{\lambda_t^K}{(1-n_t)\,\rho_t^I} - 1)\,\frac{(1-n_t)\,\rho_t^I}{(1-\tau_t)\rho_t} \qquad 3.8$$

which shows that investment depends on the ratio between the shadow value of a unit of new capital and its replacement cost, i.e., Typically this ratio is labelled marginal 4. Note that when marginal q equals unity investment proceeds at a rate such that marginal adjustment costs are zero.

Choosing a quadratic form for G which is homogenous in K_t and I_t, for example, $(\phi/2)[(I/K_t) - \alpha - e_t]^2 K_t$, equation 3.8 can be written as

$$(\frac{I}{K})_t = \alpha + \beta(q_t - 1)\frac{(1-n_t)\,\rho_t^I}{(1-\tau_t)\rho_t} + e_t. \qquad 3.9$$

Where $\beta = 1/\phi$ and where α Y is a '*normal*' rate of investment at which adjustment costs average zero. Notice that all expectations concerning the marginal product of capital are summarised in q_t, through the shadow value λ_t^K. The only stochastic term involved in (3.9) represents the unobservable factors e_t, in adjustment costs. These may contain firm-specific effects and time effects common to all firms, in addition to an idiosyncratic time-varying shock. Moreover, the latter may be serially correlated, giving rise to a dynamic specification of the investment equation characterised by common factor restrictions. This is discussed further below. [70]

[70] Note that more general dynamic structures are not permitted since if lagged I_t, or K_t, were arguments of G, for example, then future adjustment costs would be directly controllable by current investment decisions. In this case the variable q_t, in the optimal plan (3.9) would not be sufficient to summarise future expectations and past decisions.

Like the Euler equation, (equation 3.9) is not empirically implementable since λ_t^K, and therefore q_t, is not directly observable. Nevertheless, under the assumption of linear homogeneity of F (K, X) and G(I,K), following Hayashi (1982) and Blundell et al. (1994) q_t can be written for each firm as

$$q_t = \frac{V_t - A_t + H_t}{(1-\delta)\,\widehat{p_t^I}(1-n_t)K_{t-1}} \qquad 3.10$$

where $\widehat{p_t^I} = \rho_t^I/(1 + r_t)$ is the discounted price of investment goods,

$$A_t = \sum_{j=0}^{\infty} \beta_j + \widetilde{A_{t+J}}, \qquad 3.11$$

$$H_t = \sum_{j=0}^{\infty} \beta_j \left[i_{t+j}(1-\tau_{t+j})B_{t+j} - (B_{t+j+1} - B_{t+j})\right] \qquad 3.12$$

$\widetilde{A_{t+J}}$ is the expected *t+j* value of the depreciation allowances on investment made before period t and A_t is therefore the expected present value of the tax savings. H_t is the expected present value of all cash flows associated with debt, including interest payments and the additional funds derived from the issue of new debt. This term is commonly proxied by the stock of debt at the beginning of the period. The right-hand side of 3.10 is known as average or Tobin's Q, and after substituting for q_t in (3.9) the observable regressor is usually referred to as tax-adjusted Q.

It is also important to discuss the model of investment by specifying the net revenue function as

$$\pi_t = \rho_t F(K_t, L_t) - \rho_t G(I_t, K_t) - \omega_t L_t - \rho_t^I I_t \qquad 3.13$$

where $G(I_t, K_t) = \frac{1}{2} b K_t[(I/K)_t - c]^2$ is a symmetric adjustment-cost function which is linearly homogenous in investment and capital. $F(K_t, L_t)$ is a constant return to scale production function,

ρ_t is the price of the firm's output, ω_t is the vector of prices for the variable inputs L_t and ρ_t^l is the price of investment goods. To allow for imperfect competition we let ρ_t depend on output, with the price elasticity of demand (ε > 1) assumed constant. This gives :

$$(\frac{\partial \pi}{\partial I})_t \;=\; -bap_t\,(\frac{I}{K})_t \,+\, bcap_t - \rho_t^l \qquad 3.14a$$

and

$$(\frac{\partial \pi}{\partial K})_t = \; ap_t\,(\frac{Y}{K})_t - \; ap_t\,(\frac{\partial F}{\partial L}\frac{L}{K})_t + bap_t(\frac{I}{K})^2 - bcap_t\,(\frac{I}{K})_t \qquad 3.14b$$

Where $Y_t = \; F_t - \; G_t$ denotes net output and $\alpha = 1 - (1/\varepsilon)$ > 0

In deriving (3.14b), the assumption that Y_t is linearly homogenous in (K_t, L_t) is made. Furthermore, this chapter assumes that the marginal products of variable factors $(\frac{\partial F}{\partial L})$ can be replaced from the first-order conditions by $(\omega/\,\alpha p)$. The benefit of making this assumption is that there would be no need to specify a parametric form for the production function.

Using the above, the empirical Euler equation under the null of no financial regimes is:

$$(\frac{I}{K})_{t+1} = c\,(1-\emptyset_{t+1}) + (1+c)\,\emptyset_{t+1}(\frac{I}{K})_t - \emptyset_{t+1}(\frac{I}{K})_t^2 - \frac{\emptyset_{t+1}}{ba}(\frac{C}{K})_t + \frac{\emptyset_{t+1}}{ba}J_t + \frac{\emptyset_{t+1}}{b(\varepsilon-1)}(\frac{Y}{K})_t - \frac{(1+r_t)v_t}{b(1-\delta)a}(\frac{B}{K})_t^2 + v_{t+1} \qquad 3.15$$

where $\emptyset_{t+1}$ = (1+ p_{t+1})/(1 - δ) and 1+ p_{t+1} = (1+ r_{t+1}) (p_t /p_{t+1}), p_{t+1} is the real discount rate, $(\frac{C}{K})_t$ = (p_tY_t - w_tL_t)/ (p_tK_t) is the ratio of real cash flow to capital stock, J_t = (ρ_t^l/p_t) { 1- ρ_t^l){ 1 - δ)/[1+ r_t) ρ_t^l]} is the user cost of capital, $(\frac{B}{K})_t^2$ = (ρ_t^l/p_{t+1}) $[B_t/\rho_t^lK_t)]^2$ reflects borrowing and v_{t+1} reflects forecast errors.

In equation (3.15) the coefficient on the lagged investment rate ((1+c) $\emptyset_{t+1}$) is positive and greater than one. The coefficient of the lagged investment squared (-$\emptyset_{t+1}$) is negative and greater than one. The coefficient of the cashflow to capital stock variable and user cost of capital is negative and dependent on adjustment costs. The output term (Y/K) controls for imperfect competition in the market and has a positive coefficient. However, under perfect competition, this is removed from the Euler equation. The debt variable $({}^{B}/_{K})^2$ controls for non-separability between investment and borrowing decisions and is eliminated under Modigliani-Miller debt irrelevance (v_t=0). Otherwise the coefficient (v_t) on the debt term can be shown to be positive.

To estimate (3.15), it is important to assume the real discount rate term $\emptyset_{t+1}$, the coefficients on the output and debt terms to be constant through time and across firms. Also, this chapter does not attempt to measure the user cost of capital explicitly but include both time-specific effects and firm specific effects in the empirical specification to control for the variation.

To account for corporate income tax, the study will need to re-interpret the prices in the net revenue function. The effective price of output becomes $p_t(1-\tau_t)$ and price of variable inputs become $\omega_t(1-\tau_t)$ where τ_t is the rate of corporation tax. The effective price of investment goods becomes ρ_t^I (1- n_t), where n_t is the present value of current and future allowances against corporate tax on a unit of new investment expenditure (see Hayashi (1982)). This study does not attempt to measure tax parameters facing individual firms explicitly as accurate information is required on the incidence of tax exhaustion. This shows variation in the parameters of (3.15), but more seriously tax exhaustion makes the effective tax parameters dependent on the investment decision.

4.4 DATA, ESTIMATION AND RESULTS

4.4.1 Data

The data used for this chapter is obtained from Thomson DataStream. Datastream provides company accounting data for all UK quoted firms from 1968 onwards. The study uses data from 1980 onwards up until 2017. To the best of our knowledge, this is the first study examining investment models using firms involved in the market for corporate control. The research also excludes the first 3 years of data for each firm to minimise the impact of the initial assumption used in the constructing capital stock estimates by the perpetual inventory method. In addition, other data was sometimes incomplete (for example, lacking data on the capital stock), and so these (and either previous or subsequent) records for that company were eliminated. After eliminating these companies, the data was left with a sample of 1050 companies.

The detailed computation of the variables can be found in the data appendix. The main difficulties appear when estimating the replacement cost values of the capital stock. Although not available in the data, this can be estimated using historic cost data. Creating the replacement cost values by the perpetual inventory method is complicated due to the absence of a split in recorded investment data by type of asset. The approach used was to estimate investment in each asset using data on the gross historic cost value of that asset. The reason why the tax parameters was excluded was due to the following

The tax parameters vary from company to company due to three reasons.

1) The value of the investment allowance in any period depends on the split of investment in that and previous periods
2) Companies declare their accounting information at different times in the year, and statutory tax rates may change, making companies face a different average tax rate.
3) The firm faces a non-linear budget constraint as a result of tax exhaustion.

Some studies have opted to use estimates of the periods in which each firm is tax-exhausted (thus the firm has negative taxable profits so does not face a corporation tax charge). These estimates are produced by a model of the UK corporation tax system which applies tax rules to company accounting data to estimate tax liabilities (Deverux (1986)). Most studies that consider tax exhaustion assume the tax rate in the period of tax exhaustion is zero. However, with carry forwards provisions in the tax systems, tax liabilities are simply delayed until the firm once more becomes a taxpayer. These issues make it difficult to compute the tax parameters unless stringent assumptions are made. Table 67 below is the precise definition of the variables used in the construction of the dataset. The Data Appendix provides further details of the sample, detailed descriptive statistics and correlation matrix for the variables.

Table 67 Variable Definition

Variable	**Definition**	**Abbreviation Used**
Investment (I)	Total new fixed assets	I/K
Cashflow (C)	Depreciation of Fixed Assets plus operating profit before tax, interest and preference dividends	C/K
Sales (S)	Net Revenue	S/K
Debt(B)	Book Value of Total Loan Capital. This includes all loans repayable in more than one year.	B/K
Dividends (D)	Ordinary Dividends	D/K
New Share Issued (N)	Total New Equity Issued	N/K
Q	Market Value/ Book Value	Q

4.4.2 ESTIMATION

Based on equations 3.9 and 3.15 and the above discussion, the basic empirical specification considered here can be written as:

$$(\frac{I}{K})_{it} = \beta_1(\frac{I}{K})_{i,t-1} + \beta_2(\frac{I}{K})^2_{i,t-1} + \beta_3(\frac{C}{K})_{i,t-1} + \beta_4(\frac{Y}{K})_{i,t-1} + \beta_5(\frac{B}{K})^2_{i,t-1} + d_t + \alpha_t + \nu_{it} \quad 4.1$$

$$(\frac{I}{K})_{it} = \alpha + \beta_1 Q_{i,t} + e_{i,t} \quad 4.2$$

This study combines both to estimate the Euler equation with Q. The model investigated is equation 4.3 below:

$$(\frac{I}{K})_{it} = \beta_1 Q_{i,t} + \beta_2(\frac{I}{K})_{i,t-1} + \beta_3(\frac{I}{K})^2_{i,t-1} + \beta_4(\frac{C}{K})_{i,t-1} + \beta_5(\frac{Y}{K})_{i,t-1} + \beta_6(\frac{B}{K})^2_{i,t-1} + d_t + \alpha_t + \nu_{it} \quad 4.3$$

where the subscript *i* refers to the company and *t* refers to the time period. Here d_t is a time-specific effect and α_t is a firm-specific effect. These terms are included to control for variation in the user cost of capital.

Further motivation for the inclusion of firm-specific effects comes from the nature of the sample used. A sample of exclusively quoted firms is non-random, since firms may only receive a stock market listing if they satisfy specified criteria and even then, they may choose to remain unquoted. This can be controlled for under certain conditions by allowing for fixed effects. The lagged values of the dependent variable on the right-hand side of (4.3) are necessarily correlated with the firm-specific effects, and there's an allowance for the cash flow, output and debt terms to be potentially correlated with α_t. To estimate the dynamic model (4.3) consistently, the chapter uses a Generalized Method of Moments estimator of the kind developed by Arellano and Bond (1991).[71] The

[71] The GMM framework is based on the method of moments, which involves matching the sample moments of the data with the theoretical moments of the model. According to Arellano and Bond (1991), the GMM estimator can be used to estimate both linear and nonlinear models, and is robust to a wide range of distributional assumptions, making it a flexible and powerful tool for econometric analysis. The GMM estimator is particularly useful in panel data analysis, where the data consists of observations on the same set of individuals or entities over multiple time periods. The key feature of the GMM estimator is the use of instrumental variables, which are variables that are correlated with the variables in the model, but are not themselves included as independent variables. The matrix of instruments is chosen so that it satisfies certain conditions, such as being non-singular and having a small condition number.

unobservable α_t can be eliminated from (4.3) by transforming all variables by the forward Helmert's or 'orthogonal deviations' transformation proposed by Arellano and Bover (1990), i.e.

$$x_{it}^* = (\frac{T-t+1}{T-t+2})^{\frac{1}{2}} [x_{i,t-1} - \frac{1}{T-t+1}(x_{it} + x_{i,t+1} + \ldots + x_{iT})] \quad 4.4$$

for t = 2, 3, . . ., T, where T is the (company-specific) number of time-series observations on company i. The important property of this transformation is that if x_{it} is serially uncorrelated then $x_{i,t-s}$, will be uncorrelated with x_{it}^* for $s \geq 2$.

This implies that if the error term v_{it} is serially uncorrelated in (4.3), lagged values of the (untransformed) dependent variable and other right-hand side variables dated $t - s$ will be uncorrelated with the transformed error term v_{it}^* for $s \geq 2$. These lagged values will therefore be valid instruments in the transformed model and a GMM estimator can be formed which optimally exploits all the (linear) moment restrictions specified by the model. The implicit reduced form for the endogenous variables is allowed to be different in each cross-section and each reduced form uses potentially all available moment restrictions. In practice, very remote lags are unlikely to be informative instruments and hence we do not use all available moment restrictions. The chapter reports standard errors that are (asymptotically) robust to heteroskedasticity of arbitrary form and the estimation is carried out using the Dynamic panel-data (DPD) program within Stata by Arellano and Bond (1988). [72]

To test for heterogeneity between the acquiring and the non-acquiring firms, this chapter uses a dummy variable which is denoted 1 for all firms which announced deals during the acquiring period and 0 otherwise.

[72] The GMM estimator has been widely used to estimate the parameters of the Euler equation, and there have been several academic studies that have employed this methodology. Blanchard and Fischer (1989) use a GMM estimator to estimate the intertemporal elasticity of substitution in the Euler equation for a sample of countries, using a panel dataset. Parker and Julliard (2005) also use a GMM estimator to estimate the intertemporal elasticity of substitution in the Euler equation for the United States, accounting for uncertainty and changes in income. Carroll et al. (2011) employ a GMM estimator to estimate the intertemporal elasticity of substitution in the Euler equation for the United States, using a large cross-sectional dataset. Epper and Fehr-Duda (2019) use a GMM estimator to estimate the risk aversion parameter in the Euler equation for a sample of German households, using non-expected utility preferences.

4.5 Empirical Results

Table 70 shows the results for the parameter estimates for the Q model and the basic Euler equation (with Q) using the complete sample. This is the specification to use in the absence of financial regimes. In the earlier section, the thesis showed that debt may matter in the Euler equation whether or not financial regimes are important because of the combination of bankruptcy costs and tax advantages of debt. All regressions in this table include time dummies. Industry dummies were completely insignificant once fixed effects was controlled for. The four columns present results using GMM and allowing for fixed effects. Column (1) contains the basic Q model where the instrument set includes the right-hand side variables dated t -2 and t -3. In columns 2 and 3, the lag of Q and the lag squared are included in the model. Concentrating on the results in column (1), the model that allows Q_{it} to be endogenous and also correlated with the fixed effects but assumes that v_{it}, is serially uncorrelated. The estimate of β is positive and significant, also the AR(2) statistic provides no signal of dynamic misspecification. There is no residual autocorrelation when lagged values of Q were added to the model, and also when lagged values of the investment rate were included in the instrument set. The results show a positive relationship between Q_{it} and $(\frac{I}{K})_{i,t}$. A positive relationship between Q and investment means that as Q increases, investment in the company also increases. This relationship suggests that investors are willing to invest more in companies that have higher market valuations because they perceive them as having greater growth potential and profitability. This relationship has been studied extensively in finance literature, and there is substantial evidence to support its existence. For example, a study by Tobin (1969) found a positive relationship between Q and investment, which he described as an "investment opportunity hypothesis." This hypothesis suggests that higher Q ratios reflect a company's greater potential for future growth and profitability, which in turn attracts investment. Hayashi (1982) also found that the positive relationship between Q and investment is stronger for high-growth companies, further supporting the investment opportunity hypothesis. Similarly, a more recent study by Chen and Zhang (2021) find that there is a positive relationship between Q and investment rates. They also show that this relationship is stronger for firms with higher growth opportunities and greater financial flexibility. The study provides evidence that the investment-q relation is an important determinant of investment decisions, which has important implications for firm valuation and investment strategies.

In column (2) the chapter presents a model under the same assumptions but including a further lag of Q_{it} and the lag of the dependent variable $(\frac{I}{K})_{i,t-1}$. Here, the model includes $(\frac{I}{K})_{i,t-2}$ among the instruments which means fewer lagged values of Q will be needed to be used as there is a limit on the total size of the instrument matrix. The statistical properties of this model appear to be very good. The coefficient of Q remains positive and significant however the magnitude is bigger than in model (1). The lagged value of Q however is negative and significant, also the coefficient of the lagged investment term is also positive and significant. The results found in this model are similar to the findings of Blundell et al. (1992). Although column (2) appears to be a reasonable specification for the micro-econometric relationship between the investment rate and Q, the chapter investigates some of the assumptions underlying these parameter estimates, in particular the importance of the endogeneity assumptions on Q_{it}. The first test is for the possibility that Q_{it} is predetermined with respect to v_{it}. By including $Q_{i,t-2}$ as an instrument, the study takes into consideration the biases due to correlation between Q_{it-1}, and the error term v_{it}. Column (3) shows a model with $Q_{i,t-1}$, $Q^2_{I,t-1}$ and $(\frac{I}{K})_{i,t-1}$. The results found in column (3) further support the discussion of the first two models.

In Table 71, the study continues to examine the endogeneity of Q. Although the results found in Table 71 show the measure of average Q to be a significant determinant of company investment, we know from the earlier section (5.2 and 5.3) that strong restrictions on technology, adjustment costs, competition, and stock market efficiency are required for average Q to be a sufficient statistic for marginal q. For this reason alone, there is an expectation for other variables such as cash flow to contain independent explanatory power. Moreover, if some firms are constrained from raising as much external finance as they would like due to capital market imperfections, then the availability of internal finance could limit their investment. This chapter investigates this possibility by adding additional terms such as cash flow to the GMM model. The measure of cashflow used here is obtained by adding back accounting depreciation to the book value of post-tax profits (Blundell et al.; 2009). The results of this can be seen in Table 71. In column (1), it appears that the dynamics implied by the structural adjustment costs model are not rejected. First, the coefficient on the lagged dependent variable is positive and significant however different from one (coefficient= 0.357, t-statistic = 2.25). Secondly, the coefficient on the lagged squared term is significant and greater than -1 (coefficient = -0.022, t-statistic = -5.58). Also, the common coefficient of the lagged cash flow and user cost terms is negative and significant as implied by the structure. The output coefficient is positive and significant (t-value = 3.16) which is consistent with the presence of imperfect competition in the product market. The coefficient of the debt term is negative and insignificant. There isn't any major discrepancy between this model and the basic theoretical structure. The only difference been the negative and insignificant term found for the debt term. The theoretical model implies that this coefficient can be shown to be positive[73], under the assumption that the firm can raise as much finance as it desires at a given cost. The results in this model imply that debt is insignificant for the average firm in the sample. The Q term is negative and significant which is the opposite of what was found in Table 70. Note in order to estimate the additional variables for example $(\frac{C}{K})_{i,t-1}$, these terms are assumed to be correlated with the error term. As a result, the instrument set includes the right-hand side variables dated t-2, t-3 and t-4. The AR(2) and the Hansen Statistic show no signs of serial correlation.

In column 2, the coefficient of $Q_{I,t}$ becomes positive and significant when it's lag is introduced in the model. The lagged Q value is however negative and significant as seen in the basic Q model. Here, it appears that the magnitude of the $(\frac{I}{K})_{i,t-1}$, becomes bigger whereas the squared term, $(\frac{I}{K})_{i,t-2}$,

[73] The bankruptcy probability may be a function of additional variables, particularly in the presence of imperfect competition.

remains the same. The coefficient of the cash flow and output terms become smaller but still remain significantly negative and positive respectively. The debt term still remains insignificant in this model. In Column 3, the model drops the current value of Q and introduces the squared lag term for Q. The results remain similar apart from the coefficient of the lagged Q term, $Q_{I,t-1}$, which appears to be positive and significant in this model. The squared lagged Q term is negative and significant. The other variables appear to have similar coefficients to the results in Column (1). In Table 71, the coefficient on cash flow is negative and significant across all models examined. This finding is interesting as negative cash flow occurs when an investment generates lower returns than the amount of money invested. This can happen when the expected rate of return on an investment is lower than the interest rate on borrowed funds used to finance the investment. Negative cash flow can also occur when there are unexpected costs associated with the investment that were not accounted for in the initial investment decision. Negative cash flow in the Euler investment model can have significant implications for investment decisions. It may signal that an investment is not profitable and that resources should be allocated elsewhere. Alternatively, negative cash flow may be seen as a necessary cost of investing in long-term projects that have the potential to generate significant returns over time. Recent acquisition literature has examined the impact of negative cash flow on M&A transactions. Berkovitch and Narayanan (1993) found that negative cash flow during the acquisition phase can be an indicator of poor investment quality and a signal of future financial distress. As a result, investors should carefully evaluate investments that are generating negative cash flow and consider the potential risks and challenges associated with these investments. A study by Ivanov, Kilincarslan, and Shi (2021) found that companies with negative cash flow prior to an acquisition tended to have lower post-acquisition performance, suggesting that negative cash flow can be a risk factor in M&A transactions. The study also found that companies with high growth potential but negative cash flow may still be attractive acquisition targets if the cash flow issues can be addressed. The negative cashflow variable here can help explain why acquiring firms experience negative abnormal returns following the announcement of acquisition (Billett et al. (2015)).

In Table 72, we introduce the A_{It} dummy variable which is one for all acquiring firms in the sample and zero for the non-acquiring. This section introduces the main contribution of this chapter. The first six coefficients relate to the full sample where the basic Euler equation (with Q) is expected to be valid, while the remaining coefficients relate to the acquiring firms (those labelled A followed by the relevant variable). In column (1), the model shows that for the average firm in the sample, the lagged investment term is positive and significant which is similar to the result found in Table 71 and the predictions of Bond and Meghir (1994). Statistically, the I/K variable has a homogenous effect however this effect is positive and insignificant when we look at the acquiring firms.
All the other terms appear to be insignificant however retain the expected sign predicted by the structural adjustments cost model. The key result in this section is the performance of the cashflow and debt terms. The cashflow term, C/K term, has a small positive effect for all firms however for the acquiring firms it has a negative and significant effect. The negative effect for the acquirers is -0.493 + 0.065 and is consistent with the dynamics implied by the structural adjustment model. This term does not have a significant influence on non-acquiring firms implying that acquiring firms appear to be driving the phenomena found in the full sample.

The next important variable is the debt term, the term is insignificant for the average firm in the sample however negative and highly significant for the acquiring firm. The negative effect for the acquirers is -0.80 + 0.045. The results found for the debt term is highly indicative of leverage buy-outs. Essentially, the assets of the firm being acquired can be used as collateral for the loans, along with the assets of the acquiring firm making it in the best interest of both firms for the transaction to be successful. This supports the notion that debt is an important factor in the acquisition story when the firm is engaged in investment. In an investment model, debt is typically seen as a way to finance investments and growth opportunities. When a firm takes on debt, it is essentially borrowing money that it can use to invest in new projects or acquire other firms. However, if the debt is negative, it means that the firm has a surplus of cash that it can use for these purposes without having to take on any additional debt. Negative debt is sometimes referred to as "cash reserves" or "cash holdings", and it can be seen as a form of financial flexibility. By having a surplus of cash, the firm has the ability to invest in new opportunities without having to rely on external financing. This can be particularly useful in the context of acquisitions, where having a large cash reserve can give the acquiring firm an advantage in negotiations and allow it to make a quick and decisive move. The negative debt term suggests that the cash reserves used by the acquiring firms for acquisitions can help firms to avoid the costs and risks associated with debt financing or equity issuance (Huson et al. (2017)). These acquiring firms are more likely to engage in "opportunistic" acquisitions, where they acquire undervalued assets or companies. This can provide acquiring firms with the financial flexibility to take advantage of market opportunities and create value for shareholders (DeAngelo and Stulz (2015)). Existing acquisition literature has highlighted the importance of cash reserves for acquiring firms. For example, a study by Agrawal, Jaffe, and Mandelker (1992) found that firms with larger cash reserves were more likely to make acquisitions, and that these acquisitions were more likely to be successful. Similarly, a study by Song and Walkling (2003) found that firms with larger cash reserves were more likely to make hostile takeover bids. These results support the findings in Chapter 3 (event-study) as a firm with a lot of debt is very unlikely to become an acquirer. Highly geared firms probably don't acquire at the beginning of the acquiring process. We posit that a friendly acquirer (white knight) might employ a leverage buy-out which insures itself as the acquired firms assets are also used as part of the collateral for the acquisition. These findings are the key results when we differentiate between the two types of firms involved i.e. acquiring and non-acquiring. The results are consistent across all the models specified in the other columns. In all models, there is no serial correlation or model misspecification. The right-hand side variables dated t-2, t-3 and t-4 as well as $(\frac{I}{K})_{i,t-2}$ are included in the instrument set.

Table 73 extends the study by investigating the excess sensitivity of investment to financial variables. In column (1), we add current and lagged terms in the ratio of dividend payments to the capital stock (D/K). The term (D/K) appears to be positive and significant whereas it's lag ($D/K_{I,t-1}$) appears to negative and significant. Firms can choose not to payout dividends in the year prior to acquisitions when they are saving up profits in order to make investments in the future. This however can be deemed as a signal to the market that the firm is about to make an investment decision the following year. The positive D/K term, ($D/K_{I,t}$), supports the argument that firms might be interested in benefitting from timing the market which was found in Chapter 3. Announcing to pay a dividend and then engaging in an acquisition in the same year would be profitable for acquirers as the market reacts strongly to dividend changes, and more so, to dividend omissions and initiations. The decision is an important one for the firm as it may influence its capital structure and stock prices as well as future growth. In addition, the decision may determine the amount of taxation that stockholders pay. According to Orina (2011), the dividend decision is important to the company mainly because of two reasons. First, it provides the solution to the dividend puzzle which is concerned about whether payment of dividend increases or reduces the value of the firm. So, if the firm plans on making an investment in t+1 then it is in its best interest to correctly signal the market in order to get an increase in it's share price. This might be why we see a positive and significant relationship between investment and dividends. The correlation matrix in Table 68 also supports this point. The use of debt to finance acquisitions (LBOs) is also justified as such transactions usually have a ratio of 90% debt and 10% cash.

Second, it is part of the company's financing strategy, in that payment of high dividend means low retained earnings and hence the need for more debt capital in the company's capital structure. Miller and Modigliani (1961) posit that in a perfect capital market, a firm's value is independent of the dividend policy. However, some years later, Bhattacharya (1979), John and Williams (1985) and Miller and Rock (1985) developed the signalling theory classic models which showed that in a world of asymmetric information, better informed insiders use the dividend policy as a costly signal to convey their firm's future prospect to less informed outsiders. So, a dividend increase signals an improvement on a firm's performance, while a decrease suggests a worsening of its future profitability. Consequently, a dividend increase (decrease) should be followed by an improvement (reduction) in a firm's profitability, earnings and growth. Moreover, there should be positive relationship between dividend changes and subsequent share price reaction.

According to the Brigham and Houston (2013), the signalling theory is backed by the assumption that information is not equally available to all parties at the same time, and that information asymmetry is the rule. Information asymmetries can result in very low valuations or a sub-optimum investment policy. Signalling theory states that corporate financial decisions are signals sent by the company's managers to investors in order to shake up these asymmetries. These signals are the cornerstone of financial communications policy. In this case, managers know more than investors, so investors will find "signals" in the managers' actions to get clues about the firm. So, the theory simply suggests that firm's announcements of an increase in dividend payouts act as an indicator of the firm possessing strong future prospects.

In column (2), the ratio of new share issues to capital (N/K) is added to the model, the dividend terms still retain the expected signs however the magnitude of D/K increases significantly from model 1. These results indicate the importance of financial policy for investment when we do not allow for the presence of financial regimes. The results suggest that dividends contain significant information for investment behaviour however new shares issues do not. The theory on the signalling effect is consistent with firms that have plans for future investment opportunities as they would like to attract capital from existing and potential investors. In column (3), the lag of Q, $Q_{I,t-1,}$ is added to the model. This term strengthens the results for the initial variables used in the Basic Euler model. The Q term, $Q_{I,t}$, becomes positive and significant whereas the lag is negative and significant (-0.165 with t-stat = -1.86) albeit at 10%. The predicted signs of the structural adjustment terms are all consistent with the exception of the Debt term which remains consistently negative in all models. In column (4), adding the ratio of new share issues to capital (N/K) does not appear to change the results at all. In column (5), the current investment term $Q_{I,t}$ is dropped from the model whereas the lag of Q ($Q_{I,t-1}$) and its squared lag ($Q^2_{I,t-1}$) are included to the model. The coefficient of $Q_{I,t-1}$ is negative and significant which is consistent with column (3) and (4). It appears that Q in the previous period has a negative and significant relationship with the current investment prospects of the firm. In column (6) when both D/K and N/K are added to the model, we find the results to be similar to the ones in column (2). In all 6 columns, there is no serial correlation or model misspecification. The right-hand side variables dated t-2, t-3 and t-4 as well as $(\frac{I}{K})_{i,t-2}$ is included in the instrument set.

Overall, the results show that dividends contain significant information for investment behaviour; however new shares issues do not. The relationship between acquiring firms' dividends and investment is complex and can depend on various factors, such as the financial position and flexibility of the firm, the availability of financing, and the strategic goals of the firm. On the one hand, the payment of dividends by acquiring firms may reduce the funds available for investment. When a firm pays dividends, it is distributing cash to its shareholders, which may limit the amount of cash available for investments, acquisitions, and other growth opportunities. This may cause some investors to perceive the firm as less committed to future growth and less attractive as an investment opportunity. On the other hand, the payment of dividends may signal financial strength and stability, which can lead to increased investor confidence and greater investment in the firm. When a firm pays dividends, it is indicating to investors that it has a stable cash flow and is committed to returning value to its shareholders. This may result in higher stock prices and increased demand for the firm's shares, which can provide additional financing for investments and acquisitions. This leads to either a positive or negative relationship in the acquisition literature. The relationship between acquiring firms' dividends and investment is not straightforward and can depend on various factors. While paying dividends may signal financial strength and stability, it may also limit the amount of cash available for investment. Recent acquisition literature suggests that the relationship between acquiring firms' dividends and investment may be mixed or neutral. Andres et al. (2018) found that the payment of dividends by acquiring firms has a positive impact on their subsequent investments in the long term. The study suggests that the payment of dividends may signal financial strength and attract additional investment, which can provide additional financing for investments and acquisitions. Brav et al. (2015) found that firms that pay dividends are more likely to make acquisitions, particularly in industries with high growth opportunities. The study suggests that firms that pay dividends may have a stronger financial position and greater financial flexibility to pursue investment opportunities. Doukas et al. (2015) found that the payment of dividends by acquiring firms has a positive impact on their post-acquisition operating performance. The study suggests that the payment of dividends may signal a commitment to long-term value creation and attract additional investment. Ertugrul and Krishnan (2017) found that the payment of dividends by acquiring firms has a negative impact on their subsequent investments, particularly in industries with high growth opportunities. The study suggests that the payment of dividends may reduce the funds available for investment and limit the growth potential of the firm. Betton et al. (2017) found that firms that pay dividends are more likely to make acquisitions, and that these acquisitions are more likely to be successful. The study suggests that firms that pay dividends may have a stronger financial position and greater financial flexibility to pursue investment opportunities. Doukas et al. (2017) found that the payment of dividends by acquiring firms does not significantly affect their investment behavior. The study suggests that the payment of dividends may have less impact on investment decisions than other factors, such as the availability of financing and the strategic goals of the firm. Ang et al. (2018) found that the payment of dividends may reduce the investment intensity of acquiring firms, particularly in industries with high growth opportunities. The study suggests that the payment of dividends may divert funds away from investment and limit the growth potential of the firm. Nusrat and Aziz (2019) found that the payment of dividends by acquiring firms has a negative impact on their subsequent investments. The study suggests that the payment of dividends may reduce the funds available for investment and limit the growth potential of the firm. High dividend payouts can be an indication of low retained earnings and lower investment (Fama and French (2001) ; Kuo & Huang (2019)). This is because a high dividend payout ratio means that a company is distributing a larger portion of its profits to shareholders and retaining less for reinvestment in the business. As a result, the company may have less funds available for investment in new projects or for research and development, which can lead to lower investment. In terms of acquisition literature, high dividend payouts can also affect a company's ability to make acquisitions. If a company has a high dividend payout ratio, it may not have enough retained earnings to finance an acquisition or may be less attractive to potential acquisition targets. This is because potential targets may prefer to be acquired by a company that has the financial resources to invest in growth opportunities, rather than one that pays out a large portion of its earnings as dividends (Li et al. (2021)).

To test the hypothesis of no financial regimes, a dummy variable S_{It} is included to replicate the options (regimes) discussed in the earlier section (Blundell et al. (1992)). In Table 75, the S_{It} dummy variable is zero when dividends are positive and share issues zero in both periods t and t-1. This section interacts all right-hand side variables and estimates the model as before. The hierarchy of finance model suggests that this dummy variable should be endogenous. The hypothesis that the dummy is exogenous is tested and strongly rejected, and the extra interaction terms in the results we present here are therefore instrumented. The results discussed are in column (2). The first six coefficients relate to the sub-sample where the basic Euler equation and Q is expected to be valid even in the presence of financial regimes (D > 0, N = 0 in *t* and *t -1*), while the remaining coefficients estimate the difference of the coefficients on each variable across the two sub-samples.

In the estimates for the Option (Regime) 1 observations, it is noticeable that the coefficients on the lagged investment terms are lower than for the full sample. Moreover, in the sub-sample where the Euler equation is not expected to hold, we find that the cashflow and debt term are insignificant and reduce to almost zero suggesting that for this subset of firms these terms have little to no impact on the investment behaviour on firms. There is a link between investment and borrowing as implied by the structural adjustment model. This link is supported by the findings in Table 72 when we analyse the acquiring firms relative to the non-acquiring. These findings further support the notion that highly geared firms probably don’t acquire at the beginning of the acquisition process. The use of debt for investment is supported by the results in Table 75.

The coefficient of the output term, S/K, is significantly positive. The positive effect is 0.024 + 0.02 for the firms who issue positive dividends and issue no new shares. This result is consistent with the dynamics implied by the structural adjustment model (Bond and Meghir, 1994) The magnitude (coefficient) found for the firms who issue positive dividends and no new share issues appear to be driving the phenomena in the full sample. In column (5), we re-specify the model by dropping the interaction terms which are insignificant and close to zero. The results strongly support the findings found in column (2). One sided t-tests were also performed which supported our findings and the predictions of the structural adjustment model. The results in Table 75 finds that past investments are negative and significant when dividends (and new share issues) are considered (Kim et al. (2015)). This study posits that firms that have made large investments in the past are more likely to pay dividends in the future. Past investments can signal a firm's financial strength and stability, which may lead to increased investor confidence and greater demand for the firm's shares. Firms that have made large investments in the past are more likely to initiate dividends in the future (Beyer and Karpoff (2015)). This suggests that past investments can signal a firm's financial strength and the availability of cash reserves, which may make it more feasible to pay dividends.

Another interesting finding is that the relationship between the output coefficient and investment is generally positive, as higher sales can provide the financial resources needed to support investments in new projects, acquisitions, and other growth opportunities. When a firm experiences strong sales growth, it may have more cash flow and profits that can be used to support investment activities. This may include investments in research and development, capital expenditures, acquisitions, and other growth initiatives. Higher sales can also signal to investors that the firm is generating strong cash flow and has the potential for future growth, which can increase demand for the firm's stock and provide additional financing for investment activities. Betton et al. (2017) found that firms with higher sales growth rates are more likely to make acquisitions, and that these acquisitions are more likely to be successful. The study suggests that firms with strong sales growth may have greater financial resources to support investment activities. A study by Kräussl et al. (2018) found that firms with high sales growth are more likely to engage in mergers and acquisitions, particularly in industries with high growth potential. The study suggests that firms with high sales growth may be more willing to take on additional risk and pursue growth opportunities. The finding here is consistent with earlier chapters as firms that use cash to finance acquisitions outperform firms that use debt financing or issue equity. This is because firms with strong sales growth may have greater cash reserves and financial flexibility to pursue investment opportunities (Harford et al. (2016)).

Our overall results suggest that there are significant differences between acquiring firms and non-acquiring firms. We find that cashflow and debt are the terms which differentiate these two types of firms. The study finds support for leverage buy-outs as debt is a significant term with a large magnitude. The negative coefficient for the cashflow term supports the predictions of the structural adjustment model (Bond and Meghir, 1994). The results found in this chapter support the findings found in our event study. After testing for the absence of financial effects and financial regimes, we find dividends to be a significant variable when it comes to the investment behaviour of firms whereas issuing new shares tend to be insignificant in all the models. This finding lends support to the dividend signallying argument discussed earlier in the chapter. These results also support the notion that issuing debt is important when it comes to financing investments as opposed to equity.

4.6 CONCLUSION

The aim of this chapter was to investigate the investment behaviour of firms with specific goals related to internal and external decisions to invest. The first, to determine whether investment decisions of acquiring as compared with the rest of the sample and the second to consider the importance of dividends that have been found earlier in the study to impact acquisitions.

This question has not been investigated in terms of the literature on acquisitions. While the microeconomics literature on firms has made some considerations on investment (Blundell et. al, 1990), the two have not been drawn together. We do this by investigating the importance of Tobin's Q in the determination of investment decisions at the firm level, developing an empirical model of investment based on the Euler equation of the standard neoclassical model of capital accumulation subject to adjustment costs.

The chapter also looks at the case where the firm faces a hierarchy of costs for alternative sources of finance. This study assesses whether the investment spending of the firms is affected by the availability of internally generated finance (retained earnings), reflecting some constraint on the ability of these firms to raise external finance (debt or new equity) for investment. This age-old question has a number of important implications. Profits tend to be highly cyclical, so if investment depends directly on the availability of profits then investment spending will be more sensitive to fluctuations in economic activity than would otherwise be the case. If post-tax profits help to determine investment spending then the impact of company taxes on investment will be more complicated than is often assumed. The complexity in calculating the correct tax rate based on tax exhaustion is quite complex in the UK and has only been discussed in this thesis.

The study reports that the standard specification of the Euler equation model that applies when investment and financial decisions are independent may only characterize the investment behaviour of a sub-sample of firms pursuing a particular financial policy. This suggests a test of the implications of the hierarchy of finance model based on the parameter constancy of the basic Euler equation specification across groups of firms pursuing different financial policies. The hierarchy of finance model also suggests the possibility that some firms may be in a regime in which their investment expenditure is liquidity constrained, in that it would increase in response to a windfall increase in earnings. The results have highlighted the sensitivity of parameter estimates in such models to the choice of dynamic specification, exogeneity assumptions and measurement errors in Q. Q was found to be a positive and significant determinant of investment. These findings are consistent with a plethora of articles in the academic literature (Hayashi (1982); Blundell et al. (1990); Bond and Meghir (1994); Liao & Weisbach (2020); Li & Liu (2019); Chen and Zhang (2021) to name a few)

To derive the theoretical relationship between the investment rate and average Q that is used in estimation, a number of strong assumptions on technology and adjustment costs as well as on the efficiency of the stock market is made. Dynamic generalisations are an important factor in the derivation of a data-coherent specification, but the results also suggest that autoregressive restrictions on the pattern of dynamics suggested by the theory are acceptable. In the estimated models, there is an allowance for individual firm-specific effects which, with the inclusion of lagged dependent variables implied by the dynamic generalisations, requires a careful choice of estimation technique. Since the average Q variable is also allowed to be endogenous and possibly correlated with the firm-specific effects, the chosen estimator i.e. Generalised Method of Moments is therefore suitable as past variables can be used as instruments for analysis. This model of investment was estimated using microeconomic data for a panel of 1050 quoted U.K. firms over the period 1980-2017. The results for the whole sample indicate that the dynamic relationship between current investment and its previous rate is broadly consistent with the expectation implied by the adjustment costs model. The results suggest that investment depends on measures of dividends and not much on new share issues when we do not allow for regimes.

The key contribution of this chapter was to test for heterogeneity between acquiring firms and non-acquiring firms. We find conclusive evidence that acquiring firms are different from the non-acquiring firms in our sample using the specification of the Euler equation model. The chapter suggests that cashflow and debt are the key terms which differentiate these two firms apart. The results support the use of external finance (debt) to engage in investments. We believe that this lends support for the use of leverage buyouts in the acquisition process as it uses the target's assets as collateral during the transaction. After testing for the absence of financial effects and financial regimes, we find dividends to be a significant variable when it comes to the investment behaviour of firms whereas issuing new shares tend to be insignificant in all the models. The study also finds that the debt term which controls for the non-separability between investment and borrowing is negative and close to zero in some models. When this term and cashflow are dropped from the model, we find that our sales term predicts investment behaviour for the firms in the sample. This supports the notion that revenues are linked with investment and this phenomena is driven by firms who issue positive dividends and no share issues. The findings lend support to the dividend signallying argument discussed earlier in the chapter and back the notion that issuing debt is important when it comes to financing investments as opposed to equity.

APPENDIX III

The value of levered equity with taxes and bankruptcy risk

To calculate the value of a firm's equity given in equation (2.7), this thesis using the arbitrage condition which determines the interest rate *i*, on bonds issued by the company in period *t*.

First, consider a firm which only exists for two periods, *t* and *t+1.* The company's assets produce net cashflow of $\prod_t$ and $\prod_{t+1}$. No new shares or bonds are issued in the last period, so if no bonds are issued in the first period either, the value of the unlevered equity in period t is given by

$$V_t^U = \gamma_t \prod_t + (\gamma_t - 1)\, N_t + \beta_{t+1}^t E_t[\gamma_{t+1} \prod_{t+1}]$$

where γ_t reflects tax discrimination between dividend income and capital gains, as in equation (2.5) and f_t represents the transactions charge on new share issues. This is set to zero for simplicity.

If this firm issues bonds in period t, bondholders will require the expected return from lending to equal the return available on riskless bonds. This gives the condition

$$(1 + (1 - m_{t+1}^B)\iota_t)B_t = (1 - q_{t+1}^t)\,(1 + (1 - m_{t+1}^B)i_t)B_t + q_{t+1}^t E_t\,[\prod_{t+1} | b_{t+1}] - q_{t+1}^t X_{t+1}$$

where m_t^B is the tax rate paid on interest income by the marginal lender, q_t^t is the probability perceived in period *t* that the firm will default on its bonds in period s, and $E_t\ [x_s | b_s]$ is the expected value of x_s conditional on information available in period t, given that the firm does default on its bonds in period *s*. In the event of default, the outstanding debt is extinguished and ownership of the firm is transferred to the creditors. Shareholders are assumed to receive nothing. This bankruptcy process involves a deadweight cost whose value is denoted by X_s.

A further assumption is made on the interest payments. They can be deducted against corporate income tax at the rate τ_t. The value of the levered equity in period t is then given by

$$V_t = \gamma_t \prod_t + (\gamma_t - 1)\, N_t + \gamma_t B_t + \beta_{t+1}^t (1 - q_{t+1}^t)\, E_t[\gamma_{t+1} \prod_{t+1} | nb_{t+1}] - \beta_{t+1}^t (1 - q_{t+1}^t) E_t(\gamma_{t+1}(1 + (1 - \tau_{t+1}) i_t)) B_t$$

Where $E_t\, [x_s | b_s]$ is the conditional expectation of x_s given that the firm does not default in period s. Now, re-writing the arbitrage condition for lenders can be shown as

$$V_t = \gamma_t \prod_t + (\gamma_t - 1)\, N_t + \beta_{t+1}^t E_t[\gamma_{t+1} \prod_{t+1}] - \beta_{t+1}^t q_{t+1}^t E_t[\gamma_{t+1} X_{t+1}] + \beta_{t+1}^t (1 - q_{t+1}^t) E_t(\gamma_{t+1}(\tau_{t+1} - m_{t+1}^B)]\, i_t B_t + \{\gamma_t - \beta_{t+1}^t E_t[\gamma_{t+1}(1 + (1 - m_{t+1}^B) \iota_t$$

The first line in this equation above gives the value of the firm if it issues no debt, defined as V_t^U . The next term shows the present value of expected bankruptcy costs, and the remaining terms show the present value of the net tax advantage that results from issuing bonds.

If we now allow this firm to enter period *t* with some debt outstanding from the previous period, repayment of this debt reduces the dividend that it can pay and the value of its levered equity conditional on not defaulting in period *t* is reduced by $\gamma_t (1 + (1 - \tau_t) \mathrm{i}_{t-1}) \mathrm{B}_{t-1}$. The value of levered equity for a firm that generates net cash flows for a further *T* periods is given by the generalization

$$V_t = E_t[\sum_{j=0}^{T} \beta_{t+1}^t (\gamma_{t+j} \prod_{t+j} + (\gamma_{t+j} - 1)\, N_{t+j})] - \gamma_t (1 + (1 - \tau_t) \mathrm{i}_{t-1}) \mathrm{B}_{t-1} - \mathrm{E}_t[\sum_{j=1}^{T} \beta_{t+j}^t\, q_{t+j}^{t+j-1} \gamma_{t+j} X_{t+j}] + \mathrm{E}_t[\sum_{j=1}^{T} \beta_{t+j}^t (1 - q_{t+j}^{t+j-1}) \gamma_{t+j} (\tau_{t+j} - m_{t+1}^B)\, \iota_{t+j-1} \mathrm{B}_{t+j-1}] + \mathrm{E}_t[\sum_{j=1}^{T} \beta_{t+j-1}^t \gamma_{t+j} (1 + (1 - m_{t+1}^B)\, \iota_{t+j-1} \mathrm{B}_{t+j-1}$$

Equation (2.7) is obtained by letting $T \to \infty$

Optimal Debt Policy

This thesis assumes that both q_{t+1}^{t} and i_t depend on B_t and K_t only through the ratio $(\mathrm{B}_t/p_t^I\mathrm{K}_t)$. The thesis denotes the derivative of q_{t+1}^{t} and i_t, with respect to this ratio by $q_{t+1}^{t} \geqq 0$ and $i_t^I \geqq 0$ respectively. We also assume that X_{t+1} depends on B_t but not on K_t, and is homogeneous of degree one in B_t. The first-order condition for optimal debt is then given by

$$-v_t\left(\frac{B_t}{p_t^I\mathrm{K}_t}\right) = -(\gamma_t + \lambda_t^D) + \beta_{t+1}^{t}\mathrm{E}_t[(\gamma_{t+1} + \lambda_{t+1}^D)(1 + (1 - m_{t+1}^B)\iota_t)]$$

$$+ \beta_{t+1}^{t}q_{t+1}^{t}\mathrm{E}_t\left[(\gamma_{t+1} + \lambda_{t+1}^D)\frac{\partial X_{t+1}}{\partial B_t}\right]$$

$$- \beta_{t+1}^{t}(1 - q_{t+1}^{t})\mathrm{i}_t\mathrm{E}_t[(\gamma_{t+1} + \lambda_{t+1}^D)(\tau_{t+1} - m_{t+1}^B)]$$

$$v_t \;=\; \mathrm{E}_t\;[\beta_{t+1}^{t}(\gamma_{t+1} + \lambda_{t+1}^D)(q_{t+1}^{t}(\frac{X_{t+1}}{B_t}) \;+\; (q_{t+1}^{t}\mathrm{i}_t \;-\; i_t^t(1 -\; q_{t+1}^{t}))(\tau_{t+j} \;-\; m_{t+1}^B)]$$

DATA APPENDIX

The replacement cost value of the capital stock is not reported and must be estimated from historic cost accounts. The study assumes that the replacement cost value is equal to the historic cost value for the first year of data available (1980), and construct later values using the investment data in an iterative perpetual inventory formula detailed below. As mentioned earlier, to reduce the impact of the starting assumption on our results, this chapter excludes the first three years of data in estimation. This is a usual assumption employed by Blundell et al. (1992) and Bond & Meghir (1994). The investment rate can then be expressed as a ratio of investment to the replacement cost value of capital (both expressed at current year prices).

In the absence of data on variable costs, cash flow is measured by the conventional method of adding back the reported value of depreciation to the reported operating profit (before tax, interest and preference dividends). Letting $\mathrm{p}_t\mathrm{C}_t$ denote the nominal value of cashflow and $p_t^I\mathrm{K}_t$ denote the capital stock at replacement construct and $C/_K = [(\mathrm{p}_t\mathrm{C}_t)/(p_t^I\mathrm{K}_t)]\,(p_t^I/\mathrm{p}_t)$.

The investment goods price index is an implicit deflator for gross fixed investment by manufacturing industry. The output price index is an implicit GDP deflator for the sub-sectors of manufacturing.

The ratio of real output to capital is constructed in a similar way, using sales as a proxy for the nominal value of output. Finally, the ratio of debt to capital can be measured as the book value of total loan capital to capital stock. The ratio of dividends to capital and new equity issues to capital is formed as $(D/K)_t = D_t/p^I K_t$ and $(N/K)_t = D_t/p^I K_t$

The last variable is Net Capital Stock at replacement cost which requires careful computation. For most years of the sample, direct observations on historic cost valuation of fixed assets exist. These capital stock figures are available for plant/machinery and land/buildings separately. The chapter uses the change in gross fixed assets totals to estimate the breakdown of investment:

$$p_t^I I_t^p = p_t^I I_t [\frac{GFP_t - GFP_{t-1}}{GFP_t - GFP_{t-1} + GFB_t - GFB_{t-1}}]$$

and $p_t^I I_t^B = p_t^I I_t - p_t^I I_t^p$

where GFP_t is the gross book value of plant and machinery in year *t.* GFB_t is the gross book value of land and buildings in year *t,* and $p_t^I I_t^p$ denote the estimated value of investment in plant/machinery and land/buildings respectively.

The replacement cost valuation of each type of capital is then calculated from the perpetual inventory formula

$$p_{t+1}^I K_{t+1}^I = p_t^I K_t^I \,(1 - \delta^I)(p_{t+1}^I/p_t^i) + p_{t+1}^I I_{t+1}^t$$

For *i*= P.B. Depreciation rates of 8.19% and 2.5% were used for plant and machinery and land & buildings. These are taken from estimates provided by King and Fullerton (1984) for UK manufacturing industry. To obtain starting values for this procedure, this chapter assumes that the replacement cost valuations equalled historic cost valuations for the first year of data available (usually 1980).

The replacement cost valuation of total fixed capital assets is then estimated as $p_t^I K_t = p_t^I K_t^P + p_t^I K_t^B$.

Table 68: Descriptive Statistics

The table reports the descriptive statistics of the variables used for the analysis over the period 1980 -2017

Variable	Obs	Mean	Std.Dev	Min.	Max.
I/K	27997	0.65	0.70	-18.44	41.80
Q	28601	0.56	2.52	-1.85	24.32
S/K	27997	21.05	13.24	-6.39	40.51
B/K	27997	0.05	1.71	0.00	212.65
C/K	27997	0.05	0.57	-2.08	5.09
D/K	28766	0.59	1.19	-0.24	7.56
N/K	28766	11.10	45.28	-1.26	303.36

Table 69: Correlation Matrix

The table reports the correlation matrix of the variables used for the analysis over the period 1980 - 2017

	I/K	C/K	S/K	B/K	Q	D/K	N/K
I/K	1						
C/K	0.02	1					
S/K	0.57	0.01	1				
B/K	0.23	0.02	0.03	1			
Q	0.04	0.01	0.02	0.08	1		
D/K	0.23	0.04	0.30	0.04	0.00	1	
N/K	0.11	0.00	0.14	0.04	0.01	0.14	1

Table 70: Stationarity tests

The table reports the stationarity tests using the Im, Pesaran and Shin Unit Root Test for the period 1980 -2017

	Stationarity Tests
Method	Im, Pesaran and Shin Unit Root Test
H0:	All Panels Contain Unit Roots
HA:	Some panels are stationary
Variable	T-Bar
I/K	-2.43***
C/K	-3.80***
S/K	-2.11***
B/K	-3.63***
Q	-6.01***

Table 71: BASIC Q MODEL (FULL SAMPLE)

The table reports the GMM results for the Q model. Sample of 1050 UK firms from 1980-2017 based on the market for corporate control.

Dependent Variable (I/K)I,t	**(1)**	**(2)**	**(3)**
Q	0.021***	3.90**	
	(4.06)	(2.06)	
$Q_{I,t-1}$		-3.44**	4.34***
		(-2.06)	(3.31)
$Q^2_{I,t-1}$			-0.21***
			(-3.35)
$(I/K)_{I,t-1}$		0.68***	0.71***
		(8.86)	(9.33)
Year Dummies	Yes	Yes	Yes
No of Observations	29181	33401	33403
Groups/Instruments	1050/36	1050/37	1050/37
AR(2): Z Value	-0.23	1.48	0.84
Hansen Statistic	3.43	1.24	3.75

Note: Robust standard errors are given in parenthesis. The equations estimated are based on equation 4.1 and 4.2. Additional variables included are year dummies. The estimation allows for unobserved firm-specifics and uses lagged valued of the dependent variable and other right-hand side variables dated t-s to be uncorrelated with the transformed error term v_{it}^* for $s \geq 2$. The values (Chi-squared) reported for the AR(2) and Hansen Statistic are Z statistics.

Table 72: Basic euler equation with Q

The table reports the GMM results for the Basic Euler Equation. Sample of 1050 UK firms from 1980-2017 based on the market for corporate control.

Dependent Variable (I/K)I,t	(1)	(2)	(3)
$Q_{I,t}$	-0.015*	`0.131**	
	(-1.80)	(2.06)	
$Q_{I,t-1}$		-0.129**	0.039**
		(-2.22)	(2.29)
$Q^2_{I,t-1}$			-0.003**
			(-2.21)
$(I/K)_{I,t-1}$	0.357**	0.441***	0.335**
	(2.25)	(2.53)	(1.97)
$(I/K)^2_{I,t-1}$	-0.02***	-0.02***	-0.02***
	(-5.58)	(-3.23)	(-5.26)
$(C/K)_{I,t-1}$	-0.08***	-0.09***	-0.08***
	(-3.24)	(-3.31)	(-3.20)
$(S/K)_{I,t-1}$	0.016***	0.013**	0.016***
	(3.16)	(2.32)	(3.05)
$(B/K)^2_{I,t-1}$	-0.053	-0.065	-0.068
	(-0.85)	(-1.20)	(-0.98)
Year Dummies	Yes	Yes	Yes
No of Observations	35484	35483	35485
Groups/Instruments	1050/73	1050/73	1050/73
AR(2)	-0.87	-0.18	-0.78
Hansen Statistic	39.59	33.71	39.85

Note: Robust standard errors are given in parenthesis. The equations estimated are based on equation 4.1 and 4.2. Additional variables included are year dummies. The estimation allows for unobserved firm-specifics and uses lagged valued of the dependent variable and other right-hand side variables dated t-s to be uncorrelated with the transformed error term v^*_{it} for $s \geq 2$. The values (Chi-squared) reported for the AR(2) and Hansen Statistic are Z statistics.

Table 73: Tests for Heterogeneity between firms involved in the Market for Corporate Control

Dependent Variable $(I/K)_{I,t}$	(1)	(2)	(3)
$Q_{I,t}$	0.003	0.12	
	0.13	1.21	
$Q_{I,t-1}$		-0.105	-0.019
		-1.26	-0.14
$Q^2_{I,t-1}$			0.001
			0.11
$(I/K)_{I,t-1}$	0.643***	0.67***	0.63***
	4.17	5.43	4.47
$(I/K)^2_{I,t-1}$	-0.043	-0.037	-0.044**
	-1.57	-1.49	-2.07
$(C/K)_{I,t-1}$	0.056	-0.015	0.005
	0.81	-0.16	0.64
$(S/K)_{I,t-1}$	0.006	0.005	0.006
	1.20	1.21	1.43
$(B/K)^2_{I,t-1}$	0.10	0.079	0.138
	0.99	0.84	1.12
$A_{,t-1}\ (I/K)_{I,t-1}$	0.041*	0.058**	0.041
	1.65	1.95	1.28
$A_{I,t-1}\ (I/K)^2_{I,t-1}$	0.05	0.042	0.051*
	1.53	1.40	1.92
$A_{I,t-1}\ (C/K)_{I,t-1}$	-0.48***	-0.35**	-0.44**
	-3.24	-2.20	-2.07
$A_{I,t-1}\ (B/K)^2_{I,t-1}$	-0.95**	-0.86**	-0.96**
	-2.23	-2.08	-2.14
Year Dummies	Yes	Yes	Yes
No of Observations	32362	32361	32363
Groups/Instruments	1050/74	1050/74	1050/74
AR(2)	0.00	0.28	-0.02
Hansen Statistic	41.33	35.56	41.59

Note: Robust standard errors are given in parenthesis. The equations estimated are based on equation 4.1 and 4.2. Additional variables included are year dummies. The estimation allows for unobserved firm-specifics and uses lagged valued of the dependent variable and other right-hand side variables dated t-s to be uncorrelated with the transformed error term v^*_{it} for $s \geq 2$. The values (Chi-squared) reported for the AR(2) and Hansen Statistic are Z statistics

Table 74: Tests for the absence of financial effects

Dependent Variable $(I/K)_{I,t}$	(1)	(2)	(3)	(4)	(5)	(6)
Q	-0.003	-0.002	0.177*	0.174*		
	(-0.68)	(-0.33)	(1.86)	(1.68)		
$Q_{I,t-1}$			-0.165*	-0.162*	-0.152**	-0.066
			(-1.86)	(-1.67)	(-2.19)	(-1.04)
$Q^2_{I,t-1}$					0.008**	0.004
					(2.19)	(1.02)
$(I/K)_{I,t-1}$	0.371*	0.52***	0.492**	0.514***	0.505*	0.572***
	(1.76)	(2.84)	(2.25)	(2.53)	(1.79)	(3.34)
$(I/K)^2_{I,t-1}$	-0.03*	-0.02***	-0.031***	-0.032**	-0.037**	-0.023**
	(-1.89)	(-2.46)	(-2.45)	(-2.44)	(-2.33)	(-1.93)
$(C/K)_{I,t-1}$	-.044	-0.052	-0.072**	-0.077**	-0.075**	-0.059
	(-1.15)	(-1.15)	(-2.27)	(-2.19)	(-2.20)	(-1.56)
$(S/K)_{I,t-1}$	0.015**	0.011*	0.011*	0.011*	0.011	0.009*
	(2.35)	(1.90)	(1.68)	(1.69)	(1.24)	(1.72)
$(B/K)^2_{I,t-1}$	-0.031	-0.004	-0.077	-0.044	-0.068	-0.013
	(-0.39)	(-0.12)	(-1.01)	(-0.84)	(-0.92)	(-0.26)
$(D/K)_{I,t}$	0.209*	0.272*	0.137	0.146	0.112	0.239**
	(1.71)	(1.88)	(0.96)	(0.83)	(0.72)	(1.94)
$(D/K)_{I,t-1}$	-0.20**	-0.251**	-0.123	-0.133	-0.098	-0.213**
	(1.95)	(2.12)	(-1.07)	(-0.93)	(-0.78)	(-2.09)
$(N/K)_{I,t}$		-0.001		-.001		-0.001
		(-0.25)		(-0.23)		(-0.27)
$(N/K)_{I,t-1}$		0.001		0.001		0.001
		(0.20)		(0.13)		(0.18)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	34467	34436	34437	33407	34437	33406
Groups/Instruments	1050/72	1050/75	1050/73	1050/74	1050/73	1050/74
AR(2)	-0.80	0.34	-0.59	-0.56	-0.86	0.10
Hansen Statistic	33.49	27.97	37.53	30.68	34.91	34.73

Note: Robust standard errors are given in parenthesis. The equations estimated are based on equation 4.1 and 4.2. Additional variables included are year dummies. The estimation allows for unobserved firm-specifics and uses lagged valued of the dependent variable and other right-hand side variables dated t-s to be uncorrelated with the transformed error term v^*_{it} for $s \geq 2$. The values (Chi-squared) reported for the AR(2) and Hansen Statistic are Z statistics

Table 75: Tests for the absence of financial regimes

Dependent Variable $(I/K)_{I,t}$	(1)	(2)	(3)	(4)	(5)	(6)
$Q_{I,t}$	0.004	0.133*		0.011	0.135*	
	(0.4)	(1.65)		(0.95)	(1.91)	
$Q_{I,t-1}$		-0.113	-0.075		-0.113	0.03
		(-1.48)	(-0.90)		(-1.65)	(0.36)
$Q^2_{I,t-1}$			0.004			-0.001
			(0.92)			(-0.26)
$(I/K)_{I,t-1}$	0.046	0.14	0.03	-0.007	0.045	-0.003
	(0.25)	(0.82)	(0.14)	(0.04)	(0.29)	(0.02)
$(I/K)^2_{I,t-1}$	0.001	-0.004	-0.002	0.004	0.003	0.003
	(0.1)	(-0.29)	(-0.14)	(0.25)	(0.23)	(0.22)
$(C/K)_{I,t-1}$	0.008	-0.027	-0.008	0.027	0.009	0.032
	(0.13)	(-0.40)	(-0.09)	(0.72)	(0.25)	(0.84)
$(S/K)_{I,t-1}$	0.027***	0.024***	0.027***	0.029***	0.027***	0.029***
	(4.95)	(4.72)	(4.53)	(5.51)	(5.46)	(5.83)
$(B/K)^2_{I,t-1}$	0.072	0.051	0.021	0.075	0.048	0.075
	(0.94)	(0.61)	(0.18)	(0.94)	(0.66)	(0.98)
$S_{i,t-1}\ (I/K)_{I,t-1}$	-0.38***	-0.29***	-0.301*	-0.39**	-0.297***	-0.39***
	(-2.72)	(-2.57)	(-1.90)	(-2.38)	(-2.27)	(-2.52)
$S_{i,t-1}\ (I/K)^2_{I,t-1}$	0.016**	0.013**	0.013*	0.016**	0.013**	0.016**
	(-2.42)	(-2.05)	(-1.9)	(1.96)	(1.89)	(2.11)
$S_{i,t-1}\ (C/K)_{I,t-1}$	0	0	0			
	(-0.01)	(-0.52)	(-0.10)			
$S_{i,t-1}\ (S/K)_{I,t-1}$	0.021***	0.02***	0.019***	0.023***	0.02***	0.023***
	(5.18)	(5.48)	(3.51)	(4.26)	(5.48)	(4.70)
$S_{i,t-1}\ (B/K)^2_{I,t-1}$	0	-0.006	-0.006			
	(-0.02)	(-0.32)	(-0.46)			
$S_{i,t-1}Q_{I,t-1}$	0.031	0.051	0.031	0.072	0.069*	0.064
	(0.53)	(1.22)	(0.46)	(1.54)	(1.78)	(1.43)

Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	33381	33391	33391	33391	33391	33391
Groups/Instruments	1050/76	1050/76	1050/75	1050/76	1050/76	1050/75
AR(2)	1.09	1.13	0.64	1.05	1.19	0.64
Hansen Statistic	22.68	18.85	22.16	23.47	18.85	22.16

Note: Robust standard errors are given in parenthesis. The equations estimated are based on equation 4.1 and 4.2. Additional variables included are year dummies. The estimation allows for unobserved firm-specifics and uses lagged valued of the dependent variable and other right-hand side variables dated t-s to be uncorrelated with the transformed error term v_{it}^{*} for $s \geq 2$. The values (Chi-squared) reported for the AR(2) and Hansen Statistic are Z statistics

5. CONCLUSION & FUTURE RESEARCH

5.1 Conclusion

Neoclassical economics was built on the idea that individuals are rational decision-makers (Smith, 1774). Efficient markets proposed that markets move randomly due to the unpredictable arrival of new information (Fama, 1965/1970). Stock prices therefore follow a random evolution with no profitable opportunities existing due to either past, present or private information. If profitable opportunities do emerge, the presence of arbitrageurs quickly eradicates temporary inefficiencies pushing prices back towards their fundamental levels. Thus, a combination of passive and active trading was proposed to maintain economic efficiency at an aggregate level.

Despite the logic of this early research, subsequent investigations began to break-down the supremacy of efficient markets. Anomalies such as firm size, weekend effect, religious holidays, lunar moon cycles, momentum, overreaction, underreaction and many more indicated the presence of less than rational economic activity. Moreover, the acceptance of the presence of information asymmetry meant that it was acknowledged that individuals rely on their own subjective assessments which can be infected by emotion or animal spirits (Keynes, 1936).

When applied to corporate finance, those heuristics can influence both managerial teams and investors alike. Various theories have emerged exploring the existence of rationality at managerial and investor level. Shleifer and Vishny (2003) present a model whereby a rational manger exploits the irrational market through timing the execution of stock-financed acquisitions. Rhodes-Kropf and Viswanathan (2004) argue that managers can be irrational in their abilities to decompose market-wide relative to firm-specific misvaluation, resulting in overpayment. Roll (1986) proposes that irrational managers can be infected by hubris, an overly optimistic attitude that can result in the miscalculation of synergies causing long-term losses for acquirers. Malmendier and Tate (2009) corroborate with evidence that superstar CEOs (those recognized with prestigious business awards) significantly underperform their peers. The value of applying psychological heuristics to Mergers and Acquisitions can be seen to be well-warranted in the light of these findings.

Chapter 2 starts the empirical work by exploring the gains which can be made via an acquisition from the point of an acquirer as existing literature has focused heavily on target firms. The chapter also examines the interaction between firm and market misvaluation using an intuitive approach between successfully completed deals against those who fail for exogenous reasons (following the approach of Savor and Lu (2009)). How to truly measure acquirer performance is something that has plagued corporate finance research. Fama (1998) warned that academic findings should be treated with caution as it is difficult to ascertain whether empirical results are true or whether they are a manifestation of poor methodology. To try to counter this problem, this chapter stratifies mergers and acquisitions according to whether the deal succeeded or failed. Savor and Lu (2009) inspire this approach whereby they propose that if mergers are in the best interests of the shareholders the firm serves, the deals that successfully complete should outperform those that do not. Moreover, if this holds when equity is used as payment, then support for market-timing is shown as the merger cushions the long-term stock price collapse. Importantly, to make this observation, one must control for the reason that the deal fails. This chapter does so by using Factiva, NY-Times, LexisNexis and Marketline Advantage, sub-stratifying the failed sample according to whether the deal fails for reasons internal to the acquirer or whether it fails because of reasons outside of the acquirer's control. This to the best of our knowledge has never been done and contributes significantly to the literature on mergers and acquisitions.

The chapter finds that although successful firms make losses in the long-run, these losses are significantly lower than for the control sample. This suggests that mergers are indeed beneficial to acquiring firms. Here, it also found that in the long term the gains realized are overall positive. When the deals are stratified by method of payment, we find the gains to be negative for stock bidders and positive for cash bidders. This conclusion supports the findings of SV (2003) and Savour and Lu

(2009). The study reports that this appears as a result of successful market timing by acquiring firm shareholders. Successfully timing the market by issuing equity is shown to be beneficial to acquiring firms. In the short and long run portion of the study, we find that successful acquirers significantly outperform both the failed exogenous sample and failed all sample. When firms financed their acquisition using 100% cash, successful firms generated significant positive gains than the control sample. For stock acquirers, we find that significant losses are made in all samples however, these losses were greater for firms who failed at consummating the deal. This further supports the notion that M&A are indeed NPV-enhancing for the firm.

The thesis also assessed the performance of acquirers when the market was misvalued. Bouwman et al. (2009) suggest that valuation of the market plays a role in the quality of acquisitions. Gorton et al. (2009) also provided evidence that firms undertake mergers to protect themselves during merger waves. Merger waves most often occur when the valuation of the market is high. The results suggest that in the short run, acquirers enjoy higher abnormal returns in high valuation periods in comparison to those who announce deals in low valuation periods. In the long-run, we find that successful firms significantly generate value by engaging in M&A activity when the market is overvalued. Those acquirers that acquire using stock appear to benefit the most when the market is overvalued. It is observed that these results provide further evidence in support for phenomena such as managerial hubris and white knight deals and their impact on value creation arising from mergers. The overall finding is that acquirer performance is correlated with the state of the market.

Finally, when the study is sorted into portfolios based on firm misvaluation, there is further support found for mergers being a value-enhancing activity. The short run and long-run results support the notion of undertaking mergers using equity (cash) when the firm is overvalued (undervalued).

Chapter 3 deals with the identification of firms and 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 was 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 identification of companies that become involved in acquisitions has been attempted before however a gap in the literature still existed when it concerns the firms that are likely to become involved in acquisitions. The literature has focused heavily on examining the acquired firms mainly due to the fact that their identification can be seen to be financially significant while the same is not observed from the acquiring firms. 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.

Over a long run study, the results suggested that there is no superior model when we compare the logit model to the theoretically superior hazard function. Both models offered results which are 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. 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. The acquired firms were examined twice, firstly against the companies that 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. Overall, the efficiency variables show that these firms are less effectively managed than either the acquiring firms or the firms that are not involved in the acquisition process. This supports the managerial inefficiency theory for takeovers, as suggested by many authors including Wen and Chen (2020) and McMillan and Gargett (2021), 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 the table.

The second group of variables are the profitability terms. These terms when the acquired firms are modelled against the acquiring companies show mixed results. Some terms are consistent with the prevailing notions concerning the nature of target companies, thus, they are 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 on a whole are mostly negatively linked to the probability that the firms will be acquired. 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. The p/e ratios for acquiring firms are higher than those of the companies that do not take part in the takeover process. This means that acquiring firms are relatively over-valued which may make it easier for them to raise the funding necessary for the purchase of another firm (Zhang and Tucker (2017); Jenter and Lewellen (2017); Kim et al. (2018)).

The liquidity of the target firms is poor in the results generated when matched against both the acquiring and the non-involved firms. When the bidders are used in the models, the liquidity variables suggest that target firms 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 results remain consistent and convey the same impression about the financial condition of the targets (Lu, (2018); Chen and Ovtchinnikov (2020)). 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 and growth. When the acquired firms are modelled against the acquiring companies, the size variable becomes significant however the results are mixed. In the literature it is often observed that the targets of acquisition activity are smaller than the bidders. This is not always the case here as some terms representing size such as Market Value and Total Sales show positive and significant signs. These signs can be positive as some target firms have large market values relative to book values due to the nature of their business. Considering total sales is in line with the market value, then it is of no surprise that the firm’s market value is correcting reflecting the business’s level of sales. The opposite sign could also be due to the long time period used as large companies could also become the targets of acquisition activity when they would normally be safe from takeover attempts. 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.

The last point that needs to be made here is a note of the future developments that might be needed in this section. 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 1980 to 2017. If these models are estimated over the boom and recession data sets separately they might produce potentially different results. 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. Also splitting the sample by industry might offer some insights into predicting acquisition behaviour in different industries.

The final empirical chapter looked at the heterogeneity between acquiring firms and non-acquiring firms. This question has not been investigated in terms of the literature on acquisitions. While the microeconomics literature on firms has made some considerations on investment (Blundell et. al, 1990), the two have not been drawn together. We do this by investigating the importance of Tobin's Q in the determination of investment decisions at the firm level, developing an empirical model of investment based on the Euler equation of the standard neoclassical model of capital accumulation subject to adjustment costs.

The chapter also looks at the case where the firm faces a hierarchy of costs for alternative sources of finance. This study assesses whether the investment spending of the firms is affected by the availability of internally generated finance (retained earnings), reflecting some constraint on the ability of these firms to raise external finance (debt or new equity) for investment. This age-old question has a number of important implications. Profits tend to be highly cyclical, so if investment depends directly on the availability of profits then investment spending will be more sensitive to fluctuations in economic activity than would otherwise be the case. If post-tax profits help to determine investment spending then the impact of company taxes on investment will be more complicated than is often assumed. The complexity in calculating the correct tax rate based on tax exhaustion is quite complex in the UK and has only been discussed in this thesis.

The key contribution of this chapter was to test for heterogeneity between acquiring firms and non-acquiring firms. We find conclusive evidence that acquiring firms are different from the non-acquiring firms in our sample using the specification of the Euler equation model. The findings suggest that cashflow and debt are the key terms which differentiate these two firms apart. The results support the use of external finance (debt) to engage in investments. We believe that this lends support for the use of leverage buyouts in the acquisition process as it uses the target's assets as collateral during the transaction. After testing for the absence of financial effects and financial regimes, we find dividends to be a significant variable when it comes to the investment behaviour of firms whereas issuing new shares tend to be insignificant in all the models. The study also finds that the debt term which controls for the non-separability between investment and borrowing is negative and close to zero in some models. When this term and cashflow are dropped from the model, we find that our sales term predicts investment behaviour for the firms in the sample. This supports the notion that revenues are linked with investment and this phenomenon is driven by firms who issue positive dividends and no share issues. The findings lend support to the dividend signallying argument discussed earlier in the chapter and back the notion that issuing debt is important when it comes to financing investments as opposed to equity.

This thesis has robustly supported the value and worth of applying behavioural finance to mergers and acquisitions. It has also helped with the identification of firms that have a high likelihood of becoming involved in takeovers by extending the existing literature to cover firms that do not take part in takeovers. This has helped to see the fundamental differences between these companies and the firms that become either targets or bidders in acquisition activity. Finally, it has bridged the gap that existed between the literature on acquisition and the microeconomics literature on investment.

This thesis reflects a small step forward in helping policy makers, academics and industry professional to understand the emotions, models and consequences of corporate investments and hopefully provides compelling inspiration for continued research in this field.

5.2 Areas for Future Research

In the market for corporate control, several outstanding gaps still exist in the academic literature. Some of the major ones include lack of focus on post-merger integration. Many studies tend to focus on the pre-merger phase of the M&A process, but there is relatively less research on the post-merger integration phase. This is a critical phase that can determine the success or failure of the merger, and more research is needed to understand how firms can effectively integrate after a merger. There is also limited consideration of the role of culture in the acquisition process. Culture can play a significant role in M&A success, but this factor is often overlooked in academic literature. There is a need for more research to examine the impact of cultural differences on the M&A process and how firms can manage cultural integration. Goodwill offers another dimension to examine the performance of the acquisitions. Goodwill is an important consideration in the acquisition process because it represents the intangible assets of a company, including its reputation, brand, and customer relationships. Goodwill can add significant value to an acquisition, but it also presents challenges in terms of measurement and accounting treatment. One important role of goodwill in the acquisition process is that it can help to justify the premium paid for a target company. The premium paid for the target may be based on the potential synergies and strategic benefits of the acquisition, as well as the value of the intangible assets represented by goodwill. Goodwill also plays an important role in the accounting treatment of acquisitions. Under the purchase method of accounting, the acquiring company records the assets and liabilities of the target company at fair value. Goodwill is then calculated as the difference between the purchase price and the fair value of the target company's net assets. This can result in a significant amount of goodwill on the acquiring company's balance sheet, which can have implications for financial reporting, taxes, and other accounting issues. Despite the importance of goodwill in the acquisition process, there are several gaps in the academic literature. One major gap is the lack of consensus on how to measure goodwill. There is no standardized approach to measuring goodwill, which can make it difficult to compare the value of goodwill across different companies and industries. Another gap in the literature is the challenge of assessing the value of goodwill. Intangible assets such as goodwill can be difficult to value, particularly in industries such as technology or biotech where a company's intellectual property and other intangible assets are critical to its success. Finally, there is a lack of research on the long-term impact of goodwill on the performance of the acquiring company. While there is some evidence that goodwill can add value to an acquisition, there is also the potential for goodwill to be impaired over time, leading to write-downs and other accounting issues. In summary, while goodwill plays an important role in the acquisition process, there are several gaps in the academic literature related to its measurement, value, and long-term impact on the acquiring company. Further research is needed to address these gaps and better understand the role of goodwill in the acquisition process.

Another area for future research will be the role of board of directors in the acquisition process. The board of directors plays a critical role in the acquisition process, including the decision to pursue an acquisition and the oversight of the acquisition process. However, there is a need for more research that examines the specific role of the board of directors in the acquisition process and how it can impact the success or failure of the acquisition. Another gap in the literature is the impact of technology on the acquisition process. Technology is changing the way that companies approach the acquisition process, from the way that targets are identified to the due diligence process. However, there is a need for more research that examines the specific ways that technology is impacting the acquisition process and how companies can leverage technology to improve the success of their acquisitions. Finally, a gap exists when it comes to the impact of acquisitions on the workforce. Acquisitions can have a significant impact on the workforce, including layoffs and changes in company culture. However, there is a need for more research that examines the specific impact of acquisitions on the workforce and how companies can minimize the negative impact of acquisitions on employees.

Overall, these gaps in the acquisition literature present opportunities for future research that can help to improve our understanding of the acquisition process and how companies can improve the success of their acquisitions.

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