GROUPTHINK WITHIN BOARDS OF DIRECTORS

GROUPTHINK EFFECTS DURING MERGER AND ACQUISITION DECISIONS

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FOREWORD

It is vital for any academic field to grow and have continuous research contributions. The relatively modern growth of the behaviour economics field introduces a wide array of new perspectives on puzzling findings in more traditional academic disciplines. Personally, I am fascinated with paradoxes and problems in financial markets and how the behaviour of decision makers can cause the seemingly irrational phenomena in these markets. The writing of this paper has allowed me to get an indebt perspective of one of these puzzles, namely the size of the global takeover market.

This thesis was written for the completion of a master's degree in Economics and Business with a Behavioural Economics specialisation at Erasmus University Rotterdam. Although sometimes stressful I have enjoyed writing this paper and getting the opportunity to learn about a subject that interests me greatly. I have received a lot of support during the writing process and I would like to express my gratitude towards those who have helped me in the past few months. I would like to thank my coach, Tong Wang, for giving me the freedom to explore the topic of my choice and providing me with valuable feedback during our meetings. Also, I thank my co-reader, Chen Li, for making the effort of assessing my final thesis. Finally, my friends and family have been very important for me during the writing of this thesis and my entire degree, they have helped me to stay positive and focussed and I owe them a debt of gratitude.

Daphne A. Timmermans

EXECUTIVE SUMMARY

Mergers and acquisitions are impactful events in the day to day business of a company. There is a tremendous yearly number of takeover transactions. However, empirical research finds that buyer returns from a deal are mostly zero or negative. The paradoxical relationship between shareholder results and the size of the market for corporate control shows the importance of non-traditional financial research on the topic of mergers and acquisitions.

Insights from behavioural economics can aid in the understanding of the size of the takeover market. Previous research has shown the importance of behavioural biases in the M&A process. It was found that CEOs that display hubris or a high level of overconfidence are more likely to attempt takeovers and these result in systematically lower returns compared to firms with CEOs that display lower levels of these biases. In this study the role of the board of directors is added to the existing behavioural insights in M&A literature.

The CEO of the firm is not the sole decision maker in takeover deals, because a board of directors has the responsibility to oversee the CEO and to be involved in the strategic moves of the company. This makes them the other important buyer firm party that evaluates and decides on mergers and acquisitions. Like every team that has to operate under stressful conditions, the group dynamics of a board of directors is likely to influence the quality of their decisions. This thesis focusses specifically on groupthink. Groups that are prone to suffering from groupthink seek concurrence, view outside groups as a threat, dismiss alternative options, are overly optimistic, and fail to react to warning signs or new information in their decision making process.

Within this research it is reasoned that protective measures, failure to properly make decisions and failure to evaluate decisions made by the CEO are indicators of an increased risk of suffering from groupthink. This results in five proxies for groupthink defined in this study: classified board structure, limitations to shareholders' rights of calling special meetings, director indemnification, that CEO is board chair and that board members failed to attend at least 75 percent of meetings. Board size and whether

the board includes female members are expected to influence the performance of boards of directors and are thus also added in the analyses. Similarly given the findings in previous research on CEO hubris and overconfidence and the self-attribution bias of a successful previous deal, proxies for these biases were also included.

An event study methodology was used to determine if a board with a high probability of suffering from groupthink has lower buyer abnormal returns after a takeover deal. Furthermore, it was investigated whether boards scoring high on groupthink are less likely to cancel a deal. A multitude of research designs (parametric and non-parametric) were utilized to find an effect of the groupthink proxies on M&A results. The tests, however, do not affirm the hypotheses which expect decreased board performance due to groupthink. Therefore this thesis has to conclude that no effects of groupthink on board performance in M&A decisions can be found.

The nature of the research design presents a dual hypothesis problem in this study. This implies that the lack of success to find any significant results of groupthink on takeover results can be caused either by the non-existence of groupthink influences on boards of directors or the failure of the proxies to measure groupthink. The former might be true because of agency problem protection mechanisms and performance based compensations plans that are present in most large firms. The latter is also likely given that there is no consensus in research on proper measurement of groupthink and that it is a phenomenon that might be only visible in observational and not in cross-sectional data.

The scale of corporate transactions, their impact on buyer and target firms and the roles and responsibilities of boards of directors in this process require an understanding on board dynamics. Properly functioning boards are able to generate profits for their firms and there are relatively easy methods to battle groupthink. Further research on this topic should attempt to determine proper groupthink proxies which allow proper performance measurements.

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1. INTRODUCTION

Empirical evidence shows that mergers and acquisitions create a zero or negative payoff for bidder firm shareholders, and it is therefore puzzling that corporations continue to use this business strategy at an increasing rate. This is the so-called "success paradox" that exists within the corporate takeover market (Cording, Christmann and Bourgeois, 2002). Traditional explanations for the size of market for corporate control do not fully explain why this business strategy is so immensely popular in today's economy. Thus, there can be a role for behavioural concepts to be linked with the financial research on takeovers in order to explain the success paradox. A well-known example of such behavioural research on mergers and acquisitions is the role of CEO hubris and overconfidence in the process of doing a takeover. Findings on this subject have been integrated in M&A literature standards. The hubris that CEOs have makes them more prone to be positive towards risky deals in order to increase their own stature and CEO overconfidence causes managers to put great value on their own competence and valuations. However, CEOs are not the only decision makers in mergers and acquisitions. While they do play a large public role in the takeover process, they work together with the board of directors of the firm. Theoretically, if the board of directors functions according to corporate governance standards, the influence of CEO hubris and overconfidence should be restricted. However, a non-functioning board can aggravate these issues and provide poor judgement on the value of potential deals.

Effectively, boards of directors and any other working group face similar dangers. They experience social pressure to conform and to belong to the group, and by doing so their ability to individually use rational judgement on merger decisions is reduced. This behavioural phenomenon can be described by the term groupthink, which was firstly defined by Irvin L. Janis in 1971. The term's resemblance to the newspeak language used in Orwell's 1984 is not a coincidence: it refers to a reduction in mental efficiency, which is the ability to grasp and test reality and moral standards as a result of group pressure, found both in Orwell's work and in the description of groupthink.

When boards of directors suffer from a high amount of groupthink it is likely that their judgement is less trustworthy than those of boards with a lower level of groupthink. So, it can also be reasoned that those boards that are more vulnerable to groupthink make clouded decisions on mergers and acquisitions leading to overall lower results from deals. This reasoning leads to the following research question that will be discussed in the remainder of this paper:

What is the effect of boards of directors having a high likelihood of suffering from groupthink on the results of mergers and acquisition by their firms?

In the past decades the growth of the transaction value and amount of M&A deals has been steady, the worldwide deal value in 2014 approached 4,000 billion US dollars from around 40,000 transactions. [1] The size of the corporate takeover market entails that research on this subject can have large economic value. Gaining knowledge on the way decisions on mergers and acquisitions are made and the behavioural biases present in the decision making process can help to improve the decision making processes and ensure that these decisions are made more effectively. The gain that can be made from proper decision making mechanisms in the corporate takeover market has the potential to be large when considering the size of the market.

The remainder of this paper will be organised as follows. First, relevant literature will be discussed in section 2. This will serve as input for the determination of research hypotheses and the research methods used. These will be formulated and described in section 3. Section 4 will present the results found after data analysis and finally section 5 provides conclusions, a discussion on limitations and finally possibilities for further research.

[1] See appendix 1 for trends in the market for corporate control.

2. LITERATURE REVIEW

Within this paper an attempt will be made to link knowledge on the performance of groups with the success of M&A transactions. This research is based on both M&A and behavioural literature. A vast amount of research has been done on mergers and acquisitions, and the first part of this chapter provides a concise overview on the M&A literature. The main focus of this part is the rationale for M&A and their success. Furthermore, the process and decision makers will be reviewed. After discussing merger and acquisition literature, this chapter will continue with outlining the existing literature that combines M&A and behavioural research in order to demonstrate the possibilities of combining the two fields. Next a brief description of the boards of directors will be provided. The final part of this chapter presents research on groupthink.

2.1 Mergers and Acquisitions

Merger and acquisitions are means of action in the market for corporate control, also called the takeover market, where managerial teams contest to attain the rights to manage corporate resources. In this managerial competition model of corporate control, managers are the main decision makers whereas shareholders have a comparatively passive role as judiciary force (Jensen and Ruback, 1983). Stockholders have limited interest in detailed knowledge on the firm and have little loyalty to existing managers: their decision making is only based on receiving the highest return on their investment. According to this view, the market for corporate control is an effective way to limit divergence from optimal shareholder wealth by incumbent managers. When current management is unable to perform properly, shareholders elect new outside management. Takeovers can have the form of a merger, proxy contest or tender offer (Jensen and Ruback, 1983).

In a merger two firms are combined in order to create one new firm. In a horizontal merger the partners are potential competitors that have similar businesses, whereas in a vertical merger two firms are affiliated in a supplier-costumer way (Meador, Church

and Rayburn, 1996). A proxy contest is defined as a fight for corporate control of a firm which takes place in the general shareholders meeting of the company. Dissident shareholders will try to gain control of the board positions in the firm and the remainder of the shareholders are allowed to vote on the management, either the incumbent management or the outside dissident group, which they believe will be the most beneficial controlling party for the firm (Armstrong, 1955). Lastly, a tender offer is a publically made offer by a buyer for the purchase of the target's shares, either at a certain price or at a ratio to the stock's market price. Shares are normally bought at a price that is higher than the market price, and the additional value is called the acquisition premium (Fleischer and Mundheim, 1967). Although these transactions are legally and contractually different, they all represent a transformation mechanism for the firm and all have major impact. Therefore, in many studies all these courses of action are examined as being one phenomenon often referred to as "M&A".

When looking at amount and dollar value of corporate transactions a pattern of mergers and acquisitions occurs, it becomes apparent that these deals occur in waves.[2] This means that there are periods in time when the amount of mergers and acquisitions is low and that there are times in which there are notably more deals (Bain, 1944). The amount of mergers and acquisitions has sharply risen since the 1900s. Within this overall rise 6 distinguishable waves can be found. These waves all have differing characteristics. The most recent M&A wave started in 2003 when antitrust regulations were relaxed and the global economy recovered from the 2000 crash. The end of the wave was caused by the financial crisis of 2007. Upon first inspection all of these waves have two things in common; they start due to favourable economic conditions, rising stock prices and falling interest rates and they end due to an economic downturn.

Merger waves all seem to be triggered by external shocks to industries. There are significant differences in amount and volume of M&A transactions between different industries. This shows that the patterns in the takeover market can be attributed to economic shocks to these industries. When there is an external shock to an industry, such as technological change, regulatory changes or a change to availability of supplies, firms within the industry can react either internally or externally. Doing a takeover can

[2] See appendix 2 for graphical representation and explanations for each merger wave.

be the most efficient and least costly alternative to alter the firm and adjust to the new industry standards (Mitchell and Mulherin, 1996).

The causal relation between industry shocks and merger waves is found to only be present in the case of excess liquidity in the market. Not every shock leads to a wave in the takeover market. Thus, waves are explained in two parts; they require an economic motivation for an increase in deals and in addition low transaction costs allow incremental grow in the market (Harford, 2005).

2.1.1 Rationale for M&A

The following paragraph will provide an overview of the different motives that can explain mergers and acquisitions. In the literature there is not one single reason that is considered to be the main motivation for the existence of the market for corporate control. It is most likely that the size of the mergers and acquisitions market can be explained by a combination of the motives discussed below.

Firstly, firms may attempt to do takeovers or mergers in order to accelerate growth. Internal or organic growth can be time consuming and in order to speed up the growth process a firm might pursue external growth options. The speed of these external options does come at a cost. One example is the premium that a firm needs to pay in a tender offer. Growing by means of acquisitions can be motivated by a desire to establish monopolies or oligopolies: however, extensive antitrust laws try to prevent firms from doing so (Andrade, Mitchell and Stafford, 2001). For some firms, for example Johnson and Johnson and Pfizer, growth through takeovers is an important part of their core growth strategy and is considered central in their corporate strategy (Forbes, 2014).

Besides enabling rapid growth, mergers and acquisitions are often undertaken in order to take advantage of synergies. In case of synergies the combined entity is more valuable than the sum of the loose entities. Operational synergies can be in the form of economies of scale and scope. Economies of scale are created when combining entities and increasing output causes the average cost of production of a good to decrease. When firms become so large and complex that managing the firm becomes difficult, diseconomies of scale can occur. Economies of scope form when producing a large range of products together becomes cheaper than producing single product lines. Economies of scope are often created because combining centralized business functions, such as the finance department or human resource department, reduces cost.

Besides utilizing operational synergies, combining firms can also cause financial synergies. These synergies occur when the combined entity has financial advantages over the separate firms. An example of a financial synergy is the opportunity to decrease cost of capital (Fluck and Lynch, 1999).

In addition to wanting to grow into related businesses, a focus strategy, some firms want to diversify their business. Diversification can be pursued by doing mergers and acquisitions. The value of having a diversified firm can be derived from strategic portfolio theory, where in order to eliminate idiosyncratic risk the investor assembles a portfolio of securities which have imperfectly correlated returns (Markowitz, 1952). Firms can mimic portfolio diversification by creating a portfolio of firms with imperfectly correlated cash flows, and this could reduce the firm's vulnerability to industry or firm related risk. However, it is argued that investors should not want to pay managers to diversify the firm given that they themselves are able to diversify their portfolios, presumably at lower cost (Bruner, 2004). The profitability of the diversification strategy is dependent on the circumstances of the acquisition. There are arguments in favour of unrelated acquisitions; they can be successful if the combination of firms facilitates the transfer of knowledge into different business units, when the pair enjoys financial benefits, the increase of growth is needed to be competitive in the market, transparency and control by internal capital markets is increased or when the firms are in information-insensitive industries (Salter and Weinhold, 1979; Morck and Yeung, 1997). However, if investors can create a diversified portfolio at lower cost than firms, it is likely that the stock market success of diversification strategies is low. Research shows that the market values of firms that pursue a focus strategy are substantially higher than those that diversify, and this diversification discount can reach 15 percent of the firm's market value (Berger and Ofek, 1995). Delong (2001) even finds that while on average buyer returns are negative, acquiring firms in the financial industry that focus acquisitions on location and activity have an increase in share price of on average three percent. The numbers indicate that investors rather control diversification and structure their portfolios with diversified firms according to their own preferences.

External factors can also be the cause of M&A transactions. Deregulations or, in the more broad sense, industry wide shocks are able to create environments that stimulate the market for corporate control. Strict industry regulation constraints corporate transactions by explicit discouragement of deals or by reducing the potential profits

from M&A. Furthermore, regulations provide a "safety-net" to safeguard profit levels. Regulation on price and entry reduces incentives to develop low-cost production and innovation. Deregulations have the effect of eliminating the "safety-net" which increases the importance of the managerial function and creates a necessity for managers to improve their businesses (Kohl and Lehn, 1997). Newcomers can take a first mover advantage in changing industries. Thus after deregulation the amount of M&A often increases by reducing the size constraints of existing firms and stimulating entry of new firms (Mitchell and Mulherin, 1996). Other types of external factors, or shocks, also have a positive effect on the amount of takeover activity. Shocks can have a specific industry nature, besides deregulation this can be for example an increase in input price volatility, or broader, such as changing demographics or technological advancements (Mitchell and Mulherin, 1996).

The shock explanation of mergers is part of the neoclassical merger theory. However, the predictions of the neoclassical theory do not always match with stock market evidence. In addition to the above arguments of M&A there is the stock market driven assumption. Here an inefficient market is assumed which causes some firms to be misvalued. Managers are rational and take advantage of this misvaluation, one of the ways to do this is by takeover activity. In the stock market model, firms that are overvalued and firms with high Tobin's Q-ratios, will acquire firms that are undervalued or less overvalued and prefer to pay for transactions with their, overvalued, stock (Shleifer and Vishni, 2003; Jovanovic and Rousseau, 2002).

Next to stock market observations concerning M&A deals, tax effects of a takeover can also cause firms to attempt a merger or acquisition. A takeover can have a positive effect on the tax obligation of the firms. Firstly, from the corporation perspective, a deal creates reduction in owed taxes due to increase in asset base and when the target has tax losses or tax credits these can be utilized by the buyer. Secondly, shareholders have to pay tax on their capital gains, but when stock is used to buy a target the shareholders benefit from having a more diversified portfolio without the need to cash in their shares and paying taxes. Tax considerations can add up to substantial amount and especially the value of a target's unused tax losses or tax credits can be significant. However, the importance of these in deal decision making is unclear (Auerbach and Reishus, 1987).

Next, the takeover market can be viewed as a court of last resort. When the firm's managers are pursuing their own interest rather than functioning in the best interest of

shareholders, the corporate control market can protect a firm's stockholders (Jensen, 1986). In the structure of public firms an agency problem forms because while shareholders give managers the power and responsibility to make decisions in their interest, managers might have conflicting incentives they wish to pursue that can damage the stockholders. The market for corporate control has a controlling nature, when stockholders feel that the firm is not managed properly a takeover can improve their investment results. Empirical studies have found relations that link firm malperformance with an increase in acquisitions (Agrawal and Knoeber, 1996). When managers know they will be replaced by a takeover if the results of the firm are not appropriate, they theoretically will behave more in the interest of shareholders and are thus disciplined by the market for corporate control.

Finally, there is the most behavioural explanation of M&A, which is the managerial hubris hypothesis. In contrast to the misevaluation rationale of takeovers, here it is assumed that markets are efficient but managers do not act rational. Here the valuation of the firm can be seen as a random variable with its current market price as mean. An offer will only be made if a single valuation is higher than the market price, so an offer will always represent a valuation that is too high and thus takeovers cannot have value. This means that offers are made not because they represent value enhancing mechanisms but purely because managers do not act rationally. Managers suffer from hubris which makes them to believe that their valuation is correct and the market is systematically incorrect in pricing a target. Furthermore, managers might use deals as a way to boost their stature within the firm or the outside world (Roll, 1986).

Some of the reasons discussed in this chapter are from different financial viewpoints than others. It is unlikely that there is only one reason for the large value of the takeover market. Instead it is likely that most deals arise from a mixture of these arguments. Furthermore, some causes might be clear deal rationales, such as the ability to grow or the pursuit of synergies, while others, such as the disciplining function of the market for corporate control are possibly more theoretical arguments.

2.1.2 M&A returns

There is a vast amount of research dedicated to the motivations and causes for mergers and acquisitions. Another large stream of research on the corporate takeover market covers the success of mergers and acquisitions. The most general definition of a

successful takeover is when the abnormal stock returns of the firm (target, buyer or combined) are positive. Measuring the returns of a deal can be done in several ways and literature has found differing results regarding the general success of takeovers. This paragraph will separately discuss the returns from the targets' perspective, the returns from the buyers' perspective, and the returns when looking at the combined entity.

Starting with the abnormal returns observed for target firms, it can generally be concluded that targets experience a positive change in returns after the announcement of a corporate transaction. For tender offers that can be considered completed, where the buyer was able to acquire a substantial amount of target shares, the abnormal returns found in research range from around 16% to 35%. The abnormal returns found after the announcement of a merger are lower but still clearly positive ranging from around 6% to 14%. Furthermore, it is found that when including periods before the first public announcement the average returns increase. This means that abnormal trading already occurred before the official announcement of a deal and shows that market expectations and possibly insider information have a measurable effect on the returns after merger announcements. When including targets of deals that in the end turned out to be unsuccessful into event-study analysis, there are no large differences found between the returns of successful targets and those of unsuccessful targets around the time of the announcement. This shows that the market reacts positively to both types of targets and does not judge the target's potential at the announcement time. However, when the event period is increased for merger deals these positive abnormal returns are diminished and the target experiences slight negative effects from an unsuccessful merger. When doing the same for unsuccessful tender deals it is found that targets of unsuccessful tender deals sustain their positive abnormal returns even after the deal does not go through. This can be explained by an expected increased interest by other potential buyers once a firm has been approach as a target for a takeover (Jensen and Ruback, 1983).

Although a range of outcomes is found when estimating target returns, it is in general relatively straight forward to measure them. The differences in results can be ascribed to the use of different market models or estimation techniques. For the bidding firm, however, it is more difficult to make return estimations. Bidders might have an extensive and linked acquisition program while target firms are only acquired once, so the resulting return outcomes are incremental outcomes without taking into account the value of the entire acquisition program of the buyer (Malatesta, 1981). Furthermore,

buyers might already signal their potential targets before official announcement and so the returns from acquisitions might be more dispersed (Schipper and Thompson, 1983). It is also difficult to quantify the percentage stock returns of bidder firms due to the fact that in most takeovers the bidder is much larger than the target. This means that even if the target and the bidder equally split the dollar returns of the deal, the percentage returns to the bidder will be much smaller than those for the target (Asquith, Bruner and Mullis, 1983). Controlling for these problems is difficult and they cause abnormal returns that are less convincingly positive than those of target firms. First, the returns for successful bidders in tender offers are generally positive and range from approximately 2% to around 7%. The returns for successful mergers are mixed and difficult to interpret. Most studies show a value of zero net returns, but the results range from being significantly negative to being slightly positive. The results for unsuccessful bids is less varied, for both unsuccessful tender and merger offers the bidder experiences negative abnormal returns when a deal was not completed (Jensen and Ruback, 1983).

So, the shareholders of target firms experience a positive change in the returns of their holdings while the returns of bidder firms have at best a slightly positive effect and generally face zero or negative abnormal returns. Theoretically, the loss from the bidder's side can be subtracted from the large gain of the target leading to a combined positive deal effect. However, as stated above the bidders are often substantially larger than target firms. This means that the dollar effect of the target is not enough to cover the small percentage negative effect of the buyer, leading to a combined negative effect of the deal. It is difficult to measure the percentage abnormal returns for the combined entity and the results on this matter are inconclusive. When taking the dollar value of deals the results are positive with sample outcomes of an average of around thirty million dollar gain (Malatesta, 1983). According to the dollar returns it can thus be stated that on average mergers and acquisitions do create value (Jensen and Ruback, 1983).

To summarize, targets experience returns that range from positive to highly positive, with the only exception being merger deals that were unsuccessful. Bidders of tender offers experience slightly positive returns, those of merger offers experience zero to highly negative returns and those of unsuccessful offers also have negative abnormal returns. Combined, when looking at the dollar value of acquisitions, there is a gain which indicates overall value being created in the market for corporate control.

2.1.3 Reasons for failure

As was discussed in the paragraph above, not all acquisitions are investments with a positive net present value. The success paradox of M&A shows that the prevalence and growth of corporate transactions are not in line with the actual success of most deals. In part this can be explained by faulty reasons for doing a deal, for example due to CEO hubris influencing the results of a deal. The following paragraph will discuss other problems that appear in the market for corporate control.

The main problem with acquisitions is that the market for corporate control is very competitive and a large amount of buyer firms are scanning the market for good investments and undervalued target firms. Many buyers fighting for the same firm will cause the premiums paid for the target to surge and cause the winner's curse. The successful buyer will be the firm that has overestimated the potential gains from the acquisition and so the net value created from a deal will be small or negative (Varaiya and Ferris, 1987). The winner's curse effect is aggravated given that buyers seek advice from investment bankers who broker the deals and receive large fees on the deals they complete. Their job is to promote buyers to do acquisitions making it unlikely that these bankers advise against pursuing a deal with an unprofitable premium.

Further, most firm managers suffer from having short time horizons and extensive risk aversion. When a firm is not performing well and managers need to find an instrument to improve sales or earnings, acquisitions are a fast way to change a firm's income statement. A short term boost in earnings for the total firm might hint a successful acquisition, but in the long run most acquisitions turn out to be ill-managed diversifications that further damage the buyer firm (Ebeling and Doorley, 1983).

Finally, many mergers and acquisitions fail to generate expected positive returns due to problems with integrating two different firms with different cultures. Creating economies of scope and scale require for some of the production or business functions to be eliminated and combined in order to create cost savings. The loss of jobs and the integration of people and culture of one firm into the business of another are very difficult and often underestimated. Employees are uncertain about their future and are not necessarily proponents of mergers or acquisitions which can lead to distrust towards the upper management of the firm. The integration process is budget consuming and can take a multitude of years to complete if ever fully completed (Very and Schweiger, 2001).

2.1.4 M&A process

In order to increase the probability of success of a merger or acquisition, researchers have tried to combine strategic management with transactions in the market for corporate control and have stressed the importance of a process approach to doing deals.

Within the traditional view of acquisitions, deals are analysed from a choice perspective. Corporate executives are considered to be rational decision makers, who use rational methods in order to analyse acquisition opportunities. The outcome of the transaction in the choice perspective depends on the strategic fit, whether the target complements or augments the buyers' strategy, and organisational fit, whether two organisations match from an administrative point of view, and finally the cultural and personnel point of view of the two firms. However, when moving on from the assumption of rational decision makers, the choice perspective can be complemented with a process perspective of M&A. Here, the strategic process of doing a deal becomes an important determinant of the outcome of the acquisition.

The process of doing an acquisition consists of several connected sequential steps. First, a firm decides on a business strategy and determines mergers or acquisitions to be a viable option to achieve the strategy. Next, a specific acquisition strategy is defined. The firm now moves into the pre-acquisition phase and begins looking for possible targets. This stage entails creating understanding of the corporate takeover market in the firm's industry, identifying possible candidates, creating a first selection of candidates and evaluation of the initial possible targets. When a buyer has interest in a particular target, initial contact will be made with the target's management and/or owners. When the firm moves to the acquisition phase it performs due diligence on the target in order to fully understand the business and financial and legal position of the firm. This information is used to estimate the value of the target and to provide a price for the deal. When the value and price are determined the deal specifics can be structured and the firm moves to the negotiation phase of the deal. The target and buyer discuss the deal specifics and negotiate on them. When the parties agree and the transaction is completed, the integration phase starts. Here an effort is made to create an integrated firm from the two parties. Depending on the deal specifics and industries some of the parts of the process are more important than other parts (Very and Schweiger, 2001). The complexity of tasks usually increases when the acquisitions process moves into

later stages. Finding a target is relatively easy, while the integration phase is extremely complex and can have many obstacles.

The management of the parts of this process can have an effect on the success of the deal. Several possible difficulties have been identified that can cause the acquisition process to be inefficient. Firstly, doing a merger or acquisition is a large strategic commitment for most firms that is not part of their day to day activities. It requires an extensive amount of research performed by both outsiders and insiders of the firm. Many different people will work on different parts of the process: strategist will determine the acquisition strategy and identify possible targets, while financial analysts will estimate a firm's value. The executive management of the firm is responsible for combining all information from a multitude of sources, but not all available information is always used during the acquisition process. Secondly, there are more forces that speed up the acquisition process than those that slow it down. This creates an escalating desire to speed up the process and finish the deal early. Consequently, this effect leads to less attention to all available information and especially the integration phase is not sufficiently considered. The managers deciding on the deal can become too personally committed to negotiating a successful deal, causing them to lose focus on actual potential benefits. Also, the insulation of the acquisition team and decision makers, due to confidentiality concerns, can cause this group to lose connection to the rest of the firm and their activities. Finally, the buyer firm often feels confident about its abilities and wants to help the new subsidiary within their firm. This causes the misuse of management capabilities and further aggravates integration delays (Jemison and Sitkin, 1986).

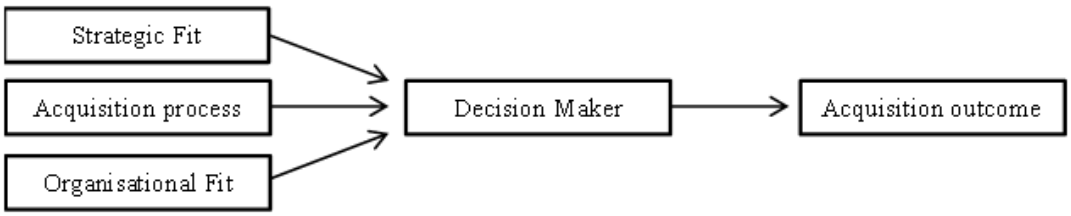

Figure 1: the effect of the process on acquisition outcome.

Figure 1 shows how the acquisition process influences the eventual acquisition outcome. Having a good acquisition process is as important as finding a target with proper strategic and organisational fit. This means that improving the acquisition

process and the decision making within the process can have a substantial impact on the results of a deal.

2.1.5 Decision makers

The previous paragraph discusses that the result of an acquisition does not only depend on the target selection and the goodness of fit of that target, but also on the process of the acquisition. This means that making the process better can improve the result of the acquisition. This paragraph will discuss the decision makers involved in the M&A process.

There are many stakeholders in a corporate transaction. There are those of the advising parties in the deal such as the investment bankers and the legal teams. There are internal stakeholders, the employees being the most important group. There are external stakeholders, the suppliers and customers of both parties, the communities in which both firms operate and the government under which the firms do business. However, the main stakeholders in the transaction are the buyer who owns the bidder firm and the seller who owns the target firm. In public firms the ownership of the two firms lays with the firms shareholders, but they give a fiduciary ownership responsibility to the board of directors of the firm. The boards of directors of both firms have the ultimate responsibility for takeover decisions (Bruner, 2002).

Although the takeover process includes many different internal and external teams, the ultimate decision to do a takeover action is made by the board of directors and the CEO. The board carries the ultimate responsibility, but this responsibility is shared among the members and there is usually not one person within the board that is held personally responsible. In fact, when a high profile deal turns out to be a failed effort CEOs tend to be affected and may even lose their position, whereas board members usually can maintain their jobs (Kummer and Steger, 2008).

2.2 Behavioural concepts in M&A

The following chapter provides an overview of literature linking findings from behavioural economics with the corporate takeover market.

2.2.1 Incentives

It has been found that there is a relationship between incentive asymmetries and, potentially negative, outcomes of mergers and acquisitions. Taking the traditional agency theory of differing incentives of the shareholders, the owners of the firm, and the management of the firm and adding other stakeholders, such as employees and investment bankers, to traditional theory can explain observed M&A patterns.

Incentive asymmetries can be defined as a conflict of interest between two or more parties that is about a particular action or economic outcome relevant to all parties (Holmstrom and Milgromm, 1994). In the takeover process there are many different stakeholders with different incentives in each step of the process. The asymmetry of incentives can be caused by three factors. First there are incentives arising from an information antecedent, comprised of different parties having limited knowledge on alternatives, limited interaction and decision time and a general environmental uncertainty. Secondly the risk antecedent incentive asymmetries arise when different stakeholders have different risk attitudes and different perceptions of risk. Thirdly, a pure self-interest antecedent causes incentive asymmetries because parties simply pursue their own interests and display opportunistic behaviour.

Incentive asymmetries cause different problems in M&A transactions. Firstly, during the initiation phase of the takeover process, incentive asymmetries can cause problematic M&A initiatives and a market for lemons problem (the takeover market for lemons is described in the next paragraph). Then during the evaluation phase and the price and bid determination, incentive problems can cause biased financial evaluations and can create an artificially high takeover price. After the evaluation phase negotiations set off, and high incentive asymmetry can cause the negotiation phase to increase in time and create prolonged contract writing. Then when the contract has been signed, the last phase of the process starts: the integration of the new firm into the old firm. When there are large differences in the incentives of the different stakeholders the planning of this phase can be undermined and the completion of the integration can consume more time than estimated. All in all, incentive problems can cause the M&A process to be inefficient and costly (Parvinen and Tikkanen, 2007).

2.2.2 Market for lemons

Especially during the first phases of the takeover process there is a large amount of information asymmetry. The buyer does not yet have full access to all documentation of the buyer and both parties do not know the other's bargaining power and hidden agenda. In a market with high information asymmetry a "market for lemons" can occur. When the buyer in a market cannot distinguish a good quality product (a cherry) from a bad quality product (a lemon) and gathering information is costly, he should be willing to pay a price of an average quality product. However, the owners of the good quality product will not accept a lower price and will exit the market leaving only the worse quality goods behind. The buyer knows this and will revise his price downwards driving out more owners. This process repeats itself until all good products have left the market and a market for lemons is created (Akerlof, 1970).

Due to information asymmetry and a competitive takeover market, a similar situation can form in the market for corporate control. Potential target firms benefit from appearing as profitable as possible, meaning they have an incentive to inflate output and display positive aspects of the firm while hiding less attractive attributes. The buyer does not have all information and the target firm does not have a credible way of proving that it is of good quality. The buyer knows that some targets have made their firm look more profitable than that it truly is: because the buyer is aware of this but cannot filter those firms out it reduces the price it is willing to pay for the target. As in the original example for the market for lemons adverse selection will occur. The reduction in price may cause the firms with good fundamentals to search for other corporate strategies to pursue, for example plan an initial public offering or develop a strategy for organic growth. This leaves the targets of lower quality willing to sell their firm to the buyer group. The market for lemons problem reduces the potential gains from doing a takeover simply due to a low supply of good targets (Balakrishnan and Koza, 1993).

2.2.3 Hubris and overconfidence

The most well-known example of a behavioural concept applied to merger and acquisition literature is the hubris hypothesis, which is already partially discussed in section 2.1. According to this hypothesis, the hubris of managers and CEOs is a main cause of mergers and acquisitions and the net effect of such deals have a negative

expected value (Roll, 1986). Managerial hubris has a causal effect on the large premiums paid in acquisitions, and bidding firms that have high levels of managerial hubris simply pay too much for their acquisitions (Hayward and Hambrick, 1997). Furthermore it is found that CEOs use high profile merger decisions as a means of empire building and safeguarding their own positions (Trautwein, 2006).

Related to the hubris hypothesis is the notion of CEO overconfidence in the merger context. This defines the CEO as being overconfident when he has too much trust in his own ability to generate returns and create value. The CEO beliefs that the outcomes of the merger are in his control. This makes the manager to underestimate potential risks, costs and odds of downside potential, overestimate the potential synergies of the deal and have misconceptions of chance processes. The slight difference between the hubris hypothesis and the CEO overconfidence theory is that in the former CEOs have underlying desires to undertake acquisitions for their own benefits while in case of overconfident CEOs deals are undertaken because it is truly believed that they can be used to create value. Both of these notions are not directly observable and several proxy measures are used in empirical analysis, such as: the amount of positive press coverage, CEO pay relative to the salary of board members and a CEO's overinvestment in the firm (Malmendier and Tate, 2008).

2.2.4 Self-attribution bias

Finally, CEOs are known to suffer from self-attribution bias. This bias is connected to the better-than-average effect in which each individual in a population believes that their skills are better than average and the narrow-confidence-interval effect in which people mis-calibrate their probability distributions for uncertain events, using confidence intervals that are too tight. (Svenson, 1981; Lichtenstein, Fischhoff, and Phillps, 1982). The self-attribution bias fosters the level of overconfidence managers have in their own capabilities. This suggests that the overconfidence effect of managers becomes more important with each subsequent deal the manager makes. Managers who have had takeover success in the past might feel that they are more experienced than others in this field and become more confident in their judgement. It is found that the announcement effects of a takeover are zero for the first deal made by a CEO but that they become increasingly negative for each subsequent acquisition. This shows that the CEO believes that the successfully completed first deal worked out due to his capabilities and thus becomes more and more overconfident leading to subsequently

higher valuations and higher risks taken (Doukas and Petmezas, 2007; Billet and Qian, 2008). It is also found that the more overconfident a CEO is the more likely he is to make quick M&A decisions and is quicker to pursue a deal.

2.3 Boards of directors

In the first section of the literature review it is discussed that boards of directors are the main decision makers in the M&A process, and they have received the power to make decisions from the owners of the firm which are the shareholders. The following section will discuss the function of boards of directors

2.3.1 Roles and responsibilities

A board of directors has both the legal and formal responsibility for controlling and maintaining a firm's operations and efficiency (Lattin, 1959). Their roles can be further specified within three dimensions: control, service and resource dependence.

The control role is the predominant role in research. It can be described as the role of the board of directors to oversee the firm's management as a fiduciary for the firm's shareholders. The board of directors is responsible for ensuring that the management of the firm acts in the best interest of the shareholders. Several factors may make it difficult for boards to perform the control role properly. Firstly, while formally shareholders have the power to elect board members during shareholder meetings, practically most shareholders do not have an active role and allow the management of the firm to cast their vote. This means that in effect the management of the firm has a large influence on the board members making it more difficult for the board members to criticize and evaluate the management of the firm. The second issue regarding the control function is caused by the increase of holdings by institutional investors. When institutions such as pension funds hold many of the firm's shares, this gives one party the opportunity to greatly influence the operations, management and board of the firm through shareholders meetings. Institutional activism can greatly change the decisions made by the firm and institutional investors have the opportunity to implement decisions for their interest. A large part of institutional activism is aimed at reforming corporate boards and injecting influence into reformed boards. This makes institutional investors a hindering party in the pure control role of the board of directors (Schellhardt, 1991). Finally, the ability of the board members to perform the control

role is assumed to depend on the independence of the members from the CEO of the firm. This means that the members should not have social or professional relationships with the CEO or top management of the firm. However, the pool from which directors are elected is limited and research shows that many board members do have relationships with the CEO or top management of the firm prior to being elected on the board. This may affect the member's ability to meet his or hers fiduciary responsibility (Fizel and Louis, 1990). Besides several phenomena that make the control role of the board more difficult, there are also legal questions on this role and the responsibilities directors face. When directors act according to the duty of care, meaning that their actions are similar to those of any other person in the same situation, and the duty of loyalty, meaning that they act in the best interest of shareholders not in their own interest, they are protected against litigation. This means that when faults are made in the management of the firm but the directors still satisfied the two duties, the full financial consequences of these faults are a burden for the shareholders not on the board. This protection, however, is questioned in literature because it might cause excessive risk taking and pursuing of self-interest by boards of directors (Goforth, 1994; Manning, 1984).

Besides the control role the board of directors is expected to fulfil the service role. Within this role the board of directors has an advisory role where they aid top management on making decisions and formulate and initiate strategic plans of action. This role has not received as much attention in the literature as the control role but researchers agree that this role becomes more apparent when the environment takes away parts of the control function. In industries with for example competitive product markets or extensive government regulations, there is more external monitoring of management making the control role of the board less important. In these industries it is more likely that boards have a stronger service role. Director surveys on their activities and responsibilities confirm the service role, members of the board state that they use a reasonably amount of time to contribute to strategic decision making (Johnson, Daily and Ellstrand, 1996).

The last role is the resource dependence role, which views the board as a means for enabling the acquisition of resources that are critical for the firm's operation and success. One of the most important resources of all firms is access to sufficient capital and cash. Research shows that appointment of board members representing different financial institutions and functions has an influence on how much capital is available to

the firm. As with the service role, the importance of the resource dependence role depends on firm characteristics. For new, small and entrepreneurial firms obtaining resources might be a key problem. These firms may benefit from having a board with a focus on the resource dependence role. They can, for example, attract a high profile director whose reputation allows for easier attraction of capital and top management. Similarly, firms who try to recover from or face bankruptcy depend on maintenance of good resource relationships, and this can be achieved by board members who have a focus on the resource dependence role (Johnson, Daily and Ellstrand, 1996; Sutton and Callahan 1987).

2.3.2 Value of the board

Most research that tries to identify the value of board performance to the firm fully focuses on the added value from individual board members instead of the value from the board as a team. Unfortunately, it is difficult to distinguish between board members given that most board members are senior, highly intelligent business people with a successful career. This difficulty causes that results in research of individual member influence on the firm's value is inconclusive.

Due to the stature of board members in combination with the overconfidence bias, it is not surprising that ninety percent of board members rate themselves "highly effective" when surveyed on their most important and strategic initiatives. However, in the same group only thirty percent gives the same ratings for the overall board performance. This shows that although researches agree that boards have the highest potential if they work in effective teams, it is unsure whether board members are actually performing as effective teams. It is found that boards with dynamics that foster an efficient exchange of information, mutual trust, a shared mind-set and a shared believes in its abilities to reach goals, have a statistically positive impact on corporate profitability (Charas, 2014).

2.4 Groupthink

Following the above discussion on general board dynamics and how they influence the decision making within boards of directors, the last part of this review will discuss groupthink, how it can be recognized and how it can be overcome.

Groups that face a decision process suffer from a degree of social conformity that is normally found in studies of cultures. This means that these groups form micro-versions of cultural behaviour that is also found in normal citizens belonging to a certain country or culture. The phenomenon of groupthink can be defined as a mode of thinking by members of the same group when "concurrence seeking" becomes overpowering and disrupts normal and realistic judgement of possible alternative ways of acting (Janis, 1971).

2.4.1 Symptoms of groupthink

There are several symptoms that can occur in case of groupthink. Groups that suffer from groupthink can display all or a selection of these symptoms. First, teams create a feeling of invulnerability, which causes the group members to feel immune to outside threats and problems. They feel more save and the feeling of invulnerability makes taking risk easier, which leads to overoptimistic and too risky decisions. It also fosters an environment where groups fail to properly respond to signs of danger. Second, groups that are influenced by groupthink rationalize counter reactions to warning signs and search for reasons to ignore alternative feedback. They also limit the possibilities to get negative feedback from outside parties. Third, the members of the group have faith in their group's morality and they tend to ignore ethical and/or moral implications of their choices. Fourth, the groupthink group creates stereotyped views of competing groups and their members and leaders. They avoid cooperation with rival groups because these groups are viewed as incapable, weak or evil. This us versus them feeling creates a distance between the group members and the rest of their environment. Fifth, an important characteristic of groupthink is the strive for concurrence. Members of groups that suffer from groupthink are willing to pressurize people into supporting their decisions, which results from this concurrence seeking wish. Sixth, even if a member of the group disagrees with the remainder of the group members, self-censorship is imposed. These disagreeing members remain silent and minimize the importance of their worries. Seventh, victims of groupthink have an illusion of unanimity, which concerns the judgements made in favour of the opinion of the majority of the group. Lastly, members in groupthink groups can make themselves mindguards, who protect the leader of the group and the other members from possible adverse information entering the discussion. All of these symptoms show that groupthink leads to excess need for uniformity within a group, which is fostered by a shared distrust of people

outside the group and which is internally protected by a self-imposed limit tot freely give one's self opinion (Janis, 1971).

Original case studies in groupthink literature were on groups that consisted only of males (Janis, 1971). In studies on the differences between genders, men are characterized by being focussed on control, mastery and are task oriented, while women relate more to relation issues and attach value to other people's welfare (Deaux and Lewis, 1984). These differences can have an effect on the probability of the formation of groupthink in a group. It has been found that women are more focussed on integrating different viewpoints and achieving a consensus in group work (Wood, 1987). This finding, however, is not conclusive on whether women groups are less vulnerable to groupthink. The focus female groups have on reaching harmony in a consensus instead of focus on the task can, in fact, lead to more groupthink. Later studies do show that there is a difference between groups containing only men and groups that contain female members and that groups with only males are more sensitive to groupthink (Kroon, Kreveld and Rabbie, 1992).

It is also found that when sufficient triggers for groupthink are present, groups that are more cohesive make worse decisions than more heterogenic groups. Especially when the group cohesiveness is based on interpersonal attraction the more cohesive groups yield poorer decision results. Furthermore, when groups are cohesive, the quality of their decisions decreases when group size increases. Larger groups are more likely to suffer from an in-group bias (Mullen, Brown and Smith, 1992) and tend to discourage individuality among group members leading to lower participation and low performance of the group members (Mullen, 1987). So the more cohesive the group and the bigger the group the more vulnerable the group is to the symptoms of groupthink and the poorer the decisions can be expected to be (Mullen, Anthony, Salas and Driskell, 1994).

2.4.2 Causes of groupthink

Studies show that certain conditions need to be present in order for groupthink to be a risk. Firstly, the team needs to be a cohesive group of decision makers. This means that it needs to be stable, without high frequency switching of members. Also, the team members should have relatively similar characteristics which allow them to identify with one another. Secondly, structural faults in the organisation create a breeding environment for the development of groupthink. Examples of such faults are: the

isolation of the group from the rest of the organisation, absence of impartial leadership in the firm, and the lack of requirements for the use of methodological procedures in the decision making process (such as a procedure on the type and amount of information needed in a decision). Finally, groupthink is preceded by a provocative situation or context, it grows when the group faces external or internal stress, for high impact decisions that are to be made in a short timeframe, and when there are few alternative paths of action. These antecedents can lead to groupthink and ultimately to poor decisions (Neck and Moorhead, 1995). The above conditions show that groups are especially prone to the symptoms of groupthink in decision making situations that are not in their routine, that are crucial and might have an effect on a large number of people (Hart, 1991). For the case of board members having to make merger and acquisition decisions, these types of external factors are likely to be present.

2.4.3 Groupthink consequences

When the symptoms described above are either all or partially present in groups, those groups are likely to face several consequences. All these consequences can be traced back to results of poor decision making processes, and they lead to unsatisfied solutions of the problems that needed to be solved.

The group is likely to consider too few alternative solutions to the problem, without initially investigating which courses of actions are actually viable. When an initial course of action is then decided upon by the group, in later stages, it is reluctant to re-examine their decision when new information on riskiness or potential drawbacks becomes available. Especially alternative options that present themselves when some implementation or vocalization of an initial idea has occurred are likely to be quickly discarded. This is because in these situations the group has externally committed to a course of action which makes revoking their choice more difficult. Also, the members of the group spend too little time re-evaluating the alternatives they have dismissed, and they will not reconsider potential gains that were first overlooked or possibilities to reduce the costs that were initially decided upon. Summarizing, groups that suffer from groupthink are likely to evaluate a limited amount of potential solutions and tend to stick with their chosen solution.

Members also overestimate their own ability to understand the setting of the problem and want to avoid the inclusion of specialist in the decision making process. Members

of groupthink groups like to receive information that affirms their initial idea, but want to circumvent the possibility of getting knowledge that supports alternative plans. The aim to avoid negative feedback makes contracting an external specialist risky, given that this entails the acceptance of the chance that the initial idea is criticized. Also, the creation of backup plans means acknowledgement of possible failure of the initial plan. Team members are reluctant to do this so teams that suffer from groupthink are likely to spend too little time discussing setbacks and creating backup options.

Overall, the decisions made by groups suffering from groupthink are likely to be ill-advised, narrow minded and not properly debated. This leads to choices that might not be in the best interest of the group or the people affected by their decisions (Janis, 1971).

2.4.4 Overcoming groupthink

The phenomena that are likely to be the causes of groupthink, the symptoms of the fallacy and the consequences of suffering from groupthink can be described. The mechanisms to overcome suffering from groupthink have also been identified and will be discussed next. These measures can ensure awareness of the presence of groupthink and allow for more efficient and better decision making.

First, the leader of the group should empower every other member to be a critical evaluator of the group's progress. By doing this the group is more encouraged to voice opinions of doubt and propose alternative solutions. This should help to make the decision making process more involved and ensures that the boards make well informed decisions. This measure can only be effective when the leader of the group is open to advice and is willing to take criticism from other members in the team. If the leader of the group displays discomfort or reluctance with the evaluation of its actions, members are discouraged of giving critique and are likely to continue to care for concurrence within the group even if the leader agrees to a critical analysis of all ideas. Secondly, when there is a clear hierarchy within the group, members of higher ranks and the leader should avoid stating their opinions or preferences at the beginning of the decision making process. This allows other members to think about the problem at hand, provide alternative solutions, and voice their thoughts. Thirdly, when there are continuous projects done by the group a firm or organisation should create multiple outside groups to work on the same continuous projects under a different leader. This ensures that there

is not one group solely focussed on this project, which creates the risk that this group becomes isolated from the day to day operations of the rest of the organisation. Fourth, the members of the group should be required to discuss the decision making process with members of their own units in the organisation, at regularly scheduled intervals. This prevents the group from making decisions that are not viable from a business perspective and allows people from the organisation to provide potentially valuable feedback. It also ensures that the decision making group retains a good connection with the people or processes affected by their decisions. Fifth, the group should make a habit out of inviting experts into their meetings who can challenge the majority view of the group and make contributions to the process. Sixth, a member should be appointed as devil's advocate, someone who has the main function of questioning the other team member's decisions. Creating this function formally will release the social stigma of giving negative feedback and thus will be likely to increase the critical evaluation of ideas, not only by the devil's advocate but also by other members of the team. Seventh, when there is case of rivalling groups or firms in the decision making process, the team should devote substantial time to analysing these groups and crafting plans to respond to different actions of the rivalling teams. This will not only improve the reaction to outsider actions, but also makes the competing teams more personable and reduces the us versus them feeling. Eight, when the group is evaluating different alternatives it is helpful to initially divide the group and have them work separately under different chairmen. This gives rise to different solutions to the problem that can then be discussed and compared. This approach is likely to lead to more critical involvement of the team members especially when its paired with an encouragement to express opinions (Janis, 1971).

These measures can be used separately or in combination with each other. As described in the section above, it has been shown that when boards function effectively and efficiently there will be a positive effect on the corporate profitability of the firm. Most of the solutions to groupthink presented above are relatively easy to implement and do not require large investments. This means that firm results can be increased relatively easily by following all or some of the measures above.

2.4.5 Assessment of groupthink

The research on the effects of groupthink can be divided between two categories. Similar to Janis' (1971) starting research on the phenomenon the first group of

researchers employs case study methodology in order to determine the effects of groupthink in well-known historical events. Examples used by Janis (1971) are from the military world (the Bays of Pigs invasion, the Cuban missile crisis, and pearl harbour), the corporate world (the collapse of Swissair, globalisations strategies of Marks & Spencer and British airways) and sports (mass resignation of the Major League Umpires Association). The second strand of research uses laboratory experiments to replicate the causes of groupthink while analysing the effect on participating subjects. Both types of studies, however, have not been able to document the full constellation of groupthink effects and do show conflicting results.

In order to improve the research on groupthink, the Social Identity Model (SIM model) was developed (Turner, Pratkanis, Probasco and Leve, 1992), and this model creates a vision of groupthink as a process of seeking concurrence directed at maintaining an overall positive view within the group about its functioning. This model does seem to explain group behaviour more accurately, but in the literature the original groupthink symptoms, consequences and prevention mechanisms are continued to be used, mainly because of the ease of understanding and implementation of these formulations (Haslam, 2003).

It can be concluded that while the groupthink phenomenon is widely researched and the effect is well defined, it is difficult for researchers to measure the exact causes and effects of groupthink. This is mainly caused by difficulties of observing full group processes and the lack of proper tools to measure the effect. However, it is clear that group dynamics and groupthink have an influence on the decision making process and the chosen courses of action by groups and that this can yield poorer results than when the group strives to overcome the effects of groupthink.

3. METHODOLOGY

This chapter describes the methodological procedures that will be used in the investigation of the research question. First the findings in the literature review will be used in order to formulate hypotheses and a conceptual model. Second the data collection will be discussed and the methodology for analysing the data will be explained. Lastly, this chapter will show descriptive statistics for the obtained sample.

3.1 Hypotheses

In the beginning of the previous chapter different reasons for undergoing an acquisition are discussed. It is found that some of these reasons are economically sound and thus have business validity, while others are more likely to damage the buyer and the combined entity. Boards of directors have the responsibility of making decisions on takeovers, acting on behalf of the firm's owners. In this decision making process boards of directors work within all three roles. First, they oversee the CEO in upper management and control that the M&A decision made by the CEO is in the interest of the shareholders, which is part of the control role. Within this role a strong board of directors should be able to protect the firm from negative return transaction decisions made by hubris or overconfident CEOs. The board can mitigate the effect of these behavioural biases. Secondly, boards act within their service role given that in large M&A decisions they are actively involved in deciding on the takeover and integration strategy. Finally, acting within their resource dependence role, directors with an active influence in the takeover process create new opportunities for the firm and aid the process of receiving capital for the transaction.

Boards of directors that function properly are able to create value for the firm by performing these roles and properly identifying the drivers of takeover plans. They should be able to decide which deals are value creating for the firm and which should be avoided given that the deal motives or potentials are not in the interest of the shareholders.

However, boards of directors have dynamics similar to other groups. Takeover decisions are of great influence for the firm and impact the entire future of the combined entity. Also the market for corporate control is a fast moving market, where there is intense competition for proper targets and strict timeframes to close deals. This setting creates an external pressure on boards of director which enables groupthink to form in the group. When boards are prone to the influences of groupthink, the critical evaluation of prospect deals is likely to be lacking. The boards fail in performing their roles and a desire to reach concurrence is more powerful than the desire to make proper decisions. This can entail that even though some deals are not motivated by economically positive rationales, still those deals are pushed through.

The reasoning above leads to the formation of the hypotheses of this study. First, in general it is found that buyer abnormal returns are on average non positive. In order to validate the quality of the collected sample, hypothesis one concerns the general sign of buyer abnormal stock returns.

Hypothesis 1: Abnormal stock returns after an acquisition are non-positive.

Taking the general finding that takeovers cause negative buyer abnormal returns, it is expected that firms with boards that are able to perform their roles properly will be able to make better M&A decisions and thus have less negative return effects. Firms that have boards which suffer from groupthink will make worse decisions and thus can be expected to have lower returns after a takeover. Given that it is not possible to measure groupthink in a cross-sectional study, in this study the likelihood of suffering from the groupthink effect is investigated. This leads to hypothesis two:

Hypothesis 2: Groups that have a high probability of suffering from groupthink will have worse abnormal returns than groups with a lower vulnerability to groupthink.

Taking knowledge from the groupthink literature there are certain characteristics of groups and thus of boards of directors that influence the chance of boards of suffering from groupthink. First, it is found that groups containing, or completely existing of, females, are less influenced by the symptoms of groupthink. Many board members are male, and in fact only around twenty percent of all board members are female. In a less cohesive board, by having females in the group reduces the influence of groupthink, the buyer returns from a takeover will be less negative. On the contrary, groups facing difficult decisions will perform less effectively when the size of the group increases.

Thus, when a board grows larger, it can be expected that this negatively effects abnormal buyer returns. Hypotheses three and four can thus be formulated as follows:

Hypothesis 3: When a board of directors contains a higher amount of females the influence of groupthink on M&A returns is reduced.

Hypothesis 4: When the size of a board of directors increases the influence of groupthink on the returns of a takeover is increased.

One characteristic of groups suffering from groupthink is that different alternatives are not properly evaluated at the initial decision making time. Next to this, groups that suffer from groupthink also have a high preference for retaining plans when they have been set into motion. So, boards that suffer from groupthink will be less successful evaluating targets and takeover motives, and this is expected to lead to lower abnormal buyer returns. When boards decide to do a takeover they will also be less likely to cancel an acquisition:

Hypothesis 5: Management boards that are vulnerable to groupthink have a lower probability of cancelling a merger or acquisition than boards with lower vulnerability to groupthink.

Previous return analysis shows that returns influenced by a takeover announcement already are influenced earlier than the actual official announcement. This makes it necessary for return analysis to include dates that are before the official announcement. Furthermore, stock markets are known to have slow reaction to news and negative effects of an acquisition are likely to increase when time passes. The last hypothesis is:

Hypothesis 6: The negative effect of groupthink becomes stronger when considering a longer timeframe.

These six hypotheses will be discussed in the remainder of this paper and will aid the discussion of the research question.[3]

3.2 Research methods

This section will describe the different methodologies that will be utilized in order to discuss the hypotheses formulated above.

[3] See appendix 3 for the conceptual model.

3.2.1 Event study

The main part of the analysis will be based on standard event study methodology. The effect of any change to the business entity can be measured by comparing the returns at a certain date with the returns that can be expected in a normal course of business on the same date. This so-called "event study" methodology relates an estimation of normal stock returns with the actual returns measured just after an event has occurred. The following equation is classically used in order to estimate the firm's abnormal returns:

$$R_{it} = \alpha_i + \beta_i R_{mt} + U_{it}$$

Here the normal relation of firm's *i* return at time *t* and the return on the market R_{mt} is controlled for and the residual value at time *t* represents the abnormal return for the firm during the event time. By using the market model to predict the firm's expected returns, the effect of economic wide factors are filtered out from the abnormal returns estimation (Fama, Fisher, Jensen and Roll, 1969). Overtime, two adjustments to Fama et al.'s (1969) original event-study methodology have become standard practice. First, studies using monthly data use five to seven years of data to estimate their market model parameters. Secondly, the event period is excluded from the estimation period given that including the event can distort the coefficient estimates (Binder, 1998). In research on the success of mergers and acquisitions the event can be the announcement date of the takeover, the date of shareholders' approval, date of official completion or the date of completion of the integration process. Early event studies use the effective date of the acquisition as the event date. However, the final approval by shareholders happens at random times after the announcement and the first effect of a takeover can be expected to be noticed at the first announcement of the deal. This makes it difficult to identify changes that are truly due to the takeover when using the effective date as event, therefore later studies began using date of public announcement as event date (Mandelker, 1974; Dodd and Ruback, 1977). The abnormal returns can be calculated for the target firm, the buyer or for the two firms combined, and also they can be determined for firms that were part of successful mergers or part of deals that did not go through in the end.

In this study the standard event study buyer abnormal returns will be calculated, using the announcement date as the event date. The announcement date is chosen because investors and thus stock markets react to news and thus it can be expected that the announcement date has the most influence on financial markets.

The abnormal returns will be estimated using CRSP database procedure. The database uses the formula given above in order to provide abnormal return estimations for specified event times. Following recent developments in literature, an estimation window of six years will be used to estimate expected returns. This means that in order to estimate the alpha, beta and sigma coefficients that represent the normal relationship between the stock and the market index, six years of stock data are utilized. When these coefficients are obtained, their regression outcomes are compared to true historical returns and the error term represents abnormal returns. Three different event windows will be used while estimating abnormal returns (1 day, 3 days and 5 days surrounding the announcement date). Abnormal returns are calculated using both the equally weighted approach and the value weighted approach, where in the former all market model returns are weighted equally while in the second model they are weighted based on their market value.

Event study methodology will be used to discuss all hypotheses except hypothesis five. Abnormal returns for each deal will represent the dependent variable in an ordinary least squares regression:

$$AR_{it} = \alpha + \beta_1 X_1 \ldots + \beta_n X_n$$

3.2.2 Logistic regression

The fifth hypothesis concerns the probability of a deal being cancelled. The sample contains deals that are either completed or cancelled and thus the cancellation of the deal will function as a binary variable input when discussing this hypothesis.

When a binary variable serves as dependent variable in analyses, it is appropriate to perform either logit or probit regressions. These models estimate the probability of the outcome being 1. In this case, a completed deal is 0 and a cancelled deal is 1. Thus a logistic regression will estimate the probability of deal cancelation based on a number of independent variables. The regression has the following function:

$$\hat{p} = \frac{exp(\beta_0 + \beta_1 X_1 + \beta_n X_n)}{1 + \exp(\beta_0 + \beta_1 X_1 + \beta_n X_n)}$$

In order to determine whether groups with a high probability of suffering from groupthink are less likely to cancel a deal (hypothesis 5) the logistic regression is used.

3.3 Variables

This paragraph will discuss the variables used in the examination of the hypotheses. For the main analysis the dependent variable in this study is formed by abnormal returns estimates obtained from event study methodology. Regressions will be repeated for each of the six return measures (three time frames and two different return calculations). For the logit model used for hypothesis five, the dependent variable is an indicator variable with 0 is a completed deal and 1 for a cancelled deal.

3.3.1 Groupthink variables

The independent variable in this study is a groupthink measure. Unfortunately, there does not exist a general measure for groupthink that can be used in a cross-sectional analysis. In order to discuss the effects of groupthink, this paper uses five variables in order to give a proxy for the effects of groupthink. These are all variables that are related to the self-protection of boards from outsiders and prosecution and inability to make and evaluate decisions properly.

The first proxy is *classified board structure*. A classified board has directors running for different time periods, and this means that instead of being elected in one time the board members are elected in phases. The classified board structure is mostly known for being an extremely efficient anti-takeover device, since it requires bidders to win more than one proxy fight in order to gain control over a company. However, the classified board structure also causes an increase in managerial entrenchment and reduces the accountability of individual board members. Boards that have a classified structure insulate the management of the firm from the market disciplining effect of takeover treats (Faleye, 2007). This insulation and the protection from outside “enemies” can cause boards that are classified to create the in-group versus out-group notion that creates groupthink. Therefore, a dummy with 1 indicating a classified board structure and 0 indicating a different board structure is the first independent variable that will be used to test the hypotheses.

Second, some boards protect themselves against outside discipline by creating *limitations to shareholder rights of calling special meetings*. This limits the shareholders voting rights to the, mandatory, yearly shareholder meeting. Besides being an anti-takeover defence, this firm charter also disallows voting on other decisions made by the board of directors and thus indicates a strong sense of self-worth of the

board (Cremers and Nair, 2005). A dummy with 1 indicating that the firms has charters that limit the shareholder rights to call special meetings and 0 indicating the non-existence of such charters is the next independent variable.

Next, when the directors or board members of a firm enjoy *indemnification*, their personal liability is limited and they are protected from litigation. Indemnification provisions act similarly to the classified board structure, given that it also protects the board from outside parties and insulates the members of the board. Where a classified structure does this mainly for possible takeover threats, the indemnification provisions insulate the board members from discipline from possible litigation threats (Bradley and Cheng, 2011). Further, limited liability decreases the incentive for board members to evaluate and scrutinize both their own decisions and those made by the other board members. It can therefore be expected that boards that enjoy *indemnification* will be less invested in properly executing their main roles. The variable *Director indemnification* with 1 indicating provisions stating the limited liability of directors and 0 for firms where directors are not protected by indemnification provisions is the third independent variable.

Fourth, it will be determined whether the *board's chair was also the firm's CEO*. This indicates a more prominent position of the leader of the board and is expected to limit the ability of other board members to question policies. The board of directors of a firm have as a main function to question and evaluate CEO decisions. Having the board chair position held by the CEO diminishes the opportunities of open debate and can cause thoughtless following of the CEO's actions, creating groupthink (Lorsch and Maciver, 1989). This variable is 1 if the firm's chair is also the CEO and 0 if those positions are separated.

Finally, a dummy variable indicating whether all board members have *attended less than 75% of board meetings* indicates whether there was actual meeting time to discuss plans of actions and choice alternatives with the majority of board members present. In order for the board to be able to make high quality decisions they need to have a surrounding that enables effective decision making. If there are at least two board members who have attended less than 75% of the board members this dummy equals 1 and is 0 otherwise.

3.3.2 Control variables

Besides the five above mentioned groupthink variables, other independent variables will be added to the analysis. First research has shown that both the size of a group and the addition of females to group can impact the likelihood of groups suffering from groupthink. Therefore the *size* of the board will be included as independent variable, which will simply be the number of board members at time of the deal announcement. Furthermore, an indicator variable with 0 representing an only male board and 1 indicating at least one *female* board member present is added to the analysis as an independent variable.

Control variables that control for other behavioural effects will be used in order to increase model fit. Firstly, given that previous research finds a negative relationship between CEO overconfidence and hubris with the buyer abnormal returns of a takeover, this will be controlled for by including a proxy variable. Unfortunately, using all ways of measuring CEO overconfidence and hubris is beyond the scope of this study and therefore only one measure of this variable will be used. In order to measure the effect, the CEO's *relative payment* compared to other executive directors will be used. Given that most CEOs can influence their own salaries, a large difference between that salary and the salary received by the rest of the board shows that the CEO greatly values his own capabilities and thus forms a proxy for CEO hubris and overconfidence effects. The second behavioural aspect that will be added to the main model is the self-attribution bias. CEOs attribute previous wins as their personal achievements. Therefore, it is expected that abnormal returns are aggravated when the CEO has done earlier deals. To control for this, a variable indicating the *number of previous deals* (in sample) is included in the analysis.

Furthermore, general financial control variables are included in order to mitigate the effects of differing firms within the sample. First, the size of the buyer is included as a control variable in order to control for any size related differences between the companies in the sample. This will eliminate small-firm biases and ensure that results are generalizable for the entire population of firms. Size will be measured by total *market capitalization*, and this size measurement is used instead of, for example, the total asset value of the firm because the importance of market reactions in the study. Secondly, given that the sample will contain acquisitions from different times, the economic conditions of those time periods will be controlled for. Again because this study is focussed on stock returns, the index value at times of the announcement date

will be included in the model, this is represented by the *SPRNT* variable. Thirdly, as was discussed in the literature review, the importance of board roles is likely to be different when considering different industries. Industries are also likely to influence the market reactions to news, with some industry stocks being stickier while for other industries investors are quick to respond to new information. Therefore a categorical variable indicating the *buyer industry* and *target industry* is added to the model. This variable is based on the Standard Industry Classification, or SIC code assigned to all firms in the sample. The categories are based on the first two digits of the SIC code and are divided based on industry. The resulting variable is categorical with ten categories.[4] Finally, the *leverage* of the buyer firm is included as a control variable because for levered firms the option value of equity is increasing in the uncertainty about future firm performance. This 'leverage effect' influences the volatility that follows from announcements by the firm and can therefore influence the effect of M&A announcements on abnormal returns (Johnson, 2004).

The full model used for the linear regression tests in this paper is as follows:

$$\begin{aligned} AR_{it} = \alpha + \beta_1 * classified\ board\ + \beta_2 * limitations\ to\ meetings\ + \beta_3 \\ * indemnification + \beta_4 * chair\ is\ CEO + \beta_5 * attended \\ < 75\%\ of\ meetings\ + \beta_6 * females + \beta_7 * board\ size + \beta_8 \\ * previous\ deals + \beta_9 * relative\ payment + \beta_{10} * SPRNT + \beta_{11} \\ * leverage + \beta_{12} * marketcap + \beta_{13} * buyer\ industry + \beta_{14} \\ * target\ industry + \varepsilon \end{aligned}$$

3.4 Data

The data used in this study is cross-sectional and obtained from several databases. First M&A deals were retrieved from ThomsonOne Banker. From their deal database only US firms are selected in order to increase the availability of further data. Firms from the utilities and financial industries are excluded because these firms are subject to different laws and regulations concerning corporate governance and takeovers and thus can be expected to have different return effects after a completed deal. Also, given that the

[4] See appendix 4 for the industry conversion table.

dependent variable is abnormal stock returns, only public firms are included in the sample, and this ensures enough liquidity and reaction speed to changing firm characteristics. All deals that do not result in a majority interest in the target firm are also excluded from the search. Similarly, deals that are not classified as being either a takeover or a merger deal are left out of the sample. Finally, the initial sample only considers deals that exceed a hundred million dollars. This is because in order for groupthink to form the deal must be impactful and smaller deals might not cause stress on the board of directors. After the initial search, 1634 deals are contained in the sample, but some of these deals lack valid firm identification codes. Given the limitations this puts on further data collection, these deals are dropped. This reduces the sample to 1267 deals.

Secondly, the dependent variables were retrieved from the CRSP database, and the Eventus event study tool was used in order to retrieve cross-sectional abnormal returns for all deals in the sample. A market model benchmark was used for both CRSP equally weighted and CRSP value weighted indexes. When the event date occurred in a non CRSP registration date, for example on weekends or during holidays, the next available date was used as event date. The event returns are not allowed to be included in the estimation window as the stock reactions to takeover announcements can be expected to be large and therefore can severely bias the normal returns estimation. Abnormal returns are estimated for event windows of one, three and five days given that longer event windows can be biased due to confounding effects and a short window can usually capture a potential significant effect (Ryngaert and Netter, 1990).

Independent variables are collected from the ISS (formerly known as riskmetrics) database, where the main independent variables (the groupthink proxies) are available as data options. CEO relative pay was calculated as CEO total payments (meaning salary and possible stock or option additional payments that were received) divided by the yearly average of the other board members total compensation values. The dummy variable *female* is set to be one if the board contains at least one female in the year of analysis.

Compustat annual US database is used to retrieve firms' market capitalization values and leverage. The leverage variable is calculated as total debt over the book value of equity (calculated as total assets minus total liabilities). CRSP database is used to obtain the daily return on the SPTR index for event days.

Some firms in the initial deal sample miss available data for all variables or the return measures. These observations are removed from the sample reducing the sample to 1083 deals.

3.5 Descriptive statistics

This paragraph describes the available data and discusses the changes that have been made to the variables. Firstly, the dependent variables will be summarized, and table 1 below provides information for all six versions of the variable. The mean and median observations are all negative. This is in accordance with hypothesis one and could indicate that on average an M&A transaction leads to a negative stock market return for the buyer. This is also in accordance to most findings in previous literature. Although there is little difference between the six indicators, in both the equally weighted and the value weighted return variables, those with a three day event window are the most negative. This can indicate an initial slow reaction to the event of the market and a return to the mean after a few days have passed. Furthermore, all the measures are slightly skewed to the right and suffer from severe kurtosis. This indicates that there are high peaks, rapid declines in the distribution resulting in fat tails. Given that all return measures are relatively similar, the main text will only present results for the three day equally weighted abnormal returns.

Table 1: descriptive statistics of abnormal return variables, EQ: equally weighted abnormal returns, VW: value weighted abnormal returns.

	Ab. Returns EQ 1 day	Ab. Returns EQ 3 day	Ab. Returns EQ 5 day	Ab. Returns VW 1 day	Ab. Returns VW 3 day	Ab. Returns VW 5 day
Mean	-.0124	-.0147	-.0117	-.0123	-.0159	-.0138
Median	-.0053	-.0107	-.0092	-.0056	-.0113	-.0109
Stand.dev.	.076	.091	.102	.076	.090	.098
Skewness	.071	.424	.532	.654	.468	.544
Kurtosis	10.10	9.29	8.05	13.91	9.16	7.90

Next the tabulation of the groupthink variables and the female variable is provided. Table 2 shows the distribution of these binary variables. The *classified board* and *female* dummy variables both have approximately the same amount of observations for both values of the dummies. For the remainder of the variables the amount of one values is lower than the zero values, with the lowest amount of positive indicators being the *attended less than 75% of meetings* variable.

Table 2: description of groupthink proxies.

Variable	Value is 0		Value is 1	
	Number obs.	% of obs.	Number obs.	% of obs.
Classified board	536	49.49	547	50.51
Limits to meetings	647	59.74	436	40.26
Indemnification	797	73.59	286	26.41
CEO is chair	837	77.29	246	22.71
<75% meetings	947	87.44	136	12.56
Female	451	41.64	632	58.36

The variables *board size* and *previous deals* are not categorical variables and it is therefore possible to show their mean and further descriptive statistics. Table 3 presents these two variables. Both have a minimum number of 1, *board size* has a maximum of 20 and *previous deals* a maximum of 19. *Board size* has a better distribution with a mean of 9 and low skewness and kurtosis. The *previous deals* variable is influenced by a few firms who are multiple acquirers in the sample, and this leads to a distribution with fat tails which is skewed to the right. The descriptive statistics of the other categorical variables is also presented in table 3. In order to improve their distributions these variables have been winsorized, limiting the effects of outlying observations, and for some variables the natural logarithm of the variable is used. [5] *CEO Relative Pay* and the *SPTR* variable continue to have high kurtosis and the former has a high negative skew.

Table 3: descriptive statistics of independent variables.

	Board size	Previous deals	Buyer Size	Leverage	Relative pay	SPTR
Mean	9	2	8.95	-.199	2.23	.000
Median	9	1	8.83	-.197	2.79	.000
Stand. dev.	3.02	2.47	1.74	1.00	0.52	.01
Skewness	-.17	2.97	.058	-.301	-1.16	-.003
Kurtosis	3.89	13.68	2.39	3.37	5.99	4.81

[5] See appendix 5 for histograms.

Two categorical variables are used in the analysis, target and buyer industry, and table 4 provides their tabulation. The majority of the observations are in categories four and nine, representing the manufacturing and services industries respectively. These are categories that contain many SIC codes and are also well represented in the population of firms. There are no observations for firms in the agriculture, forestry and fishing industry, due to smaller sized firms in these industries. Smaller sized firms are not likely to do high value deals and are thus by default not selected for the sample. A similar reasoning can be made for the construction industry (category three) and public administration industry (category ten). Finally, there are a limited amount of firms in category eight (finance, insurance and real estate), because many of the corresponding SIC codes within this category are filtered from the sample.

Table 4: tabulation of buyer and target industry categorical variables.

Industry	Buyer industry		Target industry	
	Number obs.	%obs.	Number obs.	%obs.
1	0	0	0	0
2	47	4.34	49	4.52
3	1	0.09	1	0.09
4	602	55.59	559	51.62
5	95	8.77	84	7.76
6	46	4.25	37	3.42
7	50	4.62	48	4.43
8	28	2.59	26	2.40
9	214	19.76	278	25.67
10	0	0	1	0.09

4. RESULTS

This chapter discusses the statistical tests used in order validate the hypotheses and interprets the statistical results.

4.1 Average buyer returns

As shown in the descriptive statistics the mean abnormal buyer returns are negative for each return measure, which is in line with the expectations of hypothesis one. In order to validate whether the negative means observed in the descriptive statistics are statistically different from zero, a t-test with null hypothesis of abnormal returns having a mean of zero is performed.[6] The equally weighted 3-day event window return measure has a mean of -0.014, with p-values of the mean return being smaller or equal to zero being 0.000. Thus, the t-test rejects the null hypothesis of zero mean at a one percent significance value.

This finding affirms the expectations of hypothesis one and is in line with the general expectations that are derived from the literature. This shows that the sample in this study has the expected characteristics of the takeover deal population and thus validates the use of this sample for the purpose of this study.

4.2 General groupthink effect

The following section will discuss the research methods used to investigate the second hypothesis which states that groupthink negatively influences the results of a takeover.

4.2.1 Non-parametric tests

In this paragraph a selection of non-parametric tests is discussed that allows an initial determination of any relationship between groupthink and abnormal returns.

[6] See appendix 6 for all test results.

First a Wilcoxon rank-sum (also known as Mann-Whitney) test is performed to test whether there is a difference in abnormal results when comparing observations that score high and low on groupthink. In order to perform this test the dummy scores for the five groupthink variables where added, where firms that score three, four or five in this variable are assigned a 1 in the groupthink dummy and the firms that score a one or two are assigned a 0. [7] This binary variable was used in order to perform the Wilcoxon rank-sum test. Table 5 presents non-parametric test results.[8] The null hypothesis of this test (that both groups are the same) cannot be rejected, which suggests that the groupthink indicator does not influence abnormal buyer returns. In order to measure whether there is a non-parametric statistical dependence between the groupthink dummy and the return measure a Spearman rank correlation test was done. Again the null hypothesis cannot be rejected and there is no statistical proof for a relation between groupthink and abnormal returns. The spearman correlation table shows this result per individual groupthink proxy (table 6). The table shows that the individual indicators are not correlated with abnormal buyer returns. However, there is strong correlation between certain indicators themselves. This indicates that when a board creates one protective measure, they are likely to also used alternative forms of protection. Finally an equality of means test was done, and this test also does not indicate an effect of groupthink on abnormal returns.

Table 5: non parametric tests results.

Test	H_0	Prob > |z|
Wilcoxon rank sum test	Abnormal returns (groupthink=0) = abnormal returns (groupthink=1)	0.795
Spearman rank correlation	Abnormal returns and groupthink are independent	0.795
Equality of means test	Mean abnormal return (groupthink=0)=mean abnormal return(groupthink=1)	0.927

[7] Tests with the groupthink dummy were all repeated with different computations of this dummy (such as the three score belonging to the 0 group and the three scores left blank) none of the different computations of the test caused differences in the results.

[8] Test results are presented for the three day equally measured return measure. Given that the results for the other five measures are not substantially different they not presented.

Table 6: spearman correlation table.

	Variable names					
	CARE3	Classified	Meeting limitations	Indemnification	Chair is CEO	%of meetings
CARE3	1					
Classified	-0.0134 0.6595	1				
Meeting limitations	-0.0243 0.4248	0.3155 0.0000	1			
Indemnification	0.0096 0.7515	0.0609 0.0449	0.0122 0.6880	1		
Chair is CEO	-0.0097 0.7499	0.0430 0.1575	0.1481 0.0000	-0.0498 0.1014	1	
% of meetings	-0.0405 0.1826	0.0407 0.1804	-0.0384 0.2071	0.0448 0.1408	0.0207 0.4968	1

4.2.2 OLS regression

In order to measure whether there is a linear effect of groupthink on the success (or limitation of losses) of a takeover deal for the buyer, an ordinary least square regression is estimated with the dependent return variable, the independent groupthink variables and the controls. [9] Table 7 model 1 provides the regression results for the three day equally weighted measure. The first five variables in the table represent the groupthink proxies. None of the proxies are significant at the ten percent level. The sign of all proxies except *classified board* is negative. This is as expected in hypothesis two, which states that the groupthink variables have a negative effect on abnormal buyer returns. However, the effect of the variables is small and it cannot be statistically shown that the coefficients are significantly different from zero. When comparing the results presented below to the results obtained from models using the other return measures as dependent variables, it is indeed shown that the proxy variables do not have a significant influence on the abnormal buyer returns. The only groupthink variable that shows significant results is the *CEO is chair* variable in both five day event windows. In the longest event windows it is found that when a CEO is also the chair of the board this leads to a decrease in buyer returns of 0.0192 (equally weighted) and 0.0194 (value weighted) percentage points, compared to not having the same CEO as chair, which are statistically significant at a five percent significance level.

[9] The models suffer from high kurtosis and therefore robust standard errors are used to calculated the p-values presented in the table. See appendix 7 for full test results.

The group dynamics variables, *group size* and *females* are also insignificant in each of the return measures. An increase in the size of the group has a negative effect on all of the return measures. This is in accordance to the expectations in hypothesis four. However, the sign of the *females* variable changes, where hypothesis three suggests a positive sign for this variable.

According to the self-attribution bias it is expected that the *previous deal* variable leads to lower abnormal buyer returns. However, this variable has a positive sign in each of the regressions and is statistically significant at a five percent significance level in the one day event windows. An increase in the amounts of deals done by the under the same CEO (within the sample) leads to an increase in abnormal buyer returns of 0.19 (equally weighted) and 0.17 (value weighted) percentage points. According to the hubris bias the abnormal returns should be more negative when the *relative payment* variable is higher. However, this variable also has a strictly positive sign and is statistically significant at a five percent level in both five day return measures. An increase in the payment of the CEO compared to that of other executive managers leads to an increase in the abnormal buyer returns of 1.6 (equally weighted) and 1.2 (value weighted) percentage points.

In the table below none of the control variables are statistically significant. The *SPRNT* and *buyer size* variables remain insignificant in each of the return measures. However, the *leverage* variable always has a negative sign and in the one day equally weighted and in both five day measures the amount of leverage is statistically significant at a ten percent significance level. An increase in leverage leads to a decrease in abnormal buyer returns of 0.60 (one day equally weighted), 0.77 (five day equally weighted) and 0.74 (five day value weighted) percentage points. This is according to the expected effects of a higher leverage on abnormal returns.

Lastly, the two industry measures compare the effect of being in a certain industry category on the abnormal buyer returns. Firstly considering buyer industries it becomes apparent that being in any industry (except the third category) leads to lower abnormal buyer abnormal returns than being in the base category industry (industry two). This is true for all return measures. Being in industry category three has a statistically significant effect on the dependent variable in the three day equally weighted model and both of the five day event windows. Being industry three compared to being in industry two leads to an increase in abnormal buyer returns of 0.0699 (three day equally weighted), 0.1107 (five day equally weighted) and 0.0833 (five day value weighted)

percentage points, which are statistically significant at a one percent significance level. For the target industry being in the tenth category has a negative influence on the returns compared to being in the second. The rest of the categories have positive coefficients, but again mostly the coefficients are not significant. Noticeably, being in the third industry category compared to being in the second has a positive effect on abnormal buyer returns in each of the models and is significant at the one percent level. However, this industry only consists of one observation, which has a high abnormal return, making this result for both the buyer and target industries difficult to generalize.

In general these regressions contain variables with very low effects on the dependent variables. Also, the amount of movement of the dependent variables that is explained by the model (the R-squared measures) is low, ranging from 0.0270 (equally weighted three day window) to 0.0401 (equally weighted five day window). The Ramsay Reset test for model specification was used in order to check whether different model specification can improve the test results. The null hypothesis of zero omitted variables could not be rejected (Prob > |z| = 0.7613), so there are no variables that can be added in order to improve the current OLS model.

Table 7: regression results showing the coefficient, standard error in parenthesis and p-value: *= significant 10% level, **= significant 5% level and *= significant 1% level. Model 1 provides results for the basic regression, model 2 provides results where the individual proxies are added and a groupthink categorical variable scale 1 to 5 is used in order to indicate a non-parametric pattern of groupthink. Model 3 shows logit regression results for the probability of deal cancelation and model 4 provides the average marginal effects of the estimates in model 3.**

Variables		Model 1 R^2: 0.027 # obs: 852	Model 2 R^2: 0.025 # obs: 852	Model 3 Ps. R^2: 0.67 # obs: 845	Model 4 # obs: 845
Groupthink	**1**		.0025 (.0081)		
	2		-.0084 (.0084)		
	3		-.0052 (.0099)		
	4		-.0135 (.0194)		

	5		.0135 (.0397)		
Classified board		.0030 (.0065)		-1.6013*** (.4650)	-0.0527*** (.0146)
Limitations to special meetings		-.0029 (.0065)		1.6687*** (.4625)	0.0550*** (.0145)
Indemnification		-.0009 (.0057)		-0.4988 (.4886)	-0.0164 (.0160)
Chair is CEO		-.0109 (.0079)		3.7452*** (.4856)	0.1234*** (.0113)
Meeting attendance		-.0131 (.0094)		-0.5023 (.6510)	- 0.0165 (.0213)
Females		.0032 (.0067)	.0028 (.0066)	1.2956*** (.4812)	0.0427*** (.0156)
Board size		-.0008 (.0011)	-.0009 (.0011)	-0.0177 (.0819)	-0.0005 (.0026)
Previous deals		.0007 (.0010)	.0007 (.0013)	-2.0997*** (.4456)	-0.0692*** (.0132)
Relative payment		.0097 (.0059)	.0097* (.0058)	-0.9769*** (.3614)	-0.0322*** (.0117)
SPRNT		.1727 (.3320)	.1681 (.2748)	-22.7992 (18.7793)	-0.7517 (.6154)
Leverage		-.0041 (.0038)	-.0036 (.0032)	-2.0976*** (.2705)	- 0.0691*** (.0062)
Buyer size		.0014 (.0022)	.0013 (.0022)	-0.2136 (.1619)	-0.0070 (.0053)
Buyer industry	**1**	-	-	-	-
	2	-	-	-	-
	3	.0699** (.0290)	.0664 (.0911)	-	-
	4	-.0156 (.0226)	-.0205 (.0279)	-1.0160 (1.9185)	-0.0366 (.0765)
	5	-.0241 (.0284)	-.0302 (.0320)	1.0395 (2.1198)	0.0477 (.0916)
	6	-.0392 (.0286)	-.0438 (.0343)	0.6024 (2.2759)	0.0262 (.0972)
	7	-.0170 (.0336)	-.0247 (.0375)	-1.5750 (2.5680)	-0.0532 (.0906)
	8	-.0802 (.0590)	-.0777 (.1009)	-	-
	9	-.0248 (.0251)	-.0313 (.0295)	-1.7421 (2.1113)	-0.0577 (.0803)
	10	-	-	-	-
Target industry	**1**	-	-	-	-
	2	-	-	-	-
	3	.0913*** (.0236)	.0923 (.0886)	-	-
	4	.0133 (.0212)	.0182 (.0273)	-0.1580 (1.9131)	- 0.0053 (.0659)
	5	.0024 (.0309)	.0060 (.0317)	-1.4378 (2.1473)	-0.0432 (.0694)
	6	.0360 (.0263)	.0381 (.0340)	-2.4745 (2.2132)	-0.0677 (.0689)
	7	.0294 (.0365)	.0343 (.0374)	-0.0023 (2.6399)	-0.0000 (.0912)
	8	.0760 (.0574)	.0712 (.0558)	-	-
	9	.0087 (.0222)	.0138 (.0283)	-0.0378 (2.0530)	-0.0013 (.0708)
	10	-.0172 (.0231)	-.0159 (.0882)	-	-

4.2.3 Regression adjustments

The non-parametrical tests and the standard OLS regression do not show a statistically significant relationship between groupthink and abnormal buyer returns. Alternative forms of regressions were performed in order to see whether these adjustments influence the initial results. First, the initial regression is repeated but the groupthink variables are grouped together as a categorical variable, table 7 model 2 presents the results.[10] The groupthink variable does not give significant results, but it is found that the middle categories have a negative influence while the extreme categories have a positive influence on abnormal buyer returns. Other than the significantly positive influence of relative payment on the return measure (ten percent significance level), none of the other variables have significant results in this test

Furthermore a median regression was done. [11] An OLS estimator predicts a conditional mean while a median regression makes predictions for the median observation. Using this modelling technique reduces the influence of outlying observations. The results of the median regression are not different from those for the OLS regressions. None of the groupthink variables are statistically significant and here only *leverage* has a statistically significant coefficient (at a one percent level).

4.2.4 Treatment effect

A last effort to find an effect of groupthink on abnormal buyer returns was made by using a propensity score matching procedure on the sample. Within this method the firms which have a 1 on the groupthink dummy are matched with firms that have a 0 based on a propensity score. This score is based on the control variables used in this study. Then the returns of both firms are compared and tested on their statistical similarity. The results are presented using the average treatment effect on the treated. In order for this method to work there must be sufficient overlap between the scores of groupthink and non-groupthink groups. Figure 2 provides the overlap graph, which shows sufficient overlap in the sample to use the propensity score matching method. The average treatment effect on the treated is -0.0047, indicating that firms suffering from groupthink have lower abnormal returns. However, this effect has a p-value of 0.564 meaning that it is not statistically significant.

[10] The fitted values are shown in appendix 8.

[11] See appendix 8 for outputs of alternative regressions and treatment effects.

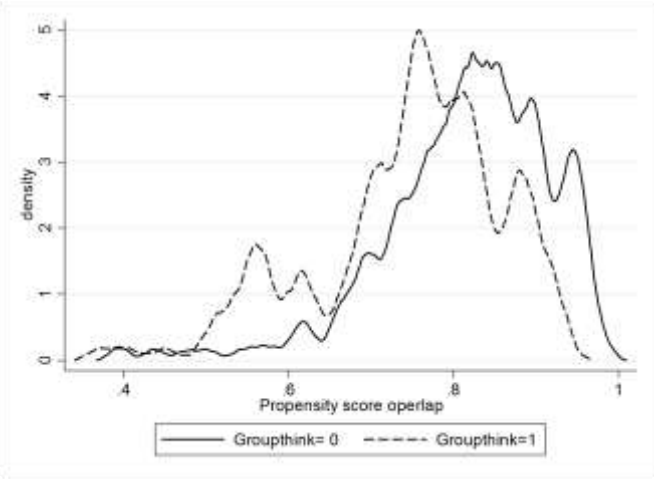

Figure 2: overlap graph propensity scores.

4.1 Groupthink and deal cancelation

Hypothesis five reasons that firms that suffer from groupthink are more likely to stick with decisions that have been made, even though there might be discoveries indicating a bad choice. In order to test this hypothesis a logistic regression analysis is used. In this analysis the dependent variable is a binary variable indicating a completed or a cancelled deal (0 and 1 respectively). Table 7 model 3 provides the regression results. Here some of the group variables show highly significant coefficients. First, having a classified board structure has a statistically significant (at the one percent level) negative impact on the probability of cancelling a deal. Having female directors on the board has a significant (at the one percent level) positive impact on the cancelation probability. Finally, the *previous deal* and *CEO relative payment* both have statistically significant (at the one percent level) negative influence on the cancelation probability. Respectively these findings are in accordance with the expectations in hypothesis five, the self-attribution bias and CEO hubris hypothesis. However, other results are unexpected. The variables *limitations to special meetings* and *Chair is CEO* both have statistically significant positive effects (one percent level) on the cancelation probability, while these groupthink indicators were expected to have a negative effect. Finally, in this analysis the negative effect of *leverage* is again found. The average marginal effects of this regression are presented in table 7 model 4.

4.2 Group size and females

In hypotheses three and four expectations on the influence of *group size* and *females* on the board are described. In the analyses above there was not a conclusive effect of these

two variables on the return measures. Therefore some extra tests were performed for just these two variables, and the results are presented in this section.

The first tests that were done were two sample t-test, testing whether the size of the board (in order to do this a size dummy with 1 being a large and 0 being a small board was created) and whether the board contains females influences the mean abnormal buyer returns. Table 9 presents results of these tests. While the *group size* dummy does not seem to influence the mean abnormal buyer returns. The tests do show that boards that contain females have significantly less negative abnormal buyer returns (at the ten percent significance level). This is in accordance with expectations in hypothesis three.

Table 12 also presents two sample t-tests done where the influence *group size* and *female* dummies on the groupthink variable (the scores of all five groupthink proxies added). For groups that contain females the mean groupthink indicator is significantly (at the ten percent level) higher compared to the mean groupthink indicator for boards without female members. The *group size* variable shows highly significant results. It shows that larger boards have a significantly higher mean for the groupthink indicator (at a one percent level).

Given that these last two results might indicate interaction effects an OLS regression including these interactions was performed. However, this did not lead to statistically significant regression results.[12]

Table 8: test results for groupthink and female variables.

Variable	Test	Pr(T < t)	Pr(|T| > |t|)	Pr(T > t)
Females	Two-sample t-test: means of abnormal returns by female 0 and female 1	0.0360	0.0720	0.9640
Group size	Two-sample t-test: means of abnormal returns by board size 0 and board size 1	0.3466	0.6931	0.6534
Females	Two-sample t-test: means of groupthink added by female 0 and female 1	0.0570	0.1140	0.9430
Group size	Two-sample t-test: means of groupthink added by board size 0 and board size 1	0.0000	0.0000	1.0000

[12] See appendix 8 for regression with interaction terms.

5. DISCUSSION

This chapter provides a discussion of the results, relates the results to the hypotheses and research question and elaborates on the limitations of this study.

5.1 Results discussion

When referring to the hypotheses, it can be stated that hypothesis one is confirmed which generates confidence in the validity of the sample. As was expected, the statistical tests show that that on average buyers experience negative abnormal returns after a takeover. For the next hypotheses results cannot be interpreted so easily.

Starting with hypothesis two which is the main hypothesis and is closely related to the research question, it is not possible to confirm that groupthink has a negative effect on abnormal buyer returns. In fact, there are groupthink proxies that even show positive effects in some of the return measures. The coefficients found in the linear regression models are not significant and when including non-parametric tests of this hypothesis still no statistically significant results were found.

When the female variable was added in the general models there was not an overall result confirming hypothesis three. However, the two sample t-test does show that the mean abnormal buyer returns are higher when there is at least one female on the board. This is as was expected in the hypothesis. Also, there is also an indication that having females on the board influences the groupthink measure in a negative way. This is not as expected given that this means that having females on the board increases groupthink. The same tests were done for the group size variable, again this variable did not have overall significant results and the t-test for group size did not show that the mean abnormal buyer returns were influenced by the size of the board. However, the same test did show that the mean groupthink level was different for big boards and smaller boards, where smaller boards had a high significantly lower groupthink mean that larger boards. This is according to the expectations regarding board size.

In hypothesis five the effect of groupthink on the probability of deal cancellation was tested. Here there were surprising results; the *classified board variable* is statistically significant and has a negative effect on cancelation probability, showing that a groupthink measure negatively influences the probability of cancelation. However, two other measures (*chair is CEO* and *limitations to special meetings*) are also statistically significant but they show a positive influence on cancelation. These mixed results again make it impossible to provide a conclusive confirmation of hypothesis five. In this model the expectations for CEO hubris and the self-attribution bias were confirmed.

The last hypothesis makes predictions concerning the different time frames of the return measures. The tests above were performed for each measure, but there were no consistent differences between the individual results. Therefore it is impossible to confirm this hypothesis.

Only hypothesis one can be confirmed in this paper and it is impossible to give an answer to the research question. With the current sample there is no proof that shows an effect of groupthink on the results of merger and acquisitions.

5.2 Limitations

As the section above discusses, the statistical tests done in this paper do not provide conclusive results to generalize the research question or hypotheses. There are several limitations that can be problematic in the research design of this thesis and which might be the cause of the statistically inconclusive results

Firstly and most importantly, it is impossible to directly measure groupthink. Whenever proxies are used in economic studies it should always be taken into account that these proxies have a certain degree of noise because they do not measure the precise concept of interest. This is definitely the case in measuring groupthink in boards of directors. There are no generally accepted proxies to measure groupthink and data availability on board characteristics is low. This means that for this study the available data had to be used to create the proxy measures and it is possible that they do not, fully, measure groupthink effects.

There are not only measurement limitations concerning the groupthink measure. As was described in the literature review, measuring buyer abnormal returns is not straightforward leading to conflicting results in abnormal buyer return studies. This paper uses a basic return measurement approach. Given the size of most buyer firms the stock effect of takeovers might be relatively small even if the dollar value of the deal is

large. A lack of large movements in the dependent variable can make statistical analysis difficult and can result in non-significant results even if there is an effect of groupthink on abnormal buyer returns.

Finally, results can be influenced by the sample selection. Many observations had to be dropped because of the availability of data in databases. The resulting sample only consists of relatively large buyer firms who publically release data regarding their board policies and meeting attendance. This can potentially create a bias in the sample.

6. CONCLUSION

In this thesis a connection is made between financial research on mergers and acquisitions and knowledge from behavioural literature. First steps in the inclusion of behavioural aspects into the M&A knowledge base have already been made by considering that CEOs can suffer from behavioural biases. This has led to the acceptance that CEO hubris and overconfidence and the attribution bias can have a negative effect on takeover decisions and thus can negatively influence the abnormal returns of a deal. However, in this paper it is argued that CEOs are not the only decision makers in the M&A process; in fact the board of directors of the firm have the responsibility to monitor the CEO and discuss major strategic decisions. Thus, the performance of boards of directors is also likely to have an influence on the success of a takeover. There are several processes that can have an effect on the performance of a group, and one of those is groupthink. In this thesis it is determined whether groupthink has a negative effect on the success of an M&A deal, where the success of the deal is measured by abnormal buyer returns.

In order to investigate the influence of groupthink on the returns of mergers and acquisitions, five proxy variables were created. These proxies (*classified board, director indemnification, limitations to special meetings, board chair is the CEO* and *attended less than 75 percent of meetings*) are all binary variables were a one indicates that a firm has these characteristics. Together with a group of control variables these proxies were used in several statistical models. In these models there was no statistically conclusive result that can confirm that groupthink negatively influences abnormal buyer returns. Furthermore, when using these indicators to predict the probability of cancelation of a deal, some proxies gave significant results in the opposite direction than was expected.

For this reason it has to be concluded that this paper was not able to find a relationship between groupthink and M&A results. However, due to the design of this research it is not possible to determine whether the results are caused by the non-existence of a relationship between M&A results and groupthink within boards of directors or because

the proxies created to measure groupthink are not able to capture the amount of groupthink in a board.

As was discussed in the literature review, boards of directors that function properly as a group can create a large increase in firm profits and other results. Furthermore, mitigating the effects of groupthink by implementing practices that limit the influence of groupthink should be relative cost efficient. This makes further research onto this topic worthwhile. This research should mainly be directed at finding or developing a good measure of groupthink in boards and testing the effectiveness of this measure. Then this groupthink variable can be used in order to do further tests.

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8. APPENDIX

The appendix references from the text above can be found in the pages below.

8.1 Appendix 1: Merger and acquisition development

The following graphs present the yearly developments in the market for corporate control.

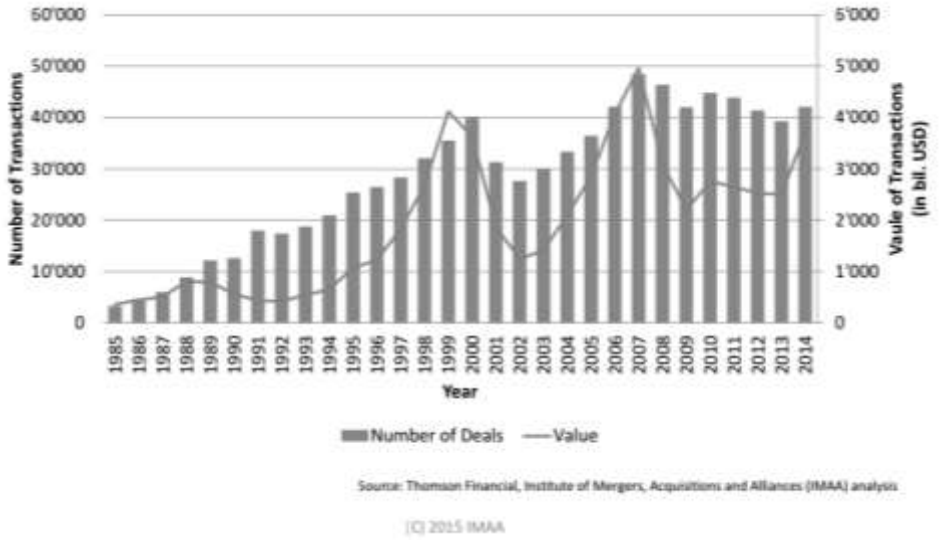


Figure 3: Worldwide M&A deals, number and value of transactions.

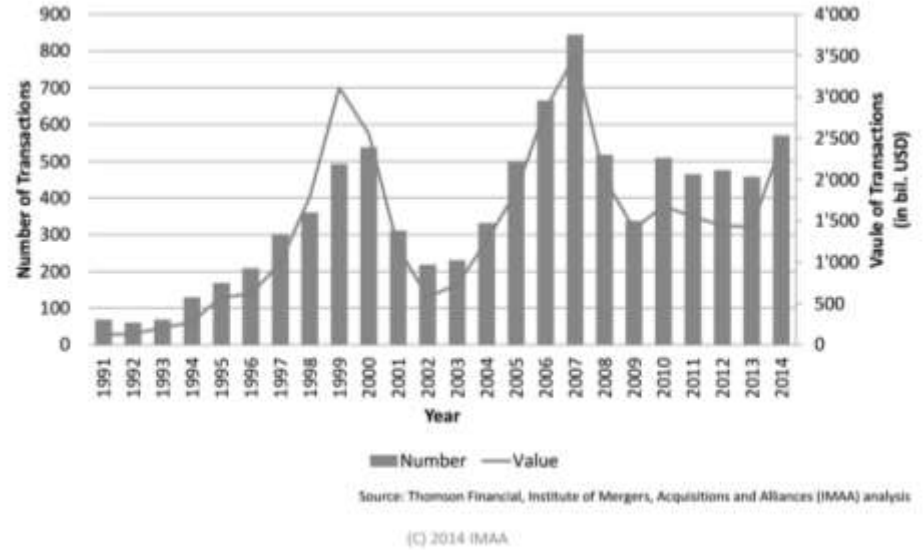


Figure 4: Worldwide mega deals (larger than 1 billion USD), number and value of transactions.

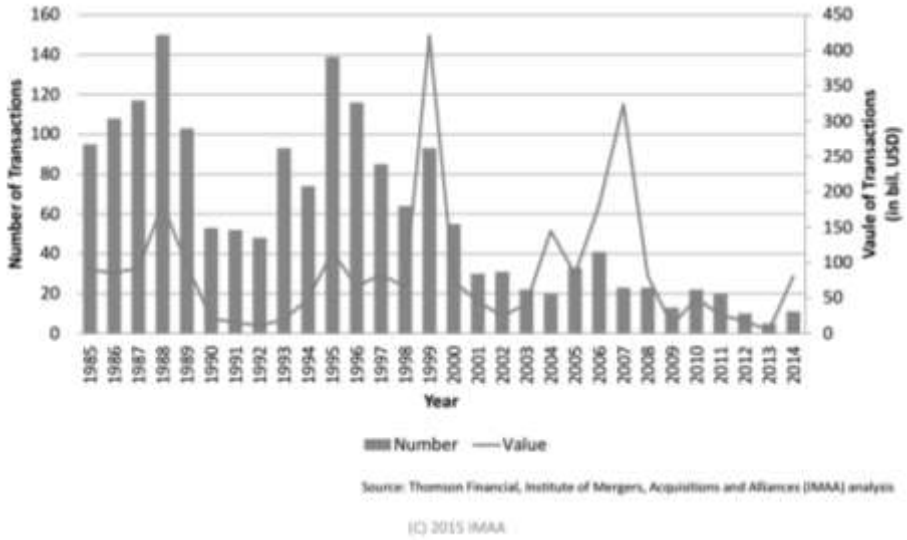


Figure 5: Hostile M&A deals, number and value of transactions.

8.2 Appendix 2: Merger waves

The graph below provides the amount of M&A transactions from 1990, it shows how there has been an upward trend in the deal count and deal value. Moreover it shows how M&A presents in waves.

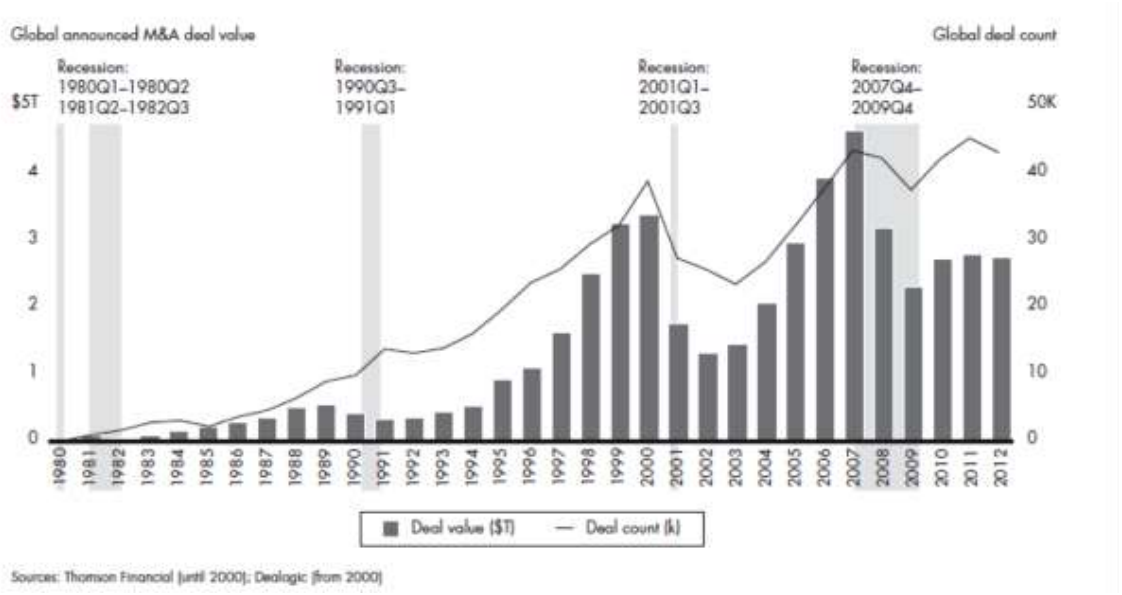


Figure 6: merger and acquisition market 1980-2000.

The first merger wave started in 1897 and ended in 1904, this wave was characterized by the technological improvements of the industrial revolution and focussed mainly on the horizontal integration of manufacturing firms. There was a favourable economic climate and it was easy to obtain finance. The first wave ended when in 1904 laws were passed that limited the possibilities of horizontal combinations. In 1920 the second wave started, during this time stock market prices boomed. Given the limitations on horizontal mergers this wave focussed on vertical integration, when the stock market crashed in 1929 the wave ended. The third wave started in 1965 when economic conditions were in a rise. This wave was dominated by a strive to achieve economies of scale and led to large conglomerate firms. Antitrust action against conglomerate building together with a started recession finished the merger wave in 1970. The fourth wave formed in 1984 and came in a time of rising stock prices and falling interest rates. Especially in Europe this wave was distinct. The fourth wave was very broad based and saw an increasing influence of private equity investors. The recession in 1990 was the turning point for the fourth wave. Soon after this turn the fifth wave started in 1992, when interest rates began to fall again. During this wave venture capitalists became more well-known, also the strive for globalisation became more important. The burst of the internet bubble in 2000 reduced the amount of M&A activity again. Finally, the

sixth wave began in 2003 when antitrust rules were relaxed and the economy recovered from the 2000 crash. There was especially a sharp increase in the amount of leveraged buyouts during this period. The financial crisis ended the sixth wave in 2007 (Kleinert and Klodt 2002) (Alexandridis, Mavrovitis and Travlos, 2012).

8.3 Appendix 3: Conceptual model

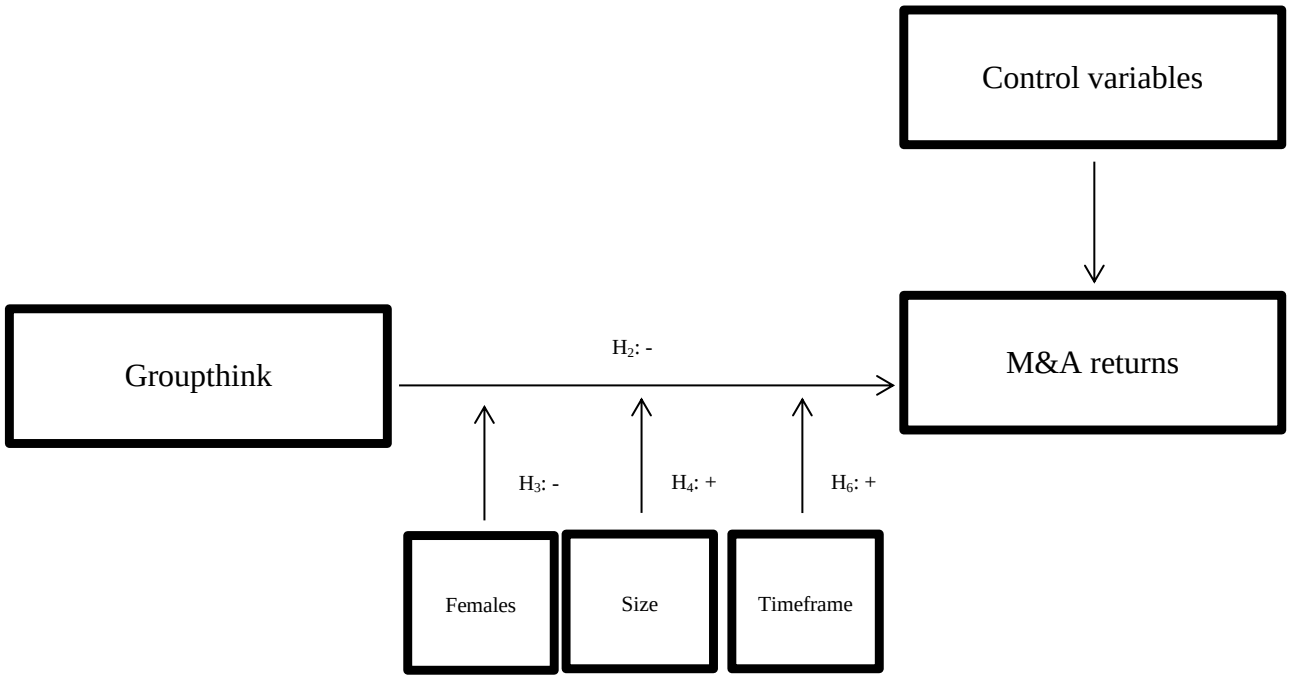


Figure 8: conceptual model 1.

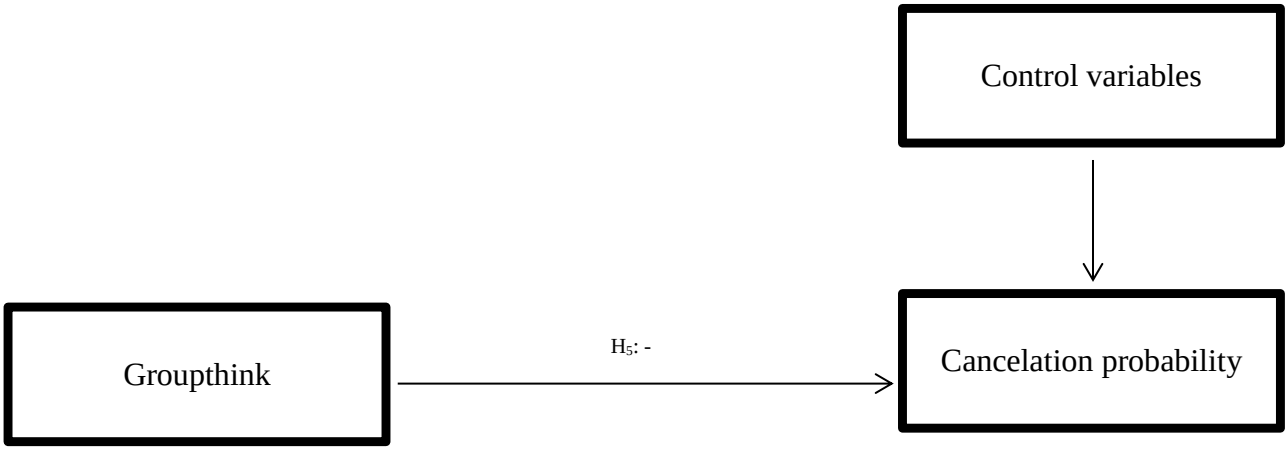


Figure 7: conceptual model 2.

8.4 Appendix 4: Industry conversion table

The following table displays the formation of the categorical industry variable by providing the SIC codes included in each category and the description of the industry categories.

Table 9: SIC code conversion table.

Category	SIC code first two digits	Description
1	01-09	Agriculture, Forestry, Fishing
2	10-14	Mining
3	15-17	Construction
4	20-39	Manufacturing
5	40-49	Transportation, Public Utilities
6	50-51	Wholesale Trade
7	52-59	Retail Trade
8	60-67	Finance, Insurance, Real Estate
9	70-89	Services
10	91-99	Public Administration

8.5 Appendix 5: Variable conversion

This appendix provides the histograms for the variables used in this study and, if applicable, shows the changes to the variables that were made in order to improve their distributions. For non-continues variables the tabulation is provided.

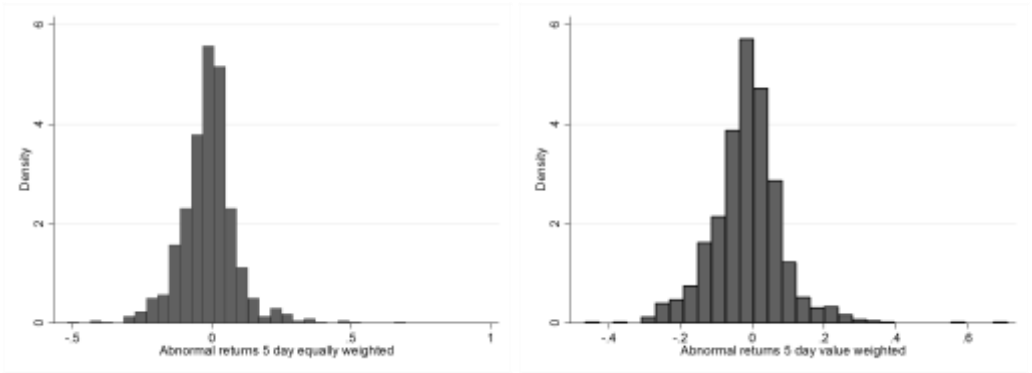
Table 10: tabulation dummy variables.

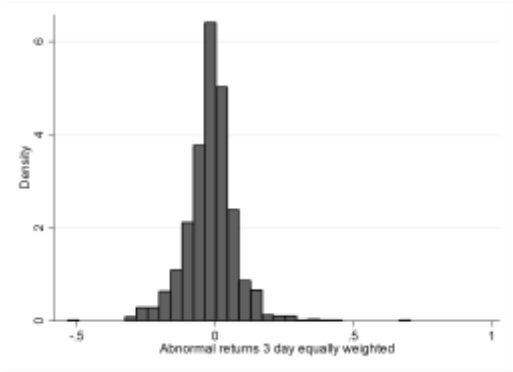
Variable	Value is 0		Value is 1	
	Number obs.	% of obs.	Number obs.	% of obs.
Classified board	536	49.49	547	50.51
Limits to meetings	647	59.74	436	40.26
Indemnification	797	73.59	286	26.41
CEO is chair	837	77.29	246	22.71
<75% meetings	947	87.44	136	12.56
Female	451	41.64	632	58.36

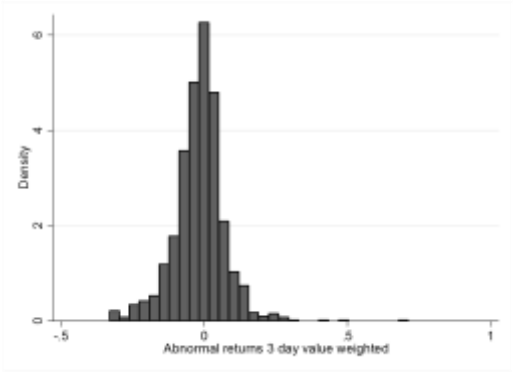
Table 11: Categorical variables.

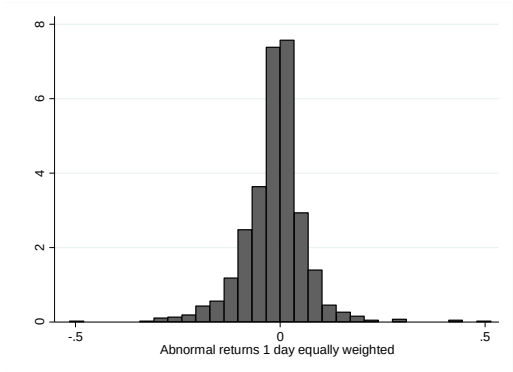
Industry	Buyer industry		Target industry	
	Number obs.	%obs.	Number obs.	%obs.
1	0	0	0	0
2	47	4.34	49	4.52
3	1	0.09	1	0.09
4	602	55.59	559	51.62
5	95	8.77	84	7.76
6	46	4.25	37	3.42
7	50	4.62	48	4.43
8	28	2.59	26	2.40
9	214	19.76	278	25.67
10	0	0	1	0.09

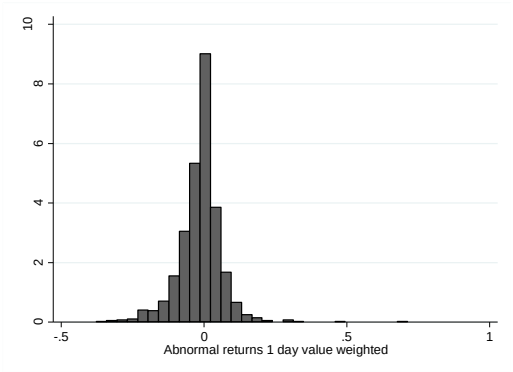
8.5.1 Abnormal return measures



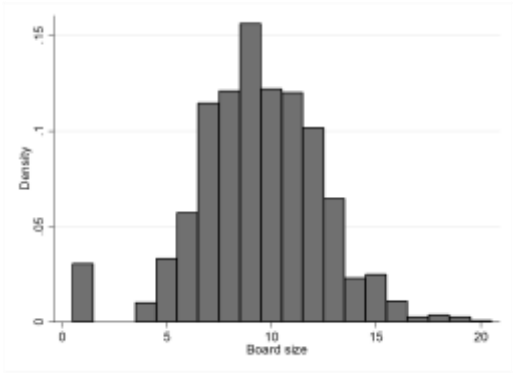


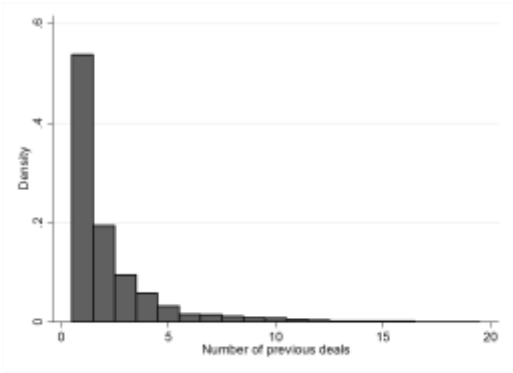


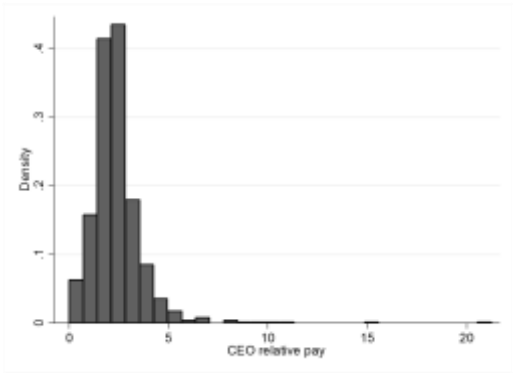


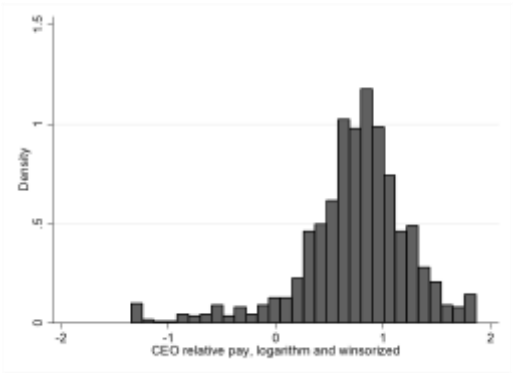


8.5.2 Independent variables



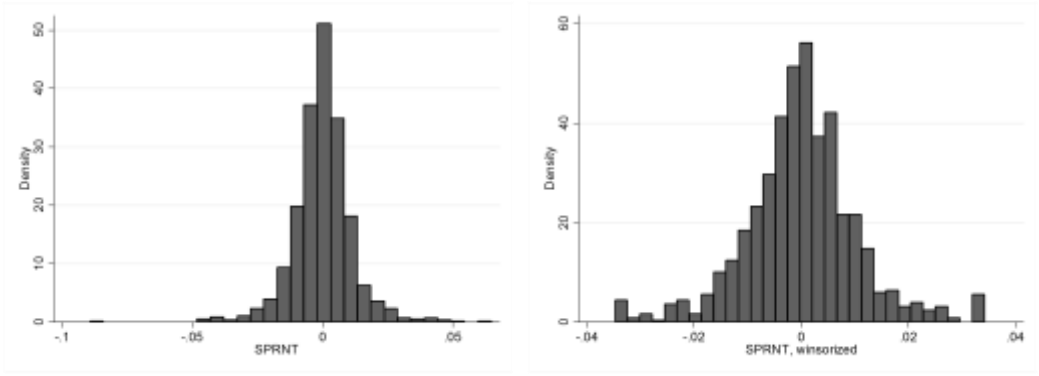




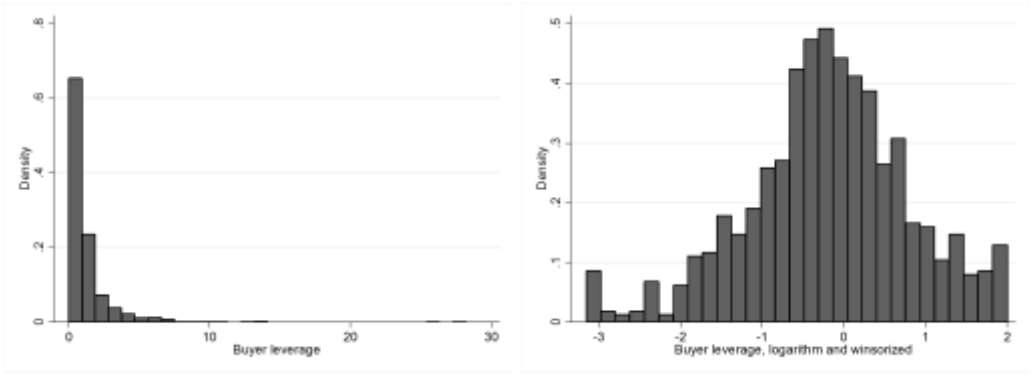


CEO relative payment represents the fraction of the payment of a firm's CEO compared to the average compensation of other executive members. The initial variable had a kurtosis of 49.75 and a skewness of 4.56, after taking the logarithm of this variable and

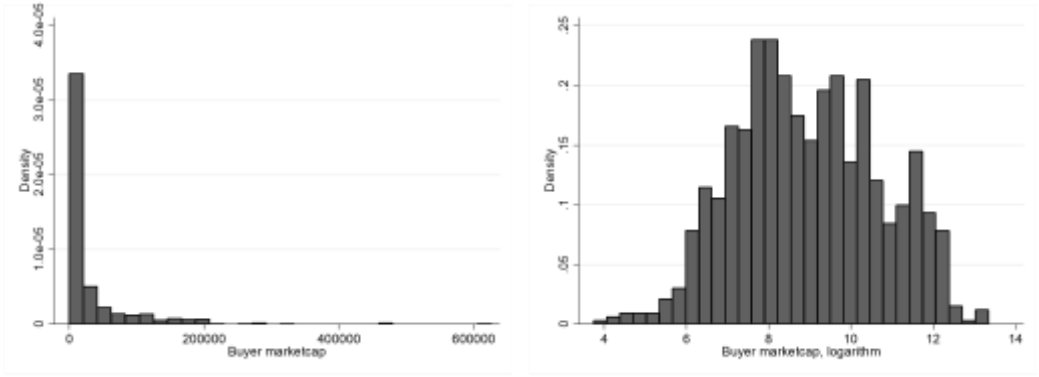
using winsorization (one percent) to reduce the impact of outliers the kurtosis and skew are 5.99 and -1.16 respectively. Although the variable still has fat tails and is skewed the modifications do improve the distribution.



The S&P SPRNT variable is influenced by outliers and thus the variable was winsorized at one percent to reduce the influence of the outlying observation. This changed its kurtosis from 9.68 to 4.82 and its skew from -.18 to -.00.



Buyer leverage suffered from extreme skewness and kurtosis (6.57 and 75.46) in order to improve its distribution the logarithm of the variable was taken and it was winsorized at one percent fraction making the skew and kurtosis -.30 and 3.37 respectively.



The marketcap of the buyer also suffered from a large skew to the right and high kurtosis (4.00 and 27.50). By using the logarithm of marketcap the distribution was improved (skewness of 0.06 and kurtosis of 2.39).

8.6 Appendix 6: Abnormal return t-tests

Table 12: t-test results abnormal return variables.

	CarEQ1	CarEQ3	CarEQ5	CarVW1	CarVW3	CarVW5
Mean	-.0124	-.0147	-.0117	-.0123	-.0159	-.0138
Stand.dev.	.076	.091	.102	.076	.090	.098
P-value: Mean<0	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000
P-value: Mean=0	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000
P-value: Mean>0	1.0000	1.0000	0.9999	1.0000	1.0000	1.0000

8.7 Appendix 7: OLS results

Table 13: OLS test results for each of the six return measures.

Variables		1 day eq. weighted R^2: 0.029 # obs: 852	3 day eq. weighted R^2: 0.027 # obs: 852	5 day eq. weighted R^2: 0.040 # obs: 852	1 day val. weighted R^2: 0.029 # obs: 852	3 day val. weighted R^2: 0.027 # obs: 852	5 day val. weighted R^2: 0.038 # obs: 852
Classified board		.0026 (.0056)	.0030 (.0065)	.0000 (.0074)	.0017 (.0055)	.0018 (.0065)	-.0020 (.0072)
Limitations to special meetings		-.0059 (.0055)	-.0029 (.0065)	-.0037 (.0073)	-.0052 (.0056)	-.0039 (.0067)	-.0033 (.0073)
Indemnification		.0006 (.0047)	-.0009 (.0057)	-.0004 (.0063)	.0011 (.0047)	-.0013 (.0055)	-.0017 (.0060)
Chair is CEO		-.0010 (.0073)	-.0109 (.0079)	-.0192** (.0085)	-.0023 (.0071)	-.0109 (.0080)	-.0194** (.0082)
Meeting attendance		-.0114 (.0081)	-.0131 (.0094)	-.0154 (.0103)	-.0104 (.0074)	-.0109 (.0086)	-.0099 (.0092)
Females		-.0030 (.0056)	.0032 (.0067)	.0000 (.0077)	-.0020 (.0055)	.0033 (.0067)	-.0007 (.0075)
Board size		-.0003 (.0009)	-.0008 (.0011)	-.0002 (.0012)	-.0005 (.0009)	-.0010 (.0010)	-.000 (.0012)
Previous deals		.0019** (.0007)	.0007 (.0010)	.0012 (.0011)	.0017** (.0007)	.0008 (.0009)	.0013 (.0010)
Relative payment		.0066 (.0056)	.0097 (.0059)	.0160** (.0065)	.0051 (.0053)	.0072 (.0055)	.0121** (.0060)
SPRNT		.2186 (.2310)	.1727 (.3320)	-.0445 (.3320)	.1190 (.2195)	.2062 (.3024)	.1443 (.3275)
Leverage		-.0060* (.0033)	-.0041 (.0038)	-.0077* (.0044)	-.0048 (.0032)	-.0041 (.0036)	-.0073* (.0041)
Buyer size		.0005 (.0020)	.0014 (.0022)	.0004 (.0024)	.0013 (.0019)	.0018 (.0022)	.0014 (.0023)
Buyer industry	**1**	-	-		-		
	2	-	-	-	-	-	-
	3	.0301 (.0254)	.0699** (.0290)	.1107*** (.0315)	.0194 (.0251)	.0447 (.0279)	.0833*** (.0297)
	4	-.0176 (.0202)	-.0156 (.0226)	-.0185 (.0219)	-.0219 (.0205)	-.0229 (.0218)	-.0299 (.0214)
	5	-.0157 (.0230)	-.0241 (.0284)	-.0304 (.0308)	-.0142 (.0226)	-.0227 (.0263)	-.0371 (.0280)
	6	-.0358 (.0250)	-.0392 (.0286)	-.0184 (.0284)	-.0414* (.0251)	-.0463* (.0279)	-.0313 (.0282)
	7	-.0103 (.0288)	-.0170 (.0336)	-.0110 (.0346)	-.0157 (.0282)	-.0282 (.0317)	-.0229 (.0318)
	8	-.0476 (.0438)	-.0802 (.0590)	-.0827 (.0558)	-.0579 (.0424)	-.0933* (.0548)	-.0989** (.0524)
	9	-.0104 (.0215)	-.0248 (.0251)	-.0191 (.0260)	-.0137 (.0218)	-.0310 (.0241)	-.0279 (.0247)
	10	-	-	-	-	-	-
Target industry	**1**						
	2	-	-	-	-	-	-
	3	.0927*** (.0201)	.0913*** (.0236)	.3050*** (.0237)	.0972*** (.0202)	.0666*** (.0222)	.2685*** (.0226)
	4	.0232 (.0178)	.0133 (.0212)	.0178 (.0202)	.0242 (.0182)	.0150 (.0200)	.0205 (.0197)
	5	.0092 (.0218)	.0024 (.0309)	.0122 (.0346)	.0042 (.0219)	-.0066 (.0283)	.0051 (.0296)
	6	.0428* (.0224)	.0360 (.0263)	.0360 (.0263)	.0493** (.0228)	.0406 (.0256)	.0332 (.0277)
	7	.0172 (.0307)	.0294 (.0365)	.0258 (.0269)	.0206 (.0296)	.0341 (.0337)	.0337 (.0339)
	8	.0635 (0419)	.0760 (.0574)	.0792 (.0537)	.0656 (.0406)	.0758 (.0531)	.0799 (.0504)
	9	.0084 (.0183)	.0087 (.0222)	.0118 (.0221)	.0094 (.0187)	.0093 (.0210)	.0125 (.0212)
	10	-.0262 (.0193)	-.0172 (.0231)	-.0249 (.0226)	-.0267 (.0196)	-.0215 (.0218)	-.0270 (.0218)

8.8 Appendix 8: Alternative methods

In this appendix outputs are shown for the alternative statistical methods that were performed for the main analysis. The first alternative regression done is a median regression, here not the conditional mean of the dependent variable given the response variables is given, but the conditional median. This can aid in the reduction of the influence of outliers. The results of the median regression are similar to those of the OLS model (table 15 shows results for 3 day equally weighted abnormal returns) the model fit does seem slightly better. Secondly, a model is presented with just the groupthink dummy, the dummy has a negative effect on returns but is not significant. Finally, a model is presented that includes interaction terms with the groupthink proxy, again the results do not indicate a significant effect. Table 14 provides the ATET and ATE results for the propensity score matching procedure, again the results are not significant but the influence of groupthink is negative for both effects. Figure 9 displays how abnormal return movement is related to the groupthink categorical variable.

Table 14: propensity score matching results.

Treatment-effects estimations: propensity score matching based on probit treatment model # of observations: 852			
Abnormal return 3 day equally weighted	**Coefficient**	**Robust standard error**	**p-value**
ATET	-.0047	.0082	0.564
ATE	-.0043	.0113	0.699

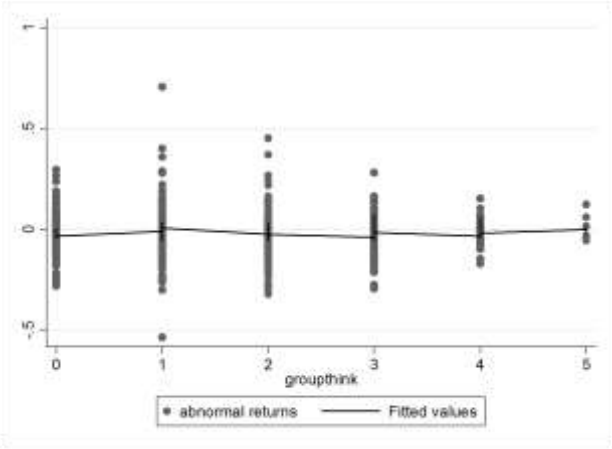


Figure 9: fitted regression line for groupthink categorical variable.

Table 15: alternative regression outputs.

Variables		Median Regression Ps.R^2:0.028 # obs: 852	Dummy model R^2: 0.024 # obs: 852	Interaction model R^2: 0.025 # obs: 852
Groupthink dummy			-.0036 (.0068)	.0126 (.0331)
Size*groupthink				-.0036 (.0025)
Female*groupthink				.0075 (.0145)
Previous deals*groupthink				.0008 (.0019)
Relative payment*groupthink				.0168 (.0174)
Classified board		-.0014 (.0055)		
Limitations to special meetings		-.0078 (.0056)		
Indemnification		.0018 (.0059)		
Chair is CEO		-.0032 (.0068)		
Meeting attendance		-.0052 (.0080)		
Females		.0004 (.0057)	.0038 (.006)	-.0053 (.01974)
Board size		-.0016 (.0010)	-.0010 (.0011)	.0032 (.0032)
Previous deals		.0088 (.0012)	.0009 (.0010)	-.0002 (.0026)
Relative payment		.0054 (.0051)	.0100 (.0060)	-.0105 (.0187)
SPRNT		.2318 (.2404)	.1439 (.3241)	.1492 (.3250)
Leverage		-.0091*** (.0028)	-.0033 (.0038)	-.0030 (.0038)
Buyer size		.0013 (.0019)	.0013 (.0022)	.0013 (.0022)
Buyer industry	**1**	-	-	-
	2	-	-	-
	3	.0786 (.0786)	.0632** (.0268)	.0753*** (.0279)
	4	.0072 (.0238)	-.0183 (.0215)	-.0213 (.0213)
	5	.0028 (.0275)	-.0275 (.0276)	-.0297 (.0274)
	6	-.0165 (.0296)	-.0428 (.0277)	-.0450 (.0279)
	7	.0064 (.0323)	-.0197 (.0327)	-.0259 (.0331)
	8	-.0499 (.0884)	-.0684 (.0595)	-.0804 (.0547)
	9	.0032 (.0253)	-.0276 (.0242)	-.0301 (.0241)
	10	-	-	-
Target industry	**1**	-	-	-
	2	-	-	-
	3	.0664 (.0772)	.0912*** (.0220)	.0895*** (.0228)
	4	.0096 (.0231)	.0154 (.0199)	.0180 (.0198)
	5	-.0025 (.0272)	.0031 (.0298)	.0058 (.0298)
	6	.0248 (.0291)	.0361 (.0254)	.0364 (.0256)
	7	.0401 (.0322)	.0313 (.0355)	.0359 (.0361)
	8	.0381 (0487)	.0683 (.0586)	.0781 (.0539)
	9	-.0005 (.0239)	.0103 (.0211)	.0141 (.0211)
	10	-.0331 (.0191)	-.0130 (.0205)	-.0135 (.0206)