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Master Thesis Financial Economics

Corporate Governance and M&A Performance

How Internal Corporate Governance Influences Acquiring-Firm Returns

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Preface and Acknowledgements

Completing this thesis for the Master Financial Economics has been a valuable and instructive experience. It offered me an in-depth understanding of Corporate Governance and M&A performance and developed my skills in research and analysis. Writing the thesis was a challenging and interesting last hurdle before finishing my Masters. The Financial Economics Master has been a perfect fit for my interests and has helped me figure out what I want the next step in my career to be.

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Abstract

In recent years, mergers and acquisitions (M&A) have reached record-breaking volumes, and the effect of internal Corporate Governance on acquiring-firm returns remains a crucial factor. This thesis explores the relationship between Corporate Governance mechanisms, specifically board composition, and the performance of M&A deals, using a sample of 1,817 US deals from 2007 and 2022 obtained from the Eikon database. The study examines the effect by using four OLS regression models with robust standard errors and identifies that board size and the percentage of independent directors are negatively related to the cumulative abnormal return (CAR), the proxy for M&A performance. Board diversity, and director ownership and voting power do not seem to significantly affect the M&A performance. Interestingly, the effect of board size and independent directors disappears during merger waves. In addition to these findings, several control variables, such as firm size and relative deal size, also influence the acquirer-returns, in and outside of merger waves.

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1. Introduction

Value maximization for existing shareholders is the primary goal of every company and its management. One way to create value is to engage in mergers and acquisitions (M&A). By merging with or acquiring another firm, the company can create synergies which in turn can lead to a growth in shareholder value. M&A has been extremely popular in recent times with the absolute record year in 2021 with more than $5 trillion in global volume (Morgan Stanley, 2022). Given the significant global volume, proper target evaluation is crucial before engaging in an acquisition. A firm should only engage if it can create value with good M&A performance.

To prevent potential value destruction during M&As, a board of directors is appointed to oversee and monitor the management. As M&A is a vital growth strategy, an effective and efficient board composition is essential. This raises questions like: What is the ideal board size? How many independent directors should be on the board? And many other interesting questions. These considerations form the internal Corporate Governance of a firm, assisting in establishing a trustworthy board to supervise these practices. It is interesting to explore if robust internal Corporate Governance leads to improved M&A performance, as this has not been studied extensively in the existing literature. In this study, the relation between these mechanisms and M&A performance, measured with the cumulative abnormal return (CAR) of an acquirer, is tested by using five OLS regression models with robust standard errors. The independent variables are divided into three groups: the board composition, the board diversity, and the director ownership and voting power.

The objective of this study is answered by testing four different hypotheses in the main regression analysis and an additional hypothesis in the merger wave analysis. This last hypothesis is added to the study as a robustness check and compares the coefficients of a model that has deals that were announced during a merger wave, with a model that only has deals outside of a merger wave.

The research question that is the primary focus of this study is the following:

Does Internal Corporate Governance Positively Affect the Acquiring-Firm Returns During Mergers & Acquisitions?

The internal Corporate Governance mechanisms included in the study are the board size, independent directors, CEO/Chairman duality, financial expertise, female directors, ethnic

minority directors, directors aged over 55, director ownership, and voting power. Next to these variables, there are also controls included to account for other factors that can influence the returns.

Data for this analysis is drawn from the Eikon database on M&A deals, focusing on U.S. deals between 2007 and 2022. This is combined with the CompuStat database on company financials, the CRSP database for stock price data, and a dedicated dataset for board information. The resulting sample consists of 1,817 completed deals.

The findings of this study, aimed at answering the question above, reveal that internal Corporate Governance partly affects abnormal returns. First, the board size of a firm is negatively and significantly related to CAR. This indicates that the larger the board of directors is, the lower the performance is after the announcement of an M&A deal. Furthermore, the percentage of independent directors is also negatively correlated with the dependent variable CAR. This is not what is expected when considering the existing literature but implies that the more independent directors a board has, the worse off the shareholders are due to lower returns. In addition to these findings, several control variables seem to influence the cumulative abnormal return. Firm size, leverage, profitability, and net profit margins consistently impact CAR across all models. Their consistent significance underscores the importance of firm-specific financial factors in M&A performance.

Concerning the analysis on merger waves, it is found that board size affects the CAR in times outside merger waves but not during. Furthermore, having a larger relative deal size during a wave seems to be beneficial, while it has a negative impact outside of a wave. In addition, the financial strategy is important during a wave, which means less cash at hand and more leverage. Tobin's Q positively affects the CAR during waves and profitability is only a predictor of M&A performance outside a merger wave.

The rest of this thesis will dive deeper into existing literature, outline the research methodology, present empirical results, and conclude with a discussion and summary of key findings. The definitions of the variables used in this study can be found in the Appendix.

2. Literature Review

In this section, the theory and empirics of the existing literature are discussed to help find the gaps and limitations, which will lead to the hypotheses of this study. The hypotheses that are used in this study are discussed after the relevant variables, in the sub-section *Corporate Governance and M&A & firm performance.*

2.1 Mergers and Acquisitions, and Firm Performance

A company seeks to maximize its performance, as it should act in the best interest of the shareholders (Jensen, 1986). Next to growing organically, mergers and acquisitions (M&A) have become a popular way for companies as an expansion strategy in recent years. Expansion is an effective way to try and maximize firm value. M&A can lead to economies of scale, financial growth, entering a new market, and more beneficial reasons (Gugler et al., 2003). M&A deals tend to increase the already present tensions between shareholders and management in major public businesses (Jensen & Meckling, 1976). Healy, Palepu, and Ruback (1992) studied the post-acquisition performance and found that the firm performance significantly increased after the acquisition. Is an M&A deal then generally beneficial? Agrawal and Jaffe (2000) studied acquisitions and performance, and they found that the majority of acquirers have negative abnormal returns on the days around the announcement of the deal. Negative abnormal returns are an indicator of weakening firm performance. In addition, it is said that large firms experience these negative abnormal returns while smaller firms earn larger and positive abnormal returns post-acquisition (Moeller et al., 2004).

Several theories help explain why companies and their directors engage in value-destroying acquisitions. The agency theory, empire-building, stewardship theory, and the Hubris hypothesis are discussed below.

2.1.1 Agency Theory and Empire-building

As said, there are several interesting theories that can help to explain why value-destroying or -enhancing acquisitions take place. The first is the agency theory, which is a theory that can be seen as a driver of Corporate Governance. It focuses on the relationship between parties where one is the agent, in this case, the directors on the board, and a principal, which in the case of an M&A deal is the shareholder. The principal thus gives the agent the responsibility to make decisions (Jensen & Meckling, 1976). The agent should always try to maximize the value for the principal while receiving an award in return. Due to information asymmetry, the

relation is skewed. An agent can use extra information that is unknown to the principal to their own advantage. In M&A deals, this could lead to directors engaging in value-destroying acquisitions because the shareholders do not know everything about a certain target. This is the conflict that arises and is called the agency problem, where the agents act in their favour instead of acting in the interest of the principal. The agency problem is frequently portrayed as the relationship between shareholders and management, with shareholder principals aiming for value maximization, whereas management agents have goals of gaining power and building an empire, commonly referred to as the "empire-building" theory. The separation of ownership is the reason that this problem arises, as the interests of both parties are no longer aligned. It can be that as the agent has less control, he wants to invest less in maximizing value, leading to the moral hazard problem (Jensen & Meckling, 1976). It can also be the case that the directors choose to invest more than necessary, overinvestment, which is risky when there is an excess of cash to invest. The directors can engage in negative net present value (NPV) projects (Jensen, 1986), while this cash should go to the shareholders to maximize their earnings and value. Why acquisitions frequently result in negative returns for acquiring firms can be attributed to managers' willingness to pay for rewards to themselves that are of no value to shareholders (Shleifer & Vishny, 1988). This is essential for this study as Corporate Governance can help solve these problems.

The first way to prevent the problem from arising is by monitoring the agent. This means that the shareholders (principal) evaluate the effectiveness of the directors (agent) (Alchian & Demsetz, 1972; Fama & Jensen, 1983). Monitoring makes sure that the agent does not destroy value for the principle by favouring their own interest (Alchian & Demsetz, 1972). The downside is that monitoring at an active level comes with monitoring costs and can also lead to limiting the directors in their day-to-day jobs as they would be over-managed. Monitoring is the most vital role of the supervisory board, which has the task of controlling the executive directors. They must review choices made by management to make sure that they are acting to maximize shareholder value (Fama & Jensen, 1983). Another method is by having regular reports published, making sure that the shareholders are kept informed on the current company's situation (Leuz & Wysocki, 2016). Regarding M&A, if the directors want to engage in an acquisition, they are informed at an early stage and can stop the deal from going through if needed.

Aligning interests is another important solution to the agency problem. This may be accomplished by a company having a suitable corporate governance framework (Shleifer &

Vishny, 1997). It can be done in several different ways, with the most important method using performance-based compensation for the agent. By doing this, agents earn more and thus maximize their compensation, which leads to better performance of the total firm (Jensen & Murphy, 1990). This is in favour of the principle and aligns the interests of both parties, solving the agency problem. If the company performs well, the directors receive a higher bonus, for instance. Equity ownership is another method to align interests. If they own a significant percentage of the firm, they profit from maximizing shareholder value as well (Jensen & Meckling, 1976). Stock options for example can help to incentivize the directors, as they profit from a rise in firm value as well (Jensen & Murphy, 1990).

Misalignment can lead to empire-building behaviour, which then can lead to value-destroying acquisitions (Jensen, 1986). When agents are acting in their own interest and trying to expand the company beyond what is optimal, it is also known as empire-building. This often evolves due to the prestige and power that comes with a bigger and more complex company (Williamson, 1964). These acquisitions take place even though they destroy shareholder value and thus can lead to worse operating profits (Shleifer & Vishny, 1989).

Important to note that these mechanisms discussed above lead to the best performance in practice when they are combined (Shleifer & Vishny, 1997).

2.1.2 Stewardship Theory

This theory can be seen as the counterpart of, or the 'managerial motivation alternative' for, the agency theory (Donaldson, 1990a, 1990b; Barney, 1990). Directors are motivated because they want to achieve, and they feel the need to become successful with the company. They feel satisfied working for the firm and take responsibility for what happens in the daily operations, as well as their performance (Donaldson & Davis, 1991). Compensation is not the main driver of these managers, but pride and recognition from the shareholders and competitors. This leads to making choices that will not make themselves better financially and make the firm stronger (Etzioni. 1975). Another main difference with the agency theory is that the stewardship theory states that the interests are aligned. In other words, the director wants to be a 'good steward' for the shareholders. They do what is good for the company without the necessity of monitoring. The performance of the directors is not limited by their own motivation, only by how the executive is constrained by the organizational structure when the ideas for high performance are not clear. (Donaldson, 1985). Every director needs a clear role description and structure to become the steward for the company. Contrary to the agency

theory, it is beneficial if there is CEO and Chairman duality, as this gives one person the authority and power. This makes sure that there is one plan for high performance and no doubts on how to get there. The duality of the CEO and Chairman will be discussed more extensively in a later section.

As for mergers and acquisitions, the stewardship theory expects directors to engage in M&A deals that are aligned with the shareholders as they have the intention to achieve long-term goals and maximize shareholder value. They want the company to grow as much as necessary instead of building an empire for their own purpose (Donaldson & Davis, 1991). This is again the opposite of what is expected in the agency theory, where an agent acts in their interest when there are no monitoring and aligning mechanisms in place. It can thus be seen as a positive theory on how agents and principals work together, leading to an environment without monitoring and control.

2.1.3 Hubris Hypothesis

Richard Roll (1986) stated in his paper "The Hubris Hypothesis of Corporate Takeovers" that M&A deals are influenced by the overconfidence of the acquiring company. CEOs have the belief that when a certain company is acquired, they can run it more efficiently. This often leads to paying a higher price than necessary for the target. There are three motives for acquisitions, according to Hayward and Hambrick (1997); synergies between the target and acquirer, weak management at the target company, and overconfidence of management (Hubris). As they often believe in the first two motives, the acquiring management tends to pay more than the intrinsic value of the target, leading to bad results for the combined entity following the acquisition (Hayward & Hambrick, 1997).

What makes this 'Hubris hypothesis' troublesome in the context of M&A deals is that it is a cognitive bias from an individual who makes the decisions (Malmendier & Tate, 2008). These overconfident CEOs engage in acquisitions and overpay, leading to value-destroying deals. As stated before, directors should always act in the interest of the shareholders. It can be concluded that the 'Hubris hypothesis' is a threat to acquisitions, and therefore, strong corporate governance is needed to monitor, control, and align incentives.

2.2 The (Growing) Importance of Corporate Governance in the United States

Corporate Governance has evolved into an important aspect of a well-performing business in the modern-day landscape. It can be defined as the mechanisms, or tools, by which the

management of a firm is monitored, managed, and controlled (Shleifer & Vishny, 1997). As elaborated on in the previous section, there are several theories that have driven the need for Corporate Governance mechanisms. Furthermore, the importance of strong Corporate Governance has grown because of the desire for transparency and the growing complexity of the firm's organization. In this section of the literature review, the focus will be on the development and the growing significance of Corporate Governance in the US, as the sample consists of US firms only.

The field of Corporate Governance has seen significant developments to cope with driven by the changing economy, new regulations, and the changes in social values towards, for example, the environment (Cheffins, 2013). There has been continuous pressure to adapt to the challenges that businesses face. In the beginning of the development of Corporate Governance, businesses were often family-owned and only had a few shareholders. Businesses started growing, and with that, the number of shareholders grew with it, as more investments were needed, separating control and ownership. This is what essentially led to the agency problem, as discussed before, which needed monitoring and control.

In the US, measures taken by the government have played a major role in shaping the Corporate Governance landscape. The 2002 Sarbanes-Oxly Act, for example, was implemented after several severe corporate frauds took place, such as the Enron and WorldCom failures, and was developed to improve transparency and accountability (Romano, 2004). Until then, the federal regime had mostly been composed of disclosure obligations as opposed to actual corporate governance standards, which were generally left to state law. Another important Act that has been implemented more recently is the Dodd-Frank Act of 2010. It was implemented in response to the global financial crisis of 2008-2009 and consists of reforms to the credit rating agencies (CRA) market (Dimitrov et al., 2015). This led to well-known CRAs, such as Moody and Standard & Poor, being more protective of their reputation (Becker & Milbourn, 2011). The corporate scandals and the global financial crisis have supported the need for strong corporate governance. Firms committing fraud and the financial system collapsing have emphasized that there must be stricter oversight and better risk management in place.

As stated before, Corporate Governance is continuously evolving as it must keep up with new trends and challenges. The most important topic nowadays is ESG factors (Environmental, Social, and Governance). Every (listed) company must take these factors into account if they want to be interesting to investors. Investors and shareholders expect ESG reports and regular

updates on how the company will go forward considering ESG. Next to increasing the value of the firm benefiting shareholders, management must improve firm performance on ESG dimensions as well (Eccles & Serafeim, 2013). The Governance dimension includes board diversity, executive compensation, and transparency, and this will be an important part of this study. Next to ESG, companies also must cope with the rise of digital technology, especially artificial intelligence. These trends are changing businesses in how they operate, and with this, it creates challenges and opportunities for firms' Corporate Governance. Lastly, globalization continues to influence firms and their need for strong governance. Expanding to other countries with other regulatory standards can lead to challenges and issues, and it is therefore, key to having strong Corporate Governance in place. This is also important for acquiring a firm in another country.

It can be concluded that Corporate Governance is becoming more important, facing pressure from new regulatory challenges and emerging trends in ESG and digitalization.

2.3 The Effect of Corporate Governance on M&A Deals

Several studies have examined the effect of corporate governance on returns and acquisition performance. Masulis, Wang, and Xie (2007) studied the effect of antitakeover provisions on acquirer returns. As control variables, they used deal, firm, and board characteristics, with the latter being the most interesting to this study. They find that managers who are more protected by antitakeover mechanisms are more likely to get involved in acquisitions that destroy shareholder value. This is in line with the agency theory as more antitakeover provisions provide the managers with a certain protection in their day-to-day business, and this can lead to self-serving empire-building and destroying shareholder value. The study also finds that separation of the roles of the CEO and Chairman leads to higher returns for the acquiring company, and this is in line with the findings from the paper written by Core, Holthausen, and Larcker in 1999. Harford et al. (2012) conducted a similar study to Masulis et al. (2007), also using the same sample assumptions. They find that entrenched managers, in other words, managers who work for firms with many takeover provisions, make value-destroying acquisitions. This value destruction is due to several factors. The first factor is that the managers seem to avoid private targets, even though these firms create more value than public companies. They avoid these firms because these firms need extra monitoring, which is time-consuming. Also, the managers want to complete the deal as fast as possible for their own purposes. This leads to them overpaying, which does not help with maximizing shareholder

value. Lastly, the directors choose low synergy targets, which is an indication of empire-building as there is no extra value generated. Loderer and Martin (1997) studied the effect of executive stock ownership on the abnormal returns surrounding acquisitions at the time of announcement. They concluded that there was no relationship but also stated that this could be due to the size of the acquisitions in their sample. The authors added to this by stating that it could also be that stock ownership was only one of many mechanisms influencing returns following acquisitions.

In the remaining part of this literature review, several governance mechanisms will be discussed that could influence M&A deals. The effects of these mechanisms on returns post M&A deals have not been studied extensively in the existing literature, especially not within the time frame of this study, and therefore it is interesting to discuss them. The mechanisms are divided into three subgroups: Board composition, Board diversity, and Director's ownership and voting power.

2.3.1 Board Composition

Board Size

How many directors on the board is optimal for firm performance? It can have a significant impact on how the board can function and, therefore, also on their decisions to engage in M&A deals. When a firm has a large board, it will have more different perspectives. The downside could be that it slows down the decision-making process, which could cause a firm to fall short when they are trying to buy a strong target. Balance is thus very important. There have been several studies that looked at board size and firm performance. Hermalin and Weisbach (2003), for example, state in their paper that board size has a negative relation with firm performance. This means that the more directors on the board, the worse a firm performs. They also mention that firms with smaller boards and higher proportions of outside directors tend to make better decisions for the firm, and acquisitions. Jensen (1993), and Lipton and Lorsch (1992) add to this by stating that when boards become too large, the agency problem arises. In 1996, Yermack found evidence for this statement when he found a relation between Tobin's Q and board size. However, they add to this that there are issues with the empirical work on board size and firm performance, as the variables related to the board are often endogenous. Firm performance is determined by the work of previous board members and influences the decisions that future board members will make. Lehn, Patro, and Zhao (2003) find similar results, stating that there is no robust relation found between performance and

board size when the characteristics are treated as endogenous variables. The authors advise researchers to use caution when establishing exogenous correlations between company performance and board size (Yermack, 1996). Board size and its influence on acquirer returns in acquisitions remains unclear, and therefore, it is an interesting variable to study.

Board Independence

The number of independent versus dependent directors on the board is another factor that has been studied in its relation to firm performance. Independent directors are all directors on the board who are not involved with the day-to-day operations of the firm. These outsiders are part of the board to give their objective insights regarding important matters. There have been several studies measuring the influence of independent directors on firm performance. Hermalin and Weisbach (1991) and Bhagat and Black (2000) studied the relationship between Tobin's Q and the proportion of independent directors. They all found that there is no significant relationship between this proportion and performance. The same issue was the case when using accounting performance measures instead of Q. In 2003, Hermalin and Weisbach suggested that board composition is not related to firm performance, which they derived from the existing empirical literature. Another approach to measuring the relation, which also found another result, was used by Rosenstein and Wyatt (1990), where they studied the reaction of the price of a stock on the day that the firm announced they were going to add independent directors to the board. Results indicated that there was a 0.2 percent statistically significant increase in these prices after the announcement was made. Jensen (1993) stated that the only dependent director on the board should be the CEO, as other outside directors will not criticize the CEO's decisions. It is difficult to say what the relationship between outside directors and firm performance is, especially in M&A deals. Therefore, this is an interesting variable to include in trying to explain cumulative abnormal returns.

CEO / Chairman Duality

Nowadays, in US firms, the function of the Chair of the board is more often held by an independent director instead of the CEO. There has been a positive trend in recent years, with currently 57% of S&P 500 firms separating the CEO and Chairman, which was 43% a decade ago (Spencer Stuart, 2022). Furthermore, 36% of S&P 500 Chairmen were truly independent and not a former CEO or another former manager, while this was 23% in 2012 (Spencer Stuart, 2022). The CEO/Chairman duality is closely linked to the agency problem (Kesner & Dalton, 1986). The main goal of the board of directors is to monitor management to make

sure that they maximize shareholder value. There must be an impartial stance towards decision-making, and this is more likely to happen if the Chairman is independent. The board's objectivity is affected when the CEO serves as its Chairman (Donaldson & Davis, 1991). A CEO is more likely to make decisions that are not in favour of the owners when there is a duality in place. On the other hand, there are also studies that support the stewardship theory in relation to duality and state that those who hold organizational roles are driven by a need to succeed, a desire to feel intrinsically satisfied after completing challenging work, a desire to exercise responsibility and authority, and a desire to be recognized by their peers and superiors (McClelland, 1961). Managers want to do a good job and be a good steward for the company. This can lead to full authority for the CEO, and as he makes choices that are in the best interest of the firm, it makes it less challenging when the CEO is also the Chairman, as there is no room for doubt and debate (Donaldson & Davis, 1991). In contrast to duality, which reflects lesser board oversight and greater CEO power, non-duality represents higher board supervision and weaker CEO authority (Finkelstein et al., 2009). As for empirical evidence, Dalton et al. (1998) found no significant relation between duality and firm performance. A relationship only exists on a theoretical basis (Dalton et al., 2007). Jensen (1993) stated that when the CEO is also the Chairman, this conflicts with the independence of the board, which is needed to overcome managerial entrenchment and self-serving, and therefore, duality always leads to worse firm performance. Several other researchers, such as Daily and Dalton (1992, 1993, 1994a), Baliga et al. (1996), and Rechner and Dalton (1989), all found that duality did not affect firm performance. The studies all used public US firms in their sample, and they used several different performance measures, such as ROI, ROE, P/E ratio, and shareholder return. Boyd (1995) found a positive effect on performance, using the ROI as a measure. For his study, he used a sample of 192 publicly traded US firms in 1980. In 1994(b), Daily and Dalton found a negative effect of duality on performance, which was further reinforced by the board's proportion of associated directors. All these studies used different performance measures than what this study will conduct, namely the CAR surrounding M&A deals. Therefore, it is an interesting governance measure to study, also because there is no main conclusion on what the effect of duality has on performance in general.

Financial Expertise

Following a wave of accounting scandals, there has been a serious change in the composition of the board, as regulators demand financial expertise to be included. They should have "an

understanding of generally accepted accounting principles and financial statements", which will help the board to act in the best interest of the shareholders and other stakeholders (Güner et al., 2006). According to Harris and Raviv (2008), financial experts may be better equipped to effectively oversee top management since they can access knowledge about risks of specific financial transactions for less costs. They can also identify financial opportunities that may seem risky investments to the executives. On the contrary, it can also lead to taking riskier decisions to try and benefit the shareholders of the bank, for example (Acharya et al., 2010). It can thus go both ways in the discussion on whether financial experts on the board lead to better firm performance.

Güner et al. (2006) studied the effect of financial expertise on the board of directors, investment bankers in this case, on the outcome of acquisitions, using a sample of public mature US firms. They find that these boards lose 1% more around takeover bids than firms with no financial expertise on the board. These investment bankers, thus, do not help in achieving maximum value for the shareholders. Harris and Raviv find that before the financial crisis in the period 2003 – 2006, banks with financial competence on the board fared somewhat better than banks without these professionals. However, during the crisis (2007 – 2008), they found a strong negative relation between financial expertise on the board and stock performance. Defond et al. (2005) studied the reaction of the market after the announcement of appointing financial experts as outside directors on the board. They measure this by examining the 3-day CAR of 702 appointed financial experts. The authors find a positive market reaction when the firm appoints accounting financial experts. In addition, the results hold for companies that already have relatively strong governance in place. As can be seen in the existing literature, there is no general research conducted on the effect of financial expertise on acquirer returns after an M&A deal is announced.

2.3.2 Board diversity

Gender Diversity

Gender diversity has been a hot topic worldwide, especially in the Western world. There has been an ongoing desire to have more female employees represented in the top positions of a firm. Even though in recent years, the number of women that have been hired for S&P 500 companies has grown, only 32% of S&P 500 board directors are women (Spencer Stuart, 2022). However, this is an 86% increase compared to the number of women on the board in 2012. 100% of the firms in the S&P 500 have at least one female director, and 98% include at

least two or more, compared to 61% in 2012 (Spencer Stuart, 2022). These are positive developments, and the main reason for this is there has been a desire for corporate governance reforms that help increase diversity in the board. Many European countries, led by Norway in 2003 by demanding 40% of women on boards to be female by 2008 (Ahern & Dittmar, 2012), have implemented quotas for women on the board.

The importance of gender diversity for shareholder value and firm performance has been studied extensively with mixed results. Post and Byron (2015) performed a meta-analysis of 144 studies on gender diversity and company performance. The results suggest that firms with more women on the board tend to have higher accounting returns, even though the effect is small, but that this does not lead to better market performance. The relationship between female board directors and higher accounting returns is stronger in countries that have stronger shareholder protection. Carter et al. (2003) find a significant positive relation between gender diversity and firm value after examining 1,000 Fortune firms. On the contrary, Adams and Ferreira (2009) find that the average effect of gender diversity on the board of directors has a negative effect on firm performance. At first glance, the results seem positive in this study, but after including control variables, this switches. They add to this that gender diversity could potentially only increase firm performance when the firm has weak shareholder rights and destroys value for companies that already have strong protection in place.

Ethnic Diversity

Next to more women in the boardroom, there also has been an ongoing debate on having a more ethnically diverse set of directors. Existing theory states that having a diverse racial board will lead to different opinions. These different opinions will provide well-considered decisions (McLeod et al., 1996). Jackson (1992) stated in his study on racial diversity: "Heterogeneity in decision-making and problem-solving styles produces better decisions through the operation of a wider range of perspectives and a more thorough critical analysis of issues". There is an upward trend with respect to racial groups on the board of directors. In 2022, 46% of newly appointed independent directors were Black or African American, Hispanic or Latino, or Asian (Spencer Stuart, 2022). 26% of the directors was Black or African American, which was only 11% in 2020 (Spencer Stuart, 2022). Also, 93% of all S&P 500 firms nowadays disclose their racial or ethnic composition, while this was only 60% a year earlier in 2021 (Spencer Stuart, 2022).

To test if there is indeed a relationship between ethnic diversity and firm performance, several studies have been conducted. Herring (2009) found a positive relationship between racial diversity and sales revenue. He states that growth and innovation are accelerated when there is a diverse board, even though there could be communication barriers and group conflicts. In addition, Carter et al. (2003) also find a positive and significant relationship between racial minorities on the board and firm performance (Tobin's Q). They find a coefficient of 1.5975 for minority directors on the board and 7.5735 for the percentage of minorities on the board. These findings imply that companies with minority directors tend to be more valuable. Carter et al. (2010) found contradicting results in another study, where they did not find a significant positive or negative relationship between Tobin's Q and ethnic diversity. Their conclusion is that ethnic diversity on the board of directors does not influence the performance of the firm. Again, these studies focus on firm performance with performance measures such as Tobin's Q and do not study the announcement effects surrounding M&A activity. It is thus interesting to examine if there is a relation between ethnic diversity on the board and the CAR following an announcement.

Age of Directors

The last component of diversity on corporate boards that will be discussed is the age of the directors. Having a variety of age groups on the board can provide different perspectives, knowledge, and resources, which can all help in making the correct decisions in favour of the shareholder (Kang et al., 2007). Wegge et al. (2008) stated in their study that age diversity has a positive effect on the performance of the team, especially in situations with complex tasks at hand. In addition, Østergaard et al. (2011) assert that the economic, technical, and political developments that each generation encounters have an impact on their viewpoints, ideas, and attitudes. Next to this, it is also argued that having an excessive age diversity could negatively influence firm performance as communication barriers and conflicts can arise (Murphy & McIntyre, 2007).

The empirical studies on age and firm performance have mixed results. Dagsson and Larsson (2011) find that when using ROA as the dependent variable, there is no significant and positive relationship with age diversity. When using Tobin's Q as the dependent variable, they did find a positive and significant effect in the relation. However, they did exclude small and medium-sized firms for these findings. McIntyre et al. (2007) found a result that was the opposite of Dagsson and Larsson. In their findings, there was a positive and significant relation between age diversity and firm performance when using Tobin's Q as the dependent

variable, but not when using the ROA. According to the study by McIntyre et al. (2007), the optimal standard deviation for age diversity is 9.06 years. The average director age was 59 years in their study.

It will be interesting to see what the effect of age diversity will be on M&A performance, as there has not been a study related to this.

2.3.3 Directors Ownership and Voting Power

Director Ownership

As the directors on the board have the authority to make decisions for the firm in the name of the shareholders, board ownership can be a helpful Corporate Governance tool to align incentives. Directors will feel the incentive as the decisions they make also impact their own values (Bhagat & Bolton, 2019). Aligning incentives will lead to better monitoring and control. This will then create more value for the shareholders, which is the main goal of the board of directors. If the ownership becomes too excessive, this can lead to managerial entrenchment, which can lead to directors making decisions in their own favour rather than maximizing firm value (Morck et al., 1988). Several studies have been conducted on the relationship between stock ownership and firm performance. Bhagat and Bolton (2019) study the relationship and find that there is a positive relationship between the ownership of board members and operating performance, specifically in the future. They suggest that director stock ownership is the best measure of corporate governance to align incentives and maximize shareholder value. Morck et al. (1988) found that ownership should not exceed a certain threshold as this destroys firm performance. The authors studied the relation between ownership and Tobin's Q, and found that Tobin's Q first increases but later drops if directors have more than 5% stock ownership. Demsetz and Lehn (1985) did not find a significant relationship between stock ownership and firm performance, using a sample of 511 large US corporations.

As for M&A deals, Loderer and Martin (1997) studied the relationship between executive stock ownership and acquisition performance by using the abnormal stock return at the announcement date. They also study Tobin's Q relation, as this is more widely used in the literature. The findings of their study indicate that there is no relation and that stock ownership thus does not improve performance. The studies on this M&A and ownership relation are limited, and the effect on performance is not clear and conclusive. Therefore, it is

an interesting mechanism to include as a variable in a study on the relationship between CAR and Corporate Governance.

Voting Power of the Board

The voting power of the board of directors is a crucial component of corporate governance since it establishes who has influence over choices that must be made, such as whether to select a certain CEO or engage in certain acquisitions. According to the agency hypothesis, it could be advantageous to have a voting system that is staggered to prevent directors from acting in their own best interests. This will lead to better corporate governance and, in the end, to better firm performance (Jensen & Meckling, 1976). However, it can also lead to indecisiveness if voting power is spread. Having more concentrated voting power helps to make faster decisions and it can also lead to better firm performance if the strategy is strong (Fama & Jensen, 1983). As for M&A deals, having a staggered degree of voting power could help in better research before a deal is made, making sure that the company does not engage in bad and value-destroying acquisitions. And, on the other hand, if the voting power is more concentrated, a firm can benefit from opportunities faster when decisions need to be made quickly to capture the market timing (Masulis et al., 2007).

Empirical evidence on voting power on the board is limited and therefore it is an interesting mechanism to include in the analysis. Together with the board composition and board diversity mechanisms, a strong relation between internal mechanisms of Corporate Governance and cumulative abnormal returns after M&A deal announcements can be established.

In addition to these three hypotheses stated there is an additional hypothesis that tests all internal Corporate Governance mechanisms and their relation to M&A performance.

2.4 Merger Waves

As an interesting sub-analysis, the relation between Corporate Governance mechanisms and the CAR in M&A deals will be compared using a subset of deals that take place within a merger wave and with deals that did not take place in a wave. History has shown that deals come in waves, which can be seen as a period where there are more M&A deals than usual. They seem to be clustered when looking at time series of M&A activity, and there are several theories for why merger waves occur. The first one is written by Jovanovic and Rousseau (2002), who state that well-managed companies, which add value and therefore have a high Tobin's Q, increase their M&A activity, which can then lead to a merger wave. According to

Rhodes-Kropf and Viswanathan (2004), merger waves occur as a result of managerial timing of market overvaluations of their companies. Another explanation is that merger waves take place due to shocks within several industries at the same time (Harford, 2005), as these shocks drive up stock prices and lead to more profitable M&A deals. Gugler, Mueller, and Weichselbaumer (2012) provide a behavioral explanation of why merger waves happen. They state that during stock market booms, the constraints on companies' management drop as the optimism on the markets rises, which leads to more value-destroying mergers.

This last theory shows the importance of why it is necessary to understand merger waves as this influences shareholder wealth. If an M&A deal destroys value, then the deal should not happen in the first place. Do all mergers and acquisitions lead to value destruction, or can there be value creation when a company expands through M&A activity? Moeller, Schlingemann, and Stulz (2005), for example, find that during the merger wave of 1998 – 2001, acquiring-firm shareholders lost a total of $240bn, mainly caused by a few acquisitions by high valued companies. The companies furthermore performed very poorly after these M&A's were completed. On the other hand, studies have found that public acquisitions lead to positive abnormal returns for acquiring firms (Alexandridis et al., 2017). These mixed findings show that there is still research to be done, especially regarding value creation or destruction during merger waves, as there is no consensus on the creation or destruction of value through corporate M&A activity within the academic world.

2.5 Gaps and Limitations

The existing literature on the relationship between Corporate Governance and abnormal returns following the announcement of an M&A deal is limited. There are several gaps and limitations that explain why this study is an interesting addition. First, a more recent time frame is a good addition, as most of the existing literature has focused on data from the 90s and 2000s, and as businesses change together with the competitive landscape, more recent data improves the findings. Businesses, for example, nowadays must focus on solving issues and concerns that arise due to ESG requirements, and this is significantly different than in the existing studies. Secondly, there has been a focus on external mechanisms in most of the studies, such as the antitakeover provisions and regulatory enforcement. There have been several studies that study one internal mechanism, for instance, CEO and Chairman duality, but there is not enough evidence to make proper conclusions. Internal mechanisms can have a significant impact on firm-performance, and therefore this is the focus of this study. In addition, the interaction of these internal mechanisms has not been studied, as stated before.

The focus often is on one mechanism of firm performance. However, these mechanisms interact with each other and can help in establishing a broader view of the relationship between Corporate Governance and cumulative abnormal returns. Lastly, it can be interesting to compare returns influenced by Corporate Governance during merger waves and outside of these waves. These four gaps combined lead to an interesting analysis of the relationship and thus potentially will lead to interesting findings that are tested using five hypotheses that are formulated in the next section.

2.6 Hypothesis Formulation

In this study, there are several hypotheses formulated with different key assumptions. These hypotheses help to fill in the gaps and limitations in the existing literature. They are all tested using variables that will be explained in the methodology section and will help to answer the main research question of this paper.

The first hypothesis will be related to the variables for which board composition is tested. The four variables are combined to not omit the effect of one on the other.

> *H1: A smaller board, more independent directors, splitting the CEO and Chairman, and financial expertise on the board, leads to better M&A performance in terms of the CAR.*

For the second hypothesis, the three diversity variables are used:

> *H2: Diversity in terms of gender, ethnicity, and age leads to better M&A performance in terms of the CAR.*

Similarly, the third hypothesis uses the two director ownership variables:

> *H3: Director ownership and voting power on the board leads to better M&A performance in terms of the CAR.*

In the fourth hypothesis, all variables of the three subgroups are combined to find out what the total effect is of all internal Corporate Governance mechanisms combined:

> *H4: Board composition, board diversity, and director ownership combined lead to better M&A performance in terms of the CAR.*

The last hypothesis is a robustness check where the difference between the effects of these variables is measured in and outside of merger waves:

> *H5: Corporate Governance has a stronger influence on M&A performance in terms of the CAR inside merger waves.*

3. Methodology

3.1 Sample Selection

For this study, the Wharton Research Data Services (WRDS) website is used, together with Refinitiv Eikon, to extract M&A deals. WRDS is the largest and most well-known data provider for business, and they have several different interesting databases that will be used in this study. As for the sample, US domestic firms are chosen, as these companies have the most information available with respect to financials and board composition. The firm can be public, private, a subsidiary, a division, or a branch. Companies where the acquirer controls less than 50% of the shares before the transaction and 100% after the transaction are used, and the deal value of the acquisition must be at least $1m. The timeframe for this study will be 2007 – 2022, meaning that the announcement date of the acquisition must be within this period, as the Directors data (see data collection section) is available for this period. This period gives a good overview of how returns are influenced by corporate governance over time, and it gives insight into the recent situation. It also gives the opportunity to find a potential new merger wave, as the last real merger wave that is often discussed in the literature was from 2003 to 2007.

3.2 Data Collection

The data will be collected from several databases. First, the acquisition data is retrieved from the Refinitiv Eikon database, which was formerly known as the SDC Platinum database. Using the assumptions stated above, the search gives us approximately 14,000 deals between 2007 and 2022. Next, the annual financial statement data is extracted from the CompuStat database, which is accessible through WRDS. For the corporate governance mechanisms, the Directors dataset via SAS Studio is used, which contains information on the board and director characteristics. Stock return data is gathered from the CRSP database, which is also accessible through WRDS. As the stock information is shown as daily returns, the CRSP database has over 250m observations. This leads to an overflow in Stata, which leads it to crash. To solve this issue, all columns are deleted except the date and CUSIP code. This file is then merged with the date and CUSIP of the master file which consists of the Refinitiv Eikon data, CompuStat data, and the director's data. That CRSP file with only CUSIP and announcement date is then merged with the original CRSP file after which all companies are

dropped that are not included in the master data file. All databases are merged using the CUSIP code and the year of the announcement of the M&A deal. All CUSIP codes must be the same length which could mean that they must be shortened for certain databases to match. Lastly, to calculate the Cumulative Abnormal Return (CAR), the Event Study tool from WRDS is used. The CUSIP codes from the last merged database are plugged in, and the length of the event study is decided on as the study takes place. Typically, this would be a 5-day CAR but could deviate depending on the study.

3.3 Merging the Data

The datasets are merged one-by-one, starting with the Refinitiv Eikon acquisitions dataset and the CompuStat financial statements dataset. To merge the data, the CUSIP code and the year of the deal are used as the unique identifier. Before this first merger, the acquisition data contained 8,760 observations. After merging with the CompuStat dataset, there are 4,906 observations matched. Next the Directors dataset, containing information on the board members per company, is merged with the main dataset. After this merger, there are 2,055 observations left for the analysis. Then the CRSP stock dataset is merged with the main data and this leaves 1,983 deals in the sample. Lastly, the Event Study data is added, containing the dependent variable CAR, and this leaves 1,919 deals in the sample. After removing deals that missed values for certain control variables, as well as removing the free cash flow control variable, the final sample consists of 1,817 deals between 2007 and 2022.

3.4 Sample Distribution

In Table II below, the sample distribution can be found. The table shows the number of acquisitions per year, together with the percentage that this amount represents of the total sample. It also reports the average and median of the market value of equity on the sixth day before the announcement, the deal value, and the relative deal size. The number of acquisitions fluctuates between 89 and 154 deals, apart from 2020 and 2022. For 2020, the reason could be that COVID-19 had a big impact on the M&A landscape, as companies put their expenses on hold due to uncertainty. In 2022, the lower number could be explained by the fact that not all information is available on the deals that have been announced in 2022.

Table I
Sample Distribution by Announcement Year (2007-2022)
The sample consists of 1,817 completed M&A deals in the U.S. (retrieved from the Eikon database) between
2007 – 2022 and have board- financial- and stock information available in their specific databases.

Year	Number of Acquisitions	Percentage of Sample	Mean Acquirer Market Value of Equity ($mil) (Median)	Mean Deal Value ($mil) (Median)	Mean Relative Size (Median)
2007	139	7.7	11,246 (2,121)	313 (77)	0.100 (0.030)
2008	131	7.2	13,065 (1,889)	340 (75)	0.098 (0.041)
2009	94	5.2	19,053 (3,269)	1,643 (168)	0.098 (0.033)
2010	154	8.5	15,977 (2,182)	494 (134)	0.108 (0.043)
2011	152	8.4	16,061 (2,560)	614 (90)	0.103 (0.030)
2012	146	8.0	20,412 (2,472)	456 (109)	0.101 (0.039)
2013	130	7.2	15,346 (2,873)	640 (175)	0.145 (0.051)
2014	155	8.5	19,278 (3,330)	868 (170)	0.118 (0.038)
2015	128	7.0	20,572 (4,081)	1,805 (300)	0.162 (0.072)
2016	90	5.0	29,141 (4,512)	1,743 (507)	0.179 (0.081)
2017	89	4.7	26,612 (7,411)	2,613 (649)	0.182 (0.087)
2018	100	5.5	33.289 (4,633)	1,941 (472)	0.241 (0.108)
2019	89	4.9	25,213 (6,601)	4,329 (445)	0.181 (0.079)
2020	65	3.6	69,152 (6,199)	3,292 (827)	0.254 (0.092)
2021	102	5.6	64,900 (6,409)	1,934 (583)	0.195 (0.070)
2022	56	3.1	69,140 (13,063)	1,962 (572)	0.115 (0.044)
Total	**1,817**	**100**	**25,335 (3,475)**	**1,326 (230)**	**0.141 (0.049)**

3.5 Variables

3.5.1 Dependent Variable

As the dependent variable, the Cumulative Abnormal Return (CAR) is used, which is
retrieved by using the Event Study tool in WRDS. In studies where M&A activity is

considered, it is very common to use this and not the returns itself. First, this measure helps to isolate the impact of the deal announcement. The aim is to determine the effect of the event on the returns; therefore, the expected return is subtracted from the realized return. If the total return is chosen, then there are several other factors included that may influence this, such as the firm and market factors. Another reason to use the CAR as the dependent variable is because it shows the impact of the announcement over a certain event window. The CAR needs several parameter inputs to calculate its value. The event window is the period over which one calculates the abnormal returns. This is a window that starts days before the event and ends the same number of days after the event. The event, in this case, is the deal announcement date. The choice of window is related to when the market is expected to react to the announcement. In this study, the window will be (-1, +1), meaning that the window starts one day before the announcement and ends one day after.

Next, the estimation window is chosen, which is the period that is used to estimate expected returns. These expected returns are deducted from the actual returns. This leads to abnormal returns for the specific acquiring company. When choosing the window, it must be considered that it needs to be a window that has no other moments that can significantly influence the acquiring firms' returns. This will be 200 days in this study, starting 205 days before the announcement and ending six days before the announcement. Using this window, as well as the expected reaction window, keeps the assumptions aligned with the paper written by Moeller et al. (2005) "Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave".

To find the expected return of a certain security, a market model is used. This can be the Capital Asset Pricing model, and the Fama-French factor models, among others. For this study, the Fama-French three-factor model is used. This is an extension of the most common market model, the CAPM. It takes three factors into account: the market return (CAPM), the size of a firm (SMB), and the book-to-market ratio (HML). The model was developed by Fama French with as the main objective to overcome the limitations that arise when using the CAPM model (Sattar, 2017). In the same study conducted by Mahnoor Sattar in 2017, he found that the Fama-French 3-factor model had a higher adjusted R-squared compared to the CAPM. The goal of the study was to compare the CAPM and the Fama-French model to see which could better explain the excess returns of five companies on the Dhaka Stock Exchange. The outcome suggests that the Fama-French model thus better predicts variation in the returns. This supports choosing the model in the event study to find the CAR.

3.5.2 Independent Variables

The independent variables, or the explanatory variables, are related to corporate governance, as this study examines the relationship between corporate governance and acquiring-firm returns. These independent variables are expected to have an impact on the dependent variable stated above. Variables used can be grouped together as the board characteristics of an acquiring company. All variables, excluding the board size and the duality variable, are calculated as a percentage variable, meaning that they represent the amount in percentage. The data for these variables is retrieved from the Directors dataset. For example, the Female variable represents the percentage of females on the board. The higher the variable, the more females are active on the board of directors.

The first variable measures the size of the board of directors. This represents the total number of directors that are active at the time of the announcement of the acquisition. As stated before, there are several different views on the effect of the size of the board on returns, and therefore it is an interesting variable to include.

The next variable measures the independence of the board of directors. It is calculated as the number of independent directors divided by the total number of directors. This leaves the percentage of independence of the board, where a higher portion should have a positive influence on the CAR.

A third variable, the CEO/Chairman Duality variable, is a dummy variable that has a value of 1 if the CEO is also the Chairman of the board, and 0 otherwise. This duality can have a negative influence on returns as this leads to agency costs, as previously discussed.

Financial expertise can help during the decision-making process before entering an M&A deal. This variable measures the percentage of directors with financial expertise on the board at the time of the acquisition announcement. This variable is found in the directors' data set, where the variable Financial Expert states "Yes" if the director has a financial background. Financial background means that the director fulfills the requirements of the stock exchange and thus has accounting or related financial management expertise. This is an additional requirement that was implemented with the Sarbanes-Oxly Act (ISS Director Definitions). More financial expertise could lead to a higher CAR for the firm.

Another important independent variable is the number of females on the board. In the studies that were discussed in the literature review, the conclusion was that females have a positive

influence on firm performance when they are included on the board of directors. This variable is calculated as the number of female directors over the total board size, leading to a proportion variable.

Like the previous variable, ethnic minority on the board is an important variable. Again, ethnic diversity seems to lead to improved firm performance following several studies conducted in this field. Ethnic Minority is calculated as the percentage of ethnic minorities on the board of directors, leading to a proportion variable. If the value is 0.4, this indicates that 40% of the board of directors is non-Caucasian/white. A higher percentage means more diversity and should lead to better performance.

The age of the directors of the board is another variable used in this analysis to help explain the CAR. The threshold that is chosen for older managers is if they are over 55 years old. The number of directors over 55 is divided by the total number of members on the board, with as output thus a percentage. For the age under 18 and over 100, the values are removed as these are not realistic. It is interesting to see if a high percentage of older directors has an impact on the CAR and in what direction. For example, is it more beneficial to have a large portion of young directors, or is experience and thus an older age better for firm performance? Following existing literature, it seems that diversity in age has the most positive impact on firm performance. However, some state that older and more experienced directors lead to higher returns.

Director stock ownership leads to better firm performance. Therefore, the variable for the percentage of directors that own less than 1% is interesting to study. If the majority owns less than 1%, the board is not incentivized to perform better, and this could lead them to engage in value-destroying acquisitions. This is not beneficial for the other shareholders of the firm. The variable is calculated as the number of directors that own less than 1% divided by the total board size, again leading to a portion variable. A higher portion could lead to worse firm performance.

The last independent variable is the voting power of the board. Board members can have significant managerial control if they have a high percentage of voting power. This can impact decision making, as shown in the literature study. The variable is calculated as the total amount of voting power that the board has together. A higher value indicates a higher portion of voting rights.

3.5.3 Control Variables

Next to the dependent variable and the independent variables discussed in the previous section, there is also the need for a set of control variables. These variables are held constant throughout the analysis so that these variables do not influence the relationship between the dependent variable and independent variables. As stated before, the control variables can be divided into two groups: firm characteristics and deal characteristics. First, the firm characteristics are discussed. In parentheses, the item from the CompuStat list and its corresponding number are shown:

Firm size is calculated by applying the natural logarithm to the total assets of the acquirer. The total assets (at, item 6) can be found in the CompuStat dataset.

The Leverage variable is also obtained from the CompuStat dataset. It is calculated by adding short-term debt (dlc, item 34) and long-term debt (dltt, item 9), and divided by the total assets (at, item 6).

The Profitability of an acquirer is measured by dividing the net income (ni, item 172) by total assets (at, item 6).

Tobin's Q, or the firm's value, is calculated as the market value of assets over the book value of assets. This is done by subtracting the book value of equity from the total assets, adding the market value of equity, and then dividing this by total assets ((item 6 – item 60 + item 25 * item 199) / item 6). The method used to calculate Tobin's Q is consistent with the approach adopted by Masulis et al. (2007).

The net profit margin is calculated as the net income (ni, item 172) over sales (sale, item 12). And, lastly, the cash holdings are calculated as the total cash (ch, item 162) over total assets (at, item 6).

For the deal-specific control variables, there are two different measures included in the analysis:

The first one is the relative deal size of the acquisition, calculated as the deal value over the market value of equity on the sixth day before the announcement. This information is retrieved from the acquisition data and the CRSP data. The market value of equity is calculated by multiplying the share price with the shares outstanding on the sixth day before the announcement.

The second variable is the diversification measure, which shows if the acquired company was active in the same industry or if the acquirer was diversifying. This is a dummy variable that takes on 1 if it is not the same industry and 0 otherwise. This information is retrieved from the acquisition dataset.

3.6 Pearson Correlation Matrix

The Pearson correlation matrix shows the correlation coefficients between all the variables that are included in this study. The goal is to investigate the relation between these coefficients and to identify possible relations that need further care. The correlation coefficients range between -1 and 1. 1 means perfect positive linear correlation, and -1 the opposite.

In the matrix shown in Table II, several interesting correlations can be found. First, the relation between firm size and board size has a significant coefficient of 0.592, indicating a moderate positive relation between the two variables. This could indicate that firms with more people on the board have bigger firm sizes, which is measured as the natural logarithm of total assets. This result does not indicate a causal relation between the two variables but indicates that bigger boards could explain bigger firms.

In addition, there is a 0.651 correlation coefficient between net profit margin and profitability, which is significant at the 1% level. This potentially positive moderate relationship could indicate that higher profits lead to a higher net profit margin. This seems to be a rational relationship. Again, this does not mean that one causes the change in the other, as there are potentially other factors that influence this relation.

The more financial expertise on the board of directors seems to lead to a higher percentage of directors that own less than 1% in shares, with a coefficient of 0.436. Again, even though this is positive and significant, it is not conclusive, and it cannot be stated that one leads to the other. Several other significant correlations exist, which can be found in the matrix below.

Drawing conclusions and stating that there are causal relationships between variables can be a risky assumption. Researchers must be careful with this, and further investigation of these relations is necessary to make decisions. The regression analysis will help in answering these correlations, as well as answering the formulated hypothesis in section 2.6.

Table II: Pearson Correlation Matrix

The sample consists of 1,817 completed U.S. M&A deals between 2007 – 2022, downloaded from the Eikon database. *P*-values are in parentheses. Variable definitions can be found in the Appendix.

	CAR	Board Size	Independent	Duality	Financial Expert	Female	Ethnicity	Age over 55	Owner	Voting power	Firm size	Leverage	Profit	Tobin's Q	Net profit margin	Cash holdings	Relative deal size
Board Size	-0.105*																
	(0.000)																
Independent	-0.064*	0.141*															
	(0.006)	(0.000)															
Duality	-0.025	0.104*	0.112*														
	(0.286)	(0.000)	(0.000)														
Financial Expert	0.018	-0.137*	0.099*	-0.024													
	(0.444)	(0.000)	(0.001)	(0.309)													
Female	-0.024	0.243*	0.278*	-0.003	0.089*												
	(0.309)	(0.000)	(0.000)	(0.887)	(0.000)												
Ethnicity	0.003	0.045	-0.000	0.102*	-0.143*	-0.060											
	(0.901)	(0.054)	(0.998)	(0.000)	(0.000)	(0.011)											
Age over 55	-0.031	0.170*	0.136*	0.099*	0.076*	0.045	-0.102*										
	(0.194)	(0.000)	(0.000)	(0.000)	(0.001)	(0.058)	(0.000)										
Owners	-0.031	0.171*	0.274*	-0.003	0.436*	0.278*	-0.218*	0.169*									
	(0.183)	(0.000)	(0.000)	(0.896)	(0.000)	(0.000)	(0.000)	(0.000)									
Voting power	0.030	-0.059	-0.327*	-0.005	-0.092*	-0.129*	0.009	-0.150*	-0.222*								
	(0.203)	(0.012)	(0.000)	(0.832)	(0.000)	(0.000)	(0.694)	(0.000)	(0.000)								
Firm size	-0.101*	0.592*	0.241*	0.150*	0.056	0.408*	0.013	-0.232*	-0.278*	-0.131*							
	(0.000)	(0.000)	(0.000)	(0.000)	(0.018)	(0.000)	(0.589)	(0.000)	(0.000)	(0.000)							
Leverage	0.064*	-0.009	0.055	-0.031	0.110*	0.172*	-0.058	0.070*	0.099*	-0.011	0.165*						
	(0.007)	(0.689)	(0.020)	(0.194)	(0.000)	(0.000)	(0.014)	(0.003)	(0.000)	(0.627)	(0.000)						
Profit	0.027	0.020	0.041	0.064*	0.005	0.047	-0.008	-0.0153	-0.030	0.013	0.044	-0.103*					
	(0.260)	(0.406)	(0.079)	(0.007)	(0.832)	(0.044)	(0.749)	(0.516)	(0.203)	(0.582)	(0.061)	(0.000)					
Tobin's Q	0.034	-0.073*	0.041	0.035	-0.015	0.130*	-0.031	-0.120*	-0.017	0.015	-0.063*	-0.069*	0.428*				
	(0.154)	(0.000)	(0.081)	(0.138)	(0.518)	(0.000)	(0.181)	(0.000)	(0.465)	(0.524)	(0.007)	(0.003)	(0.000)				
Net profit margin	-0.033	0.139*	0.012	0.041	-0.016	0.042	-0.062*	0.036	0.053	-0.013	0.166*	-0.056*	0.651*	0.165*			
	(0.159)	(0.000)	(0.596)	(0.084)	(0.490)	(0.074)	(0.009)	(0.121)	(0.024)	(0.583)	(0.000)	(0.018)	(0.000)	(0.000)			
Cash holdings	0.009	-0.191*	0.014	-0.029	0.004	-0.109*	0.064*	0.119*	-0.027	0.008	-0.268*	-0.221*	0.141*	0.298*	-0.041*		
	(0.716)	(0.000)	(0.553)	(0.218)	(0.861)	(0.000)	(0.006)	(0.000)	(0.252)	(0.738)	(0.000)	(0.000)	(0.000)	(0.000)	(0.079)		

Table II: Pearson Correlation Matrix (Continued)

The sample consists of 1,817 completed U.S. M&A deals between 2007 – 2022, downloaded from the Eikon database. *P*-values are in parentheses. Variable definitions can be found in the Appendix.

	CAR	Board Size	Independent	Duality	Financial Expert	Female	Ethnicity	Age over 55	Owner	Voting power	Firm size	Leverage	Profit	Tobin's Q	Net profit margin	Cash holdings	Relative deal size
Relative deal size	-0.003	-0.046	-0.043	-0.098*	0.069*	0.022	-0.059	0.030	0.052	-0.038	-0.032	0.210*	-0.180*	-0.166*	-0.106*	-0.050	
	(0.889)	(0.052)	(0.066)	(0.000)	(0.003)	(0.339)	(0.012)	(0.201)	(0.027)	(0.107)	(0.168)	(0.000)	(0.000)	(0.298)	(0.000)	(0.033)	
Diversifying merger	0.026	-0.128*	0.047	-0.028	0.040	0.014*	-0.001	-0.065*	-0.023	0.012	-0.112*	0.008	0.021	-0.021*	-0.066*	0.033*	-0.078*
	(0.261)	(0.000)	(0.043)	(0.242)	(0.092)	(0.549)	(0.963)	(0.006)	(0.329)	(0.602)	(0.000)	(0.732)	(0.376)	(0.369)	(0.005)	(0.162)	(0.001)

3.7 Method of Analysis

In this study, the dependent variable is the 3-day cumulative abnormal return (CAR) of a company. As this is a continuous variable, the appropriate method of analysis will be a linear regression. There are several hypotheses that will be tested, and each has a different model. Below, the models that correspond to the hypothesis are explained.

H1: A smaller board, more independent directors, splitting the CEO and Chairman, and financial expertise on the board leads to better M&A performance.

The cumulative abnormal return (CAR) is used as the proxy for M&A performance. The model that follows hypothesis 1 is:

$$CAR_{i,t} = \alpha + \beta_1 Size_{i,t} + \beta_2 Independence_{i,t} + \beta_3 Duality_{i,t} + \beta_4 FinExp_{i,t} + \mu_{i,t} + \varepsilon$$

In this model, the dependent variable, CAR, is the cumulative abnormal return for company i at the time t of the acquisition announcement. α is the intercept of the model and β_i are the coefficients that measure the effect of each of the variables, in this case the board size, board independence, CEO and Chairman duality, and financial expertise on the board. $\mu_{i,t}$ corresponds to the control variables used in this study, for company i at the time t of the acquisition announcement.

H2: Diversity in terms of gender, ethnicity, and age, leads to better M&A performance in terms of the CAR.

The model that follows hypothesis 2 is:

$$CAR_{i,t} = \alpha + \beta_1 Gender_{i,t} + \beta_2 Ethnicity_{i,t} + \beta_3 Age_{i,t} + \mu_{i,t} + \varepsilon$$

Again, in this model the dependent variable, CAR, is the cumulative abnormal return for company i at the time t of the acquisition announcement. α is the intercept of the model and β_i are the coefficients that measure the effect of each of the variables, in this case the gender diversity, ethnic diversity, and the age diversity of the board of directors. $\mu_{i,t}$ corresponds to the control variables used in this study, for company i at the time t of the acquisition announcement.

H3: Director ownership and voting power on the board leads to better M&A performance.

The model that follows hypothesis 3 is:

$$CAR_{i,t} = \alpha + \beta_1 Ownership_{i,t} + \beta_2 Power_{i,t} + \mu_{i,t} + \varepsilon$$

The dependent variable, CAR, is the cumulative abnormal return for company i at the time t of the acquisition announcement. α is the intercept of the model and β_i are the coefficients that measure the effect of each of the variables, in this case the director ownership in terms of stock, and the voting power of the board. $\mu_{i,t}$ corresponds to the control variables used in this study, for company i at the time t of the acquisition announcement.

H4: Board composition, board diversity, and director ownership combined leads to better M&A performance

The model that follows hypothesis 4 is:

$$CAR_{i,t} = \alpha + \beta_1 Size_{i,t} + \beta_2 Independence_{i,t} + \beta_3 Duality_{i,t} + \beta_4 FinExp_{i,t} + \beta_5 Gender_{i,t} + \beta_6 Ethnicity_{i,t} + \beta_7 Age_{i,t} + \beta_8 Ownership_{i,t} + \beta_9 Power_{i,t} + \mu_{i,t} + \varepsilon$$

In this fourth model, all variables are included to measure the overall effect on the internal Corporate Governance mechanisms on the CAR.

3.8 Robustness Check

As a robustness check the sample is analyzed by splitting the sample into inside and outside merger wave deals. The model of H4 is used to test H5, and the difference between in and outside coefficients of each variable will help to determine the effect of merger waves. The fifth hypothesis was as stated before:

H5: Corporate Governance has a stronger influence on M&A inside merger waves.

The model that follows hypothesis 5 is:

$$CAR_{i,t} = \alpha + \beta_1 Size_{i,t} + \beta_2 Independence_{i,t} + \beta_3 Duality_{i,t} + \beta_4 FinExp_{i,t} + \beta_5 Gender_{i,t} + \beta_6 Ethnicity_{i,t} + \beta_7 Age_{i,t} + \beta_8 Ownership_{i,t} + \beta_9 Power_{i,t} + \mu_{i,t} + \varepsilon$$

In this fifth model, all variables are included to measure the overall effect on the internal Corporate Governance mechanisms on the CAR. Comparing the in and outside merger wave samples will help to create robust results of the analysis.

4. Results

In this section, the results of the regressions analysis shown in section 3 are discussed. First, the descriptive statistics are shown, then the regressions for H1 up to H4. Next, the results of the robustness check are presented, H5, which examines the effect of a merger wave on the key variables.

4.1 Descriptive Statistics

Table III below shows the descriptive statistics of all variables included in the regression models. The total sample consists of 1,817 completed M&A deals in the U.S. between 2007 and 2022. As stated before, all deals are obtained from the Eikon database and included if all financial information needed for control variables and the board information for the independent variables is available. The statistics are divided into six panels; Panel A includes the dependent variable, which is the cumulative abnormal return; Panel B contains the variables related to board composition; Panel C shows the board diversity variables; and Panel D has the information for the last independent variables that are related to ownership and voting power. Panels E and F represent the control variables containing the bidder and deal characteristics. Taking a closer look at the most essential variable in this analysis, the CAR, there is a positive mean, which indicates that over half of the deals included in the sample experienced positive returns. The average CAR has a value of 0.359, suggesting that, on average, the deal announcements generated positive abnormal returns of 0.359%. As a comparison, in the study by Masulis et al. (2007), the average cumulative abnormal return was slightly lower but similar, with a value of 0.215 or 0.215%. Interestingly, in a paper by Moeller et al. (2005), the authors find a substantially higher CAR for the whole time frame between 1980 – 2001 with a value of 1.1%. Kaplan and Weisbach (1992) find a negative cumulative abnormal return of 1.49% in their study "The Success of Acquisitions: Evidence from Divestitures. These comparisons provide interesting insights for the cumulative abnormal return found in this study. The range of abnormal returns differs in different studies and environments.

Next to comparing the mean CAR found in this study, several other key variables are compared to the existing literature below.

The average board size is 9.5 for the total sample of this study, while the mean percentage of independent directors on the board is 80.1%. In a paper on the impact of board size on firm performance, written by Guest (2009), the average board size was slightly lower, with a value

of 7.2, while the percentage of outsiders was even substantially lower, with an average percentage of 41.0%. In a paper written by Güner et al. in 2008 they find that, on average, 18.0% of directors are financial experts, whereas this study finds a mean of 22.0%. The same paper also states that the average age of directors on boards in their sample is 60 years old, which is line with the average of 79% of directors older than 55 in our sample. In addition, 8.5% of directors are female, according to their findings, which is close to half of what this study finds with 16.3%. Carter et al. (2010) find an 11.6% mean for the percentage of female directors, while they find a 9.2% average for minority directors which is substantially lower than the average in this study, 19.2%. As for the CEO / Chairman duality dummy, it has an average of 0.48 in this study, while Carter et al. find a mean of 0.71 in their 2010 study.

Comparing the mean Tobin's Q with the study by Masulis et al. (2007), the results are similar with both a mean of 1.98. The standard deviation is lower for this study, 1.27, compared to 1.91 in the Masulis et al. paper. The average relative deal size, diversifying acquisition dummy, and the leverage variable are similar but differ slightly. The relative deal size is 0.14 compared to 0.16 in their study, whereas the dummy of diversifying acquisition is 0.26 in this study, compared to 0.20 in theirs. The leverage variable is higher, comparing 23.7%, with 15.0%.

The rest of the descriptive statistics can be seen in Table III below.

Table III

Descriptive Statistics

The sample consists of 1,817 completed M&A deals in the U.S. (from Eikon database) between 2007-2022, made by firms covered by the director database. Variables are defined in the Appendix.

Variable	Mean	St Dev	Q1	Median	Q3
Panel A: Cumulative Abnormal Return (Dependent Variable)					
CAR	0.359	5.553	-1.747	0.234	2.236
Panel B: Board Composition					
Board size	9.533	2.338	8	9	11
Independent board (%)	80.08	9.99	75.00	81.2	88.89
CEO/Chairman duality	0.481	0.500	0	0	1
Financial expertise (%)	21.61	13.54	11.11	20.00	30.77
Panel C: Board Diversity					
Female directors (%)	16.31	11.53	10.00	14.29	25.00
Minority directors (%)	19.24	17.47	9.09	15.38	27.27
Age > 55 (%)	79.15	16.08	70.00	80.00	90.00
Panel D: Director Ownership and Voting Power					
Director ownership (%)	84.57	26.52	83.33	91.67	100.00
Voting power (%)	5.07	12.22	0.00	1.00	3.93
Panel E: Bidder Characteristics (Control Variables)					
Firm size	8.501	1.693	7.235	8.420	9.664
Leverage (%)	23.69	14.64	9.57	22.15	35.09
Profitability (%)	4.80	7.30	1.28	4.68	8.20
Tobin's Q	1.98	1.27	1.19	1.62	2.33
Net profit margin (%)	9.63	17.68	3.86	8.45	15.94
Cash holdings (%)	9.63	10.00	2.04	6.27	13.82
Panel F: Deal Characteristics (Control Variables)					
Relative deal size	0.141	0.239	0.017	0.049	0.150
Diversifying acquisition	0.262	0.440	0	0	1

4.2 Main Regression Results

In this section, the results of the first four hypotheses will be discussed, forming the primary analysis of this study. Each hypothesis has its a regression model that has been elaborated on in the methodology section. The results are shown in Table IV. Furthermore, three diagnostic tests are conducted to fulfill the assumptions of an OLS-regression. The first ones are the tests for heteroskedasticity, to test for the assumption of homoskedasticity of the residuals. This means that it is expected that the variances of the error terms are constant across levels of the independent variables. The tests are the Breusch-Pagan/Cook-Weisberg test and the White test. The *P*-values of the two tests are below the significance threshold of 1%, 0.000 for the Breusch-Pagan/Cook-Weisberg test and 0.000 for the White test, which indicates strong evidence to reject the null hypothesis and that the constant variance in the error terms is violated. To solve this violation, robust standard errors are included in the regression, which are designed to provide more reliable standard error estimates under conditions of heteroskedasticity.

The second test is to test for multicollinearity in the regression model, which is the situation in which two or more independent variables are highly correlated. To test for this, the Variance Inflation Factor (*VIF*) is used. If the factor is greater than 10 it could indicate that there is a problematic amount of multicollinearity. The cutoff of 10 is often used as a rule of thumb, in some studies they choose the number 5 as a cutoff to be more conservative. The results of this test indicate that there is no issue of multicollinearity as the independent variable with the highest *VIF* is *board_size,* with a *VIF* of 1.69. The median is 1.40 for all independent and control variables. This value is far below the cutoffs of 5 or 10, so no further action was needed to solve the issue. All values for VIF per independent or control variable can be found in the Appendix.

The last test is to check whether these residuals are approximately normally distributed. This analysis uses the skewness and kurtosis test is used, which is the *sktest* in Stata. The *P*-values for the skewness, kurtosis, and the two combined are below the significance level of 1%, which indicates that the residuals are not normally distributed. Non-normal residuals can affect the validity of the regression models. To solve this, the dependent variable CAR could be transformed using the natural logarithm. However, as the dependent variable also can take on negative values, this is not a solution in this study. Another solution for this issue is to use robust standard errors, just as with the test for heteroskedasticity. Therefore, the regression

results discussed in the rest of the results section include robust standard errors to solve the violations found with the tests discussed above.

Model 1, Hypothesis 1

For the first hypothesis, the effect of board composition on the 3-day cumulative abnormal return (CAR) is tested in model 1 as stated before. It thus includes the variables board size (*board_size*), percentage of independent directors (*Independent_pct*), CEO and Chairman duality (*Firm_Duality*), and the percentage of financial experts on the board (*fin_exp_pct*), which together form the way a firm's board is composed. The model has an adjusted R-squared of 0.0191. This value indicates that approximately 1.9% of the variation in the dependent variable CAR is explained by the independent and control variables included in the model. The analysis reveals several significant relationships between the composition and M&A performance. First, the *board_size* coefficient of -0.0011654 is significant at the 10% level with 7.7%, which indicates that an additional board member leads to a 0.11654% decrease in the CAR. This result suggests that larger boards lead to lower abnormal returns, which can be due to less effective decision-making in M&A deals. Next to this result, the percentage of independent directors on the board (*Independent_pct*) seems to affect the CAR negatively. The coefficient of -0.0273226, or -2.7%, indicates that for a 1% increase in independent directors on the board, the CAR decreases with 2.7%. The result is significant at the 5% level with a p-value of 0.050, or 5.0%. These findings suggest that more independent directors will lead to lower returns, possibly due to conservative or risk-averse strategies. The coefficients *Firm_Duality* and *fin_exp_pct* are not statistically significant under the 1%, 5% or 10% level, and therefore, it cannot be said that there is a substantial effect on the CAR.

Looking at the control variables that are included in this model, firm_*size, leverage, profitability, and net_profit_margin* are all significant at either the 1% or 5% level. The coefficient of the firm size of the acquirer is -0.002306, or 0.23%, indicating that when a firm size increases by 1%, the CAR decreases by approximately 0.23%, which is significant at the 5% level. Next, the leverage coefficient of 0.0254323, or 2.5%, indicates that higher leverage leads to higher CAR. Firms with higher debt levels could thus benefit more from an M&A deal. Leverage is significant at the 1% threshold. With a coefficient of 0.057234, equivalent to approximately 5.7%, profitability has a positive relationship with CAR. More profitable firms could experience higher cumulative abnormal returns after an M&A deal is announced, possibly due to confidence in their operations because of their strong financial performance.

This coefficient is significant at the 5% level. Lastly, slightly contradicting the profitability variable, the net profit margin coefficient negatively affects the CAR with 2.0%. This could indicate that firms with higher net profit margins are already performing well and thus will not gain substantially from a deal. The other control variables are not statistically significant in model 1, and they thus do not seem to have a strong effect on the returns of these firms.

Model 2, Hypothesis 2

In model 2 the second hypothesis is tested: the effect of board diversity on cumulative abnormal returns. As discussed, the independent variables in this model are the percentage of female directors on the board (*Female_pct*), the percentage of ethnic minorities on the board (*minority_pct*), and the percentage of directors older than 55 years old (*Age_55_older_pct*). The adjusted R-squared of this regression is 1.6%, which again shows how much of the variance in the CAR can be explained by the independent and control variables included in this model. It seems low, but this could be due to unobservable factors that influence the outcomes and is not uncommon in these cross-sectional studies. The coefficients for the female percentage and minority percentage are both positive, 0.0015121 and 0.0020454, respectively. This could indicate that the more females on the board and ethnic minorities, the higher the cumulative abnormal return. However, both coefficients are not statistically significant at any significance level (1%, 5%, and 10%). Therefore, it cannot be said that gender and ethnic composition strongly affect returns post-announcement. The coefficient of the percentage of directors older than 55 years old is -0.0022183, indicating that more older directors could have a negative effect on abnormal returns. Again, this coefficient is not statistically significant at the 10% level, and it cannot be said that there is a significant effect on the outcome. The three coefficients that together form the board diversity do not seem to influence the cumulative abnormal returns. Thus, board diversity alone does not predict M&A performance following these results.

As for the control variables, the same were used as in model 1, and the same outcomes can be seen. Just as before the coefficients of firm size, leverage, profitability, and net profit margin are all statistically significant at the 1% or 5% level. Firm size has a negative effect of 0.37%, leverage has a positive effect on abnormal returns of 2.7%, profitability has a 5.7% positive effect, and the net profit margin has a negative 2.0% effect. The signs of these coefficients are the same as in model 1 and thus have the same potential explanations. The remaining control variables are not statistically significant in this model.

Model 3, Hypothesis 3

The third model for the third hypothesis is the regression model that tests the effect of the ownership and voting power of the directors. It consists of the two previously discussed variables for the percentage of directors that own less than 1% of the business (*OWNLESS1_pct*) and the total voting power of the board (*voting_power_percent_board*). The control variables are again the same as in the previous two models. For this model, the adjusted R-squared is 1.6%, which is again relatively low, indicating that other factors potentially influencing the dependent variable are not included. The two independent variables' coefficients in this model are both (slightly) positive but not statistically significant at any significance level. This indicates that both the percentage of directors that own less than 1% of the firm, and the total voting power of the directors, have a relationship with the cumulative abnormal return in M&A deals.

Again, the same coefficients were statistically significant for the control variables. Firm size and leverage are significant at the 1% level, whereas the profitability and net profit margin coefficients are significant at the 5% level. Firm size has a negative effect of -0.36%, which is approximately near to the effect as in model 2. Leverage has a positive 2.7% effect, and profitability has a 5.7% effect, like the coefficients in model 2. Lastly, the net profit margin has a negative effect of 2.0% on the cumulative abnormal return.

Model 4, Hypothesis 4

In the last model of the primary analysis, all independent variables are included to test the total effect of internal governance mechanisms on M&A performance, which can be seen as the primary model of this analysis. Model 4 thus includes the variables for board composition, board diversity, and director ownership and voting power. The control variables are the same as in the previous three models. The adjusted R-squared of this regression model is 1.7%, slightly higher than models 2 and 3 but lower than model 1. The model thus does not explain a large portion of the variation in the dependent variable, which again indicates that other factors influence the abnormal return. The F-statistic of the model is significant at the 1% level, which shows that the whole model is statistically significant. Regarding the independent variables, the board size coefficient is statistically significant at the 10% level. The negative coefficient of -0.001209 suggests that larger boards are associated with a decrease in the dependent variable CAR. In addition, the percentage of independent directors on the board has a negative effect on the CAR and is statistically significant at the 10% level. With a 1%

increase in the percentage of independent directors, the cumulative abnormal return drops by 2.9%. The other independent variables in this model on the total effect of internal corporate governance are not statistically significant, and thus do not have a relation with the dependent variable. This indicates that board composition only partly influences the returns in M&A deals, whereas the board diversity, and the director ownership and voting power have no significant impact.

Looking at the control variables in model 4 the same set of variables are significant as in the previous models. Firm size is significantly and negatively correlated with the CAR at the 5% level. The negative coefficient of 0.0025067 indicates that larger firms might experience lower abnormal returns. The leverage coefficient indicates that for every unit increase in leverage leads to an increase of 2.50%. This coefficient is significant at the 1% level. It shows that companies with higher levels of debt have higher abnormal returns, which could be due to them taking more risk. Profitability is statistically significant at the 5% level with a positive coefficient of 0.0571592. This positive relationship signals that higher profits lead to higher abnormal returns. Lastly, the net profit margin is negative and significant with a coefficient of -0.0193217. This seems a contradictory finding as profitability has a positive coefficient, but it could be that other factors influence this.

Comparison to Existing Literature

Comparing the coefficients of the significant independent variables found in the main regression analysis to the existing literature gives exciting insights. First, for the board size of a firm, a coefficient significant in both model 1 and model 4, with the coefficient taking on a value of -0.0011654 in model 1 and -0.001209 in model 4. In the paper written by Guest in 2009, the results of his analysis showed a -0.140 negative relation between the natural logarithm of board size and share return. In addition, Haniffa and Hudaib (2006) found a 0.048 relation between the ROA and the board size. These measures are different from the cumulative abnormal return used in this study but indicates what the effect is on firm performance. The other significant independent variable found in these models is the percentage of independent directors on the board. In model 1 the variable has a coefficient of -0.0273226, and in model 4 the coefficient is -0.0290419. Haniffa and Hudaib also studied the relation between the proportion of outside (independent) directors and firm performance. The coefficient they found in their results is equal to -0.027, indicating a negative relation with the

ROA. This is a similar effect as found in this study; however as stated before, it is another measurement for financial performance.

Table IV
Main Regression Analysis

The sample consists of 1,817 completed M&A deals in the U.S. (from the Eikon data base) between 2007-2022, made by firms covered by the Director database. The dependent variable is the 3-day Cumulated Abnormal Return from the acquirer in percentage points. Variables are defined in the Appendix and the t-statistic is in parentheses based on standard errors adjusted for heteroskedasticity. *, **, *** stand for statistical significance based on two-sided tests ate the 10%, 5% and 1% level.

	(1)	(2)	(3)	(4)
Board Composition				
Board size	-0.001*			-0.001*
	(-1.77)			(-1.84)
Independent percentage	-0.027**			-0.030*
	(-1.96)			(-1.77)
CEO/Chairman duality	-0.001			-0.001
	(-0.26)			(-0.26)
Financial expertise	0.004			0.004
	(0.46)			(0.34)
Board Diversity				
Female directors		0.002		0.007
		(0.11)		(0.48)
Minority directors		0.002		0.004
		(0.26)		(0.49)
Age > 55		-0.002		0.000
		(-0.24)		(0.03)
Ownership and Voting Power				
Director ownership			0.000	0.001
			(0.02)	(0.24)
Voting power			0.006	0.001
			(0.61)	(0.08)
Bidder Characteristics				
Firm size	-0.002**	-0.004***	-0.004***	-0.003**
	(-2.35)	(-4.17)	(-4.44)	(-2.40)
Leverage	0.025***	0.027***	0.027***	0.025***
	(2.88)	(3.05)	(3.08)	(2.81)
Profitability	0.057**	0.057**	0.057**	0.057**
	(2.04)	(2.01)	(2.01)	(2.01)
Tobin's Q	0.001	0.001	0.001	0.001
	(0.59)	(0.52)	(0.57)	(0.50)
Net profit margin	-0.020**	-0.020**	-0.020**	-0.019**
	(-2.35)	(-2.36)	(-2.38)	(-2.27)
Cash holdings	-0.011	-0.012	-0.011	-0.011
	(-0.68)	(-0.73)	(-0.71)	(-0.70)
Deal Characteristics				
Relative deal size	-0.005	-0.004	-0.004	-0.005
	(-0.46)	(-0.37)	(-0.37)	(-0.46)

*** p<.01, ** p<.05, * p<.1

Table IV (Continued)				
Diversifying acquisition	0.001	0.001	0.001	0.001
	(0.29)	(0.28)	(0.29)	(0.26)
Intercept	0.050***	0.029***	0.027***	0.050***
	(4.04)	(2.88)	(3.30)	(3.24)
Number of obs.	1,817	1,817	1,817	1,817
Adjusted R-squared	1.9%	1.6%	1.6%	1.7%

*** p<.01, ** p<.05, * p<.1*

4.3 Merger Wave Analysis

As a robustness check, the effect of a deal being announced during a merger wave is tested. For this analysis, model 4 compares coefficients in two sub-samples. The first sub-sample consists of the deals from the total sample that took place during the merger wave. In this analysis, a new merger wave has been identified, which took place from 2010 to 2015. It can be said that this is the seventh merger wave that has taken place in history, even though this is not seen as an official merger wave in the existing literature on merger waves. These years together have a total of 865 deals in the sample. The remaining years together form the subsample outside of merger wave, which are the years 2007 to 2009, and 2016 to 2022. This sample has a total of 952 deals, which together with the wave sample gives U.S. the total number of deals that were included in the main regression analyses study, 1,817.

Model 5 – Hypothesis 5; In-wave Sample

The regression model of the wave sample analysis thus consists of 865 deals. It includes the same corporate governance variables and control variables as model 4, testing the total effect of internal corporate governance on M&A performance. Looking at the F-statistic the overall model is significant at the 1% level, which indicates that the model significantly predicts the cumulative abnormal returns. The adjusted R-squared of this model is substantially higher than the previous models, with a value of 5.6%, which is still low but not uncommon in a cross-sectional analysis. Diving into the independent variables, all coefficients are not statistically significant at any level. The coefficient for the percentage of directors that own less than 1% of the firm is the only coefficient that approaches the 10% threshold, with a p-value of 0.117. This result implies that there is no strong evidence that internal corporate governance mechanisms do not influence the cumulative abnormal returns during merger waves. It could indicate that during merger waves other factors have more effect on returns, which overshadows the governance mechanisms and their effect.

When considering the control variables and their coefficients, four variables are statistically significant at the 5% level, two at the 10% level. First, the firm size of an acquirer has a negative relation with the CAR, with a coefficient of -0.0027277 and a p-value of 0.043. Leverage on the other hand has a positive coefficient of 0.0328245 and a p-value of 0.007. Tobin's Q has a positive and significant relationship with the CAR at the 10% level, with a coefficient of 0.0040984, and a p-value of 0.056. Net profit margin has a negative coefficient with -0.0208006, and a p-value of 0.052. Lastly, cash holdings and the relative deal size have a statistically significant effect on the CAR, which is the first model where these controls have a significant relation. The variable cash holdings has a negative relation with the returns, with a coefficient of -0.0533248, which implies that the more cash a company holds with respect to the amount of total assets, the lower the CAR. With a coefficient of 0.034006, the relative deal size has a positive effect on the CAR. This indicates that the larger the relative deal size is, the higher the abnormal returns will be.

Model 5 – Hypothesis 5; Out-wave Sample

The second part of this analysis is rerunning the same model but this time with the sample of deals that were not announced during a merger wave. Following the discussion of these results, the coefficients of the in-wave and out-wave results are compared to see what the effect of the wave is on corporate governance mechanisms.

For this second part, the sample consists of 952 deals. The overall model has a p-value below the 1% significance level, indicating that the total model is a good predictor of the effect on CAR. The adjusted R-squared is lower than the value for the model with the in-wave sample, standing at 1.7%, thus indicating that this model accounts for 1.7% of the variability in the CAR. A closer look at the independent variables in this model shows that only board size is a negative and significant predictor of the abnormal returns, even though this is only at the 10% level. The coefficient of -0.0019781 indicates that with a unit rise in board size, the cumulative abnormal return drops by approximately 0.2%. *Independent_pct* has a p-value of 0.143, indicating a non-significant coefficient. This result suggests it might be worth investigating further, especially in larger or different samples. However, there is no statistically significant relationship between the percentage of independent directors and CAR in this analysis, which leads to non-conclusive findings. Other independent variables do not show a statistically significant coefficient, and thus do not have a significant influence on the abnormal returns in this analysis, using this dataset.

Analyzing the control variables shows that there are two control variables significant at the 10% level; profitability and the relative deal size. Profitability has a positive relation with the dependent variable, with a coefficient of 0.063467. This relation suggests that more profitable firms have a higher cumulative abnormal return. The relative deal size shows a negative coefficient of -0.0257042, which indicates that with a 1 unit increase the CAR drops by around 2.6%. The higher the relative deal size is, the lower the return would be. Another notable result is that of the net profit margin, as the p-value slightly exceeds the 10% threshold. The negative relation with the cumulative abnormal return is thus interesting to further investigate. However, in this analysis, the inverse relationship is not statistically significant. The remaining control variables do not have a statistically significant coefficient, or near significant, and thus do not influence the CAR in this analysis.

In-wave vs Out-wave

When comparing the two analyzed samples, there are several interesting findings to discuss. First, the models are both statistically significant at the 1% level. The in-wave sample has a slightly higher F-statistic, indicating that the combined variables are slightly stronger in predicting the CAR during the merger wave. Next, the in-wave adjusted R-squared is more than three times higher than the out-wave sample (5.6% versus 1.7%). The variables in the model explain the variability in the cumulative abnormal return better during merger waves. Also, the adjusted R-squared of this in-wave model is the highest value compared to all models in this study.

As for the independent variables included in the models, there is a significant difference between the two. Board size is a significant predictor of CAR in the periods outside of the merger wave but is not during the wave. Outside merger waves, a larger board is associated with lower abnormal returns. Interestingly, this is the only independent variable that is a significant predictor in any of the two models.

The control variables are associated with more significance than the independent variables in the model. The variables firm size, leverage, Tobin's Q, net profit margin, and cash holdings stand out in the in-wave analysis. Outside of the wave they are not significant, and this could indicate the importance of these controls during waves. For instance, it could be beneficial to have less cash in hand during a wave, as this could lead to a 5.3% decrease in CAR with a unit increase in cash. On the other hand, more leverage in these periods could positively influence the CAR with a 3.3% per unit increase. The variable profitability is statistically

significant in the out-wave sample but not in the in-wave sample, indicating that being more profitable as an acquirer benefits your returns outside a wave. Lastly, perhaps the most interesting finding is the flip in the sign of the coefficient of the relative deal size. In the in-wave model, the coefficient is positive, whereas it is negative in the out-wave model. This indicates that during a wave, it is beneficial to have a bigger deal size as it benefits your abnormal returns, while it has a negative impact on the CAR in a non-wave situation.

These differences in findings between the two models are interesting and can help in the conclusions of this study. However, it should be noted that the sample size is substantially smaller than when combining the two samples together, which can, of course, give biased results. Also, there is always the possibility that there are omitted variables that can have a strong impact on the dependent variable.

Table V

Merger Wave Regression Analysis

The sample consists of 865 completed U.S.M&A deals during the merger wave (5a) and 952 outside of the wave (5b) (from Eikon database) between 2007-2022, made by firms covered by the Director database. The dependent variable is the 3-day CAR from the acquirer in percentage points. Variables are defined in the Appendix and the t-statistic is in parentheses based on standard errors adjusted for heteroskedasticity. *, **, *** stand for statistical significance based on two-sided tests ate the 10%, 5% and 1% level.

	(5a)	(5b)
Board Composition		
Board size	-0.000	-0.002*
	(-0.53)	(-1.76)
Independent percentage	-0.006	-0.038
	(-0.32)	(-1.47)
CEO/Chairman duality	-0.002	0.000
	(-0.50)	(0.08)
Financial expertise	-0.007	0.014
	(-0.49)	(0.80)
Board Diversity		
Female directors	0.023	0.027
	(1.18)	(1.24)
Minority directors	0.003	0.008
	(0.24)	(0.74)
Age > 55	-0.007	0.004
	(-0.52)	(0.30)
Ownership and Voting Power		
Director ownership	-0.031	-0.002
	(-1.57)	(-0.26)
Voting power	-0.003	-0.011
	(-0.19)	(-0.58)
Bidder Characteristics		
Firm size	-0.003**	-0.002
	(-2.02)	(-1.18)

*** p<.01, ** p<.05, * p<.1

Table V (Continued)

Leverage	0.033***	0.013
	(2.72)	(1.06)
Profitability	0.065	0.063*
	(1.56)	(1.72)
Tobin's Q	0.004*	-0.002
	(1.91)	(-1.32)
Net profit margin	-0.021*	-0.020
	(-1.94)	(-1.51)
Cash holdings	-0.053***	0.020
	(-2.57)	(0.84)
Deal Characteristics		
Relative deal size	0.034**	-0.026*
	(2.04)	(-1.92)
Diversifying acquisition	0.004	-0.002
	(0.92)	(-0.33)
Intercept	0.054**	0.056**
	(2.44)	(2.40)
Number of obs.	865	952
Adjusted R-squared	5.6%	1.7%

*** p<.01, ** p<.05, * p<.1

5. Discussion

This section of the thesis discusses the interpretation of the main findings, followed by the comparison with existing literature, the practical implications and limitations, and what could be interesting for further studies.

Interpretation main findings

Model 1 – Hypothesis 1

Looking at the results from the first model, which tests the first hypothesis of this study, board composition partly affects the dependent variable. Board size and the percentage of independent directors seem to hurt the cumulative abnormal returns. These findings imply that larger boards are less effective in making decisions and that a higher proportion of independent directors could lead to risk-averse strategies. Having a large board could also lead to free riders, where certain directors let others make the critical decisions. This makes their position less impactful, and the decision-making can get weaker. Also, the more opinions there are on the board, the more disagreement can occur. This is not beneficial, even though it is usually said to be a good thing. As for the independence of the board, it can also lead to decisions that are not in favor of maximizing shareholder value. A too high proportion of independent directors leads to a lack of firm-specific knowledge on the board. Another reason for this negative sign could be that while it is intended to mitigate the agency problem, too many independent directors can lead to over-cautious decision-making. CEO / Chairman duality and financial expertise on the board do not seem to have a significant effect on CAR in this study. Based on these findings from model 1, Hypothesis 1 is partly supported, as the board size assumption is significant. However, the independent director's assumption is significant with the opposite sign. Instead of more independence leading to better returns, it leads to lower returns. Board size and the percentage of independent directors negatively and significantly influence abnormal returns. Certain control variables also had an impact, namely firm size, leverage, profitability, and net profit margin. Larger firms might have lower CARs because they have less to gain from acquisitions; highly leveraged firms might see M&As as an opportunity to diversify risk or improve financials; profitability indicates confidence and expected synergies; and a high net profit margin might mean the company is already doing well, so M&As don't lead to much-added value.

Model 2 – Hypothesis 2

In this second model, testing the effect of board diversity on M&A performance, the findings are not statistically significant. Neither gender nor ethnic diversity nor the number of older directors have a significant effect on the dependent variable CAR. As there is no evidence of a positive relation between the board diversity and the CAR, the analysis fails to reject the null hypothesis of Hypothesis 2. In this model, the same control variables for firm size, leverage, profitability, and net profit margin were statistically significant with the same coefficient sign.

Model 3 – Hypothesis 3

The Hypothesis on director ownership and voting power was the focus of model 3. Again, the variables are not statistically significant at any significance level. This indicates that directors that own less than 1% of shares and the total % of voting power of the board does not have a significant effect on the dependent variable. Again, the model fails to reject the null Hypothesis, as evidence supports Hypothesis 3. As in the models 1 and 2, the same set of controls are again significant with the same sign.

Model 4 – Hypothesis 4

In the fourth model of this study, testing Hypothesis 4, all independent variables are combined to test the total effect of all internal corporate governance mechanisms on M&A performance. Unsurprisingly, board size and the percentage of independent directors are the only statistically significant predictors of the cumulative abnormal return. The sign also remains the same, with larger boards and more independent directors on the board leading to lower returns. As in all other models, board diversity, director ownership, and voting power seem to have no substantial impact on CAR, whereas the board composition only partly affects returns. For this model, it thus again must be concluded that it fails to reject the null hypothesis and that internal corporate governance does not seem to have an impact on M&A performance. The same control variables remain consistent with the previous findings.

Model 5 – Hypothesis 5

In the last model of this study, a robustness check is performed to investigate the effect of merger waves on the relationship between corporate governance and M&A performance. The in and out wave sample coefficients are compared in the results section to see their effect on returns. Looking at the independent variables, the importance of board size in predicting CAR during out-wave periods emphasizes how important board dynamics are in affecting M&A

outcomes. The negative coefficient suggests that larger boards might be less flexible in the decision-making process, as in the previous models. This could be due to increased bureaucracy or conflicting opinions. The reason that it is important during periods outside of merger waves is because there is less pressure than during a wave. During merger waves, this relation between board size and the returns does not seem to exist, indicating that challenges and opportunities presented during these waves might lower the importance of the board size. The other variables are not significant in both models, indicating that there is no effect to be found on the M&A performance in this study. Based on these results, the null hypothesis is rejected. Concerning the control variables, several interesting results are found. Firm size, leverage, Tobin's Q, net profit margin, and cash holdings are all statistically significant in the in-wave sample but do not affect the out-wave model. For firm size, this suggests that during the wave larger firms are perceived to be better equipped to profit from the opportunities or face the challenges that arise. During these times, larger firms may have the operational competence, market share, and resources to deal with the complexity of these M&A transactions successfully. The positive relation between leverage and CAR during waves is interesting because more leverage indicates more risk. It could be that the market values this risk-taking behavior as a progressive strategy to grow or that they have confidence in the deals they want to engage in. Tobin's Q has a positive relationship with abnormal returns, indicating that when the market expects the market value of the firm to be higher than the book value, this leads to higher returns. During the merger wave, the net profit margin has a negative effect on the returns, which seems counter-intuitive, as discussed before. The reason for this negative relation could be that during waves, the market has even higher expectations towards firms with high margins. Also, high-margin firms might be paying premiums for their M&A deals during waves, which could be seen as overvaluation and a drop in CAR. For the cash holdings variable, having more cash leads to lower returns during waves. This could lead to the market seeing a firm as overly cautious with their money, and thus missing out on potential opportunities and limiting growth.

Profitability is statistically significant and positive in only the out-wave model, suggesting that more financially healthy companies are better at capturing value from M&A deals outside of a merger wave. Another interesting finding is that the sign of the coefficient for the relative deal size changes between the in-wave and out-wave samples. During merger waves, bigger deals might come with synergies or competitive advantages that lead to a higher CAR. On the

contrary, outside of these waves, larger deals might be seen as riskier, which leads to a drop in abnormal returns.

The most important finding concerning the internal corporate governance mechanisms in this analysis is that board size and the percentage of independent directors have a negative relation with the acquirer's abnormal return. When looking at the board size findings this is in line with what Hermalin and Weisbach (2003) found. They stated in their paper that board size has a negative relation with firm performance. In addition, Jensen (1993) and Lipton and Lorsch (1992) found that when boards become too large, the agency problem arises. Yermack (1996) added to these findings by finding a negative relation between Tobin's Q and board size. In addition, Guest (2009) also found a negative relation between board size and share price performance, whereas Haniffa and Hudaib (2006) found a positive relation between the ROA and the board size. This study found a negative relation with the cumulative abnormal return for the percentage of independent directors. This is an interesting finding, as Hermalin and Weisbach (1991), and Bhagat and Black (1998) studied the relationship between Tobin's Q and the percentage of independent directors on the board, and they all did not find a statistically significant relationship between independency and performance. Hermalin and Weisbach (2003) added to this by studying the existing empirical literature and found no relation between independence and firm performance. Haniffa and Hudaib (2006) also studied the relationship between the proportion of outside (independent) directors and firm performance, finding a negative relationship with the ROA. The negative relation between M&A performance and the percentage of independence is thus an interesting result. Unfortunately, the other variables in this study were not significant and thus did not have an impact on the returns.

The findings concerning board size and independent directors, and the significant control variables in the results of the first 4 hypotheses of the study have several implications. First, firms need to be aware of the relationship between board size, independent directors, and their returns, as a too-large board and too many independent directors can impact the M&A performance. Second, in many studies, board independence is generally seen as a good governance practice to solve the agency problem. However, this study suggests a negative relation with abnormal returns, indicating that too much independence will lead to conservative strategies in M&A decision-making. This is something for these firms to be aware of. Furthermore, firms must be financially healthy when considering that profitability is

positively correlated to the CAR. Lastly, firms with higher leverage benefit more from M&A deals, which suggests that more leveraged firms are better positioned to take risks.

The findings from the 5th model, the in and out wave comparison, give additional implications. Board size, for instance, is a significant predictor of abnormal returns in times outside of merger waves but not during them. This implies that firms must re-evaluate their board size, especially during these out-wave periods. In addition, firms can benefit from having a larger deal size during a merger wave, whereas it has a negative impact when outside of a wave. This suggests that firms should pursue more substantial acquisitions during merger waves, suggesting that timing for M&A activity is key. The financial strategy of a firm is important during a merger wave, as it is beneficial to have less cash and more leverage. Less cash indicates that a firm is using it to grow and to engage in acquisitions, while it indicates that they are risk-averse if they have a lot of cash at hand. more leverage can signal to the market that the firm is confident about its future cashflows. Tobin's Q plays a role during a merger wave, indicating that it is beneficial to be valued by the market when engaging in acquisitions during merger waves. Profitability seems to be more important outside waves, indicating that being financially healthy is key for a firm.

The most important limitation of these findings is that the majority of the independent variables are not statistically significant in this study. This suggests that the models used may not fully capture the relationship between corporate governance and M&A performance. In addition, it could be that as these variables are insignificant, there could potentially be omitted variables that do influence the CAR. Also, the adjusted R-squared of each model is relatively low, even though this is common in cross-sectional analysis. Compared to existing literature, for example, the paper written by Moeller et al. (2005), finds an adjusted R-squared for their models between 2.4% and 5.6%. This is not much higher, but every extra percentage explains more of the variance in the dependent variable. Another limitation is that in this study the residuals are found to be non-normal, which leads to using robust standard errors. Even though this violation is solved by robust standard errors, it still can be a concern in terms of the validity of the findings. For the merger wave model, a limitation is that the sample sizes of both samples slightly differ, which can lead to biased results.

As for future research, it would be interesting to have a larger sample of deals within a broader time frame. This could help in finding more conclusive evidence for the independent variables that were not significant in this analysis. A larger sample could also help in solving

the relatively low adjusted R-squared. An additional interesting analysis could be an industry-specific analysis. Specific industries might be more affected by corporate governance, and especially during merger waves it could be interesting. Having an international dataset of deals could also be interesting for future research. Comparing corporate governance in Europe, Asia, and the US, to analyze the different effects on the M&A performance. This is of course difficult to achieve as data is commonly known to be hard to find in Europe and especially in Asia.

6. Conclusion

The primary objective of this study was to understand whether internal Corporate Governance mechanisms significantly affect acquiring-firm returns during mergers and acquisitions (M&A). After the analysis, several interesting findings were found contributing to the existing literature, and businesses and regulators.

First, board size and the percentage of independent directors are negatively related to the cumulative abnormal return (CAR) post-deal announcement. For board size, this is in line with the existing literature. The board independence results contradict the literature, as more independent directors typically lead to better firm performance. These two outcomes indicate that firms should re-evaluate their board composition, as large boards and a high percentage of independent directors could lead to worse performance. Besides these two variables, none of the analyzed mechanisms were statistically significant, thus no relation has been found. The findings also indicate that firm size and the net profit margin have a negative impact on the abnormal returns. In contrast, the leverage and profitability of the acquirer influence the CAR positively.

Interestingly, this study also highlights the impact of merger waves. Board size's effect on CAR is more prominent outside merger waves, suggesting that Corporate Governance mechanisms interact differently with market conditions. Additionally, a firm's financial health and strategy, reflected by criteria such as leverage and profitability, has a significant impact on CAR, with leverage being more important during merger waves, and profitability outside of one. Furthermore, Tobin's Q has a positive effect on M&A performance during merger waves but this effect disappears outside of them. Also, the relative deal size has a positive impact during a merger wave, while interestingly, the sign flips when outside of a wave.

To summarize, internal Corporate Governance, especially board composition, plays a role in the outcome of M&A performance. However, as these findings reveal, the complexity of this relationship needs to be approached carefully both in academia and especially in practice, and future research is needed to investigate the relationship further.

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Appendix

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Appendix: Variable Definitions

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Variable	Definitions
	Panel A: Dependent Variable
CAR (-1, +1)	Three-day cumulative abnormal return (in percentage points) calculated using the market model. The market model parameters are estimated over the period $(-205, -6)$ with the CRSP equally-weighted return as the market index.
	Panel B: Board Composition
Board size	Number of directors on bidder's board.
Independent percentage	The percentage of independent directors on the board.
CEO/Chairman duality	Dummy variable: 1 if the bidder CEO is also Chairman of the board, 0 otherwise.
Financial expertise	The percentage of directors on the board with a financial background according to the stock exchange listing requirements
	Panel C: Board Diversity
Female directors	The percentage of females on the board of directors.
Minority directors	The percentage of directors which is not from the ethnicity group of Caucasian/White.
Age > 55	The percentage of directors aged older than 55 years.
	Panel D: Director Ownership and Voting Power
Director ownership	The percentage of directors which holds <1% voting power.
Voting power	The total percentage of voting rights on the board of directors.
	Panel E: Bidder Characteristics
Firm size	The natural logarithm of book value of total assets (Item 6).
Leverage	Book value of debts (Item 34 + Item 9) over total assets (Item 6).
Profitability	Net income (Item 172) divided by total assets (Item 6)
Tobin's Q	The market value of assets over the book value of assets: (Item 6 – Item 60 + Item 25 * Item 199) / Item 6
Net profit margin	Net income (Item 172) over sales (Item 12)
Cash holdings	Total cash (Item 162) over total assets (Item 6)
	Panel F: Deal Characteristics
Relative deal size	Deal value (from Eikon) over bidder market value of equity on the sixth day before the deal announcement.
Diversifying acquisition	Dummy variable: 1 if bidder and target do not share an industry, 0 otherwise.

Appendix: Histogram of Residuals normality check
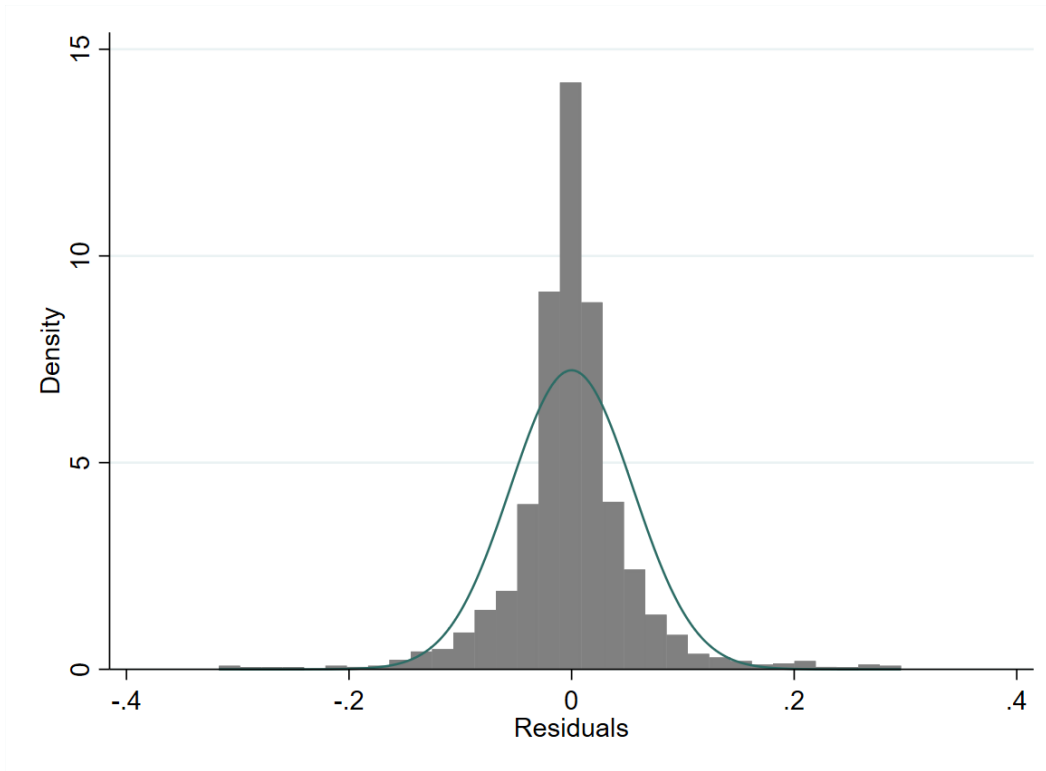
Appendix: Variance Inflation Factor (VIF) Analysis

Variable	VIF	1/VIF
Profitability	2.22	0.45
Firm size	2.01	0.50
Net profit margin	1.91	0.52
Board size	1.69	0.59
Director ownership	1.55	0.64
Tobin's Q	1.43	0.70
Female directors	1.37	0.73
Financial expertise	1.33	0.75
Independent directors	1.28	0.78
Cash holdings	1.26	0.79
Leverage	1.17	0.86
Voting power	1.16	0.86
Age > 55	1.13	0.89
Relative deal size	1.12	0.90
Minority directors	1.10	0.91
Firm duality	1.07	0.94
Diversification	1.05	0.95
Mean	**1.40**	

Appendix: Scatterplot residuals - Homoskedasticity test