Influences of Corporate Governance on Mergers and Acquisitions: Acquisitiveness, Pricing, and Performance Effects

by

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Intellectual Property Statement

The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Motivated by the empirical gaps on the linkages between corporate governance and Mergers and Acquisitions (M&A), and also by considering the interdependence of governance mechanisms, this thesis aims to provide a more nuanced understanding of the role of firm-level governance mechanisms in acquisition decisions and outcomes. More specifically, the thesis focusses on three key governance mechanisms, namely the board of directors, CEO pay incentives, and institutional investors' ownership in the US context and comprises three empirical studies as follows.

The first study explores how the interrelations ("bundles") of governance mechanisms influence a firm's acquisition propensity. The findings show significant substitutive effects between monitoring and incentive alignment governance mechanisms towards firm acquisitiveness, thus mainly providing support for the *Substitution Hypothesis*. Nevertheless, an exception is detected in a case of complementary effects between two monitoring mechanisms. The second empirical analysis investigates the moderating role of acquirer's governance in acquisition premium decisions. The study yields several novel results by finding that certain governance mechanisms in the acquiring firm moderate the effect of synergies (either operational or financial) on the size of the acquisition premium paid. Further analysis reveals that during the recent financial crisis the efficacy of governance mechanisms has been inhibited due to increased information asymmetries, thereby exacerbating agency conflicts in the M&A setting. Finally, the third study examines how the interdependence of acquirer governance mechanisms affects acquirer post-acquisition performance both in the short run and in the long run. The results of the event study analysis provide support for both the *Substitution* and *Complementarity Hypotheses* between different pairs of monitoring and incentive alignment governance mechanisms in influencing acquirer announcement returns, whereas the results of the long-term operating performance analysis suggest the presence of complementary only effects between governance mechanisms.

Together these studies suggest that it is insufficient to simply explore the independent effects of governance mechanisms on firm decisions and outcomes and contribute to the *configurational* perspective of corporate governance, by offering new evidence that governance "bundles" can allow for different degrees of firm acquisitiveness and post-acquisition performance. In addition, this research shows that acquirer governance arrangements can reduce the overpayment potential in M&A in terms of the acquisition premium paid. The findings of this research have important implications for both theory and practice.

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List of Abbreviations

CAPM	Capital Asset Pricing Model
CAR	Cumulative Abnormal Return
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CRSP	Center for Research in Security Prices
CSR	Corporate Social Responsibility
EBC	Equity-based Compensation
IPO	Initial Public Offering
ISS	Institutional Shareholder Services
IV	Instrumental Variable
M&A	Mergers and Acquisitions
NPV	Net Present Value
NYSE	New York Stock Exchange
R&D	Research and Development
ROA	Return on Assets
ROE	Return on Equity
S&P	Standard & Poor's
SD	Standard Deviation
SEC	Securities and Exchange Commission
SIC	Standard Industrial Classification
T1B	Thomson One Banker
TMT	Top Management Team
UK	United Kingdom
US	United States of America
VIF	Variance Inflation Factor

1 Introduction

1.1 Introduction

Mergers and Acquisitions[1] (hereafter referred to as M&A) are a critical strategic device, employed by firms in the pursuit of growth and shareholder value maximisation. The past few decades have witnessed a surge of M&A activity. By the end of 2018, the global M&A deal volume reached US$3.53 trillion, the third-highest deal volume since 2001, and up by 11.5% from 2017. The US remained the most sought after region for M&A deals by both deal value and count with 5,718 completed transactions reaching a total value of US$1.5 trillion (Mergermarket, 2018). The extant empirical literature has shown that target firm shareholders generally benefit from merger announcements as these announcements generate significant positive market returns (e.g., Asquith and Kim, 1982; Malatesta, 1983; Datta et al., 1992). However, for acquirer shareholders the overall balance of evidence suggests that M&A have detrimental or at best neutral effects on shareholder wealth (e.g., Andrade et al., 2001; King et al., 2004; Moeller et al., 2005), either in the short term (e.g., Dodd, 1980; Asquith, 1983; Jarrell and Poulsen, 1989) or in the long term (e.g., Agrawal et al., 1992; Loderer and Martin, 1992; Rau and Vermaelen, 1998). The ongoing popularity of M&A as a strategic tool for firm inorganic growth is puzzling, considering the fact that their value effects are often disappointing for the acquiring firms. Additional and more sophisticated empirical research is warranted so as to identify the relative importance of the factors that influence acquisition decisions and outcomes and examine how multiple factors may jointly work in influencing M&A activity (Haleblian et al., 2009), given also the significant unexplained variance in post-acquisition performance (King et al., 2004; Golubov et al., 2015).

Similarly, shareholder value maximisation represents one of the key areas of focus of corporate governance. Essentially, corporate governance from an agency theory lens (Eisenhardt, 1989; Jensen and Meckling, 1976), encompasses rules and mechanisms that aim to ensure effective monitoring of managerial decision-making and align the interests of managers with those of shareholders. Therefore, its scope is to minimise the agency costs embedded in the separation between ownership and control of the firm and, in doing so, pursue shareholder value maximisation. Despite the extensive research on the effects of corporate governance on firm performance (e.g., Dalton et al., 1998; 2007; Hermalin and Weisbach, 2003), there has been less attention to the implications of governance on the

[1] Henceforth, the terms "mergers" and "acquisitions" are used interchangeably.

investment function of the firm. With respect to the influence of governance on acquisition outcomes, Aktas et al. (2016a, p. 248) posit that although the field is "well developed and growing" the relationship is far from clear. This is mainly due to two reasons. On the one hand, scholars have rather focussed on short-term acquisition performance effects via short-window event studies, thereby ignoring the long term implications of governance on acquisition outcomes. However, corporate acquisitions are complex strategic events that their full performance implications and economic impact can be better assessed in the long run (e.g., Lubatkin, 1987; Oler et al., 2008; Zollo and Meier, 2008). On the other hand, prior agency-based research has predominantly examined governance mechanisms in isolation from each other, thus largely ignoring the relatively unexplored effects of the *Substitution* and *Complementarity Hypotheses* (Cuomo et al., 2016). A burgeoning body of governance literature adopts a *configurational* perspective which suggests that firm outcomes depend on the effectiveness of certain combinations or "bundles" of corporate governance mechanisms, rather than on the effectiveness of any single governance mechanism (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009). Within this framework multiple governance mechanisms may substitute and/or complement one another towards influencing firm decisions and outcomes.

The overarching purpose of this thesis is, therefore, to take the corporate governance literature a step further and challenge the notion that by adding more governance mechanisms, this will keep improving certain organisational outcomes. Given the limited resources and structural constraints within firms that make the implementation of multiple governance mechanisms costly to them, it is important to take a more holistic approach to governance research and investigate the interdependence of governance mechanisms (Aguilera et al., 2012). On this basis, the thesis aims to provide a better understanding of the role of corporate governance in M&A. At the same time, the thesis aims to inform the M&A literature by seeking to identify another set of predictor variables in the form of governance configurations that may explain part of the unexplained to date variance in M&A decisions and outcomes.

M&A represent an opportune setting to explore the role of corporate governance in acquisition decisions and outcomes. The reasons for focussing on M&A are twofold. First, corporate acquisitions have been argued to intensify the inherent conflicts of interest between shareholders and managers in large public firms (Jensen, 1986; Morck et al., 1990; Masulis et al., 2007). M&A can be the result of value-destroying acquisition motives which may arise when managers pursue self-serving interests and exhibit opportunistic behaviour inconsistent with shareholder value maximisation. For example, managers may engage in

M&A in order to secure private benefits, such as empire building (e.g., Jensen, 1986; Andrade et al., 2001), higher compensation (e.g., Grinstein and Hribar, 2004; Harford and Li, 2007), power and prestige (e.g., Jensen, 1986), and employment risk reduction (Amihud and Lev, 1981). Thus, corporate governance mechanisms may help to avoid M&A that destroy shareholder value. Second, although a sizeable amount of governance literature has examined the impact of corporate governance on firm performance, the endogeneity between the two variables has yielded conflicting results (e.g., Hermalin and Weisbach, 1998; 2003; Wintoki et al., 2012). Further, it has been argued that empirical research in governance may produce more consistent results in specific settings instead of studying the effect of governance mechanisms, particularly the effect of board characteristics, on overall firm performance (Daily et al., 2003; Hermalin and Weisbach, 2003). In this respect, the thesis follows a more fruitful way by utilising the M&A backdrop to understand the effects of certain monitoring and incentive alignment governance mechanisms on acquisition-related decisions and outcomes.

Corporate governance mechanisms[2] are commonly divided in *internal*, if they are within the decision control of the firm, and *external* to firms if they are exogenously decided (Walsh and Seward, 1990; Gillan, 2006). The board of directors and managerial pay incentives represent primary internal mechanisms, while the external ownership structure (e.g., ownership by institutional investors) is considered to be among the main external governance mechanisms. Another way of distinguishing between governance mechanisms using an agency theory lens is either by their *monitoring* role which is predominantly performed by the board of directors, or *incentive alignment* of management's interests with those of shareholders, which is thought to be achieved primarily through executive compensation contingent on firm performance.

Given that corporate governance is a multifaceted construct, this thesis focusses on three key governance mechanisms: the board of directors, CEO pay incentives and institutional investors' ownership in the US context which continues to be the most active market for corporate control. First, M&A are major and complex corporate investments which can potentially have long-term consequences on the shareholder value of the acquirer (Haleblian et al., 2009). As such, board monitoring is particularly salient in these decisions since they require intensive board-level deliberation and ultimate approval. Second, given the fact that the Chief Executive Officer (CEO) of a firm typically initiates M&A activity and has considerable discretion in merger negotiations, M&A present an ideal setting to study the

[2] For a comprehensive review of the literature on the various types of governance mechanisms available to firms see, for example, Denis (2001) and Gillan (2006).

role of managerial pay incentives as they are employed so as to encourage managers to pursue risky but positive net present value (NPV) projects that maximise shareholder value (Jensen and Meckling, 1976; Smith and Stulz, 1985). Third, considering the prevalence of institutional investors in the US stock market (Derrien et al., 2013), the acquisition process provides a suitable setting to examine the external monitoring exercised by institutions in influencing acquisition decisions and outcomes in their investee firms.

Prior empirical studies on the intersection of the literature of corporate governance and M&A tend to focus on the effects of one of the three aforementioned firm-level governance mechanisms on the acquisition process and outcomes. In particular, several studies explore the effects of acquirer board characteristics, such as board size and independence on either firm acquisitiveness (Kolasinski and Li, 2013) or acquirer post-acquisition performance (Byrd and Hickman, 1992; Masulis et al., 2007) and how board leadership structure (i.e. CEO duality) influences the acquisition premiums paid (Fralich and Papadopoulos, 2018). Other studies examine the role of managerial incentives in the decision of a firm to undertake an acquisition as well as their influence on the acquiring firm's post-acquisition performance (Boulton et al., 2014; Croci and Petmezas, 2015) and the size of the acquisition premium paid (Datta et al., 2001). Finally, another line of research investigates how institutional investors' ownership may affect the frequency, quality and cost of firms' acquisition decisions (Gaspar et al., 2005; Chen et al., 2007).

This thesis provides a more comprehensive analysis of the role of acquirer corporate governance in the M&A setting by considering a broader set of governance mechanisms. Further, motivated by the empirical gaps on the linkages between corporate governance and M&A decisions and outcomes and also by considering the interdependence of governance mechanisms, this thesis addressed three major empirical research questions: *(Q1) "To what extent do firm-level governance mechanisms operate in a substitutive and/or a complementary fashion in influencing firm acquisitiveness?" (Q2) "What is the role of acquirer corporate governance in acquisition premium decisions?", and (Q3) "To what extent do firm-level governance mechanisms operate in a substitutive and/or a complementary fashion in influencing acquirer post-acquisition performance?"*

1.2 Contributions of the Thesis

By addressing the above empirical questions, this thesis contributes to the literature in multiple ways. Collectively, it offers valuable insights into the growing body of literature that considers the interactive effects of governance mechanisms on decision quality and investment appraisal. The findings of this thesis should encourage governance scholars to, henceforth, consider the interrelations between governance mechanisms in influencing

organisational decisions and outcomes, thereby resulting in a more streamlined governance research, and direct practitioners of the field towards a more refined approach to the design of firms' governance structures in order to achieve optimal outcomes. Moreover, the thesis informs the theoretical and empirical literature on the influence of corporate governance on investment decision performance and shareholder value. In this vein, the thesis can further contribute to the debate over the appropriate balance of corporate governance considering both its "accountability" or monitoring element as well as its "enterprise" or shareholder wealth-creation dimension (Keasey and Wright, 1993; Short et al., 1999).

The following sub-sections introduce the three empirical chapters, provide a summary of their main findings, and discuss their contributions.

1.2.1 Corporate Governance "Bundles" and Firm Acquisitiveness

Chapter 3 investigates the interplay of firm-level governance mechanisms and in particular, whether they act as substitutes or complements of each other in influencing firm acquisition propensity. Overall, the findings of this chapter are in support for the *Substitution Hypothesis* as four pairs of incentive alignment and monitoring governance mechanisms are found to interact as substitutes of each other in influencing the likelihood of a firm to make an acquisition. However, an exception is detected in a case of complementary effects between two monitoring mechanisms (i.e. board and institutional investor monitoring).

This study makes important contributions to two streams of research. First, it contributes to the emerging body of governance research which adopts the *configurational* perspective, demonstrating that degrees of firm acquisitiveness can be achieved through different combinations or "bundles" of firm-level governance mechanisms. The findings of this study are, thus, in line with the notion of "equifinality" (Rediker and Seth, 1995; Gresov and Drazin, 1997), suggesting that firms are flexible to design their bundle of governance practices so as to achieve similar outcomes and, in this case, the desired levels of acquisitiveness. As such, the study sheds additional light on the largely unexplored substitutive and complementary effects of governance mechanisms in affecting firm decisions and subsequent outcomes. Second, building on these findings, a second major contribution of this study is that it complements previous M&A research which investigates the determinants of corporate acquisitions. The findings provide evidence that firm-level governance configurations represent another predictor in the decision of a firm to engage in M&A. This evidence may help enrich our understanding about the drivers of acquisition decisions and how multiple drivers may work in conjunction with respect to influencing firm acquisition behaviour.

1.2.2 The Moderating Role of Corporate Governance in Acquisition Premium Decisions

The second empirical chapter, Chapter 4, examines the moderating role of acquirer's corporate governance arrangements in the relationship between M&A synergistic motives and the size of the acquisition premium paid. The study considers two key types of synergies, namely operational and financial synergies. The analysis conducted in this study yields several interesting findings. In particular, three significant interactions, two between operational synergies and two governance variables (CEO/Chair duality, CEO cash pay), and one interaction between financial synergies and dedicated institutional ownership; towards determining the size of the acquisition premium are found. The findings from this chapter suggest that certain corporate governance mechanisms in the acquiring firm moderate the effect of synergies (either operational or financial) on the acquisition premium paid. Noticeably, additional analysis in this study reveals that during the years of the recent financial crisis the effectiveness of corporate governance mechanisms has been hindered due to increased information asymmetries, which in turn may have exacerbated agency conflicts in the M&A setting.

The study is novel by empirically testing the moderating effects of certain governance mechanisms of the acquirer on the relationship between synergy-driven M&A motives and the size of the acquisition premium paid, and adds to both the M&A and corporate governance literatures. Importantly, the results of this chapter shed light on a relatively under-examined concept within the M&A literature, the acquisition premium, by uncovering a new determinant in the form of interactive effects between governance mechanisms and synergy-driven merger motives on the acquisition premium paid.

1.2.3 Corporate Governance "Bundles" and Acquirer Post-Acquisition Performance

The last empirical chapter, Chapter 5, considers the *configurational* perspective in corporate governance, as empirically tested in Chapter 3, and examines the interactive effects of firm-level governance mechanisms on acquirer post-acquisition performance both in the short run and in the long run. The results of the short-term performance analysis provide support for both the *Substitution* and *Complementarity Hypotheses* between different pairs of monitoring and incentive alignment governance mechanisms, while the results of the long-term performance analysis are consistent with the *Complementarity Hypothesis* only. This suggests that the governance "bundles" that are perceived by market participants as effective for

improving acquirer performance in the short term may be somewhat different from the governance configurations that actually influence the long-term performance of the acquirer.

Further analysis reveals that governance "bundles" have at least some explanatory power in influencing the acquirer post-acquisition performance in deals that involve unlisted targets only, consistent with the proposition that such M&A deals are plagued by substantial information asymmetries due to more relaxed disclosure requirements of unlisted firms. This, in turn, may inhibit the effectiveness of certain governance configurations with respect to influencing M&A performance.

Taken together, the results provide strong support for the presence of governance "bundles" in influencing acquirer post-acquisition performance. Thus, the study responds to recent calls for further research into the *configurational* approach in governance and contributes to this nascent body of research, by documenting how multiple governance mechanisms interact with one another to influence an acquiring firm's post-acquisition performance. In addition, the study advances the M&A literature which explores the value effects of M&A, by showing that governance "bundles" represent another factor that influences the post-acquisition performance of the acquiring firms both in the short run and in the long run.

1.3 Structure of the Thesis

The remainder of the thesis is structured as follows. Chapter 2 provides an overview of the governance literature relating to the Anglo-American governance system, with a particular focus on the theoretical and empirical research that examined the three key firm-level governance mechanisms that underlie the main variables of interest in the thesis. The chapter also presents a brief review of key aspects of the literature on the M&A setting which is studied in this thesis. Then, Chapters 3 to 5 are the three empirical chapters which investigate the role of the acquirer's corporate governance in acquisition decisions and outcomes. The thesis concludes with Chapter 6 which provides a summary of the main findings, outlines the implications and limitations of the empirical studies, and offers suggestions for future research.

2 Literature Review

2.1 Introduction

Since the seminal work of Berle and Means (1932), documenting the separation of ownership and control in modern corporations, the field of corporate governance has attracted considerable attention both from researchers and practitioners. Particularly since the mid-1980s, corporate governance has been steadily climbing both the regulatory and policy agendas. As a response and with the aim to improve the alignment of interests between managers and shareholders, corporate governance codes have been developed worldwide. It is a widely held view that the development of corporate governance reform began in the UK with the formation of the Cadbury Committee in 1991 and the publication of the Cadbury Report in 1992. Corporate governance is defined as "the system by which companies are directed and controlled" in the Cadbury Report (para 2.5). Corporate governance research has proliferated in the past few decades and interest in the area reignited following a number of governance failures that led to the bankruptcy of large corporations such as Enron in the US during 2001, and also after the more recent global financial crisis in 2008. There is a wide array of definitions of corporate governance in the literature "depending on one's view of the world" (Aguilera et al., 2015, p. 485).

Corporate Governance from a *principal-agent* perspective can be viewed as the set of mechanisms that can minimise the value losses that arise from the separation of ownership and control in a firm. As postulated by agency theory (Eisenhardt, 1989; Jensen and Meckling, 1976) especially during the second half of the 20th century, the separation of firm ownership and control has been deemed to give rise to *agency conflicts* between managers *(agents)* and shareholders (*principals*). These agency conflicts have been said to produce two information asymmetry problems: moral hazard and adverse selection. In the case of moral hazard (Holmstrom, 1979; Levinthal, 1988) managers may be involved in the consumption of perquisites, shirking or undertake wasteful investment projects which may not be consistent with shareholder value maximisation due to the inability of the shareholders to perfectly monitor the agents' actions. Adverse selection refers to the problem that principals have in lacking the private information the agents' have while negotiating a contract. For example, the agents may lie about their skills and abilities at the time of hiring (Eisenhardt, 1989). Therefore, corporate governance mechanisms need to be employed so as to alleviate agency costs, reconcile the interests of shareholders and managers in a firm, and therefore maximise the value of the firm to its shareholders.

As aforementioned, the topic of corporate governance has attracted considerable interest from academics as well as practitioners over the past few decades. The academic literature on firm-level corporate governance mechanisms is now vast. Despite this proliferation of research that has provided many valuable insights, our understanding of which governance mechanisms and how they contribute to effective corporate governance still remains fragmented (Aguilera et al., 2015). A more recent stream of empirical literature calls for taking a broader perspective in corporate governance and pushes the field beyond a narrow approach that views governance mechanisms as operating in silos, while disregarding their interdependencies which may play a significant role in the effectiveness of a firm's governance (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009).

In this thesis, we will follow a more fruitful way to understand the interactive effects of certain monitoring and incentive alignment governance mechanisms, by considering their impact on M&A which are discrete strategic events and they provide a setting where agency problems are particularly severe between shareholders and managers (Jensen, 1986; Morck et al., 1990; Masulis et al., 2007). M&A, for example, can be the result of managerial self-interest, inconsistent with shareholder value maximisation, such as empire building (e.g., Jensen, 1986; Andrade et al., 2001), higher compensation (e.g., Grinstein and Hribar, 2004; Harford and Li, 2007), power and prestige (e.g., Jensen, 1986), and employment risk reduction (Amihud and Lev, 1981). Hence, corporate governance mechanisms may help to avoid M&A that destroy shareholder value.

What follows is a review of the literature on the aforementioned governance mechanisms, focussing on the Anglo-American governance system which is characterised by widely dispersed ownership, an active market for corporate control, mature capital markets, a strong focus on shareholder value, and a common-law tradition (La Porta et al., 1998; 2000). Thus, the following literature review is by no means exhaustive, but instead provides the theoretical framework and motivates a set of three key research questions which are addressed in the following three empirical chapters.

We start with a review of the literature on the board of directors (sub-section 2.2.1), focussing particularly on three important board structure characteristics, namely board size, board independence, and CEO/Chair duality. We then provide an overview of the literature on executive compensation (sub-section 2.2.2), followed by an overview of the literature of institutional investors' ownership (sub-section 2.2.3). Then, a growing stream of governance literature which deals with the interdependence of governance mechanisms is presented (Section 2.3).

We then introduce the M&A context (Section 2.4) and provide a brief review of the literature on three important aspects of the M&A acquisition process, namely the drivers of the M&A activity (sub-section 2.4.1), the key determinants of the size of the acquisition premium paid from the acquirer's perspective (sub-section 2.4.3), and the most commonly examined determinants of acquirer performance (sub-section 2.4.3). Section 2.5 concludes the chapter.

2.2 Corporate Governance Mechanisms

2.2.1 The Board of Directors

The board of directors is considered to be the primary internal control mechanism in public firms with a fiduciary obligation to represent and protect the interests of shareholders (Fama and Jensen, 1983b). A board fulfils discrete tasks such as hiring, replacing, evaluating and rewarding top management (Fama and Jensen, 1983b; Jensen, 1993). Conceptually, boards of directors have an important dual role to play in firms, namely monitoring and advising the top management. The monitoring role, which is essentially grounded in agency theory, refers to the board's obligation to vigilantly oversee managers so that they act in shareholders' best interests. The advising role suggests that directors also provide valuable advice and counsel to managers and assist in the formulation and execution of corporate strategy, thus contributing to firm performance (e.g., Zahra and Pearce, 1989; Westphal, 1999; Hillman and Dalziel, 2003).

2.2.1.1 Board Size

An issue which has attracted considerable debate in the governance literature deals with the optimal board size. Lipton and Lorsch (1992) and Jensen (1993) support the view that larger boards function less effectively due to coordination problems, poorer communication among board members, and issues of director "free-riding" (Alchian and Demsetz, 1972) and social loafing (Latané et al., 1979). Thus, they propose that smaller boards of no more than ten directors should be preferred as it takes less time and compromise for board members to reach consensus. In smaller boards, decisions are made more quickly given the limited available time in board meetings and directors are more likely to engage in a critical evaluation of corporate affairs and express more openly their opinions.

The extant empirical evidence on this matter is mixed. Yermack (1996) and Eisenberg et al. (1998) find an inverse relationship between board size and firm performance, suggesting that smaller boards of directors are more effective. However, there is also evidence that casts doubt on the theoretical predictions of smaller boards being beneficial in all cases. For

example, Coles et al. (2008) show that complex firms such as large, diversified or highly-leveraged, benefit from a larger board with more independent directors because these firms have more advising needs. In particular, they find that firm performance as measured by Tobin's Q improves as board size increases for complex firms, whilst the opposite holds for simple firms. Likewise, Linck et al. (2008) provide evidence that smaller boards are not always better than larger boards, but firms make decisions about board size and board structure in general, considering trade-offs between costs and benefits of the monitoring and advising roles of the board. Using as proxies for monitoring and advising costs, the market-to-book ratio, the level of R&D expenditures, and the standard deviation of stock returns, they find a negative relation between board size and these attributes.

2.2.1.2 Board Independence

The monitoring role of the board has been closely associated with board independence. Independent (otherwise termed as outside) directors can be defined as directors which are not employed by the firm or affiliated with it in any other way besides their directorships. These directors have more incentives to be vigilant overseers of managerial behaviour and actions, and in doing so protect shareholders' interests, due to concerns for their reputations as decision experts (Fama, 1980; Fama and Jensen, 1983b). The passage and implementation of the Sarbanes-Oxley Act (SOX) of 2002 in the wake of high-profile corporate scandals in the US as well as amended rules for listing on the New York Stock Exchange (NYSE) and the Nasdaq stock market have placed more emphasis on the role of independent directors on the board. From a theoretical viewpoint, a higher proportion of independent directors on the board should improve firm performance.

Despite the sizeable amount of research on the impact of board independence on firm performance, the results of this research are mixed and inconclusive (e.g., Dalton et al., 1998; 2007; Dalton and Dalton, 2011). For example, early studies (e.g., Baysinger and Butler, 1985; Pearce and Zahra, 1992; Ezzamel and Watson, 1993) find a positive association between the presence of independent directors and firm profitability, while later empirical work (e.g., Bhagat and Black, 1999; 2002) fails to provide evidence of any significant systematic relationship between board independence and firm performance.

Another stream of research has investigated the implications of board independence for a number of discrete corporate decisions. Weisbach (1988) finds that the relationship between poor firm performance and the likelihood of a CEO being replaced is stronger for firms having boards dominated by independent directors than for those with insider-dominated boards, emphasising the monitoring role of independent directors by improving managerial accountability. In the same spirit, Rosenstein and Wyatt (1990) document findings

which are consistent with the argument that independent directors are chosen to protect and promote shareholder interests. They report that firms experience significant positive abnormal returns after the appointment of an independent director, despite the fact that the majority of boards were dominated by independent directors prior to the appointments. Regarding responses to a takeover bid, Cotter et al. (1997) show that tender offer target firms with a majority of independent directors on their boards, experience around 20% higher stock price returns than do other targets, even if those targets have adopted takeover defenses in the form of "poison pills". Their results corroborate the findings of Brickley et al. (1994) who report that firms that adopt "poison pills" but have outsider-dominated boards experience positive stock market reaction, but it is negative when the board is not controlled by outside directors. Taken together, the results of the aforementioned studies highlight the value-enhancing role of independent directors when fulfilling certain discrete board tasks.

2.2.1.3 CEO/Chair Duality

Turning now to the board leadership structure, CEO/Chair duality refers to the situation when a person simultaneously occupies the positions of the CEO and Chair in a firm (Rechner and Dalton, 1991). This has been a highly controversial issue, since the 1990s, following corporate misconduct involving highly entrenched CEOs, insufficient disclosure and financial reporting failures. In the UK, the Cadbury Report (1992) and subsequent governance codes sought to improve the monitoring effectiveness of the board of directors by decentralising power within the firm and recommending, for example, the separation of the roles of CEO and chairperson. However, CEO/Chair duality existed in nearly 70% of the large US public firms (Dalton et al., 2007). During the last decade, though, there has been a trend towards separating the two positions with only half of the S&P 500 firms maintaining the combined board leadership structure in 2018 (SpencerStuart, 2018).

From an agency theory perspective, the separation of the CEO and Chair positions serves to limit potential CEO entrenchment and opportunistic behaviour. Conversely, the presence of CEO duality allows the CEO to have greater power and control over the board and consequently inhibits the monitoring function of the board (Fama and Jensen, 1983b; Jensen, 1993; Finkelstein and D'aveni, 1994). As a result, CEO/Chair duality is not favoured from an agency theory perspective as it has been argued to negatively influence firm performance (Jensen, 1993; Dalton et al., 1998; Krause et al., 2014).

Contrary to agency theory predictions, advocates of the stewardship theory - which views managers as good stewards of the firm's assets - highlight the benefits of CEO/Chair duality (e.g., Donaldson and Davis, 1991; Finkelstein and D'aveni, 1994). According to this

perspective, a firm benefits from maintaining the combined board leadership structure because it leads to effective decision making resulting from defining clear lines of authority, which is usually referred to as the principle of the "unity of command", and signalling a strong leadership to external parties of the firm (Finkelstein and D'aveni, 1994). Moreover, from the perspective of stewardship theory, CEO/Chair duality improves firm performance by reducing the costs associated with the separation of the two positions (Brickley et al., 1997), such as agency costs of monitoring the behaviour of the chairperson and extra compensation for the chairperson.

While the vast bulk of empirical research on CEO/Chair duality[3] has focussed on how it influences firm financial performance, it has failed to provide convincing evidence of a significant systematic relationship (e.g., Dalton et al., 1998; 2007; Dalton and Dalton, 2011). Several empirical studies report a negative relationship between CEO/Chair duality and firm performance consistent with agency theory prescriptions (e.g., Rechner and Dalton, 1991; Daily and Dalton, 1994; Worrell et al., 1997), while others find support for the stewardship view and document a positive impact of the joint board leadership structure on firm performance (e.g., Donaldson and Davis, 1991; Boyd, 1995; Brickley et al., 1997). There is also a stream of research that finds no significant effect of CEO/Chair duality on firm financial performance (e.g., Rechner and Dalton, 1989; Daily and Dalton, 1992; 1993). Collectively, though, the available evidence so far indicates that neither the presence nor the absence of CEO/Chair duality results in improved firm performance.

2.2.1.4 Board Structure

As previously discussed, there is a lack of clear evidence for the effectiveness of board-related characteristics on firm performance. This lack of support has been largely attributed to the endogenous nature of board structure which results in impediments to the research design of such empirical studies. Endogeneity is a central issue in empirical corporate governance research that attempts to examine the impact of board structure on firm performance (e.g., Hermalin and Weisbach, 1998; 2003; Wintoki et al., 2012). There are two potential sources of endogeneity associated with this line of empirical research. First, we have the issue of causality in relationships between governance variables and firm performance, since it can run in the opposite direction, i.e. firm performance could also drive governance mechanisms. This situation is often referred to as *simultaneity* or *reverse causality*. For example, Denis (2001) notes that firms are more likely to increase the number of independent directors subsequent to performing poorly. This could lead researchers to wrongly assume that there

[3] See Krause et al. (2014) for a comprehensive review of the literature on this topic.

is a negative relationship between board independence and firm performance. Second, the problem of *unobservable heterogeneity* arises when underlying unobservable factors may potentially influence both firm performance and governance mechanisms. In this case, this may lead researchers to pick up relationships where actually they do not exist and thus the relationship between a governance mechanism and firm performance will be in fact spurious. For instance, Hermalin and Weisbach (1998) argue that firms with high-ability CEOs will engage in less intense monitoring of their actions, hence they may have less independent boards. Following this reasoning, if we ignore this unobservable factor then an OLS regression of firm performance on board structure may find a negative impact of board independence on firm performance.

A widely proposed approach to address the reverse causality issue is to find a strictly exogenous instrument for the independent variable of interest (Larcker and Rusticus, 2010). In their review of papers, Larcker and Rusticus (2010) conclude that the instrumental variables chosen by researchers seemed generally arbitrary without sufficient theoretical justification and led to biased parameter estimates and misleading inferential tests. The instrumental variable should satisfy two challenging conditions. Specifically, the instrument should be highly correlated with the endogenous explanatory variable ("relevance" condition), but uncorrelated with the dependent variable except through its effect on the explanatory variable ("exogeneity" condition). However, in practice, it is very difficult to find valid strictly exogenous instruments (Wintoki et al., 2012). An alternative strategy to address endogeneity concerns using a more careful research design is to exploit natural experiments resulting from regulatory shocks, such as those brought about the passage of the Sarbanes-Oxley Act (SOX)[4] of 2002 so as to investigate unexpected changes in board structure.

It has been also argued that governance research may produce more consistent results in certain settings instead of studying the effect of board characteristics on overall firm value. Daily et al. (2003) suggest, for example, that a more accurate evaluation can be obtained by focussing on financially distressed firms. Hermalin and Weisbach (2003) support the study of discrete board tasks, while Desender et al. (2013) further endorse the investigation of board decisions in settings of overt conflicts of interests between shareholders and managers. M&A decisions require board approval and aside from being major and discrete strategic events, corporate acquisitions have been argued to exacerbate the inherent conflicts of interest between shareholders and managers in large public firms (Jensen, 1986; Morck et al., 1990; Masulis et al., 2007).

[4] See, for example, Linck et al. (2009) that used SOX as a natural experiment to study the impact of an increased demand for outside directors.

2.2.2 Executive Compensation

Agency theory describes the conflicts of interest that may emanate from the separation of ownership from control in a firm (Jensen and Meckling, 1976). As discussed above, a way that has been suggested to mitigate agency problems is by increasing the level of monitoring so as to curb the opportunistic behaviour of managers and ensure that they act in the shareholders' best interests. A second solution that has been widely proposed is for owners to employ managerial incentives in order to eliminate the divergence of interests between shareholders and managers. The most straightforward way to achieve this is by introducing equity-based compensation (hereafter referred to simply as EBC) plans (such as stock and stock option ownership). It has been argued, on the one hand, that executive compensation plans that include equity ownership elements should induce the joint value maximisation of shareholders and managers (e.g., Holmstrom, 1979; Murphy, 1999). In other words, EBC packages should direct executives' incentives towards firm value maximisation by rewarding them for improving firm performance, while at the same time reducing their aversion towards risky but shareholder value maximising projects (e.g., Haugen and Senbet, 1981; Smith and Stulz, 1985). On the other hand, it has been suggested that EBC may be part of the agency problem itself (e.g., Bebchuk and Fried, 2003; Dalton et al., 2007). The preponderance of EBC since the 1990s in the US (Murphy, 1999), has motivated the ongoing debate as to the efficacy of EBC as an incentive alignment governance mechanism, given an observed disjunction between executive compensation and firm performance, and large executive pay rises in periods of declining firm performance. In this regard, stock options have been viewed as the culprit. Next, we present both sides of the debate on EBC[5] and discuss the key issues underlying the related research, which has attracted considerable attention, albeit with little consensus, focussing particularly on the studies exploring the effects of executive stock options.

CEO EBC increased by almost 300% from 1993 to 2003 and the EBC paid to top-five executives increased by 334%, controlling for firm size and performance (Bebchuk and Grinstein, 2005). In an early empirical investigation of the effectiveness of incentives in managerial compensation contracts, Jensen and Murphy (1990) introduced the concept of pay-performance sensitivity and measured it by taking the estimated coefficient from an OLS regression of a model that links the dollar change in the CEO pay to a change in firm performance. A higher coefficient would imply a better alignment of interests between the

[5] See, for example, Bebchuk and Fried (2003), Core et al. (2003), and Goergen and Renneboog (2011) for excellent reviews of the literature on executive compensation.

CEO and shareholders. The authors find that, during their sample period (1974-1986), CEO pay increased by about $3.25 for every $1,000 increase in shareholder wealth, and conclude that surprisingly these managerial pay incentives are found to be particularly small. Complementary evidence for this relationship is provided by the meta-analysis of Tosi et al. (2000) which documents that firm financial performance accounts for less than 5% of the variance in CEO pay levels. However, over time executive pay-performance sensitivities in large US firms have been steadily increasing due to the explosive growth of stock option grants since the 1980s (Hall and Liebman, 1998), until 2008, when the recent financial crisis led to a significant decrease in both the CEO pay-for-performance sensitivity and the total CEO pay (Faulkender et al., 2010).

Several empirical studies have provided evidence supporting the benefits of linking executive pay to firm performance and the wealth of the shareholders. For example, Mehran (1995) finds that firm performance measured in terms of Tobin's Q and ROA is positively related to the proportion of EBC. Relatedly, Morgan and Poulsen (2001) study the managerial proposals of incentive compensation plans and report a positive market reaction to the announcement of these plans, suggesting that pay-for-performance compensation is beneficial to shareholder wealth. Furthermore, Certo et al. (2003) provide evidence that investors view stock option compensation favourably as they document a positive association between CEO stock option pay and investor valuations of IPO (initial public offering) firms.

While stock options clearly comprise a large part of the executive compensation package among large US firms nowadays, at the same time this type of EBC has been shown to create perverse incentives for managers. One interesting line of work is grounded in the behavioural agency theory (Wiseman and Gomez-Mejia, 1998) which predicts that loss aversion is the driving force behind decision making, whereas traditional agency theory views risk aversion as the motivating force. In addition, behavioural approaches argue that the risk-taking preferences of agents change, ranging from risk-averse to risk-seeking behaviour. With regards to EBC, behavioural agency theory suggests that equity and stock options have asymmetric risk properties and thus different effects on managerial decision making (Sanders, 2001). The main difference between equity and stock options is that holders of stock options do not suffer losses as they have the right to buy equity in the future (usually five to ten years) at a predetermined price but are not obliged to do so. Thus, only equity holdings pose a threat of loss of wealth leading to risk-averse behaviour, while the upside potential of stock options may result in excessive risk taking that can harm firm value.

In support of these ideas, Sanders and Hambrick (2007) find that CEOs compensated with high proportions of stock options exhibit a higher risk-taking behaviour by investing in acquisitions that produce more extreme firm performance, and in the majority of cases this risk-taking behaviour delivered much larger losses than gains. Likewise, Devers et al. (2013) suggest that acquiring CEOs act opportunistically when they cash out exercisable stock options and sell firm stock following acquisition announcements, in an attempt to minimise their own wealth risk by decoupling it from firm performance. This, in turn, implies that they may have low confidence in the long-term value-adding potential of those M&A deals they have actually pursued. Their findings are consistent with the aforementioned argument, suggesting that stock options as part of EBC, contrary to agency theory predictions, fail in some cases to incentivise managers towards maximising long-term shareholder wealth.

Other empirical studies document undesirable outcomes from the extensive use of option-based pay, including earnings management (e.g., Bergstresser and Philippon, 2006; Burns and Kedia, 2006), timing of stock option grants before the announcement of good news[6] (e.g., Yermack, 1997; Aboody and Kasznik, 2000), and stock option repricing[7] (Brenner et al., 2000; Chance et al., 2000).

A large body of early empirical work on incentive-based compensation used relatively noisy proxies of EBC (e.g., the number or value of stock option grants in a given year), ignoring the incentive effects from the accumulated CEO wealth in the form of stock and option grants. In recent studies two of the most widely used measures of managerial incentives are the vega and delta incentives: the former represents the sensitivity of managerial wealth to the volatility of stock returns, while the latter entails the sensitivity of managerial wealth to stock price (e.g., Guay, 1999; Core and Guay, 2002).

The impact of delta incentives on managerial risk taking is theoretically ambiguous due to two opposing effects. An increase in delta should, on the one hand, work towards aligning the interests between managers and shareholders and motivate managers to pursue risky and positive net present value (NPV) projects that they would otherwise forgo since both parties will benefit from an increase in the stock price. On the other hand, delta incentives could accentuate managerial risk aversion by exposing undiversified managers to higher firm-

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[6] Since stock options are generally granted with a strike price equal to the stock price on the award date, managers may opportunistically manage the timing of their stock option awards prior to the release of good news, so as to increase their personal monetary gain via stock option compensation.

[7] Stock option repricing is the process of resetting the strike price of previously granted stock options usually when declining stock prices have resulted in the options to be out-of-the money. Critics of this strategy argue that repricing eliminates the risk imposed on the managers as an incentivising device, and may be viewed as an indicator of entrenched management, thus suggesting the presence of weak governance in the firms that it occurs.

specific risk, which in turn might lower their risk-taking appetite and discourage them from undertaking risky investments (Amihud and Lev, 1981; Smith and Stulz, 1985; Lambert et al., 1991; Lewellen, 2006).

Stock options induce convexity in the wealth-performance relationship, by increasing the sensitivity of managerial wealth to stock return volatility (vega). This encourages managers to take more risk in order to increase their expected wealth (Guay, 1999). As noted above, stock options offer the advantage of insulating managers from downside risk when the stock price falls below the option exercise price but provide unlimited upside potential when the stock price exceeds the exercise price, thereby limiting managerial risk aversion and inducing managers to pursue more risky investment projects (Smith and Stulz, 1985; Hirshleifer and Suh, 1992; Edmans and Gabaix, 2011). There is strong evidence reported by more recent empirical studies of a positive relationship between vega and explicit managerial risk-taking actions, including higher R&D expenditures and higher financial leverage (Coles et al., 2006), increased M&A activity in financial and non-financial firms (Hagendorff and Vallascas, 2011; Croci and Petmezas, 2015), higher oil exploration risk for oil and gas firms (Rajgopal and Shevlin, 2002), less use of derivatives as a hedging mechanism (Knopf et al., 2002), higher implied cost of equity capital (Chen et al., 2015), and risky tax avoidance beyond the shareholder desired level (Armstrong et al., 2015).

2.2.3 Institutional Investors' Ownership

Institutional ownership represents another important monitoring, yet external governance mechanism of the US corporate governance system. The striking growth of institutional investors' ownership in US public firms has been reported, for instance, by Dalton et al. (2007), Holderness (2009) and Davis (2013). Institutional investors are now the dominant shareholder group in the US stock market (e.g., Derrien et al., 2013) and have a fiduciary duty to maximise the returns from their portfolio of investments (Rappaport, 2011). This category of shareholders has been suggested as an important monitoring element of the corporate governance bundle. The typically large ownership stakes of such investors in a firm (Shleifer and Vishny, 1997), their greater expertise and degree of sophistication (Pound, 1988) and their greater access to top management (Smith, 1996) enable them to collect critical information about the firm, analyse and act on it, hence monitor and discipline management at a lower cost than individual equity holders.

Institutional investors usually become specialised monitors by either "voting with their feet" or "voting with their voice" (Hirschman, 1970). The first option is associated with selling the shares of a firm's they have invested in, a decision which would result in a decline of the firm's stock price and induce a disciplinary effect if the managers' actions destroy

shareholder wealth (Edmans, 2014). Even, the threat of selling the firm's shares (threat of "exit") could be a potential avenue through which institutional investors may prompt managers to maximise shareholder value, especially if EBC is a large portion of their wealth (Admati and Pfleiderer, 2009). The second option ("voice") relates to the direct intervention of institutional investors in corporate affairs, including, for instance, sponsoring shareholder proposals, voting against management at the annual general meeting (AGM), or engaging in private (behind-the-scenes) negotiations with management (McCahery et al., 2016). The existing evidence on whether institutional investors are effective external monitors of a firm's management, thereby increasing increase shareholder wealth, remains mixed. Two surveys by Karpoff (2001) and Romano (2001) conclude that activism by large institutional shareholders did not have significant effects on firm performance. Other empirical studies find no convincing evidence that shareholder proposals result in firm policy or performance improvements (Karpoff et al., 1996; Wahal, 1996; Gillan and Starks, 2000).

It is crucially important to understand that institutional investors are heterogeneous in terms of their investment preferences and behaviour (Grinstein and Michaely, 2005). In turn, these differences suggest considerable differences among institutions' incentives (Hoskisson et al., 2002) and degree of monitoring within a firm. A number of studies have shown that not all institutional investors, but certain types, can exert a positive influence on certain corporate activities. Brickley et al. (1988), for example, classified institutions as "pressure-resistant" or "pressure-sensitive"[8]. "Pressure-resistant" institutional investors (e.g., mutual funds, public pension funds) are more likely to actively engage in monitoring of managerial actions and exert significant influence over management's decisions to promote shareholders' interests, as they do not have direct business ties with the firms. In contrast, "pressure-sensitive" institutions (e.g., banks, insurance companies) are more likely to suffer from potential conflicts of interest because of their business relation with the firm they have invested in and become vulnerable to management influence. Thus, these investors are less likely to monitor and discipline managers. Empirical support for the active monitoring role of "pressure-resistant" investors can be found in the positive relationship between this type of investors and firms' operating cash flow returns (Cornett et al., 2007), as well as a greater influence of these investors over executive compensation (David et al., 1998; Almazan et al., 2005), and a greater likelihood to vote against antitakeover amendments, which have been linked with management entrenchment (Brickley et al., 1988).

[8] A third type of institutional investors is the "pressure-indeterminate" institutions which includes corporate pension funds, brokerage houses, investment counsel firms, miscellaneous and unidentified institutions.

Another widely used[9] taxonomy for classifying institutional investors in terms of their investment horizons was developed by Bushee (1998). The first category includes the "dedicated" institutions which are those with large, long-term equity stakes in a few firms and as a result, they have stronger incentives to collect information in order to actively engage with the firm and monitor management in the long-run. Conversely, "transient" investors are characterised by short-term investment horizons, high portfolio diversification and high portfolio turnover. These short-term investors are thought to encourage managerial myopic behaviour and they are less likely to be vigilant. "Quasi-indexers" is the third category of investors and they are defined as those that use indexing or passive buy-and-hold strategies and exhibit high diversification but low portfolio turnover. Given that they are long-term investors due to their indexing strategies, they are expected, on the one hand, to monitor management, but on the other hand, they might entice short-sighted investment behaviour due to their passive, dispersed ownership which prevents them from collecting information on the firm in order to actively monitor management. Using the aforementioned classification of institutional investors, Bushee (1998) finds that "transient" institutions promote managerial myopic behaviour, as managers are more inclined to cut R&D expenditures in order to improve short-term earnings when "transient" investors are dominant shareholders. In a related paper, Bushee (2001) shows that "transient" institutions prefer to invest in firms with more value expected to be realised in short-term earnings so as to reap short-term trading profits. In addition, this paper finds that the preferences of these investors produce significant misvaluations since high ownership stakes by "transient" institutions are accompanied by significant over-weighting of the short-term earnings value element.

At an empirical level, a number of recent studies highlight the importance of long-term institutional investors in encouraging firm decisions that will promote effective corporate governance and increase shareholder value in the long-term. In this regard, Dong and Ozkan (2008) find that "dedicated" institutions which have long-term interests in the firms, not only restrict director pay, but also have a positive influence on pay-performance sensitivity in firms where they have significant ownership stakes, using a sample of publicly listed non-financial UK firms over the years 2000-2004. Similarly, Attig et al. (2012) argue that institutions with long-term investment horizons serve a better monitoring role than other short-horizon institutions, by gathering more information about the firm which, in turn, mitigates information asymmetry and related agency costs. Consistent with these arguments,

[9] Indicatively, studies which used the Bushee (1998) classification include Bushee (2001), Chen et al. (2007), Andreou et al. (2017) and Elyasiani et al. (2017).

they report that the presence of long-term institutional investors is associated with a smaller wedge between the costs of internal and external funds which, consequently, reduces investment sensitivity to internal cash flows. Derrien et al. (2013) find that in undervalued firms with long-term institutional investors, the more their managers choose to invest and increase equity financing, and the less they pay out to shareholders in dividends and share repurchases. These findings are also in line with the view that long-term institutions encourage managerial decisions that maximise shareholder wealth in the long run. Gaspar et al. (2013), on the other hand, show how short-term institutions affect firm payout policy choices. More specifically, they find that firms dominated by short-term investors induce firms to use a higher proportion of share repurchases compared to a dividend increase, are more likely to conduct repurchases and these repurchases receive a less positive market reaction compared to the ones made by firms with long-term oriented investors. In other words, the market perceives the repurchases made by firms that are held by investors with short-term investment horizons as a less credible signal about their value as these investors focus more on the short-term stock price reaction. Finally, in the context of M&A, long-term institutional investors have been found to positively influence acquirer post-acquisition performance (Chen et al., 2007) and strengthen the bargaining position of the target firms in merger negotiations (Gaspar et al., 2005).

2.3 The Interdependence of Governance Mechanisms

There is a rich empirical literature that examines the relationship between corporate governance and firm performance through the lens of agency theory. However, the empirical evidence from this line of research has yielded ambiguous results. For instance, empirical studies of the effects of board characteristics and ownership structure on corporate financial performance have failed to provide consistent evidence of any significant and systematic effects (e.g., Dalton et al., 1998; 2007; Deutsch, 2005). Previous studies have largely investigated governance mechanisms in isolation from each other, without considering that they may interact in complex ways with one another towards a firm outcome. An emerging stream of research that adopts a *configurational* perspective in governance advocates that firm performance depends on the effectiveness of the "bundle" of governance arrangements, rather than the effectiveness of any single governance mechanism (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009). In other words, it supports the existence of multiple combinations or "bundles" of governance mechanisms, whereby alternative combinations of governance mechanisms can lead to similar firm outcomes (Rediker and

Seth, 1995; Gresov and Drazin, 1997). Within this framework, two hypotheses have been developed, namely the *Substitution* and *Complementarity Hypotheses*.

2.3.1 The Substitution Hypothesis

The *Substitution Hypothesis* postulates that one governance mechanism can be used as a substitute for another mechanism, while the overall effectiveness of the governance system is not affected (e.g., Agrawal and Knoeber, 1996). This perspective takes into account not only the benefits but also the associated costs of implementing various governance mechanisms (Rediker and Seth, 1995). Hence, the simultaneous implementation of many governance mechanisms may not be necessary, if their costs exceed the potential benefits (Zajac and Westphal, 1994). Instead, the substitutive perspective favours a balance between the various monitoring and incentive alignment mechanisms (Hoskisson et al., 2009).

There have been numerous studies with empirical findings supporting the substitutive view between monitoring and incentive alignment governance mechanisms. Early studies, for example of Beatty and Zajac (1994) and Zajac and Westphal (1994) show that when adequate managerial pay incentives are in place they can be a substitute for costly monitoring mechanisms and vice versa. Relatedly, Randøy and Goel (2003) focus on family-controlled firms which face lower agency costs and find that in this context a higher level of monitoring as measured by blockholder ownership and foreign ownership is, in fact, detrimental to firm performance because as the authors argue, it tends to suppress potentially profitable entrepreneurial opportunities. Conversely, non-founder firms in which agency conflicts are prevalent, benefit from low levels of incentive alignment mechanisms (board and inside ownership) and a high level of monitoring mechanisms (blockholder ownership and foreign ownership). Kim and Lu (2011) present evidence of substitutive effects on shareholder value - as measured by Tobin's Q - between managerial ownership, an important incentive alignment mechanism and two external monitoring mechanisms, namely product market competition and institutional ownership concentration, but only at low levels of managerial ownership. Recently, Oh et al. (2016) document substitutive effects between several monitoring and incentive alignment mechanisms in affecting corporate social responsibility (CSR). Specifically, when there is a high level of blockholder ownership in a firm, high levels of top management team (TMT) ownership are not necessary to promote CSR. Similarly, when there are high levels of TMT compensation incentives, additional monitoring by an independent board does not significantly increase CSR.

Another group of studies emphasises the substitutive perspective between various monitoring governance mechanisms. In support of this view, Rediker and Seth (1995) adopt a cost-benefit analysis and present evidence of the substitution hypothesis between

monitoring by independent directors and other monitoring mechanisms, including monitoring by outside blockholders and mutual monitoring by inside directors. In a similar vein, Agrawal and Knoeber (1996) find support for the substitution hypothesis on firm performance between the following monitoring mechanisms: board independence, debt financing and the market for corporate control. The findings of Sundaramurthy et al. (1997) also lend support to the substitution perspective between two monitoring mechanisms. In particular, the presence of CEO/Chair non-duality reduces the negative impact on shareholder wealth associated with the adoption of antitakeover provisions. In such a case, the monitoring role exercised by a chairperson other than the CEO acts as a partial substitute for the market for corporate control, which is an external monitoring mechanism undermined by antitakeover provisions. Moreover, Cyert et al. (2002) find that external monitoring by the largest outside blockholder and internal monitoring by the board of directors are strongly negatively related to the size of CEO EBC, thus interacting as substitutes in constraining management's tendency of awarding higher EBC to itself. Lastly, Oh et al. (2016) present additional findings in support for the substitutive effects between two monitoring mechanisms (i.e. board independence and blockholder ownership) and two incentive alignment mechanisms (i.e. TMT ownership and TMT incentive intensity) in encouraging CSR.

2.3.2 The Complementarity Hypothesis

Turning to the *Complementarity Hypothesis* which assumes that on a firm-level there are synergistic effects among the various governance mechanisms and these mechanisms become more effective in dealing with agency problems between shareholders and managers when they are mutually enhanced (Aguilera et al., 2008). In turn, this implies that any governance mechanism will not be sufficient on its own so as to mitigate agency problems, but the joint presence of multiple governance mechanisms improves their effectiveness as interrelated parts of the corporate governance "bundle". Two governance mechanisms interact as complements when the marginal benefit of one governance mechanism towards a firm outcome is enhanced in the level of the other governance mechanism (Schmidt and Spindler, 2002; Siggelkow, 2002).

Empirical evidence on the complementarity perspective is more recent. A number of previous studies document the presence of complementary effects between monitoring and incentive alignment governance mechanisms. Hartzell and Starks (2003) find that managerial pay-performance sensitivity (incentive alignment mechanism) is stronger in the presence of greater institutional ownership concentration (monitoring mechanism), suggesting that these two mechanisms can be used as complementary governance devices in ameliorating agency

problems. Rutherford et al. (2007) provide survey evidence supporting that a board's information gathering behaviour, which improves monitoring and reduces information asymmetry, is positively related to a CEO's EBC, indicating that neither monitoring nor incentive alignment mechanisms can mitigate agency problems on their own, but they rather serve as complements to this end. Schepker and Oh (2013) report findings that strongly support the complementarity view in the context of poison pill repeal. The poison pill is an antitakeover provision which has been associated with undermining the effectiveness of the market for corporate control and encouraging management entrenchment. The authors find that firms with strong monitoring and incentive alignment mechanisms in place are more likely to repeal poison pills, including more independent directors (e.g., those not nominated by the incumbent CEO), activist ("pressure-resistant") institutional ownership, and outside director ownership. Two more recent studies that are based on the *configurational* approach explained above, employ the fuzzy-set qualitative comparative analysis (fs/QCA) and find empirical support for complementarities between a variety of monitoring and incentive alignment mechanisms resulting in improved firm financial performance. First, García-Castro et al. (2013) identify heterogeneous "bundles" of governance mechanisms that form dyads, triads or higher-order combinations and lead to high firm performance as measured by return on equity (ROE). Among other findings, the authors find complementarities between board independence and employee loyalty or between performance-contingent compensation and efficient market for corporate control. Second, Misangyi and Acharya (2014) propose that both monitoring and CEO incentive alignment mechanisms are necessary for the effectiveness of the corporate governance "bundle". This formal proposition is based on the fact that all six of the different combinations leading to high profits in terms of ROA were found to include at least one of either internal (e.g., board independence) or external (e.g., blockholder ownership) monitoring mechanisms and at least one of the CEO alignment mechanisms (e.g., CEO ownership, CEO EBC). It should be mentioned, though, that according to García-Castro et al. (2013, p. 395), "fuzzy sets qualitative comparative analysis (fs/QCA) permits the assessment of causal conditions or combinations of causal conditions that lead to an outcome based on set-subset connections using Boolean algebra (Ragin, 2000; 2008)". This method compared to conventional regression analysis has the advantage of permitting researchers to investigate three-way or more interactions which result in an outcome (e.g., Fiss, 2007). However, any findings cannot be generalised beyond the sample under investigation since this method does not involve statistical inference and since the analysis is cross-sectional without taking into account time

differences. Also, if this method is used in governance research, still endogeneity issues will have to be addressed.

Prior empirical work suggests that there are complementary effects between various monitoring governance mechanisms. Cremers and Nair (2005), for example, find that shareholder activism and the market for corporate control act as complements towards increasing shareholder value in terms of long-term equity returns. Two proxies for shareholder activism are used, the ownership by the largest blockholder and the ownership by public pension funds (active shareholders). The proxies for the market for corporate control are the G-Index developed by Gompers et al. (2003) which includes 24 antitakeover provisions and a more narrow index suggested by this paper which includes only three key antitakeover provisions. In particular, they find that in terms of long-term abnormal returns, shareholder activism (internal monitoring governance mechanism) is important only in the presence of takeover vulnerability (external monitoring governance mechanism) and correspondingly, the takeover market is only important in the presence of an active shareholder such as public pension fund ownership. A portfolio that buys companies with the highest degree of takeover vulnerability and shorts companies with the lowest degree of takeover vulnerability is found to generate annualised abnormal returns between 10%-15%, only in the presence of high public pension fund (blockholder) ownership. Masulis et al. (2007) extend the work of Cremers and Nair (2005) and show evidence of complementary effects between takeover vulnerability, product market competition and CEO/Chairman non-duality in the context of corporate acquisitions. Acquirers that face more pressure from the market for corporate control, operate in industries with higher competition and maintain a separate board leadership structure, are found to engage in acquisitions of better quality as they experience higher abnormal announcement returns. Desender et al. (2013) adopt a contingency approach to test how the ownership structure of a firm will influence the relationship between monitoring by the board and external auditors. Using a sample of Continental European companies they show that there is a complementary relationship between board independence and audit services, but only when ownership is dispersed as would typically hold in the case of the Anglo-American governance system.

2.4 M&A context

M&A are a way in which companies can grow. They combine two or more business entities into one, with shared ownership and one top management. From a strategic management perspective, M&A can be a potent basis for implementing diversification strategies that will ultimately create shareholder value. The resource-based view of the firm suggests that M&A as key strategic tools, provide the potential to firms to achieve sustainable competitive advantage by accessing valuable bundles of resources that are rare, difficult to imitate or substitute (Wernerfelt, 1984; Barney, 1986). As such, M&A represent a vehicle by which firms may redeploy and reconfigure their assets in order to enhance their capabilities and become more competitive (Haspeslagh and Jemison, 1991; Capron et al., 1998).

M&A activity has grown substantially since the beginning of the 20th century, mostly clustered around the so-called "merger waves" (i.e. peaks of M&A activity due to industry-level shocks such as economic, technological or regulatory shocks). Since the recent global financial crisis, investment activity has returned to the international capital markets mainly in the form of large takeovers and "mega-deals". Particularly, since early 2014, the so-called seventh "merger wave" (Mavis et al., 2017) has reignited the interest of practitioners, regulators, and scholars on M&A. Accordingly, a large number of studies have undertaken the investigation of determinants and consequences of these complex business phenomena, in particular with reference to their impact on shareholder value. The sub-sections below describe the various motives for M&A activity, the key determinants of the size of the acquisition premium from the acquirer's perspective, and the most commonly studied antecedents for predicting acquirer performance that have been identified in the literature.

2.4.1 Antecedents of M&A activity

Acquisition motives can be categorised as either value-increasing or value-decreasing. The synergy rationale is the most common theoretical driver of value-increasing M&A as the literature predicts that the sum of combining two firms is greater than their individual parts. To better illustrate the concept of synergy, we refer to Chatterjee's (1986) classification of synergies into three distinct groups. First, *collusive synergies* arise when a firm engages in takeover activity in order to increase its market share and market power by being able to dominate a particular market and eliminate competition. Second, *operational synergies* take the form of productive efficiencies either as economies of scale or scope. Economies of scale arise with the reduction of the average cost of producing goods or services due to an increase in size by allocating fixed costs over a higher volume of production. To the same end, economies of scope imply a reduction of the average total cost from synergies arising by

selling different products or services by the same enterprise. Third, *financial synergies* lead to lower cost of capital since M&A may be used as a means to diversify business risk from diversifying into unrelated business activities. Thus, a firm may lower its dependency upon any one market or product, and also secure lower borrowing costs, since large companies may have access to wider and more competitive funding opportunities. In this case, tax advantages may also emerge from the beneficial tax treatment of debt relative to equity.

A second value-increasing motivation for explaining M&A activity is the market discipline or the *market for corporate control*, a term introduced by Manne (1965). A bidding firm may seek to replace the underperforming management of a target company, through acquisition, with the purpose of improving its performance (Jensen and Ruback, 1983; Morck et al., 1989). This implies that M&A activity itself represents an important external governance mechanism when internal governance mechanisms fail to align the interests of shareholders and managers in a firm (Walsh and Seward, 1990).

The abovementioned motives for M&A activity are expected to contribute to shareholder value maximisation. Nevertheless, it has been shown that value destruction acquisition motives also exist. To begin with, Roll (1986) developed the managerial *hubris hypothesis* (or overconfidence) as an explanation of the M&A activity. Malmendier and Tate (2008) provide empirical support for the *hubris hypothesis* as managers that are over-optimistic of their abilities and skills to run a larger combined firm end up overpaying for the target firm and engage in lower quality M&A that ultimately lead to value destruction for their shareholders.

Agency issues are the second type of value-destroying M&A motives as managers may exhibit opportunistic behaviour in the pursuit of their own self-interest. For example, managers may engage in empire-building acquisition strategies, especially when there are abundant cash firm reserves (Jensen, 1986; Harford, 1999; Andrade et al., 2001). CEOs of the acquiring firms infected with hubris believe that they engage in value-increasing acquisitions, while in the case of empire-building, CEOs act on their own self-interest in order to build empires and attain increased status, power and personal wealth. Other forms of agency issues, closely related to the empire-building motive, arise when M&A activity is driven by rent-extraction motives such as in the case when managers engage in M&A stemming from their desire for increased EBC (Harford and Li, 2007), bonuses (Grinstein and Hribar, 2004), and other forms of compensation (Bliss and Rosen, 2001), following M&A regardless of the acquisition performance. Another agency motive that can potentially result in value-destroying M&A is the reduction of managerial employment risk (Amihud and Lev, 1981). As the human and financial capital of managers is tied to the firm they are employed, they may choose to engage in diversifying M&A, not necessarily in the benefit of

the shareholders, but in order to reduce the risk of their own relatively undiversified wealth portfolio.

2.4.2 Antecedents of M&A premium

This sub-section considers the acquisition premium which according to Haleblian et al. (2009) has not been used extensively in the M&A research but could be an acquisition outcome investigated on its own and represents an effective proxy for the management's strategic objectives. The merger premium or "control" premium as it is usually referred to, represents the cost of a takeover from the acquirer's perspective (e.g., Bozos et al., 2014). It is widely defined as the amount above the current market value of the target firm that the target's shareholders are willing to accept in order to transfer control to the bidding firm.

Despite the growing body of research, both in the finance and strategy literatures, the extant literature fails to provide a deeper understanding of the determinants of acquisition premiums (Laamanen, 2007; Haleblian et al., 2009). There are several explanations that dominate the literature with respect to the major determinants of the size of the acquisition premium from the acquirer's perspective. First, it has been argued that the bidder's desire for synergistic gains is considered a value-creating premium determinant (Díaz et al., 2009). In theory, the higher the synergistic gains, the higher the premium that the bidder would be willing to offer to acquire the target firm. A limited number of empirical studies report a weak relationship between synergies and the size of the acquisition premium (e.g., Varaiya, 1988; Slusky and Caves, 1991). A more recent paper of Laamanen (2007) reveals synergistic gains stemming from the combination of the target's and bidder's resources resulting in value-increasing resource combinations (Capron et al., 1998). Specifically, this study documents that although for technology intensive firms, higher premiums are paid for the technological resources of a target, these premiums are justified by the value of these R&D-related assets and do not lead to bidder shareholder value destruction since they are not found to result in negative abnormal bidder returns.

Second, extremely high premiums which may have negative effects on the acquirer's performance and even result in the bankruptcy of the acquirer (Haunschild, 1994) are explained by the concept of bidder overconfidence or *hubris* (Roll, 1986; Hayward and Hambrick, 1997) as mentioned in the previous sub-section. Managers may overestimate their abilities to achieve acquisition gains leading them to overvalue the target firm and, in turn, overbid and overpay for the target.

Third, the presence of agency conflicts could potentially explain overbidding and overpayment in the acquisition market. As explained earlier, M&A represent a setting of heightened agency problems since they provide managers with opportunities to secure

private benefits from controlling larger firms (Morck et al., 1990) or pursue diversifying acquisitions in order to reduce their employment risk (Amihud and Lev, 1981). Jensen (1986) contends that managers may be incentivised to grow their firms beyond the optimal size so as to increase their compensation and boost their power and prestige.

Fourth, another frequently stated reason for the payment of hefty premiums on behalf of the acquirer is the competition for targets (Varaiya and Ferris, 1987; Slusky and Caves, 1991). In this case, we may observe the "winner's curse" problem (Bazerman and Samuelson, 1983; Eckbo, 2009) in which the winning acquiring firm during a bidding war will be the one that most overestimated the true value of the target firm and hence overpaid to acquire control of the target.

Finally, another explanation for the size of acquisition premiums paid is related to board interlocks and investment advisors. Haunschild (1994), using a sample of 453 acquisitions taking place in the US between the years 1986-1993, shows that both inter-organisational linkages with interlock partners and professional firms influence acquisition premiums, irrespective of the influences of synergies, competition, the financial state of the target, macroeconomic and industry effects. On the one hand, acquirers pay premiums that are similar to the ones paid by their interlock partners. On the other hand, information diffusion by investment bankers leads to similar premiums for firms that they have business relationships with.

2.4.3 Antecedents of M&A performance

Having discussed the determinants of the firm's decision to engage in M&A activity and the most important factors that determine the size of the acquisition premium from the acquirer's side, we now move on to discuss the most frequently studied determinants for predicting the post-acquisition performance of the acquirer. King et al. (2004) conduct a meta-analysis of 93 past studies of M&A performance dating back to 1921 and conclude that the four most commonly examined variables influencing acquirer performance are the method of deal payment, acquirer prior acquisition experience, whether or not the M&A deal involved related firms, and whether or not the M&A deal was made by a conglomerate firm. These are now discussed in turn.

First, there are two main methods by which an acquirer can pay for an M&A deal: cash and stock. It has been suggested in the finance literature that stock-finance deals act as a negative information signal that the acquirer's stock is overvalued, whereas managers of the acquiring firm are more likely to finance acquisitions using cash if they believe that their firm's stock is undervalued (Myers and Majluf, 1984; Loughran and Vijh, 1997). In line with this argument, existing evidence suggests that acquirers of stock-financed deals experience

significant losses, while the post-acquisition performance of cash-financed deals outperforms stock-financed M&A (e.g., Travlos, 1987; Brown and Ryngaert, 1991; Servaes, 1991).

Second, given the fact that M&A are complex phenomena, prior acquisition experience of the acquiring firms is expected to be beneficial, especially at the stage of post-acquisition integration of the target and hence contribute positively to the acquirer's performance. However, research on the relationship between acquisition experience, usually measured by the frequency of M&A bids, and post-acquisition performance fails to produce consistent findings. Kusewitt (1985) finds that acquirer performance deteriorates as the number of acquisitions increases, while Fowler and Schmidt (1989) report that prior acquisition experience improves significantly the post-acquisition financial performance of acquirers, and Lahey and Conn (1990) show that there is no impact between merger frequency by acquirers and post-acquisition performance. Other studies suggest moderating effects. For example, Haleblian and Finkelstein (1999) report a U-shaped relationship between prior acquisition experience and acquisition performance. The study also documents that the higher the similarity between a firm's targets is to its previous acquired targets, the better the performance. The authors attribute their findings to the fact that inexperienced acquirers, after completing their first acquisition, inappropriately apply that acquisition experience to following dissimilar acquisitions, whereas acquirers with more acquisition experience were able to avoid such mistakes.

Third, the degree of relatedness between acquirer and target firms is widely believed to influence the post-acquisition performance of the acquiring firms. Business relatedness among the merging parties can play an important role in the integration process in an M&A deal since acquiring related targets allows the acquirer to productively share similar pre-existing resources within the newly formed businesses and exploit operational synergies in the form of economies of scale and/or scope (Singh and Montgomery, 1987; Grant, 1988; Harrison et al., 1991). Nevertheless, related M&A are not without costs and risks. Acquirers may underestimate certain bureaucratic costs which in turn may increase the risk of integration failure by merely replicating existing organisational routines instead of effectively integrating them across business units (Jones and Hill, 1988; Barkema and Schijven, 2008).

Fourth, conglomerate M&A involve completely unrelated firms such as firms that operate in different industries or different geographic markets. The extant literature has produced mixed findings on the impact of corporate diversification on post-acquisition performance. On the one hand, some scholars have reported that diversification is a value-increasing firm strategy (e.g., Campa and Kedia, 2002). Diversified firms have been argued to perform better as they benefit from either the creation of unique synergies resulting from the integration of

the different resources of the acquirer and target firms (Harrison et al., 1991) or the exploitation of financial synergies (Amit and Livnat, 1988). On the other hand, other studies argue that diversification destroys firm value due to the existence of a "diversification discount" which suggests that diversified firms trade at lower valuations compared to non-diversified firms (Lang and Stulz, 1994; Berger and Ofek, 1995). It has been suggested in the literature that value-destroying diversifying M&A may be the result of agency conflicts between managers and shareholders as managers may choose to diversify and grow their firms beyond the optimal size in order to secure private benefits, such as empire building (e.g., Jensen, 1986; Andrade et al., 2001), higher compensation (e.g., Grinstein and Hribar, 2004; Harford and Li, 2007), power and prestige (e.g., Jensen, 1986), and employment risk reduction (Amihud and Lev, 1981). Alternatively, value-destroying diversifying M&A may be driven by psychological biases such as managerial overconfidence in which case managers may overestimate their knowledge about the target's unrelated business and are more likely to overinvest in lower-quality unrelated acquisitions (Malmendier and Tate, 2008; Andreou et al., 2019).

2.5 Conclusion

In light of the above discussion, there is a burgeoning body of research that attempts to explore the substitutive and complementary relationships between multiple governance mechanisms towards firm outcomes (Aguilera et al., 2008; 2015; Cuomo et al., 2016), with an aim to account for the lack of consistency in previous empirical studies which focussed only on the independent effects of corporate governance mechanisms (e.g., Dalton et al., 1998; 2003; 2007).

In recognition of this gap, and given that there has been less attention to fully understanding the implications of corporate governance on acquisition investments (Aktas et al., 2016a), this thesis aims to explain the role of firm-level governance mechanisms in corporate acquisition decisions and outcomes. In this regard, the three following empirical chapters make important contributions in innovatively testing the *Substitution* and *Complementarity Hypotheses* with respect to exploring how the interrelations of certain governance mechanisms influence a firm's decision to undertake acquisition investments (Chapter 3) and its post-acquisition performance (Chapter 5), as well as considering the moderating role of acquirer's governance in acquisition premium decisions (Chapter 4).

3 Corporate Governance "Bundles" and Firm Acquisitiveness

3.1 Introduction

M&A are among the most significant corporate investments employed by firms in the pursuit of growth and shareholder wealth creation. Although there is a significant body of research from different academic fields on the determinants of corporate acquisitions, this research has been rather disparate in identifying the relative importance of each driver and how multiple drivers may contemporaneously work in influencing firm acquisitiveness (Laamanen, 2007; Haleblian et al., 2009). For instance, Haleblian et al. (2009) emphasise the need for additional research on the influence of governance mechanisms, such as board structure, executive compensation, and blockholder ownership on firm acquisition behaviour.

Aside from being major and discrete strategic events, corporate acquisitions have been argued to exacerbate the inherent conflicts of interest between shareholders and managers in large public firms (Jensen, 1986; Morck et al., 1990; Masulis et al., 2007). M&A, for instance, can be the result of managerial self-interest, inconsistent with shareholder value maximisation, such as empire building (e.g., Jensen, 1986; Andrade et al., 2001) and employment risk reduction (Amihud and Lev, 1981). Acquisition decisions can be the source of a wide divergence of interests between shareholders and managers and, therefore, have been frequently investigated using the agency theory lens (Jensen and Meckling, 1976). Thus, the M&A framework provides a suitable setting to explore the role of corporate governance in influencing acquisition decisions.

The relationship between corporate governance mechanisms and firm performance has been at the centre of governance research. However, the evidence from this research has yielded equivocal results. For example, studies of the effects of the board of directors characteristics (e.g., board independence, board leadership structure) and ownership structure on corporate financial performance have failed to provide consistent evidence of significant and systematic effects (e.g., Dalton et al., 1998; 2007; Deutsch, 2005). The fact that the extant literature has produced mixed and inconsistent results is due, at least in part, to the examination of governance mechanisms in isolation from each other, without considering their joint effects.

To overcome this shortcoming, a more holistic approach to corporate governance has been proposed, by considering a *configurational* perspective. Under the *configurational* perspective, substitutive and/or complementary effects between governance mechanisms result in the creation of multiple combinations or "bundles" of governance mechanisms

(Rediker and Seth, 1995) that work effectively together towards firm outcomes (Aguilera et al., 2012; 2015; Cuomo et al., 2016). To date, nevertheless, there has been limited empirical research into this configurational perspective of corporate governance.

The main objective of this study is, consequently, to address the aforementioned gaps both in the M&A and corporate governance literatures and explore the interrelations of certain firm-specific governance mechanisms with respect to influencing a firm's propensity to undertake corporate acquisitions. Given the multifaceted nature of corporate governance, this study focusses on three key governance mechanisms, namely board monitoring, CEO pay incentives, and institutional investor monitoring. M&A are complex corporate investments with highly uncertain outcomes and can have major valuation effects for the acquirer's shareholders. Thus, studying the impact of board monitoring characteristics on a firm's acquisition propensity is particularly salient, as acquisition decisions require board approval. In addition, as the CEO of a firm typically initiates an M&A deal, it is interesting to examine the role of CEO pay incentives in influencing acquisition decisions as an important incentive alignment governance mechanism. Moreover, given the increasing importance of institutional investor ownership in US public firms (Derrien et al., 2013), these shareholders have a vested interest in influencing acquisition decisions and represent another monitoring, yet external governance mechanism.

Using a sample of US firm acquisitions for the period from 1998 to 2015 and drawing from the literature on the configurational perspective in corporate governance, we empirically test the *Substitution* and *Complementarity Hypotheses* in the context of M&A decisions using the *marginal effects* concept as used in the field of economics (e.g., Vives, 1990). The substitutive assumption (e.g., Zajac and Westphal, 1994; Rediker and Seth, 1995; Oh et al., 2016) suggests that one governance mechanism may weaken the marginal effects of another mechanism on firm outcomes. This, in turn, implies that simultaneously deploying multiple governance mechanisms may not always lead to optimal outcomes, as the associated costs of additional mechanisms may exceed their benefits. Alternatively, the complementarity view (e.g., Cremers and Nair, 2005; Schepker and Oh, 2013; Misangyi and Acharya, 2014) assumes that two (or more) governance mechanisms work in a synergistic fashion and that one mechanism could increase the marginal effects of another.

Our results mainly provide support for the *Substitution Hypothesis*. We find that incentive alignment and monitoring governance mechanisms act as substitutes of each other in influencing the likelihood of a firm to undertake an acquisition. Nevertheless, we detect an exception in the case of board and institutional investor monitoring, which present complementary effects on acquisition propensity. As such, we make several contributions to

both the M&A and corporate governance literatures. First, taking into account the under-examined interactive effects between different governance mechanisms (Cuomo et al., 2016), our results add to the existing M&A literature on the determinants of acquisition activity (Aktas et al., 2016a) by identifying a set of predictor variables in the form of firm-level governance configurations. Second, this study contributes to the *configurational* perspective of corporate governance research (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009), suggesting that degrees of firm acquisitiveness can be achieved through different combinations or "bundles" of firm-level governance mechanisms. In accordance with the idea of "equifinality" (Rediker and Seth, 1995; Gresov and Drazin, 1997), firms are flexible to design their bundle of governance practices so as to achieve similar outcomes and, in this case, the desired levels of acquisition propensity.

The remainder of this chapter is organised as follows. Section 3.2 reviews the prior related literature and Section 3.3 develops the research question. Section 3.4 describes the data, the sample selection process, the variables employed in this study, along with the empirical methodology. The empirical results of the main analysis with robustness tests are provided in Section 3.5. Section 3.6 discusses the theoretical and practical implications of the empirical results and concludes the chapter.

3.2 Related Research

3.2.1 The Board of Directors

Within agency theory, in firms with widely diffused ownership, the board of directors is considered one of the most powerful internal monitoring mechanisms (Fama and Jensen, 1983b). To protect shareholders' interests, boards fulfil their monitoring role by holding management accountable, thus mitigating the costs of potential self-serving opportunistic behaviour of managers-agents. M&A represent important corporate investments for which board monitoring is particularly salient: acquisition decisions, unlike day-to-day managerial decisions, are complex and time-consuming and can have long-term consequences on the shareholder value of the acquiring firm (Haleblian et al., 2009). Thus, they require intensive board scrutiny and, ultimately, approval. In this regard, M&A provide an ideal setting to investigate the effectiveness of board monitoring.

First, a significant body of research argues that board size is a key characteristic contributing to the monitoring effectiveness of the board of directors (Jensen, 1993). However, while board size has been studied extensively, there is no consensus in the existing empirical work regarding the subject of optimal board size. On the one hand, several studies suggest that smaller boards are more effective monitors and can improve firm performance

because they avoid, for example, communication, coordination and slower decision-making issues encountered by larger boards (e.g., Yermack, 1996; Eisenberg et al., 1998). On the other hand, there is evidence of larger boards being more beneficial in certain cases, for instance, in firms with greater advising needs (Coles et al., 2008). In such cases, larger boards are particularly effective because they bring more valuable knowledge and expertise and can provide better advice and counsel with respect to strategic decisions of the firm. With respect to M&A, Cheng (2008) finds a negative relationship between board size and frequency of acquisitions, supporting the view that larger boards experience more difficulties in reaching consensus on risky projects.

Second, agency theorists favour a higher presence of independent directors on the board as they are expected to be vigilant supervisors of management actions. These non-executive directors are assumed to contribute to superior firm performance because they are detached from management. Despite substantial research on the impact of board independence on firm performance, the results are still mixed and inconclusive (e.g., Dalton et al., 1998; 2007; Dalton and Dalton, 2011). For instance, Hill and Snell (1988) and Baysinger et al. (1991) report a negative association between outside director representation and the intensity of R&D expenditures. According to standard agency theory, the presence of outsider-dominated boards would encourage R&D spending because it is consistent with the objective of increasing a firm's value. Yet, the findings of Hill and Snell (1988) and Baysinger et al. (1991) support the propositions of Baysinger and Hoskisson (1990), who argue that while independent directors emphasise financial (i.e. objective performance–related criteria) over strategic controls, managers are preoccupied with employment risk and, hence, they focus on short-term performance and are less willing to engage in risky initiatives. Conversely, Kolasinski and Li (2013) show that boards of moderate size (between 4 and 12 directors) can curb the acquisitiveness of overconfident CEOs. Such findings confirm the assumption of Malmendier and Tate (2008) that independent directors can add to firm value by restraining value-destructive acquisitions motivated by managerial overconfidence.

Third, from an agency theory perspective, a board's monitoring effectiveness is compromised when CEO/Chair duality is present, as CEOs become too powerful vis-à-vis the board when they hold both titles, resulting in managerial entrenchment (Fama and Jensen, 1983b; Jensen, 1993; Finkelstein and D'aveni, 1994). Nevertheless, also here there is no clear consensus on the relationship between CEO/Chair duality and firm financial performance (e.g., Dalton et al., 1998; 2007; Dalton and Dalton, 2011). Agency theory posits that managers are naturally risk averse since they hold relatively undiversified wealth portfolios with their human capital invested in their own firm, thus exposing them to high

levels of both systematic and unsystematic (firm-specific) risk (Jensen and Meckling, 1976; Eisenhardt, 1989). To reduce their own employment and compensation risk, the CEO/Chair might pursue diversifying acquisitions as a way to reduce their relatively undiversifiable employment risk (Amihud and Lev, 1981). Some studies investigate the impact of CEO duality on firm strategy by taking into account CEO risk taking contingencies (Krause et al., 2014). For example, using a sample of French public firms, Castañer and Kavadis (2013) find an association between the power of the CEO dual position and high levels of free cash flows - as an indicator for potential opportunism and agency conflicts (Jensen, 1986) - and, hence, increased financial diversification. Similarly, Li and Tang (2010) find that the effect of CEO hubris (Roll, 1986) - a value-destructive acquisition determinant (Malmendier and Tate, 2008) - on firm risk-taking is more pronounced in the presence of CEO duality.

3.2.2 Managerial Incentives

Corporate acquisitions have been argued to exacerbate agency conflicts (Jensen, 1986; Morck et al., 1990) and are considered risky strategic investments as their outcome is highly uncertain (e.g., Pablo et al., 1996; Sanders, 2001). Prior research provides considerable evidence of the presence of a relationship between the incentive structure of executive compensation and firm risk. Two of the most widely considered measures of managerial incentives are the vega and delta incentives: the former represents the sensitivity of managerial wealth to the volatility of stock returns, while the latter entails the sensitivity of managerial wealth to stock price (e.g., Guay, 1999; Core and Guay, 2002). The main rationale for option-based managerial compensation is that stock options induce convexity in the wealth-performance relationship, by increasing the sensitivity of managerial wealth to stock return volatility (vega). This encourages managers to take more risk in order to gain benefit (Guay, 1999). Stock options limit managerial risk aversion and induce managers to pursue value-enhancing (riskier) investment projects (Smith and Stulz, 1985; Hirshleifer and Suh, 1992; Edmans and Gabaix, 2011). A number of empirical studies report evidence of a positive influence of vega on managerial risk-taking (e.g., Guay, 1999; Coles et al., 2006; Low, 2009). Conversely, the impact of delta incentives on managerial risk taking is theoretically ambiguous. An increase in delta should, on the one hand, work towards aligning the interests between managers and shareholders and increase the efforts of managers to pursue valuable risk-increasing investment opportunities that they would otherwise forgo. On the other hand, delta incentives could accentuate managerial risk aversion by exposing undiversified managers to higher firm-specific risk, which in turn might lower their risk-taking appetite (Amihud and Lev, 1981; Smith and Stulz, 1985; Lambert et al., 1991; Lewellen, 2006).

The growing body of research that has explored the impact of pay incentives on acquisition decisions has offered interesting findings. Datta et al. (2001) observe that, on average, firms awarding higher equity-based compensation (EBC) experience increases in the level of risk, as measured by stock return volatility, in the post-merger period. Boulton et al. (2014) also report a positive association between CEO's EBC and both acquisition intensity and likelihood. In economic terms, the effect is significant, as a one standard deviation increase in CEO delta for a non-acquiring firm translates into an 8.7% increase in the probability that the firm makes an acquisition in the following year. Additionally, the authors note that this positive relationship is attributed to exercisable options.

Along the same lines and consistent with theoretical predictions that risk-taking incentives encourage managerial risk taking, Croci and Petmezas (2015) find firm acquisitiveness to be positively associated with CEO vega, with one inter-quartile range increase in vega increasing acquisition investments by roughly 4.22%. Lastly, Gormley et al. (2013) show that CEOs with high portfolio vega incentives are less likely to take actions to offset the unanticipated increase in left-tail risk, such as pursuing diversifying acquisitions, thus providing strong evidence that the convexity of managerial pay incentives influences directly the firm decision-making with respect to risky investment opportunities.

Finally, executive compensation packages normally consist of compensation contingent on performance as well as a fixed (cash) element or base salary. It has been argued that entrenched CEOs with a higher level of cash pay are more likely to avoid risk (Berger et al., 1997). At the same time, a competing argument is that CEOs with large amounts of cash-based compensation that can be invested outside the firm are less risk averse since they are better positioned to diversify their wealth (Guay, 1999; Armstrong and Vashishtha, 2012). Therefore, the direct effect of CEO cash compensation on the decision of a firm to undertake acquisition investments - which feature significant firm-specific risk - is also ambiguous.

3.2.3 Institutional Ownership

Finally, within the corporate governance literature, a principal monitoring mechanism is institutional ownership, which has increased substantially over the past few decades. Indeed, institutional investors have now become the largest class of investors of US firms (Gillan and Starks, 2000; Derrien et al., 2013). Given their sizeable shareholdings and sophisticated expertise, institutional investors have been suggested to be better positioned to monitor the investee firms' management and to do so at lower cost than individual shareholders (Shleifer and Vishny, 1986). It is argued that the larger the institutional holdings, the smaller the monitoring costs an institution will have to incur as there are economies of scale for

collecting and processing firm information (Chen et al., 2007). Furthermore, total monitoring costs may decrease for institutions with large ownership as they often gain easier access to senior management and board members (Carleton et al., 1998).

However, different types of institutional investors may have divergent investment objectives and preferences, thereby leading to considerable differences in their degree of monitoring. Prior research has shown that the investment horizons of institutional investors are one of the dimensions along which they may differ and which would have an impact on the efficacy of their monitoring role (e.g., Bushee, 1998; 2001). The presence of institutional investors with longer investment horizons improves the effectiveness of governance practices within a firm (McCahery et al., 2016), as they actively engage and monitor the management (Attig et al., 2012) compared to short-term institutional investors. In the context of acquisition decisions, Gaspar et al. (2005), among other findings show that target firms with higher investor turnover have a significantly higher propensity to receive a takeover offer. This implies that potential acquirers are more inclined to bid for targets held by investors with short-term investment horizons because these represent easier targets with lower bargaining power.

Other studies examined the influence of foreign institutional ownership on acquisition propensity and the overall findings confirm the active role of institutional investors in takeover decisions. Ferreira et al. (2010) provide evidence that institutional investors facilitate cross-border acquisitions by connecting firms they have invested in, thus reducing the transaction and bargaining costs of these deals. They find a higher probability of cross-border M&A in the presence of large and foreign institutional investors in both target and acquirer firms. Andriosopoulos and Yang (2015) carried out similar research investigating the impact of institutional ownership on UK M&A and demonstrate that the presence of foreign institutional investors increases the likelihood of UK firms acquiring foreign targets, in line with Ferreira et al. (2010). Moreover, the authors find that the presence of institutional investors with long-term and medium-term investment horizons makes it more likely for the acquirers to assume full control of the target after the completion of the M&A deal.

Agency-based research generally assumes that firm-level governance mechanisms operate independently and, therefore, has predominantly investigated them separately. However, as mentioned earlier, this line of research has not been able to establish a definitive link between individual governance mechanisms and firm performance (e.g., Dalton et al., 1998; 2007; Deutsch, 2005). One possible explanation for these alternative findings is that, since various governance mechanisms coexist within firms, then more attention should be paid towards

exploring the interconnections between these mechanisms, treating them as a governance "bundle" (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009).

3.2.4 The Interdependence of Governance Mechanisms

A growing body of governance literature adopts a *configurational* perspective, which posits that firm performance depends on the effectiveness of the "bundle" of governance arrangements, rather than the effectiveness of any single governance mechanism (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009). The configurational approach in corporate governance assumes that in order to achieve a desired firm outcome, the interdependencies of governance mechanisms should be considered. This suggests the existence of multiple combinations or "bundles" of governance mechanisms. Therefore, it challenges universalistic governance policy prescriptions (Aguilera et al., 2008; Cuomo et al., 2016) and supports the notion of "equifinality", whereby alternative combinations of governance mechanisms can lead to similar firm outcomes (Rediker and Seth, 1995; Gresov and Drazin, 1997). In the growing body of research focussing on the interdependence of governance mechanisms, two hypotheses have been developed, namely the *Substitution* and *Complementarity Hypotheses*.

3.2.4.1 The Substitution Hypothesis

First, the *Substitution Hypothesis* predicts that governance mechanisms can substitute one another and, in doing so, effectively mitigate agency costs, especially considering the costly implementation of these mechanisms in a firm (e.g., Agrawal and Knoeber, 1996). This assumption has already received empirical support. For example, several studies provide evidence of substitutive effects between monitoring and incentive alignment mechanisms with respect to organisational outcomes such as firm value - as measured by Tobin's Q - (Randøy and Goel, 2003; Kim and Lu, 2011) and corporate social responsibility (Oh et al., 2016). In the same spirit, other studies find support for the substitutive perspective between various monitoring governance mechanisms with regards to outcomes such as firm performance - as measured by Tobin's Q - (Agrawal and Knoeber, 1996) and the impact on shareholder wealth associated with the adoption of antitakeover provisions (Sundaramurthy et al., 1997).

In the context of this study, we conjecture, using the marginal effects concept - as employed in the field of economics (e.g., Vives, 1990) - that there are substitutive effects between two governance mechanisms if one governance mechanism decreases the marginal effect of another mechanism on firm acquisitiveness. The substitutive perspective implies that if certain governance mechanisms are sufficiently high, the costs of implementing

additional mechanisms - either monitoring or incentive alignment - may exceed the benefits. Therefore, the joint presence of multiple governance mechanisms may not always be effective in achieving certain firm outcomes; hence, the marginal effect of each mechanism will not be strengthened or will even weaken.

3.2.4.2 The Complementarity Hypothesis

Alternatively, the *Complementarity Hypothesis* posits that the coexistence of multiple firm-level governance mechanisms is required in order to reduce a firm's agency costs, implying synergistic effects among governance mechanisms. A recent stream of research confirms the presence of complementary effects between monitoring and incentive alignment governance mechanisms, for instance, with respect to reducing information asymmetry and mitigating agency costs (Rutherford et al., 2007), repealing poison pills (Schepker and Oh, 2013), and improving firm profitability in terms of ROA (Misangyi and Acharya, 2014). Other studies also offer evidence in favour of complementarities between various monitoring governance mechanisms. Cremers and Nair (2005), for instance, find evidence that shareholder activism and the market for corporate control work together as complements towards increasing shareholder wealth in terms of long-term equity returns. Specifically, a portfolio which buys firms with the highest degree of takeover vulnerability and shorts firms with the lowest degree of takeover vulnerability generates annualised abnormal returns between 10%-15%, only in the presence of high public pension fund (blockholder) ownership. Masulis et al. (2007) extend the work of Cremers and Nair (2005) and demonstrate that there are complementary effects between takeover vulnerability, product market competition and CEO/Chair non-duality in the M&A context. Acquirers that face more pressure from the market for corporate control, operate in industries with higher competition and separate the positions of CEO and chairperson, are found to engage in more profitable acquisitions in terms of higher abnormal announcement returns.

In the specific context of M&A, the complementarity perspective implies that the adoption of multiple governance mechanisms would have a greater impact on a firm's acquisition propensity than either governance mechanism in isolation. Complementarity, therefore, assumes that governance mechanisms work in a synergistic fashion and the adoption of certain combinations of governance mechanisms is required to maximise their impact on firm outcomes, such as firm acquisitiveness in our case. On the basis of the *marginal effects* concept, two governance mechanisms are complementary when the marginal effect of one increases the marginal effect of the other on firm acquisitiveness.

3.3 Research Question

Traditional agency theory–based assumptions suggest that higher levels of EBC should create long-term incentives for managers towards maximising shareholder value (Fama and Jensen, 1983b; Eisenhardt, 1989). As such, CEOs having equity compensation as a substantial part of their compensation package, are more likely to engage in strategic investments such as M&A which could benefit not only shareholder value in the long-term but also enhance their personal wealth through these investments. In other words, if the CEO believes that undertaking M&A pays off over the long run, firms will be more likely to increase their acquisitiveness.

Since monitoring governance mechanisms, such as the board of directors or the presence of institutional investors, are employed in order to reduce managerial opportunism, acquisition decisions are expected to receive intensive scrutiny and deliberation, given also their inherent complexity and the potential major long-term consequences on the shareholder wealth of the acquirer. For example, the board of directors as the primary monitoring mechanism in a public firm, is involved in the approval (or rejection) of strategic initiatives proposed by the firm's management and is expected to constrain CEO discretion, particularly in cases where the proposed M&A may be driven by value-destroying motives, such as hubris (Roll, 1986), empire building (e.g., Jensen, 1986; Andrade et al., 2001), and employment risk reduction (Amihud and Lev, 1981). Likewise, large and concentrated institutional investors are expected to engage in active monitoring and scrutinise the acquisition decisions of their investee firms for shared gain. Therefore, monitoring governance mechanisms will be more likely to curb firm acquisition propensity.

Considering the situation in which the positive effect of CEO pay incentives (incentive alignment mechanism) on acquisition propensity becomes weaker (i.e. has a smaller marginal effect) in the presence of high levels of a monitoring governance mechanism, for example, in the form of a large or independent board of directors, then that would suggest that there is a *substitutive* effect between CEO pay incentives and board monitoring on firm acquisition propensity. In a similar vein, if the negative effect of a strong board of directors on acquisition propensity becomes weaker when there is a high level of large and concentrated institutional shareholders, then that would also suggest that these two monitoring mechanisms act as *substitutes* for each other in reducing firm acquisitiveness. In this case, additional monitoring by another monitoring mechanism would not significantly affect the firm's acquisition decision because monitoring by one mechanism would be sufficient. If, one the other hand, the negative effect of a strong board of directors becomes stronger (i.e. has a greater marginal effect) concurrently with the presence of a high level of institutional

ownership concentration (compared to when there is a low level of institutional ownership concentration), then this would imply a *complementary* effect between the two monitoring mechanisms.

The two hypotheses (*Substitution* & *Complementarity*) suggest that governance "bundles" may operate in different ways towards influencing firm outcomes. Given that extant research has not provided a uniformed answer as yet, the synergies (or not) are dependent on the types of governance mechanisms investigated and the exploratory nature of the study, our main research question is the following: "*To what extent do firm-level governance mechanisms operate in a substitutive and/or a complementary fashion in influencing firm acquisitiveness?*"

3.4 Research Design

In this section, we describe the data sources and sample selection criteria. Then, we explain the variables employed in the main regression analysis, followed by some descriptive statistics. Finally, we present the methodology to investigate our research question.

3.4.1 Data and Sample Selection

The initial sample of this study comprises the whole population of US public firms from Compustat Fundamentals Annual[10] database from 1997 through 2014. This sample is constrained by the availability of data on the main variables of interest, i.e. board characteristics, CEO compensation, and institutional ownership. We collect the data on board of director characteristics from the ISS[11] (formerly known as RiskMetrics and IRRC before that), CEO compensation data from the ExecuComp[12] and institutional ownership data from the Thomson Financial 13F[13]. The above merging process results in a sample of

[10] We use this database for the firm accounting variables.

[11] Institutional Shareholder Services (ISS) database provides data on directors for the S&P 1500 companies (S&P 500, S&P Midcap 400 and S&P SmallCap 600 indices) from proxy statements starting in 1996. Since 2007, ISS changed the data collection methods and meaning of some variables. Hence, data on directors are in two separate datasets in WRDS, a 'Directors Legacy' dataset which contains data between 1996 and 2006 and a 'Directors' dataset which provides data from 2007 onwards. We match proxy statements to their fiscal year following the methodology of Coles et al. (2014) and using the link data to merge the ISS data with Compustat available from https://sites.temple.edu/lnaveen/data/.

[12] ExecuComp contains executive compensation data since 1992 for firms currently or previously included in the S&P 1500 index (S&P 500, S&P Midcap 400 and S&P SmallCap 600). This information is collected directly from a firm's annual proxy statement.

[13] Thomson Financial 13F contains all 13f filings. According to the SEC Rule 13f of the Securities Exchange Act of 1934, all institutional investors who manage equity portfolios of $100 million or more, must file a quarterly report of all equity holdings that exceed 10,000 shares and/or $200,000 in market value. Compustat, ExecuComp and ISS firm-level data are on a fiscal year-end basis. We use the institutional ownership data of the last quarter for each fiscal year in order to merge these with the other accounting and governance data.

2,476 unique firms with 21,696 firm-year observations over our sample period[14].

We obtain acquisition data for US public acquirers from Thomson One Banker (T1B) with domestic deals that took place between January 1, 1998, and December 31, 2015. Following Masulis et al. (2007) and Alexandridis et al. (2013), the M&A sample is built following the criteria below:

i. All exchange offers, leveraged buyouts, repurchases, recapitalisations, spinoffs, minority stake purchases, acquisitions of remaining interest, self-tenders and privatisations are excluded.
ii. The deal status is completed. We refer to the year of the deal announcement as the year of the acquisition.
iii. The target firms included are either public or private firms[15].
iv. The acquirer controls less than 50% of the target's shares before the deal announcement and controls more than 50% after the deal completion, to ensure that transactions included in the sample represent a transfer of control.
v. The deal value is at least $1 million at the announcement date.

There are 16,642 M&A deals that meet the above criteria. We then match the two samples so as to identify both acquirers and non-acquirers. Following previous literature, we exclude financials (SIC 6000–6999) and utilities (SIC 4900–4999). Finally, all firms must have complete data on the variables used in the empirical analysis. The above procedure resulted in an unbalanced panel[16] of 1,708 unique firms with 12,643 firm-year observations. Within this sample, there are 1,865 completed M&A deals by 865 acquirers during the 1998-2015 period.

3.4.2 Variables

3.4.2.1 Dependent Variable

In order to measure *acquisition propensity,* we use a binary variable that takes the value of one if the firm made an acquisition in a given year, and zero otherwise. It should be noted that for each firm-year observation, we identify a firm as an acquirer if it made at least one acquisition, thus we keep only one completed M&A deal per acquirer per year as we are interested in investigating a firm's acquisition propensity and not acquisition intensity. This,

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[14] To mitigate any reverse causality concerns, all independent variables are lagged by one year. As a result, they refer to the period 1997-2014, while our dependent variable is observed over the period 1998-2015.

[15] In order to ensure that we have a "pure" M&A sample, the following target categories are omitted: 'Government', 'Joint Venture', 'Investor', 'Mutually owned', 'Subsidiary', and 'Unknown'.

[16] By using an unbalanced panel for a rather long time period (eighteen years), survivorship or attrition bias issues are mitigated, since we are able to study companies withdrawn from databases for reasons, such as being acquired or delisted.

in turn, will allow us to have a panel data structure and employ panel data methods to conduct our analysis.

However, this variable is transformed into a continuous variable taking values ranging from zero to one, following a two-phase procedure as in Pindado et al. (2008) and Hillier et al. (2011). Pindado et al. (2008) used a two-phase approach to correctly specify a logistic panel data model for estimating firm-level specificity of financial distress likelihood. Hillier et al. (2011) also used this approach to allow for the censoring of the dependent variable and thus avoided biased estimates. The rationale for this transformation in our study is to enable us using a linear rather a non-linear panel data model so as to overcome methodological issues in detecting and interpreting interaction effects between governance mechanisms[17]. Since the main focus of this study is to test empirically the *Substitution* and *Complementarity Hypotheses* in the M&A setting, in the first step of the analysis we estimate a cross-sectional probit model and predict a new dependent variable, which measures acquisition likelihood for each sample year. The *predicted acquisition likelihood* (the transformed dependent variable which is used in the second phase of the analysis) for all sample years is derived by adding together all the predicted acquisition probabilities of each year.

In Panel A of Table 3-1, we show the estimation results of the cross-sectional probit[18] regressions for the sample years 1998-2015 with heteroscedasticity-robust standard errors. The dependent variable in each model is *acquisition propensity* which takes the value of one if the firm made an acquisition in a given year, and zero otherwise. All firm and industry characteristics- including *firm size*, *book leverage*, *sales growth*, *market-to-book ratio*, *cash flows*, *cash holdings*, *ROA and M&A liquidity index*, as defined in Appendix A, are included as independent variables. We report McFadden's (1974) R^2 which compares the log-likelihood for the unrestricted estimated model and the log-likelihood of the restricted model including only the constant. We also report the likelihood ratio statistic (LR), which tests the joint significance of the explanatory variables in the model under the null hypothesis of the lack of joint significance.

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[17] According to Ai and Norton (2003), there are four critical issues when analysing interaction terms in a non-linear model as follows: (a) even if the coefficient of the product term is not statistically significant, this should not be taken as evidence of absence of an interaction effect; (b) the statistical significance of the interaction term cannot be inferred by looking only at the statistical significance of the coefficient of the product term, but the statistical significance of the entire cross-partial effect must be assessed; (c) differently from interactions in linear models in which the marginal effect of an explanatory variable is constant over its entire range, the interaction effect in non-linear models varies with the values of the explanatory variables in the model; and (d) the sign of the coefficient of the product term may be misleading about the sign of the cross-partial effect, since the interaction term is calculated from the main variables which enter the regression, so it may have different signs for different values of the independent variables.

[18] In untabulated analysis, replicating the same procedure using a logit model for the cross-sectional regressions in the first-phase of the two-phase approach resulted in qualitatively similar results in the main regressions.

In Panel B of Table 3-1, we present summary statistics of the predicted acquisition likelihood values assuming a probit model. For instance, PR98 is the predicted acquisition likelihood estimated by using a probit model for 1998. The final column of Panel B shows the summary statistics of the new dependent variable, PRACQ, which will be used in the second phase of the analysis in a linear panel data model. PRACQ captures the probability of a firm undertaking an acquisition and ranges between 0 and 1, conforming to the expected values for probability[19]. The mean of this predicted acquisition likelihood is 0.148, which is reasonable as we follow an ex-ante approach and coincides with the mean of the original binary dependent variable, i.e. acquisition propensity. In addition, the standard deviation of this likelihood is very small (0.09), supporting the accuracy of the approach.

*** Insert Table 3-1 here ***

3.4.2.2 Independent Variables

The main variables of interest are proxies for board monitoring, CEO pay incentives, and institutional investor monitoring. Firstly, board monitoring is proxied by three variables (previously discussed) which have been associated with the monitoring effectiveness of the board (e.g. Linck et al., 2008; Wintoki et al., 2012): *board size*, a refined measure of board independence (*non-co-opted independence*) and *CEO/Chair duality*. *Board size* equals the number of directors on the board. *Non-co-opted independence*[20] is measured as the fraction of directors who are independent and were appointed before the CEO assumed office. Independent directors have no material connection with the firm, are not current or former employees and they do not have any family or other business relationship with executives or directors of the firm, nor any ties through interlocking directorships (i.e. each serves as a director on the other's board). It has been also argued that one potential reason for the mixed and inconclusive evidence of the impact of board independence on firm performance and other firm outcomes is the fact that many directors are co-opted. Co-opted directors, irrespective of whether they are classified as independent using the conventional definition of board independence mentioned above, are the directors that joined the board after the CEO assumed office and thus are less likely to be truly independent as they are more likely to

[19] A final point to be made is that since the objective of applying this two-phase procedure is not to predict acquisition propensity, but rather to transform the dependent variable from binary to continuous, and then proceed with the interaction analysis in a linear model, the discussion does not focus on the percentage of correct classifications for the different years.

[20] This variable is constructed based on the methodology as detailed in Coles et al. (2014) and using the data on co-opted boards available on the website of Dr Lalitha Naveen: https://sites.temple.edu/lnaveen/data/.

exhibit their loyalty to the CEO who was engaged in their initial appointment. Therefore, we opt for using non-co-opted independence instead of the conventional measure of board independence which has been shown to be only a crude proxy for the monitoring effectiveness of the board. Specifically, Coles et al. (2014) show that the traditional measure of board independence has little power to explain CEO turnover-performance sensitivity, CEO total annual compensation, CEO pay-performance sensitivity or delta, and firm capital expenditure, whereas non-co-opted independence indeed increases the monitoring effectiveness of the board with regards to influencing the abovementioned CEO features and firm investment decisions. *CEO/Chair duality* is a binary variable that is equal to one if the CEO serves also as the Chairman of the board.

Secondly, we employ CEO vega and delta as proxies for CEO pay incentives. These variables are estimated following the approximation method developed by Core and Guay (2002)[21] which has been used in a number of recent studies (e.g., Knopf et al., 2002; Coles et al., 2006; Brockman et al., 2010; Hagendorff and Vallascas, 2011) and uses the Black and Scholes (1973) model, allowing for dividends (Merton, 1973). *CEO vega*, otherwise termed as pay-risk sensitivity, is the dollar change in the portfolio of options of the CEO for a 1% change in the annual standard deviation of stock returns at the fiscal year-end. In line with Guay (1999), the vega of the equity portfolio is assumed to be zero, so the vega of the options portfolio is only used. *CEO delta* (or the pay-performance sensitivity) is the dollar change in the portfolio of equity and options holdings of the CEO for a 1% change in the stock price at the fiscal year-end. Delta is calculated as the sum of the deltas of the stock and options portfolios. To take into account the changes in the pre- and post-2006 reporting regime on executive compensation data, we follow Coles et al. (2006). Essentially, under the new reporting standards, all EBC arrangements should be estimated using their fair value at the grant date. Further, the CEO vega and delta are scaled by cash compensation (Graham and Rogers, 2002; Hagendorff and Vallascas, 2011; King et al., 2016) since pay incentives are correlated with firm size and are also highly correlated between them. Scaling the incentives measures also allows us to include both vega and delta in a single model and consider differences in their magnitude. In addition to CEO pay incentives, we include *CEO cash pay*, the fixed component in the compensation associated with CEO risk aversion. CEO cash pay is calculated as the natural log transformation of the total CEO pay in the form of cash compensation (salary and bonus).

[21] The data on CEO pay incentives are available from the website of Dr Lalitha Naveen: https://sites.temple.edu/lnaveen/data/.

Finally, institutional ownership entails the third monitoring governance mechanism employed. Given the heterogeneous preferences and objectives of institutional investors, we employ *institutional ownership concentration* - expressed as the percentage of the sum of shareholdings by the five largest institutional investors to the total shares outstanding[22] at the fiscal year-end - as a suitable proxy for the monitoring incentives of institutional investors following, amongst others, Hartzell and Starks (2003), Sauerwald et al. (2016), and Goranova et al. (2017). With the significant increase in institutional shareholdings in US public firms in recent years, there has also been an increase in the concentration of institutional ownership. Institutional investors with large shareholdings are expected to have much stronger incentives to monitor and influence acquisition decisions because the M&A outcome can significantly affect shareholder value.

3.4.2.3 Control Variables

Following the extant literature, to control for other factors that potentially influence a firm's decision to undertake an acquisition, we include a variety of control variables in all model specifications. In particular, we include three sets of determinants focussing on firm, industry and CEO-specific characteristics.

In terms of firm-level variables, we control for the *firm size* using the natural log of total assets in the fiscal year as a proxy. Large firms have been shown to undertake more acquisitions (e.g. Harford, 1999). Next, we control for the *book leverage* which is measured as the sum of the book value of the long-term plus short-term debt divided by the book value of total assets at the fiscal year-end. The direction of the effect of leverage on the acquisition propensity is not straightforward. On the one hand, there may be a positive relationship between leverage and a firm's likelihood to undertake risky investments such as acquisitions (Faccio and Masulis, 2005). On the other hand, excessive leverage may pose constraints on a firm's ability to acquire and thus may decrease a firm's likelihood of making an acquisition. Uysal (2011) documents a negative and significant effect between overleverage and acquisition probability. Previous studies on acquisitiveness (e.g. Levi et al., 2010; 2014) also control for a firm's *sales growth*, defined as the firm's sales in the current fiscal year to the sales in the previous fiscal year minus one. We also include *Market-to-book ratio* to account for the effect of growth opportunities. It is computed as the firm's market value of total assets

[22] The total shares outstanding figures are sourced from the Center for Research in Security Prices (CRSP) database as recommended by WRDS, and adjusted for splits and special distributions. The reason is that the Thomson Financial 13F database may contain incorrect information on the total number of shares outstanding, resulting in the sum of shares held by institutions for a firm to exceed the total number of shares outstanding for that firm.

divided by the book value of total assets at the end of the fiscal year, where the market value of assets is defined as the book value of assets plus the market value of common stock minus the book value of common stock. We employ *Cash flows* as in Croci and Petmezas (2015), as operating income before depreciation minus income taxes minus interest expenses minus dividends (common and preferred), divided by the book value of total assets of the firm. High levels of free cash flows enable firms to undertake investments, hence increasing acquisition propensity (Bauguess and Stegemoller, 2008). Furthermore, firms with excess cash reserves are more likely to carry out acquisitions (Jensen, 1986). To measure cash reserves, we include *cash holdings*, computed as the firm's cash and short-term investments, and scaled by the book value of total assets at the fiscal year-end. We also control for accounting performance by the firm's *ROA* (Sauerwald et al., 2016).

With regard to the industry characteristics which may have an impact on the acquisition likelihood, we add the *M&A Liquidity Index*, since there is evidence of a positive association between this variable and the likelihood of an acquisition (Uysal, 2011). Following Schlingemann et al. (2002), Moeller et al. (2004) and Croci and Petmezas (2015) we construct the *M&A Liquidity Index* as the ratio of the value of all corporate control transactions[23] of at least $1 million reported by the Thomson One Banker for each Fama–French 49-industry classification and year to the total book value of assets of all Compustat firms in the same Fama–French 49-industry classification and year.

The last group of control variables refers to certain CEO characteristics that have been linked with acquisitiveness. We control for *CEO tenure* as a proxy for CEO power and entrenchment (Berger et al., 1997; Bertrand and Mullainathan, 2001) which may increase acquisition likelihood. It is computed as the number of years the CEO has held this position. Additionally, we include the age and gender of the CEO, two proxies of CEO risk aversion. Both Yim (2013), using a US sample, and Zhang et al. (2016) conducting a study in the UK setting, report a negative relationship between *CEO age* and acquisition propensity, with younger CEOs pursuing more acquisitions. With respect to *CEO gender*, there is evidence that female directors and executives undertake fewer acquisitions than their male counterparts (Huang and Kisgen, 2013; Levi et al., 2014), due to female risk aversion and male overconfidence (Barber and Odean, 2001; Croson and Gneezy, 2009).

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[23] Following Schlingemann et al. (2002), we include as corporate control transactions all exchange offers, tender offers, spinoffs, minority stake purchases, privatisations, acquisitions of remaining interest, and leveraged buyouts. We exclude buybacks, such as self-tenders and repurchases.

We also control for *CEO overconfidence* (Malmendier and Tate, 2008) under the assumption that overconfident CEOs will be more acquisitive, especially in firms with abundant cash reserves. Risk aversion and under-diversification are expected to induce CEOs to exercise their stock options early if the stock price is sufficiently high so as to "lock-in" a profit (Hall and Murphy, 2002). However, overconfident CEOs may be overly optimistic about the future returns of their investments, and as a result they may postpone the exercise of their stock options in anticipation of higher firm stock prices. As in Croci and Petmezas (2015), we construct CEO overconfidence using the options-based measure developed by Campbell et al. (2011). Overconfidence is a dummy variable that takes the value of one if the CEO is classified as overconfident (delaying the exercise of vested options that are at least 67% in the money), and zero otherwise (Malmendier and Tate, 2005; 2008). CEO overconfidence is calculated on an annual basis. We follow Campbell et al. (2011) approach to calculate the average moneyness of the CEO's option for each sample year. First, for each CEO-year, the average realisable value per option is calculated by dividing the total realisable value of options by the number of options held by the CEO. Second, the strike price is calculated by subtracting the average realisable value per option from the stock price at the end of the fiscal year. Then, the average percent moneyness of the options is computed by dividing the average realisable value per option by the estimated strike price minus one. Only vested options held by the CEO are included because we are only interested in the options that the CEO can exercise.

As a final CEO characteristic, we control for *CEO ownership*, computed as the proportion of total shares outstanding held by the CEO, excluding options. Incentive alignment mechanisms in the form of CEO equity ownership may encourage CEOs to undertake acquisitions with the objective of shareholder wealth creation. On the other hand, undiversified and risk averse CEOs who receive company stock as part of their compensation would bear a wealth loss from engaging in value-destroying risky investment projects and consequently become more risk averse. This could result in foregoing risky but value-increasing projects (Coles et al., 2006) and hence, limited acquisition propensity. Therefore, the direction of the effect of CEO stock ownership on acquisition decisions is theoretically unclear.

To alleviate potential endogeneity concerns all explanatory variables are lagged by one year with regard to the dependent variable. All continuous variables are winsorised at the 1% level in both tails to mitigate the influence of outliers on our results.

3.4.3 Descriptive Statistics

Table 3-2 presents the descriptive statistics of the variables used in the main analysis. Appendix A provides detailed definitions of all the variables. Panel A shows that, on average, 15% of the firms in our sample completed at least one acquisition during a year. Panel B focuses on the statistics of the independent variables. The average board of directors consists of 9 members, of which 36% are independent outsiders non-co-opted by the CEO, suggesting that roughly a third of the board consists of directors who are more likely to be truly independent, thus acting as more effective monitors. These values compare favourably with those reported by Coles et al. (2014). In about 60% of the sample firms, the CEO is also the firm's Chair. Concerning the CEO pay incentive structure, we observe that the pay incentives scaled by cash compensation vary considerably in our sample. For example, the median vega (delta) scaled is around 8% (25%) against a mean value of 13% (79%). There is also noticeable institutional ownership concentration in the sample firms; the average holdings of the top five institutions in a firm is 29%. For comparison, the equivalent number is approximately 25% in Goranova et al. (2017) with a sample over the years 1997-2006.

Moving onto the summary statistics of the firm and industry characteristics, as shown in Panel C, the average firm has total assets of $7.6 billion, book leverage of 22.3%, sales growth of 9.2%, market-to-book ratio of 2.02, cash flows of 8.8%, cash holdings of 14.5%, and a ROA of 4.7%. These firm-level variables are largely in line with those reported in prior studies examining the impact of various governance or director characteristics on firm acquisitiveness (e.g., Levi et al., 2014; Croci and Petmezas, 2015). At the industry level, the mean M&A liquidity index is 0.015 and median 0.006. These figures are comparable to those in Uysal (2011) and Guest et al. (2017).

Regarding the CEO characteristics, as reported in Panel D, the average tenure of the CEO is 7.7 years, the average CEO age is approximately 56 years old and the CEO owns on average 1.7% of the firm's common stock, confirming previous literature (e.g., Andreou et al., 2017; Aktas et al., 2019). Further, only a few firms have a female CEO (2.6%) and 18.7% of CEOs are overconfident on average.

*** Insert Table 3-2 here ***

Table 3-3 compares the means and the standard deviations of the explanatory and control variables between the sub-samples of non-acquirers and acquirers. Regarding the main explanatory variables, we find that the CEO pay incentives (vega and delta) are higher for acquirers than for non-acquirers, consistent with predictions of a positive relationship

between equity-based compensation and a firm's likelihood to undertake acquisitions as it increases managers' propensity to pursue risky but promising investment projects (Jensen and Meckling, 1976; Smith and Stulz, 1985). Additionally, there appears to be slightly higher institutional ownership concentration in non-acquirers rather than in acquirers. With regards to board characteristics, there appear to be no significant differences between non-acquirers and acquirers.

In terms of firm characteristics, acquirers tend to be larger in size, have higher sales growth, market-to-book ratio, cash flows, cash holdings and better accounting performance in terms of ROA compared to non-acquirers. In addition, consistent with the *free cash flow hypothesis* (Jensen, 1986), acquirers tend to have more cash holdings. Not surprisingly, the M&A liquidity index is higher for acquirers relative to non-acquirers.

Considering the CEO characteristics, CEOs of the acquirers sub-sample contain fewer female members, have shorter tenure and are a little younger than their counterparts in the non-acquirers sub-sample. Moreover, acquirer CEOs are found more overconfident as suggested by Malmendier and Tate (2008). Finally, CEO ownership tends to be higher in the non-acquirers sub-sample, supporting the predictions of Amihud and Lev (1981) and Lewellen (2006) that undiversified risk-averse managers may become even more risk averse if their wealth is tied to their firm's stock price.

*** Insert Table 3-3 here ***

Table 3-4 presents the correlation matrix along with collinearity diagnostics for the variables employed in the main specifications. With respect to the main variables of interest, CEO pay incentives (vega and delta) and CEO cash pay are positively correlated with acquisition propensity, while board characteristics (board size, non-co-opted independence, CEO/Chair duality) are not. Institutional ownership concentration is negatively correlated with acquisition propensity. We next examine the impact of governance mechanisms and their interrelations in a multivariate setting, since omitted variable bias in pair-wise correlations may conceal the true relationships. All regressors present a Variance Inflation Factor (VIF) value lower than 5, suggesting that multicollinearity is not a concern in the estimated specifications.

*** Insert Table 3-4 here ***

3.4.4 Methodology

We investigate the influences of the three key corporate governance mechanisms (i.e. board of directors' characteristics, CEO pay incentives, and institutional ownership concentration) in an exploratory way so as to identify which, if any, of these mechanisms act in a substitutive or complementary fashion with each other. We test the substitutive/complementary effects of these mechanisms on firm acquisitiveness by including in our specifications all pairwise two-way interaction terms by introducing product terms, and examining the marginal effect of one mechanism on acquisitiveness depending on the levels of the other for the significant interaction terms. For the purposes of this study, two governance mechanisms interact as complements (substitutes) if the marginal effect of one governance mechanism on firm acquisitiveness increases (decreases) as the other governance mechanism increases (Poppo and Zenger, 2002; Siggelkow, 2002). The aforementioned approach has been employed, for instance, by studies exploring interactive relationships between governance mechanisms in promoting a firm's corporate social responsibility (Oh et al., 2016). A significant interaction effect exists when the estimated coefficient of the product term is statistically significant and if the inclusion of this term significantly increases the variance explained in the dependent variable.

Interaction effects are tested via *hierarchical moderated regression analysis* (e.g. Jaccard et al., 1990; Cortina, 1993) which essentially involves two steps: in the first step, which represents the baseline model, only the main effects of the three governance mechanisms of interest are included. In the second step, the product terms are entered in a hierarchical manner, by adding each interaction term with the associated main effects in a separate model. In each case, a significant increase in R^2 from the baseline model (by means of an F-test, i.e. the ratio of the variance explained only by the interaction term to the unexplained variance in the full model) is attributed to the interaction term included in that model (Elbanna and Child, 2007).

To further examine significant interactions we conduct simple slope tests (Aiken et al., 1991; Cohen et al., 2003) and calculate the marginal effects on one governance mechanism on acquisition propensity at different levels of the other governance mechanisms. In this way, we explore how governance mechanisms interact with each other across different levels towards acquisition propensity. Simple slopes are the sensitivity of the dependent variable on an independent variable at particular values of the moderator variable. In order to perform a simple slope test, we first calculate the slope by substituting a particular level of the moderator into the regression equation. If the moderator is a continuous variable, researchers commonly use one standard deviation (SD) above and below the mean value, but any two meaningful values could be chosen such as the minimum and maximum observed values.

The second step is to calculate the standard error of this slope. Then, the test of the simple slope is a t-test conducted by calculating the ratio of the simple slope to its standard error, with n – k – 1 degrees of freedom, where n is the sample size and k is the number of regressors including the interaction term.

Having transformed our initial binary dependent variable (*acquisition propensity*) into a continuous one (*acquisition likelihood*), we can proceed to the second phase of the two-phase approach (Pindado et al., 2008; Hillier et al., 2011) and use a linear panel data model to investigate interactive relationships between the governance mechanisms of interest. For the baseline specification, we employ a firm fixed effects regression model as a way to address omitted variable bias[24] from omitted variables which are time-invariant, firm-specific and unobservable. Acquisition propensity is strongly associated with firm-level characteristics, such as corporate culture and strategy which are difficult to obtain or measure. As a result, some firms may be more inclined to undertake acquisitions than others because of their own unobserved specificities. Fixed effects models allow for any correlation between firm-specific effects (unobserved firm heterogeneity) and the included regressors in the model, whereas a critical assumption of random effects models is that firm-specific effects are uncorrelated with the independent variables, which is often violated[25].

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[24] Further endogeneity concerns were taken into account, including the simultaneity or reverse causality issue, in line with research in empirical corporate finance (Wintoki et al., 2012). Simultaneity arises when the independent and dependent variables are simultaneously determined. Nevertheless, the issue of reverse causality is not a primary theoretical concern in this study as we follow a more fruitful way to understand the effects of certain governance mechanisms. We consider their impact on discrete, strategic decisions, namely M&A decisions, instead of testing the relationship between corporate governance mechanisms and firm financial performance which is plagued by issues of endogeneity. Empirical corporate governance studies may produce more consistent results in certain settings (Daily et al., 2003) and particularly when studying the effects of board structure on specific board tasks (Hermalin and Weisbach, 2003). In our case, we use M&A as a vehicle to test the role of firm-level governance mechanisms in acquisition decisions. While in conducting our analysis we lagged all independent variables by one year as an important step towards addressing the reverse causality issue, we acknowledge that this does not solve the issue. For example, in the context of our study, prior studies present evidence that CEO compensation is higher by pursuing M&A that significantly increase firm size (e.g., Kroll et al., 1997; Grinstein and Hribar, 2004; Harford and Li, 2007, Chen et al., 2017). Moreover, prior research has shown that institutional investors are more likely to invest in large firms (e.g., Sias and Starks, 1997; Gompers and Metrick, 2001). Thus, an increase in firm size via M&A, may attract a higher level of institutional ownership in that firm. In general, the reverse causality issue implies that we could observe different governance structures for more acquisitive firms. A widely used approach to address the reverse causality issue is to find an instrument for the endogenous independent variable of interest which should satisfy two challenging conditions, namely the "relevance" and "exogeneity" conditions (Larcker and Rusticus, 2010). However, in practice it is very difficult to find valid strictly exogenous instruments (Wintoki et al., 2012), especially in the case of our study with multiple endogenous independent variables and their interactions. Because of these limitations, we have not been able to test the validity of our results in terms of completely addressing the above mentioned simultaneity concerns.

[25] The Hausman (1978) test also led to a strong rejection of the null hypothesis ($p < 0.001$) that a random effects model provides consistent estimates, thus suggesting that the fixed effects estimator is more appropriate.

Accordingly, the baseline model before including the two-way interaction terms is:

$$PRACQ_{i,t} = \beta_0 + \beta_1 BSIZE_{i,t-1} + \beta_2 NCI_{i,t-1} + \beta_3 DUAL_{i,t-1} + \beta_4 VEGA_{i,t-} + \beta_5 DELTA_{i,t-1} + \beta_6 CASH_{i,t-1} + \beta_7 IOC_{i,t-1} + \sum \beta_k (CEOControls_{i,t-1}) + \varepsilon_{i,t} \quad (3.1)$$

Subscripts i and t denote firm and year, respectively. The dependent variable is the predicted acquisition likelihood derived from the first phase of the two-phase approach, as shown in Table 3-1. The main explanatory variables are defined as above, where $BSIZE$ stands for board size, NCI stands for non-co-opted independence, $DUAL$ stands for CEO/Chair duality, $VEGA$ stands for CEO vega, $DELTA$ stands for CEO delta, $CASH$ stands for CEO cash pay, and IOC stands for institutional ownership concentration. $CEOControls$ is a vector of all the CEO control variables as previously described[26]. In this model the error term $\varepsilon_{i,t}$ consists of the following elements: $\varepsilon_{i,t} = \eta_i + d_t + v_{i,t}$, where η_i is the time-constant firm fixed effect which captures the unobserved heterogeneity, d_t refers to year fixed effects, and $v_{i,t}$ is the random disturbance.

3.5 Empirical Results

3.5.1 Main Results

We begin our analysis by reporting the results of the baseline model which includes only the main effects of the three governance mechanisms of interest. Then, we augment the baseline specification by introducing two-way interaction terms between heterogeneous governance mechanisms. All model specifications include calendar year dummies (not displayed for brevity), as it has been shown that acquisitions occur in waves (e.g. Mitchell and Mulherin, 1996; Andrade et al., 2001). We cluster robust standard errors at the firm level in all regressions to control for heteroscedasticity and within-firm correlation of residuals (Petersen, 2009).

We first present the regression results of the main effects of the governance mechanisms of interest using three different empirical specifications. Table 3-5 model 1 reports estimates of a pooled probit regression where the dependent variable takes the value of one if a firm made an acquisition in a given year, and zero otherwise. Instead of coefficient estimates,

[26] As firm and industry controls - firm size, book leverage, sales growth, market-to-book ratio, cash flows, cash holdings, ROA and M&A liquidity index - were included in the first phase in order to transform the binary dependent variable to continuous, they are excluded from this baseline specification.

marginal effects calculated at the sample means of the regressors are reported for easier interpretation. The marginal effects reflect the average change in acquisition propensity given a one-unit increase in an independent variable. A positive marginal effect indicates an increase in acquisition propensity with a one-unit increase in the independent variable of interest. In line with prior work, we find that the probability of a firm making an acquisition is significantly and positively related to CEO vega and CEO cash pay (Croci and Petmezas, 2015). Consistent with Cheng (2008), we find that a larger board decreases acquisition probability. Similarly, institutional ownership concentration (IOC) is significantly and negatively related to acquisition probability, as larger and more concentrated institutional investors are more likely to monitor management and constrain the firm's acquisition propensity. With respect to the control variables, our findings corroborate previous studies (Yim, 2013; Boulton et al., 2014; Croci and Petmezas, 2015). The probability that a firm carries out an acquisition is significantly and positively related to firm size, sales growth, cash flows, cash holdings, and ROA. As expected, firms are more likely to become acquirers when there is a more active market for corporate control in their industry, as proxied by the M&A liquidity index. In contrast, firms are less acquisitive when they have higher book leverage, and when their CEOs are older and have higher stock ownership.

Subsequently, we employ panel data methods to address and control for possible unobserved heterogeneity at the firm level. Column (2) presents the second-phase regression results for the fixed effects model. The dependent variable is continuous and measures the predicted acquisition likelihood. In this model firm controls are excluded as they have been included in the first phase in order to transform the binary dependent variable to continuous.

*** Insert Table 3-5 here ***

To investigate the interplay of governance mechanisms on acquisition propensity, we perform an interaction analysis (see Table 3-6). We explore all possible two-way interaction terms between the main explanatory variables using the hierarchical approach, in which the variables are introduced in a stepwise fashion, by adding each pair-wise interaction term one at a time, while controlling for the effects of the other governance mechanisms on acquisitiveness. For brevity, we only present the significant pair-wise interaction terms in Models 2-6[27]. All model specifications include CEO control variables (i.e. CEO tenure, CEO age, CEO gender, CEO overconfidence, and CEO ownership), as well as year fixed effects.

[27] For the sake of completeness, we provide the results of the non-significant two-way interaction terms in Appendix A, Table A-2.

Figures 3-1 to 3-5 depict graphically the significant interactions found.

Model 1 in Table 3-6 reports the estimates of the first-order terms for the firm fixed effects model. All governance and control variables are included as the main effects. We refrain from interpreting the regression coefficients at this first step prior to the introduction of the interaction terms; in the presence of significant moderation, the interpretation of main effects would be unwarranted or even misleading (Edwards, 2008). While main effects are conditionally invariant, a significant interaction term may render them conditional, meaning that the relationship of each variable with the criterion (dependent) variable depends on the level of the moderator.

Before computing the product terms, we mean-centre all continuous regressors (i.e. subtract the sample mean of a variable from it, so it will have a zero mean). Mean-centering usually reduces the correlation between the first-order terms and their products but has no effect on the estimation or interpretation of the interaction terms (Cohen, 1978; Kromrey and Foster-Johnson, 1998; Dalal and Zickar, 2012). Mean-centering the two first-order terms before computing their product generates an estimate of the effect of each that is conditional on a value of the other that will always be within the range of the sample values, i.e. at the sample mean (Edwards, 2008).

Models 2 through 6 present the significant interactions of the governance mechanisms investigated on acquisitiveness. To plot these interaction effects we used the maximum (high) and minimum (low) values of the two governance mechanisms considered each time while holding all other covariates at their mean values. In Model 2, the interaction term of two monitoring mechanisms (i.e. Board size × IOC) is negative and significant ($\Delta R^2 = 0.0006$, $p < 0.05$). The simple slope test suggests that while the relationship between board size and acquisition likelihood is not significant when institutional ownership concentration is low (simple slope = 0.002, n.s.), it is significant when institutional ownership concentration is high (simple slope = -0.003, $p < 0.05$). Figure 3-1 displays this finding. Thus, a larger board size on its own is not sufficient to constrain acquisitiveness. But, in the presence of highly concentrated institutional holdings, these two monitoring mechanisms work together and interact as complements in curbing acquisitiveness. This finding, therefore, lends support to the *Complementarity Hypothesis*.

In Model 3, we find a negative and significant interaction between board size and CEO delta ($\Delta R^2 = 0.0008$, $p < 0.05$). The simple slope test indicates that the relationship between CEO delta and acquisition likelihood is not significant when board size is high (simple slope = 0.001, n.s.) but it is significant when board size is low (simple slope = 0.006, $p < 0.01$). Figure 3-2 illustrates this finding. This result, therefore, suggests that acquisition likelihood

increases with CEO delta, but only in the presence of a smaller board of directors. Otherwise, in the presence of a larger board of directors (high board size), CEO delta has a rather neutral effect on acquisitiveness (the slope is rather 'flat'). We, therefore, conclude that there are *substitutive effects* between board size and CEO pay incentives - in the form of CEO delta - on acquisitiveness.

In Model 4, there is a negative and significant interaction between non-co-opted independence (NCI) and CEO cash pay ($\Delta R^2 = 0.0005$, $p < 0.10$). A simple slope test suggests that the relationship between CEO cash pay and acquisition likelihood is significant when non-co-opted independence is both low (simple slope = 0.029, $p < 0.01$) and high (simple slope = 0.018, $p < 0.01$). As shown in Figure 3-3, the results suggest that the CEO is more sensitive to cash pay when non-co-opted independence is low, as shown by the steeper slope of the continuous line. While the effect of CEO cash pay on acquisitiveness is positive, it is less pronounced in the presence of high non-co-opted independence. If, on the other hand, non-co-opted independence is low, the positive effect of CEO cash pay on acquisitiveness becomes stronger. This finding also supports the *Substitution Hypothesis*.

In Model 5, the interaction term of CEO duality and CEO cash pay also reveals a negative and significant interaction ($\Delta R^2 = 0.0011$, $p < 0.01$). The CEO is more sensitive to cash pay when she also holds the board chair role (CEO duality), in which case the acquisition likelihood is higher as shown in Figure 3-4. In other words, CEO duality intensifies the positive effect of CEO cash pay on acquisition propensity. In contrast, the absence of CEO duality, which has been associated with a better ability of the board to monitor management, acts as a substitute for the positive effect of CEO cash pay on acquisitiveness.

Finally, in Model 6, the interaction between CEO cash pay and institutional ownership concentration (IOC) is negative and significant ($\Delta R^2 = 0.0014$, $p < 0.01$). A simple slope test suggests that the effect of CEO cash pay on acquisition likelihood is significant when institutional ownership concentration is both low (simple slope = 0.037, $p < 0.01$) and high (simple slope = 0.010, $p < 0.05$). Figure 3-5 portrays this result. The CEO is more sensitive to cash pay when institutional ownership concentration is low, as shown by the steeper slope of the continuous line. While the effect of CEO cash pay on acquisitiveness is positive, it is less pronounced when institutional ownership concentration is high. If, on the other hand, institutional ownership concentration is low, CEO cash-based compensation is, in fact, more effective in encouraging the CEO to make risky strategic decisions in the form of undertaking an acquisition. This finding supports the *Substitution Hypothesis*.

Overall, the results of the interaction analysis provide strong support for the *Substitution Hypothesis* between governance mechanisms in the M&A setting, with an exception in the

case of complementary effect between board size and institutional ownership concentration (Model 2).

In economic terms, our findings are of substantial magnitude. For example, using the estimated coefficients in Model 2 of Table 3-6, for a firm with an average board size of 9 members and average institutional ownership concentration (IOC) of 29.1%, an increase in the board size by one member further reduces acquisition propensity by 0.31% (3.20%-2.89%)[28]. With a mean sample acquisition likelihood of 14.8%, this suggests a 2% further decrease in acquisition propensity on average (0.31/14.8). Similarly, an increase in IOC by 10% (i.e. up to roughly 1 SD), ceteris paribus, will further reduce acquisition propensity by 0.99% (3.88%-2.89%)[29]. With a mean sample acquisition likelihood of 14.8%, this translates to a 6.7% further decrease in acquisition propensity on average (0.99/14.8).

Using the estimates in Model 6, for a firm with average CEO cash pay of approximately US$980,000 [exp(6.886) = 978.480][30] and an average institutional ownership concentration (IOC) of 29.1%, an increase in the IOC by 10% (i.e. up to roughly 1 SD) further reduces acquisition propensity by 3.84% (15.02%-11.18%)[31]. With a mean sample acquisition likelihood of 14.8%, this suggests a 25.95% further decrease in acquisition propensity on average (3.84/14.8). With a number of 1,865 acquisitions in our sample, this decrease would correspond to 484 fewer completed M&A deals. By contrast, an increase in CEO cash pay by 1 SD which corresponds to approximately US$1.9 million [exp(7.529) = 1861.243], would only reduce acquisition propensity by a further 1.05% (12.23%-11.18%),[32] ceteris paribus. With a mean sample acquisition likelihood of 14.8%, this suggests a 7.09% further decrease in acquisition propensity on average (1.05/14.8), which corresponds to 132 fewer completed acquisitions in our sample of 1,865 M&A deals. To summarise, a 1 SD increase in the IOC

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[28] In Model 2 of Table 3-6, the coefficient on Board size × IOC shows that for a firm with an average board size and average IOC, the acquisition propensity is reduced by 2.89% [9 × 0.291 × (-0.011)]. Increasing board size by one unit corresponds to a 3.20% lower acquisition propensity [10 × 0.291 × (-0.011)]. The net effect is therefore a further reduction in acquisition propensity of 0.31%.

[29] In Model 2 of Table 3-6, the coefficient on Board size × IOC shows that for a firm with an average board size and average IOC, the acquisition propensity is reduced by 2.89% [9 × 0.291 × (-0.011)]. Increasing IOC by 10% corresponds to a 3.88% lower acquisition propensity [9 × 0.391 × (-0.011)]. The net effect is therefore a further reduction in acquisition propensity of 0.99%.

[30] CEO cash pay is measured as the natural logarithm of the total CEO pay in the form of cash compensation (salary and bonus in thousands of dollars).

[31] In Model 6 of Table 3-6, the coefficient on CEO cash pay × IOC shows that for a firm with an average CEO cash compensation and average IOC, the acquisition propensity is reduced by 11.18% [6.886 × 0.291 × (-0.0558)]. Increasing IOC by 10% is associated with a 15.02% lower acquisition propensity [6.886 × 0.391 × (-0.0558)]. The net effect is therefore a further reduction in acquisition propensity of 3.84%.

[32] In Model 6 of Table 3-6, the coefficient on CEO cash pay × IOC shows that for a firm with an average CEO cash pay and average IOC, the acquisition propensity is reduced by 11.18% [6.886 × 0.291 × (-0.0558)]. Increasing CEO cash pay by 1 SD (i.e. to 7.529), is associated with a 12.23% lower acquisition propensity [7.529 × 0.291 × (-0.0558)]. The net effect is therefore a further decrease in acquisition propensity of 1.05%.

would decrease acquisition propensity by more than 3.5 times compared to a 1 SD increase in CEO cash pay.

*** Insert Table 3-6 here ***

*** Insert Figures 3-1 to 3-5 here ***

3.5.2 Robustness Tests

To confirm the robustness of our findings, we first use the Hausman-Taylor (Hausman and Taylor, 1981) as a hybrid estimator. This enables the estimation of the coefficients of time-invariant variables that cannot be estimated with a firm fixed effects model (such as industry dummies) and is more efficient by transforming the random effects model to deal with the endogeneity problem. Essentially, the Hausman-Taylor estimator is an estimator which combines the efficiency of a random effects model within the framework of a consistent fixed effects estimation (Baltagi et al., 2003). In the first step, a fixed effects model is used to estimate the coefficients for variables with within-firm variation. Next, firm-average residuals from the previous step are regressed against the regressors that do not vary within firms, using as instruments regressors that are exogenous and time-varying.

Table 3-7 shows the results using the Hausman-Taylor estimator assuming that the main explanatory variables (i.e. governance mechanisms) are endogenous while treating the CEO characteristics, and year and industry[33] controls as strictly exogenous. Model 1 reports the main effects results, while Models 2-6 present the significant pair-wise interactions between the main governance mechanisms under investigation. Alternatively, Table 3-8 reports the estimation results for the main and interaction effects using the Hausman-Taylor estimator, treating both the main explanatory variables and CEO controls as endogenous. The results of the interaction terms are robust to this alternative model specification with slight differences in the significance and magnitude of the coefficients on the significant interaction terms.

*** Insert Table 3-7 here ***

*** Insert Table 3-8 here ***

[33] We use the Fama-French 17-industry classification.

As a second robustness test, we replace *institutional ownership concentration* with an alternative proxy for institutional investor monitoring and repeat the analysis for those significant two-way interactions involving only institutional monitoring. We employ the proportion of *dedicated institutional ownership*[34] as proposed by Bushee (1998; 2001). Institutional investors are classified into three categories – dedicated, transient and, quasi-indexer – based on their investment horizons. Dedicated institutional investors are expected to actively engage with the investee firms and undertake a more active monitoring role to safeguard their long-term investments. By virtue of their long-term shareholdings, they devote more resources in collecting superior firm information and are more willing to influence firm decisions so as to protect shareholder value and realise monitoring benefits that typically emerge in the long term (Chen et al., 2007). On the contrary, transient institutions are not expected to intervene in corporate affairs and monitor the management of the firm as they choose to trade frequently with a focus on short-term performance. Quasi-indexers, despite their long-term portfolio holdings, may also avoid monitoring as their diversified holdings may prevent them from gathering and processing corporate information. We employ *dedicated institutional ownership* (mean: 0.056, std. dev.: 0.074, min: 0, median: 0.025, and max: 0.331) as an alternative measure of institutional investor monitoring.

The results in Table 3-9 confirm the findings of the main analysis. The first column (Model 1) contains the main effects of the explanatory variables of interest using a firm fixed effects regression. The estimates of the significant interaction terms involving dedicated institutional investor monitoring are qualitatively similar to those for institutional ownership concentration (see Models 2 and 3 of Table 3-9).

*** Insert Table 3-9 here ***

3.6 Discussion and Conclusion

Drawing from the governance bundle assumption, this chapter examines the interactive effects of firm-level governance mechanisms and whether they act as substitutes or complements of each other in influencing firm acquisitiveness. In sum, our results mainly provide support for the *Substitution Hypothesis* when focussing on the interdependence of three key governance mechanisms (board monitoring, CEO pay incentives, and institutional investor monitoring) in the M&A setting. Specifically, we detected significant substitutive

[34] The data on dedicated institutional ownership are available from the website of Prof Brian Bushee: http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html.

effects between incentive alignment and monitoring governance mechanisms (i.e. CEO delta and board size, CEO cash pay and non-co-opted independence, CEO cash pay and CEO non-duality, and CEO cash pay and institutional ownership concentration) with respect to influencing the propensity of a firm to undertake an acquisition. These results suggest that CEO pay incentives, either in the form of CEO delta or CEO cash pay, are more effective in encouraging the CEO to undertake high-risk projects such as acquisitions, when there are low (rather than high) levels of either internal (board of directors) or external (institutional investors) monitoring governance mechanisms. Likewise, when there are high levels of monitoring mechanisms in place, either in the form of a more vigilant board of directors (by having a larger board size, improved board independence or separating the positions of CEO and Chair) or large and concentrated institutional investors, these mechanisms constrain CEO discretion and, in doing so, minimise agency costs by weakening the positive effect of compensation-alignment mechanisms on acquisition propensity. A noteworthy exception was the complementary interplay between board size and institutional ownership concentration which offered support to the *Complementarity Hypothesis*. This result suggests that when there is vigilant monitoring by both the board of directors and large and concentrated institutional shareholders, then these mechanisms work synergistically in reducing a firm's acquisition likelihood. All results were robust to alternative model specifications and to the use of a different proxy for institutional investor monitoring based on the investment horizons of the institutions (i.e. dedicated institutional ownership).

Our study provides valuable insights for both academics and practitioners. From a theoretical standpoint, our results reinforce the view that corporate governance mechanisms do not function independently (Aguilera et al., 2008; 2015; Cuomo et al., 2016). Given that a firm's governance structure consists of possible various mechanisms, as stated by proponents of the governance "bundles" perspective it is important to consider their interrelations in order to better explain the effects of combinations (presence/absence) of governance mechanisms on firm decisions and outcomes. Indeed, the line of research that focusses on the substitutive and complementary relationships between governance mechanisms has attracted considerable scholarly attention in corporate governance research (Aguilera et al., 2012; Schiehll et al., 2014; Cuomo et al., 2016). Departing from the oversimplified view of the independent effects of corporate governance mechanisms, we contribute to the governance literature by delving into the interdependencies of corporate governance mechanisms and how these influence a firm's acquisition propensity. Our results clearly provide a better and more nuanced understanding of how the substitutive and complementary effects of firm-level governance mechanisms operate in the context of M&A.

Concretely, our findings reveal that acquisition propensity is positively influenced by higher levels of incentive alignment mechanisms, such as CEO pay incentives, and lower levels of monitoring mechanisms, such as board monitoring arrangements. On the contrary, acquisition likelihood is reduced in the simultaneous presence of two monitoring governance mechanisms, one internal - board monitoring - and one external - institutional investor monitoring.

In this regard, our study contributes to the nascent but highly promising body of governance research which adopts a *configurational* perspective and suggests that organisational outcomes depend on the effectiveness of certain combinations or "bundles" of corporate governance practices, rather than on the effectiveness of any single governance mechanism (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009). Moving beyond the M&A setting, it can be argued that these competing perspectives could be prevalent in other firm decisions that require intensive deliberation on behalf of the board of directors and other firm-specific governance mechanisms, such as decisions about the CEO appointment or other critical capital expenditures. Furthermore, our study complements and extends prior work on the interdependence of governance mechanisms by investigating their interactive effects on firm decisions and outcomes, whilst most of the previous studies in this area examined whether one governance mechanism substitutes or complements another mechanism (e.g., Zajac and Westphal, 1994; Rediker and Seth, 1995; Hartzell and Starks, 2003).

Our study also makes important contributions to the extensive yet fragmented M&A research about the antecedents of corporate acquisitions. We provide evidence that firm-level governance configurations are a crucial determinant for explaining differences we may observe in the acquisition propensity of firms, ranging from a more prudent to a more aggressive acquisition behaviour. Our results demonstrate that firm-level governance mechanisms and their interrelations are influential in the acquisition decision. These results may help explain discrepancies in the previous M&A literature about the drivers of acquisition decisions and how multiple drivers may operate in conjunction with respect to influencing firm acquisition behaviour (Haleblian et al., 2009), therefore serving as an important step in advancing our understanding of what drives corporate acquisitions.

Finally, our study has interesting practical implications. The findings offer a better understanding of how different combinations or "bundles" of firm-level governance mechanisms influence a firm's propensity to undertake acquisitions. While individual governance mechanisms - whether intended at monitoring or incentive alignment- aim to reduce agency problems from the separation between ownership and control, the way these

mechanisms "bundle" may have different implications for major strategic decisions such as corporate acquisitions. For instance, firms can increase their acquisition propensity by offering higher levels of pay incentives to the CEO, but these incentives will be more effective in encouraging the CEO to pursue more M&A deals when the level of monitoring mechanisms, such as vigilant monitoring by boards of directors and institutional shareholders, is low. In this regard, the "less is more" notion seems to apply when it comes to combinations of monitoring and incentive alignment mechanisms, as they substitute each other in promoting firm acquisitiveness. In contrast, firms can significantly decrease acquisition likelihood by employing more monitoring mechanisms. In particular, according to our findings, there is a joint interplay between higher levels of board and institutional investor monitoring as their negative effects on acquisition propensity are strengthened when combined. Taken together, our findings imply that firms should consider different governance configurations for different levels of acquisition propensity, in line with the notion of "equifinality", whereby alternative combinations of governance mechanisms can lead to similar firm outcomes (Rediker and Seth, 1995; Gresov and Drazin, 1997).

The aim of this chapter was to explore the interdependence of governance mechanisms in the context of corporate acquisitions and in particular examine their impact on the acquisition decision. Once a firm decides to undertake a corporate acquisition, then an important step in the execution process involves the cost of the deal to the acquirer in terms of the acquisition premium paid. Accordingly, the following empirical chapter investigates the moderating role of governance in synergy-driven M&A with respect to influencing the size of acquisition premiums paid.

Tables and Figures – Chapter 3

Table 3-1 Estimation results of the cross-sectional probit model and summary statistics of predicted acquisition likelihood values

Panel A of the table reports the results of cross-sectional probit regressions as part of the first phase test conducted to transform the binary dependent variable, *acquisition propensity* into a continuous one. All models include firm and industry characteristics, whose coefficients are suppressed. Heteroscedasticity-robust standard errors are included in all regressions. Panel B reports the summary statistics of fitted predicted acquisition likelihood values from a probit model for each sample year.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Panel A: First phase cross-sectional probit regressions																			
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Pseudo R^2	0.06	0.09	0.08	0.08	0.05	0.09	0.03	0.07	0.06	0.06	0.05	0.11	0.06	0.05	0.05	0.09	0.03	0.04	
LR	27.72	59.06	49.10	49.24	29.57	55.03	21.94	47.36	35.36	54.04	27.29	55.69	34.19	31.26	23.06	21.29	20.10	16.61	
Number of Observations	459	682	681	711	726	751	743	728	704	665	687	717	738	720	722	725	750	734	
Panel B: Summary statistics of predicted acquisition likelihood values assuming a probit model																			
	PR98	PR99	PR00	PR01	PR02	PR03	PR04	PR05	PR06	PR07	PR08	PR09	PR10	PR11	PR12	PR13	PR14	PR15	PRACQ
Mean	0.007	0.010	0.009	0.008	0.007	0.009	0.010	0.011	0.008	0.009	0.008	0.007	0.008	0.008	0.007	0.006	0.008	0.008	0.148
Standard Deviation	0.039	0.051	0.046	0.041	0.034	0.042	0.042	0.050	0.040	0.044	0.036	0.035	0.036	0.038	0.033	0.029	0.033	0.034	0.088
Minimum	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
Maximum	0.631	0.823	0.768	0.592	0.498	0.768	0.497	0.706	0.576	0.564	0.673	0.765	0.391	0.493	0.431	0.387	0.524	0.423	0.823

Table 3-2 Sample descriptive statistics

The table presents the descriptive statistics of the variables used in the main regression analysis. Panel A reports the statistics for the dependent variable *acquisition propensity*. Panel B reports the statistics of the independent variables employed in the empirical analysis. Panel C reports the statistics for the firm and industry characteristics. Panel D reports the statistics for the CEO characteristics. Variable definitions are provided in Appendix A.

Variables	Obs.	Mean	Std. Dev.	25th Pctl.	Median	75th Pctl.
Panel A: Dependent variable						
Acquisition propensity	12,643	0.148	0.355	0.000	0.000	0.000
Panel B: Independent variables						
Board size	12,643	9.023	2.277	7.000	9.000	11.000
Non-co-opted independence (NCI)	12,643	0.360	0.271	0.111	0.364	0.571
CEO/Chair duality	12,643	0.580	0.494	0.000	1.000	1.000
CEO vega (scaled)	12,643	0.132	0.160	0.030	0.077	0.170
CEO delta (scaled)	12,643	0.793	2.100	0.117	0.249	0.565
CEO cash pay	12,643	6.886	0.643	6.468	6.847	7.241
Institutional ownership Concentration (IOC)	12,643	0.291	0.091	0.228	0.288	0.350
Panel C: Firm & Industry characteristics						
Firm size ($ billion)	12,643	7.596	1.499	6.509	7.449	8.562
Book leverage	12,643	0.223	0.167	0.085	0.215	0.329
Sales growth	12,643	0.092	0.206	-0.006	0.072	0.162
Market-to-book ratio	12,643	2.015	1.217	1.250	1.642	2.306
Cash flows	12,643	0.088	0.066	0.058	0.089	0.121
Cash holdings	12,643	0.145	0.161	0.026	0.082	0.207
ROA	12,643	0.047	0.092	0.022	0.056	0.092
M&A liquidity index	12,643	0.015	0.027	0.002	0.006	0.015
Panel D: CEO characteristics						
CEO tenure	12,643	7.653	7.065	2.583	5.500	10.250
CEO age	12,643	55.563	6.713	51.000	56.000	60.000
CEO gender	12,643	0.026	0.158	0.000	0.000	0.000
CEO overconfidence	12,643	0.187	0.390	0.000	0.000	0.000
CEO ownership	12,643	0.017	0.042	0.001	0.003	0.011

Table 3-3 Univariate analysis of non-acquirers vs acquirers

The table compares the means and the standard deviations of all the explanatory and control variables separately for non-acquirers and acquirers. The total number of observations is 12,643. Variable definitions are provided in Appendix A. The p-values from tests of differences in means between the two groups are reported in the final column.

	Non-acquirers (N=10,778)		Acquirers (N=1,865)		Mean Difference
Variables	Mean	Std. Dev.	Mean	Std. Dev.	p-value
Independent Variables					
Board size	9.016	2.262	9.058	2.361	(0.481)
Non-co-opted independence (NCI)	0.361	0.272	0.358	0.267	(0.701)
CEO/Chair duality	0.580	0.494	0.580	0.494	(0.977)
CEO vega (scaled)	0.126	0.153	0.164	0.191	(0.000)
CEO delta (scaled)	0.755	2.019	1.014	2.504	(0.000)
CEO cash pay	6.869	0.635	6.985	0.678	(0.000)
Institutional ownership concentration (IOC)	0.293	0.091	0.276	0.090	(0.000)
Firm & Industry characteristics					
Firm size ($ billion)	7.547	1.481	7.879	1.572	(0.000)
Book leverage	0.226	0.168	0.203	0.159	(0.000)
Sales growth	0.086	0.204	0.125	0.216	(0.000)
Market-to-book ratio	1.968	1.186	2.288	1.353	(0.000)
Cash flows	0.087	0.066	0.097	0.061	(0.000)
Cash holdings	0.140	0.159	0.171	0.170	(0.000)
ROA	0.045	0.093	0.061	0.081	(0.000)
M&A liquidity index	0.013	0.026	0.023	0.035	(0.000)
CEO characteristics					
CEO tenure	7.700	7.104	7.386	6.828	(0.069)
CEO age	55.676	6.688	54.905	6.820	(0.000)
CEO gender	0.026	0.160	0.021	0.143	(0.137)
CEO overconfidence	0.182	0.386	0.214	0.410	(0.002)
CEO ownership	0.018	0.043	0.014	0.037	(0.000)

Table 3-4 Pearson correlation matrix and collinearity diagnostics

The table presents the Pearson correlation coefficients for all the variables used in the main regressions. The bold figures indicate significance at the 5% level or better. Variance inflation factors (VIFs) are also reported as tests to detect the presence of multicollinearity among the independent and control variables.

#	Variable	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Acquisition propensity		1												
2	Board size	1.61	0.01	1											
3	Non-co-opted independence	1.69	0.00	**0.17**	1										
4	CEO/Chair duality	1.21	0.00	**0.14**	**-0.17**	1									
5	CEO vega (scaled)	1.49	**0.08**	**0.18**	0.01	**0.07**	1								
6	CEO delta (scaled)	2.04	**0.04**	-0.01	**-0.19**	**0.06**	**0.29**	1							
7	CEO cash pay	2.02	**0.06**	**0.41**	**0.06**	**0.22**	**0.04**	**-0.16**	1						
8	IOC	1.16	**-0.07**	**-0.25**	**0.03**	**-0.08**	**-0.10**	**-0.11**	**-0.20**	1					
9	Firm size	2.92	**0.08**	**0.57**	**0.16**	**0.17**	**0.39**	**0.09**	**0.61**	**-0.26**	1				
10	Book leverage	1.31	**-0.05**	**0.20**	**0.06**	**0.08**	-0.01	**-0.10**	**0.15**	0.02	**0.25**	1			
11	Sales growth	1.13	**0.07**	**-0.07**	**-0.11**	-0.02	**-0.02**	**0.09**	**0.06**	**-0.05**	0.00	**-0.02**	1		
12	Market-to-book ratio	1.71	**0.09**	**-0.06**	**-0.06**	**-0.03**	**0.16**	**0.27**	**0.05**	**-0.13**	**-0.06**	**-0.21**	**0.23**	1	
13	Cash flows	1.92	**0.05**	0.00	0.00	0.00	**0.07**	**0.08**	**0.11**	**-0.06**	**0.02**	**-0.18**	**0.21**	**0.34**	1
14	Cash holdings	1.58	**0.07**	**-0.30**	**-0.10**	**-0.12**	**0.09**	**0.12**	**-0.24**	**0.06**	**-0.28**	**-0.38**	**0.03**	**0.35**	**-0.08**
15	ROA	1.98	**0.06**	**0.08**	**0.03**	**0.03**	**0.12**	**0.09**	**0.19**	**-0.09**	**0.13**	**-0.20**	**0.22**	**0.37**	**0.66**
16	M&A liquidity index	1.07	**0.12**	**-0.07**	**-0.06**	0.00	0.00	**0.03**	**0.00**	**-0.05**	**-0.08**	**-0.07**	**0.07**	**0.20**	0.00
17	CEO tenure	2.22	-0.02	**-0.10**	**-0.61**	**0.29**	**0.04**	**0.28**	**-0.03**	-0.01	**-0.10**	**-0.06**	**0.06**	**0.04**	0.00
18	CEO age	1.31	**-0.04**	**0.11**	**-0.20**	**0.29**	0.01	**0.07**	**0.12**	**-0.04**	**0.11**	**0.03**	**-0.05**	**-0.07**	-0.01
19	CEO gender	1.01	-0.01	**-0.02**	**0.04**	**-0.04**	0.00	-0.01	**-0.02**	**0.04**	-0.01	**-0.03**	**-0.02**	-0.01	0.00
20	CEO overconfidence	1.03	**0.03**	**0.03**	-0.01	**0.03**	**0.09**	-0.01	**0.07**	**-0.03**	**0.04**	-0.01	**0.06**	**0.08**	**0.06**
21	CEO ownership	2.06	**-0.03**	**-0.15**	**-0.32**	**0.13**	**-0.08**	**0.55**	**-0.16**	**-0.05**	**-0.20**	**-0.08**	**0.02**	**0.02**	0.00

#	Variable	14	15	16	17	18	19	20	21
14	Cash holdings	1							
15	ROA	0.00	1						
16	M&A liquidity index	**0.14**	0.00	1					
17	CEO tenure	**0.09**	**0.02**	0.02	1				
18	CEO age	**-0.10**	**0.04**	**-0.02**	**0.41**	1			
19	CEO gender	0.03	-0.01	-0.01	**-0.06**	**-0.06**	1		
20	CEO overconfidence	0.00	**0.08**	**0.04**	0.01	0.01	-0.02	1	
21	CEO ownership	**0.07**	0.01	0.00	**0.47**	**0.16**	0.00	**-0.05**	1

Table 3-5 Main effects

The table presents in column (1) marginal effects of a pooled probit regression where the dependent variable takes the value of one if a firm made an acquisition in a given year, and zero otherwise. Column (2) presents the second-phase regression results for the fixed effects model where the dependent variable is continuous and measures the predicted acquisition likelihood. Variable definitions are provided in Appendix A. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Pooled Probit	Fixed Effects
	(1)	(2)
Board size	-0.0057***	-0.0003
	(0.0021)	(0.0007)
Non-co-opted independence	-0.0102	-0.0053
	(0.0168)	(0.0044)
CEO/Chair duality	-0.0021	0.0009
	(0.0085)	(0.0024)
CEO vega	0.0579**	0.0012
	(0.0259)	(0.0084)
CEO delta	0.0041	0.0037***
	(0.0025)	(0.0007)
CEO cash pay	0.0147*	0.0244***
	(0.0081)	(0.0023)
IOC	-0.0857*	-0.0628***
	(0.0441)	(0.0110)
CEO tenure	-0.0004	0.0001
	(0.0008)	(0.0003)
CEO age	-0.0017***	-0.0002
	(0.0006)	(0.0002)
CEO gender	-0.0219	0.0002
	(0.0223)	(0.0073)
CEO overconfidence	0.0085	0.0038**
	(0.0078)	(0.0018)
CEO ownership	-0.2493*	-0.1099***
	(0.1361)	(0.0420)
Firm size	0.0219***	
	(0.0047)	
Book leverage	-0.0639**	
	(0.0265)	
Sales growth	0.0637***	
	(0.0170)	
Market-to-book ratio	-0.0026	
	(0.0037)	
Cash flows	0.1514**	
	(0.0740)	
Cash holdings	0.0844***	
	(0.0293)	
ROA	0.0911*	
	(0.0521)	
M&A liquidity index	0.8057***	
	(0.1156)	
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	No
Number of Observations	12,643	12,643
Pseudo R^2	0.060	
R^2		0.1457

Table 3-6 Interaction effects

The table reports in Model 1 the main effects for the firm fixed effects model. Models 2-6 present the significant pair-wise interactions between the main governance mechanisms examined. The dependent variable is the predicted acquisition likelihood derived from the first phase of the two-phase approach, as shown in Table 3-1. The following control variables are included in all of the regressions, whose coefficients are suppressed: CEO tenure, CEO age, CEO gender, CEO overconfidence, CEO ownership, and year fixed effects. ⊿R^2 denotes the change in R^2 from the main effects model (Model 1). ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix A. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects Expected Sign	Main Effects	Interactions				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Board size	-	-0.0003	-0.0005	-0.0002	-0.0003	-0.0003	-0.0003
		(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Non-co-opted independence (NCI)	-	-0.0053	-0.0052	-0.0051	-0.0046	-0.0049	-0.0054
		(0.0044)	(0.0044)	(0.0044)	(0.0044)	(0.0044)	(0.0044)
CEO/Chair duality	+	0.0009	0.0011	0.0008	0.0012	0.0007	0.0013
		(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
CEO vega	+	0.0012	0.0014	0.002	0.0008	0.0002	0.0025
		(0.0084)	(0.0084)	(0.0084)	(0.0084)	(0.0084)	(0.0084)
CEO delta	+/-	0.0037***	0.0037***	0.0038***	0.0038***	0.0038***	0.0038***
		(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
CEO cash pay	+/-	0.0244***	0.0243***	0.0245***	0.0239***	0.0305***	0.0233***
		(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0030)	(0.0023)
Institutional ownership concentration (IOC)	-	-0.0628***	-0.0651***	-0.0625***	-0.0629***	-0.0623***	-0.0660***
		(0.0110)	(0.0112)	(0.0110)	(0.0110)	(0.0110)	(0.0112)
Board size × IOC			-0.0110**				
			(0.0049)				
Board size × CEO delta				-0.0005**			
				(0.0002)			
NCI × CEO cash pay					-0.0119*		
					(0.0064)		
CEO/Chair duality × CEO cash pay						-0.0097***	
						(0.0031)	

	Main Effects Expected Sign	Main Effects	Interactions				
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CEO cash pay × IOC							-0.0558***
							(0.0165)
Constant		0.1901***	0.1890***	0.1901***	0.1902***	0.1911***	0.1890***
		(0.0047)	(0.0046)	(0.0047)	(0.0047)	(0.0047)	(0.0046)
CEO control variables		Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations		12,643	12,643	12,643	12,643	12,643	12,643
R^2		0.1457	0.1463	0.1465	0.1463	0.1468	0.1471
Adjusted R^2		0.1438	0.1443	0.1445	0.1443	0.1448	0.1451
F		53.0629	51.4124	52.0852	51.7743	51.8587	52.086
⊿R^2 from Model 1			0.0006	0.0008	0.0005	0.0011	0.0014
⊿F from Model 1			5.0996**	6.2306**	3.3829*	9.643***	11.4771***
(Prob > F)			(0.024)	(0.013)	(0.066)	(0.002)	(0.001)

Figure 3-1 Complementary effect of board size and institutional ownership concentration on acquisition likelihood

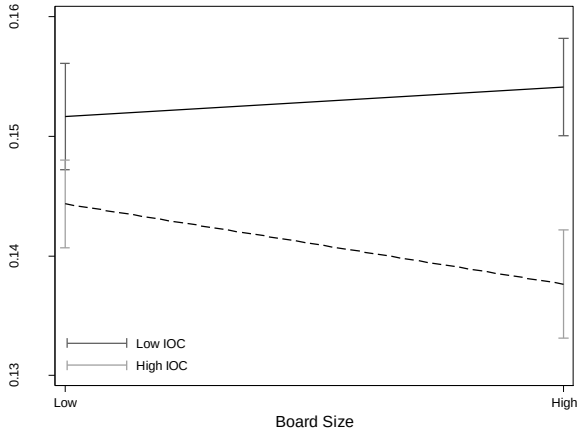

Figure 3-2 Substitutive effect of CEO delta and board size on acquisition likelihood

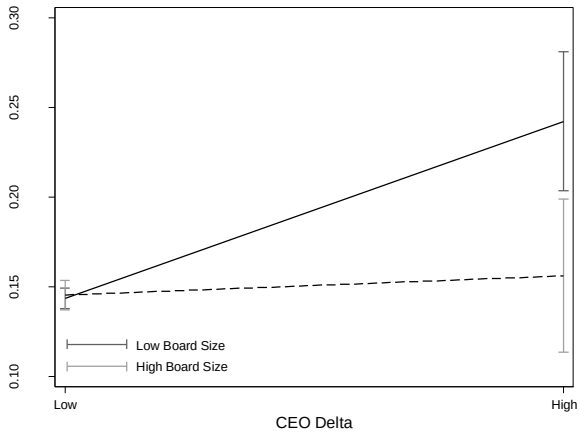

Figure 3-3 Substitutive effect of CEO cash pay and non-co-opted independence on acquisition likelihood

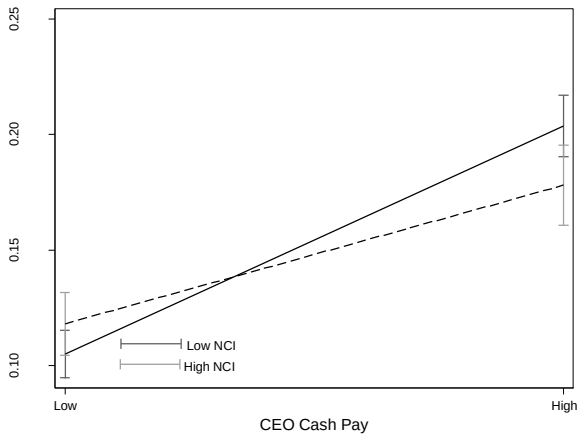

Figure 3-4 Substitutive effect of CEO cash pay and CEO non-duality on acquisition likelihood

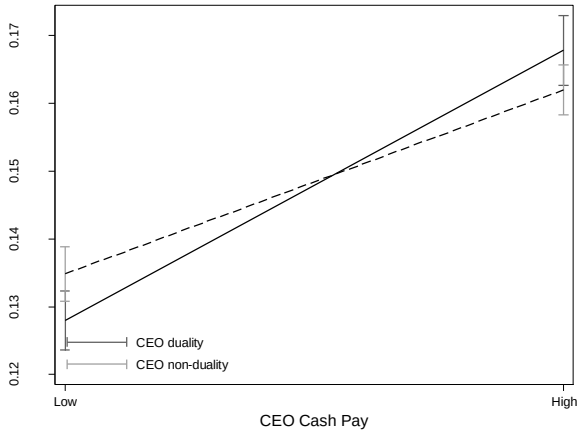

Figure 3-5 Substitutive effect of CEO cash pay and institutional ownership concentration on acquisition likelihood

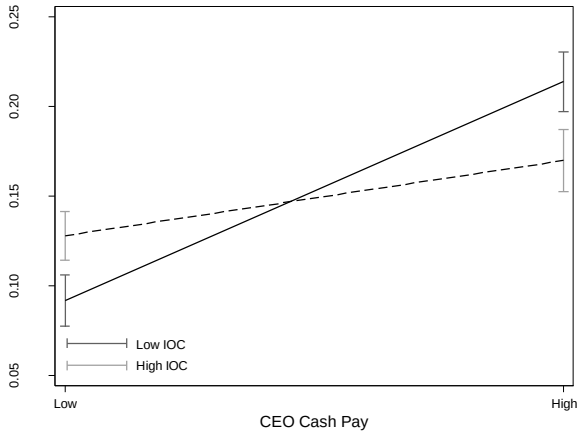

Table 3-7 Robustness test with Hausman-Taylor estimation (1)

The table reports in Model 1 the main effects using the Hausman-Taylor estimator assuming that the main explanatory variables are endogenous. Models 2-6 present the significant pair-wise interactions between the main governance mechanisms examined. The dependent variable is the predicted acquisition likelihood derived from the first phase of the two-phase approach, as shown in Table 3-1. The following control variables are included in all of the regressions, whose coefficients are suppressed: CEO tenure, CEO age, CEO gender, CEO overconfidence, CEO ownership, year and industry fixed effects. Variable definitions are provided in Appendix A. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Board size	-0.0004	-0.0006	-0.0003	-0.0004	-0.0004	-0.0004
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Non-co-opted independence (NCI)	-0.0065*	-0.0065*	-0.0063	-0.0059	-0.0061	-0.0067*
	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
CEO/Chair duality	0.0008	0.0009	0.0007	0.0011	0.0006	0.0012
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
CEO vega	0.0001	0.0003	0.0009	-0.0003	-0.0008	0.0014
	(0.0060)	(0.0060)	(0.0060)	(0.0060)	(0.0060)	(0.0060)
CEO delta	0.0039***	0.0039***	0.0040***	0.0039***	0.0039***	0.0039***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
CEO cash pay	0.0244***	0.0243***	0.0246***	0.0239***	0.0305***	0.0232***
	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0024)	(0.0018)
Institutional ownership concentration (IOC)	-0.0609***	-0.0633***	-0.0604***	-0.0610***	-0.0605***	-0.0642***
	(0.0099)	(0.0099)	(0.0099)	(0.0099)	(0.0099)	(0.0099)
Board size × IOC		-0.0115***				
		(0.0039)				
Board size × CEO delta			-0.0005***			
			(0.0002)			
NCI × CEO cash pay				-0.0116***		
				(0.0044)		
CEO/Chair duality × CEO cash pay					-0.0097***	
					(0.0025)	
CEO cash pay × IOC						-0.0584***
						(0.0130)

	Main Effects	Interactions				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.1499***	0.1488***	0.1542***	0.1496***	0.1504***	0.1498***
	(0.0202)	(0.0202)	(0.0192)	(0.0203)	(0.0203)	(0.0201)
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	12,643	12,643	12,643	12,643	12,643	12,643
Wald Chi-Square	2129.19***	2140.95***	2145.41***	2135.75***	2144.91**	2155.26***

Table 3-8 Robustness test with Hausman-Taylor estimation (2)

The table reports in Model 1 the main effects using the Hausman-Taylor estimator assuming that both the main explanatory variables and CEO control variables are endogenous. Models 2-6 present the significant pair-wise interactions between the main governance mechanisms examined. The dependent variable is the predicted acquisition likelihood derived from the first phase of the two-phase approach, as shown in Table 3-1. The following control variables are included in all of the regressions, whose coefficients are suppressed: CEO tenure, CEO age, CEO gender, CEO overconfidence, CEO ownership, year and industry fixed effects. Variable definitions are provided in Appendix A. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Board size	-0.0004	-0.0006	-0.0003	-0.0004	-0.0004	-0.0004
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Non-co-opted independence (NCI)	-0.0064	-0.0063	-0.0061	-0.0057	-0.0060	-0.0065*
	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
CEO/Chair duality	0.0006	0.0007	0.0005	0.0009	0.0004	0.0010
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
CEO vega	-0.0006	-0.0005	0.0002	-0.0010	-0.0016	0.0007
	(0.0060)	(0.0060)	(0.0060)	(0.0060)	(0.0060)	(0.0060)
CEO delta	0.0038***	0.0038***	0.0039***	0.0039***	0.0039***	0.0039***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
CEO cash pay	0.0242***	0.0241***	0.0243***	0.0237***	0.0303***	0.0230***
	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0024)	(0.0018)
Institutional ownership concentration (IOC)	-0.0610***	-0.0634***	-0.0605***	-0.0611***	-0.0605***	-0.0644***
	(0.0099)	(0.0100)	(0.0099)	(0.0099)	(0.0099)	(0.0099)
Board size × IOC		-0.0114***				
		(0.0039)				
Board size × CEO delta			-0.0005***			
			(0.0002)			
NCI × CEO cash pay				-0.0115***		
				(0.0044)		
CEO/Chair duality × CEO cash pay					-0.0098***	
					(0.0025)	
CEO cash pay × IOC						-0.0583***
						(0.0130)

	Main Effects	Interactions				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	0.1477***	0.1468***	0.1521***	0.1474***	0.1481***	0.1476***
	(0.0203)	(0.0203)	(0.0192)	(0.0205)	(0.0204)	(0.0202)
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	12,643	12,643	12,643	12,643	12,643	12,643
Wald Chi-Square	2116.41***	2127.82***	2134.13***	2122.99***	2132.43***	2142.24***

Table 3-9 Robustness test using dedicated institutional ownership

The table reports in Model 1 the main effects for the firm fixed effects model using dedicated institutional ownership as a proxy for monitoring institutional investors instead of institutional ownership concentration. Models 2 and 3 present the significant pair-wise interactions involving dedicated institutional ownership. The dependent variable is the predicted acquisition likelihood derived from the first phase of the two-phase approach, as shown in Table 3-1. The following control variables are included in all of the regressions, whose coefficients are suppressed: CEO tenure, CEO age, CEO gender, CEO overconfidence, CEO ownership, and year fixed effects. ⊿R^2 denotes the change in R^2 from the main effects model (Model 1). ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix A. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions	
	Model 1	Model 2	Model 3
Board size	-0.0002	0.0001	-0.0001
	(0.0007)	(0.0007)	(0.0007)
Non-co-opted independence	-0.0059	-0.0056	-0.0057
	(0.0045)	(0.0045)	(0.0045)
CEO/Chair duality	0.0007	0.0005	0.0007
	(0.0024)	(0.0024)	(0.0024)
CEO vega	0.0019	0.0022	0.0010
	(0.0085)	(0.0085)	(0.0085)
CEO delta	0.0039***	0.0039***	0.0038***
	(0.0007)	(0.0007)	(0.0007)
CEO cash pay	0.0249***	0.0251***	0.0256***
	(0.0023)	(0.0023)	(0.0023)
Dedicated institutional ownership (Ded IO)	-0.0341**	-0.0356**	-0.0317**
	(0.0150)	(0.0150)	(0.0151)
Board size × Ded IO		-0.0207***	
		(0.0050)	
CEO cash pay × Ded IO			-0.0672***
			(0.0184)
Constant	0.1974***	0.1996***	0.1972***
	(0.0052)	(0.0052)	(0.0052)
CEO control variables	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Number of Observations	12,643	12,643	12,643
R^2	0.1433	0.1454	0.1450
Adjusted R^2	0.1413	0.1434	0.1430
F	52.4377	51.3055	51.1913
⊿R^2 from Model 1		0.0021	0.0017
⊿F from Model 1		16.7550***	13.3726***
(Prob > F)		(0.000)	(0.000)

4 The Moderating Role of Corporate Governance in Acquisition Premium Decisions

4.1 Introduction

There are different stages in the acquisition process, from the decision of a firm to negotiate and complete an M&A deal down to the details of the deal, including its cost to the acquirer in terms of the acquisition premium paid, and its effects on acquirer performance in the post-acquisition period. In the previous chapter, we investigated the interrelations of a key set of firm-level governance mechanisms as another driver of acquisition activity. This chapter considers the acquisition premium which according to Haleblian et al. (2009) has not been used extensively in the M&A research but could be an acquisition outcome investigated on its own. The acquisition premium or "control" premium as it is usually referred to, represents the cost of an acquisition from the acquirer's perspective. In general, the acquisition premium is the amount above the current market value of the target firm that the target's shareholders are willing to accept in order to transfer control to the acquiring firm and is usually expressed in percentage terms. In the US, acquisition premiums have traditionally varied between 25%-40%, but there are cases that went beyond 100% of the target firm's market value (Zhu, 2013).

It has long been viewed that synergies are key drivers of corporate acquisitions and a well-known determinant of the acquisition premium paid (Harrison et al., 1991; Haspeslagh and Jemison, 1991; Larsson and Finkelstein, 1999; Hitt et al., 2001). The higher the anticipated synergistic gains that are expected to be realised from a given acquisition the higher the premium the bidder would be inclined to pay to acquire the target firm (Bradley et al., 1983; Slusky and Caves, 1991; Antoniou et al., 2008). However, a limited number of empirical studies have reported a relationship between synergistic gains, either in the form of operational or financial synergies, and acquisition premiums (Hayward and Hambrick, 1997; Laamanen, 2007).

Turning now to the role of corporate governance in acquisition premium decisions. M&A have been often argued to represent a setting in which agency conflicts are manifested (Jensen, 1986; Masulis et al., 2007). It is well recognised that as managers may engage in M&A to extract private benefits at the expense of shareholder wealth; sometimes they may overbid and overpay for the target firm. If governance mechanisms are expected to successfully deal with agency problems, it can be posited the acquirer's governance structures should have a negative impact on the size of actual premiums as they should prevent managers from overbidding and overpaying in a given M&A deal. Nevertheless, the empirical

evidence with respect to the direct effects of the acquirer's governance structures on the acquisition premium is also quite limited and fragmented. A possible explanation could be that if corporate governance is designed to effectively monitor and improve the day-to-day routines of a firm, it may not be as well-configured to support strategic (non-routine) tasks such as acquisition premium decisions.

In the absence of empirical research on the moderating role of corporate governance in the relationship between synergistic motives and the acquisition premium, this chapter, therefore, examines how different governance structures in the acquirer interact with two key types of synergies, namely operational and financial, towards determining the acquisition premium paid. Departing from the *configurational* perspective in corporate governance as empirically tested in the previous chapter, whilst we do not directly compare interactions among acquirer governance configurations, we compare two-way interactions between governance characteristics and synergy-driven merger motives. We are interested in delineating a more sophisticated process that takes place during the M&A scanning phase in which the acquirer's corporate governance structure is expected to influence indirectly acquisition premium decisions.

By using a sample of acquisitions made by publicly traded US firms from 1998-2015 the present study provides novel evidence on how the acquirer's governance mechanisms condition the relationship between synergy-driven M&A motives and the size of the acquisition premium paid. We find three significant pair-wise interaction effects between synergy proxies (either operational or financial) and certain acquirer's governance mechanisms with respect to influencing the size of the four-week acquisition premium. These results are qualitatively robust to using alternative measures of the acquisition premium. Moreover, additional analysis reveals that by excluding the years of the recent financial crisis, acquirer corporate governance is, in fact, more effective as it further moderates the effect of financial synergies on the acquisition premium paid.

The rest of the chapter is structured as follows. Section 4.2 provides an overview of the related literature and states the key hypotheses, while Section 4.3 describes the research design. We then report the results of the empirical analysis in Section 4.4. A discussion of the findings and concluding remarks is presented in Section 4.5.

4.2 Related Research and Hypothesis Development

4.2.1 Determinants of Acquisition Premiums

Despite the growing body of research, both in the finance and strategy literatures, the extant literature fails to provide a deeper understanding of the determinants of acquisition premiums (Laamanen, 2007; Haleblian et al., 2009). There are two competing views in the existing literature with respect to the motivations behind the payment of an acquisition premium and their influence on the size of the acquisition premiums paid. On the one hand, it has been argued that premiums proxy for the desirable synergies expected to be materialised from the M&A deal (Díaz et al., 2009). The greater the additional value that is expected to be extracted from the target firm, the higher the premium that the potential acquirer will be willing to pay for the transaction (Bradley et al., 1983; Slusky and Caves, 1991; Antoniou et al., 2008).

On the other hand, overbidding and overpaying makes it more difficult for the acquirer to extract sufficient value from the M&A deal to cover the high premium paid, thus increasing the risk of an acquisition (Haunschild, 1994; Allen et al., 1995). There is a growing belief that excessively high premiums are the main culprit behind the long-term underperformance of acquirers (Antoniou et al., 2008)[35] and may even lead to the bankruptcy of the acquirer (Haunschild, 1994). Research on the overpayment in the M&A market has identified various sources. First, acquirers may overpay due to irrationality caused by cognitive biases such as CEO overconfidence (Malmendier and Tate, 2008; 2011) or narcissism (Chatterjee and Hambrick, 2011; Aktas et al., 2016b; de Bodt et al., 2018). These decision-making biases are rooted in the *hubris hypothesis* (Roll, 1986; Hayward and Hambrick, 1997). CEOs of the acquiring firms infected with hubris may be over-optimistic of their abilities and skills to run a larger combined firm, thus overestimate the expected future economic benefits resulting from the deal, and, in turn, overbid and overpay for the target firm. Besides the aforementioned individual-level cognitive biases, there is also evidence of group-level psychological biases, such as group polarisation influencing boards' premium decisions (Zhu, 2013). According to the group polarisation theory, when directors initially support a relatively high (low) premium prior to a board meeting because of their prior premium experience across different boards, the focal premium supported is even higher (lower) after board discussions.

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[35] The extant empirical evidence suggests that M&A in the long-run have detrimental or at best neutral effects on the wealth of the acquirers' shareholders (e.g., Jensen and Ruback, 1983; Agrawal et al., 1992; Loughran and Vijh, 1997).

Second, another source of irrational bidding behaviour is related to the "winner's curse" problem (Bazerman and Samuelson, 1983; Eckbo, 2009) which is encountered in auction settings. In a competitive bidding environment, the firm that finally wins the bidding war is the one that may have overestimated the true value of the target and hence overpaid to gain control (Varaiya and Ferris, 1987; Slusky and Caves, 1991).

Third, the presence of agency conflicts could potentially explain overbidding and overpayment in the acquisition market. M&A represent a setting of heightened agency problems since they provide managers with opportunities, for instance, to secure private benefits from controlling larger firms (Morck et al., 1990) or pursue diversifying acquisitions in order to reduce their employment risk (Amihud and Lev, 1981). Jensen (1986) contends that managers may be incentivised to grow their firms beyond the optimal size so as to increase their compensation and boost their power and prestige. There is ample empirical evidence confirming the aforementioned arguments. For instance, Grinstein and Hribar (2004) find that more powerful CEOs tend to pursue larger M&A deals and receive larger bonuses even if this is associated with a negative stock price reaction. Relatedly, Harford and Li (2007) show that CEOs have an incentive to engage in acquisitions since their post-merger overall pay - including EBC - and wealth increase significantly even when the market responds negatively to the undertaken M&A deal. Avery et al. (1998) provide evidence that CEOs benefit from acquisitions because they are more likely to obtain outside directorships compared to their counterparts who did not undertake acquisitions. These results support the view that CEOs can improve their prestige and status in the business community by pursuing M&A.

Another reason for the wide variation we generally observe in the size of the premiums paid which is closely related to agency problems is that premium decisions are subject to high levels of uncertainty and information asymmetry (Haunschild, 1994). Even though much information on the target firms is necessary for the acquirer so as to determine how much to pay, premium decisions are difficult because of the subjectivity and complexity inherent in the firm valuation process (Haspeslagh and Jemison, 1991). In many cases, it is unclear what amount of premium will be sufficient to gain control over the target firm, discourage competitive offers, and yet still represent a fair value of the firm being acquired (Malhotra et al., 2015).

4.2.2 Synergistic Gains and Acquisition Premiums

As noted above, the synergy rationale is the most common theoretical driver for corporate acquisitions. The literature generally predicts that complementarities or similarities between the acquirer and the target firm enable the sum of combining two firms to be greater than

their individual parts (e.g., Barney, 1988; Harrison et al., 1991). Following this, the acquisition premium should entail part of the desirable synergies expected to be materialised, and thus, the additional value that can be extracted from the target firm. Prior research has shown that the combined acquirer and target returns are positive on average (e.g., Healy et al., 1992; Carow et al., 2004).

To better illustrate the concept of synergy as a value-increasing acquisition motive and an acquisition premium determinant, we will refer to two broad categories of synergies (e.g., Chatterjee, 1986), namely operational and financial synergies.

Operational synergies arise from combining the operations of two firms and may result in production efficiencies. This type of synergies can be classified into three distinct groups, that is revenue-based, cost-based, and investment-based operational synergies (Capron, 1999; Devos et al., 2009; Huyghebaert and Luypaert, 2013).

First, revenue-based synergies are associated with resource complementarity between the acquirer and the target firm and usually result in sales increase from integrating the operations of the acquirer and the target. For example, this may be achieved from the use of a larger distribution network by the combined firm or by utilising the strong brand name of either the acquirer or the target to promote product sales (Capron and Hulland, 1999). Alternatively, the ability to enhance revenues can be achieved by superior innovation capability post-acquisition leading to improved product features, which in turn translate into increased product prices and higher revenues (Capron, 1999).

Second, cost-based synergies arise from the exploitation of economies of scale and scope. Economies of scale arise with the reduction of the average cost of producing goods or services due to an increase in size by allocating fixed costs over a higher volume of production. To the same end, economies of scope imply a reduction of the average total cost from synergies arising by selling different products or services by the same firm.

Third, operational synergies may be realised by cutting capital expenditures and investments in working capital (Devos et al., 2009). Economies in capital expenditures may stem when the acquirer and the target share, for instance, office buildings or machinery. In addition, savings in net working capital can arise from lower inventories or improved collection of accounts receivable.

The empirical evidence on the existence of operational synergies in M&A is not entirely conclusive. On the one hand, Healy et al. (1992) find that the post-merger operational performance is improved – using ex-post accounting performance – because combined firms experience significant improvements is asset productivity compared to their industries. Similarly, Heron and Lie (2002) show that following acquisitions, the operational

performance of the combined firms improves significantly relative to their industry peers. On the other hand, Ravenscraft and Scherer (1987) provide no evidence of improvements in the operational performance of targets in tender offers. Relatedly, Maksimovic and Phillips (2001) find no evidence of improvement in the acquirer's assets productivity post-acquisition using plant-level data for manufacturing firms.

It has been generally suggested that operational synergies will arise only in M&A involving firms in the same or related industries (e.g., Chatterjee, 1986; Ravenscraft and Scherer, 1987; Amit and Livnat, 1988). Resource relatedness among the acquirer and target firms can be a crucial factor for the successful integration in an M&A deal, a process during which management undertakes the critical functions of allocating and coordinating resources within the merging parties (Grant, 1988). Strategic similarities represent another key dimension of relatedness which can be defined as the way in which managers understand industry operations, thereby conditioning their actions and approaches used to allocate resources and manage the operations of the new combined business entity (Prahalad and Bettis, 1986). Consequently, acquiring and target firms in related industries are more likely to enjoy operational efficiencies such as economies of scale and scope compared to other merging firms in unrelated industries (Harrison et al., 1991).

Another line of literature suggests that firms may engage in M&A because diversified firms enjoy several potential economic benefits. Combining firms with imperfectly correlated cash flow streams allows greater debt capacity without bearing an additional default risk (Lewellen, 1971; Stein, 2003). In this case, value may be created by utilising increased tax shields from interest deductions. Therefore, diversifying (or unrelated)[36] M&A are predicted to enable the merging firms to have higher leverage and lower tax payments than they would have if operated as independent entities. A further tax benefit of diversification is that if some of the segments that are part of a conglomerate experience losses in a year, then these can be offset against the gains of other segments, thereby resulting in lower taxes for the conglomerate (Majd and Myers, 1987).

The empirical evidence for the influence of financial synergies on the size of acquisition premiums is relatively small. Slusky and Caves (1991) report a significant positive relationship between financial synergies, as proxied by the difference in target's and acquirer's debt to equity ratio, and the size of the acquisition premium paid for a sample of US industrial firms. However, they find no evidence of a positive relationship between operational synergies and

[36] Financial synergies can also arise in acquisitions between firms in the same or related industries. But, in such M&A deals there is likely to be a higher covariance of returns and hence the chance for realising financial synergies is assumed to be lower.

the acquisition premiums. In the banking industry, Rhoades (1987) also finds that the premiums paid for target banks increase with their leverage.

4.2.3 Corporate Governance and Acquisition Premiums

Since the seminal work of Berle and Means (1932), the separation of ownership from control has long been recognised as the root of agency problems in public corporations. Key tenets of agency theory (Jensen and Meckling, 1976; Eisenhardt, 1989) are the divergence of incentives and information asymmetry between shareholders-principal and managers-agents. First, managers may prefer to take actions that maximise their personal outcomes rather than maximise shareholder wealth. Second, shareholders in firms with widely dispersed ownership are assumed to have less information about the behaviour and actions taken by the managers. On the basis of agency theory, a great number of studies have investigated how various governance mechanisms can mitigate agency problems and ensure that managers will act at the best interest of shareholders.

As discussed in the previous sub-section, the decision of how much acquisition premium to pay for another firm may be influenced by the wide disparity between shareholder and manager incentives. To the extent that corporate governance mechanisms are designed to curb the opportunistic behaviour of managers and reduce information asymmetry, there is much scope for research examining how corporate governance influences acquisition premium decisions. The great majority of extant finance studies have explored the influences of the target's corporate governance structure on the size of the premiums paid, whereas the management literature has focussed on how behavioural biases affect the size of premiums paid. For example, the finance literature has investigated the impact of antitakeover provisions or takeover defenses in the target firm such as poison pills (Comment and Schwert, 1995), termination fees (Officer, 2003), staggered boards (Moeller, 2005) and golden parachutes (Fich et al., 2013). Other finance studies have examined how the target firm's governance mechanisms such as board composition and managerial ownership influence the premium determination process, particularly, in the case of entrenched target managers (Cotter et al., 1997; Bange and Mazzeo, 2004). Following this reasoning, acquisition premiums should be higher in the case of target management resisting the takeover to prevent loss of control and thus avoid jeopardising their job security and private benefits (Song and Walkling, 1993). However, management scholars have focussed more on the acquirers and how premium decisions are shaped by biases such as CEO hubris (Hayward and Hambrick, 1997), and group polarisation on boards (Zhu, 2013) or by acquirers' network ties with board interlocks and investment advisors (Haunschild, 1994; Beckman and Haunschild, 2002).

Only a small number of previous studies have previously examined the effects of the acquirers' firm-level governance mechanisms on the acquisition premium in the US setting. For instance, Wang and Xie (2009) focus on the difference in shareholder rights (or antitakeover provisions) between the acquirer and the target as a proxy for changes in the target governance quality. In general, it has been argued that the adoption of antitakeover provisions helps poorly performing firms to resist a takeover, thus undermining the discipline exerted by the market for corporate control (Masulis et al., 2007). Wang and Xie (2009) predict that when the acquirer has stronger shareholder rights than the target, the acquisition of the target will improve the corporate governance of the target firm. Prior research has documented that firms with stronger shareholder rights (or fewer antitakeover provisions) exhibit higher firm value (Gompers et al., 2003; Bebchuk and Cohen, 2005; Bebchuk et al., 2009). Using a sample of 396 completed M&A by US firms over the period 1990-2004, Wang and Xie (2009) find that the acquisition premiums, as well as target and acquirer returns, increase with the shareholder-rights difference between the acquirer and the target. These findings lend support to their hypothesis that takeovers of poorly governed targets by acquirers with superior corporate governance create higher firm value.

Fralich and Papadopoulos (2018) investigate aspects of the board leadership structure and CEO power with regard to their effects on the acquisition premiums paid in turbulent macro environmental contexts. In line with agency theory predictions, the authors argue that powerful acquirer CEOs are more inclined to overpay for targets during more stable economic conditions since CEOs with more power hinder a board's ability to effectively monitor the firm's management. Using a sample of 242 M&A of Standard & Poor's 500 firms from 2005 to 2010, they show that CEO/Chair duality and CEO prestige and expert power negatively moderate the relationship between the recent financial crisis and the offer premium. In other words, this study presents evidence that acquirer CEO power is actually associated with lower premiums during financial crises. The explanations put forward by Fralich and Papadopoulos (2018) for their findings is that powerful acquirer CEOs can mitigate the increased information asymmetry which is amplified during acquisition negotiations in turbulent times. One way for achieving this is by using their dual CEO/Chair role to induce the board to adopt also a risk-averse behaviour and offer lower premiums compared to the cases of boards with a separate board leadership structure. In addition, these CEOs are better positioned to deal with information asymmetry by accessing superior information about targets obtained from their personal networks (prestige) and evaluate target quality by relying on their own expertise.

Turning now to incentive alignment governance mechanisms, Datta et al. (2001) examine how the managerial compensation structure influences acquisition decisions. Among other findings, they report that managers with high EBC pay significantly lower acquisition premiums (35.88%) than those paid by their counterparts with low EBC (44.66%) using a large sample of US acquisitions. In economic terms, this difference in the premiums paid translates into substantial savings ($54.6 million) for acquirers offering high EBC to their managers in a sample with a mean target market capitalisation of $621 million. Hence, this evidence highlights the positive role of EBC in promoting shareholder value in the context of M&A. Further, it adds to the ongoing debate about the efficacy of EBC arrangements towards their intended goal of better aligning managerial incentives with shareholders' interests.

A considerable amount of literature examines the governance role of institutional investors and especially since they have now become the majority equity holders in the US market (Derrien et al., 2013). The premium determination process may be influenced by the institutional ownership in the acquiring firm as these investors are usually involved in a firm's key strategic decisions such as corporate acquisitions, and may limit managers' discretion in merger negotiations who might be prone to pay a high acquisition premium (Kim et al., 2011). Researchers have distinguished between different types of institutional investors. One of the dimensions upon which institutional investors are classified is based on their investment horizons. Short-term institutional investors, who trade frequently and focus on short-term performance have been argued to encourage managerial myopia (Bushee, 2001) and choose to trade frequently rather than monitor the firm's management (Bushee and Goodman, 2007; Stathopoulos and Voulgaris, 2016). Gaspar et al. (2005) argue that the presence of short-term shareholders in the acquirer allows more scope for self-interested managers to overbid and overpay for the target firm as they have fewer incentives to act as informed monitors. Such institutional investors will tend to place greater emphasis on reaping short-term trading profits rather than remain in the firm long enough until all acquisition gains are realised. Following this, the authors find that acquiring firms held by short-term institutional investors, as proxied by investor turnover, indeed pay higher acquisition premiums analysing a sample of 3,814 US M&A deals between 1980 and 1999.

In light of the previous discussion, when it comes to the acquisition premium, we have a basic lack of knowledge with respect to its determinants. There is also weak evidence of the direct effects of the acquiring firm's corporate governance arrangements on the size of the acquisition premium. Assuming that a great deal of corporate acquisitions must be driven by synergy motivations, it would be interesting to examine the role of corporate governance in

moderating the effect of merger motivations based on synergy. As firms employ corporate governance mechanisms in order to monitor the quality of the managerial decision making, and, in doing so, pursue shareholder value maximisation, it seems reasonable to expect that various firm-specific governance arrangements can protect the firm from overestimating the value of anticipated synergies after the M&A deal - either in the form of operational or financial synergies - and thus reduce the overpayment potential in mergers. The arguments presented above provide motivation for the following hypothesis:

H1: Acquirer corporate governance (board structure, CEO pay incentives, institutional investor ownership) moderates the effect of synergies (either operational or financial) on the acquisition premium paid.

4.3 Research Design

4.3.1 Data and Sample Selection

We obtain our initial sample of all US domestic M&A deals from T1B which took place between January 1, 1998, and December 31, 2015. Following conventions in the M&A literature, we impose the following deal restrictions:

i. Both the acquirers and the target firms must be publicly listed firms. Differently from the prior empirical chapter, Chapter 3, private targets are excluded from our M&A sample due to data requirements regarding target accounting information to answer the research question of this chapter.
ii. All exchange offers, leveraged buyouts, repurchases, recapitalisations, spinoffs, minority stake purchases, acquisitions of remaining interest, self-tenders and privatisations are excluded.
iii. The deal status is completed. We refer to the year of the deal announcement as the year of the acquisition.
iv. The acquirer controls less than 50% of the target's shares prior to the transaction and more than 50% after the deal completion, to ensure that transactions included in the sample represent a transfer of control.
v. The deal value is at least $1 million at the announcement date.

These screening criteria yield a sample of 3,818 completed deals over the specified sample period. We then match this sample with Compustat for firm-level accounting data on public acquirers and targets, CRSP for stock market data, ISS (formerly known as RiskMetrics and IRRC before that) for data on the boards of directors, ExecuComp for CEO compensation data and Thomson Financial 13F for institutional ownership data. After this merging procedure, we are left with a sample of 1,419 M&A deals that includes 691 unique acquiring firms with data items available to construct the variables used in our empirical analysis.

Following previous studies, we exclude all transactions in the financials (SIC 6000–6999) and utilities (SIC 4900–4999) sectors and we require that all firms must have complete data on the variables used in our estimations. Our final sample consists of 703 completed M&A deals by 393 acquirers for the period 1998-2015.

4.3.2 Variables

4.3.2.1 Dependent Variable

Our dependent variable is the *four-week premium* reported by Thomson One Banker (field in T1B: PPM4WK) which is defined as the percentage difference between the offer price and the target closing stock price four weeks before the M&A deal announcement date. This premium measure has two main advantages over the target cumulative abnormal returns (Eckbo, 2009; Aktas et al., 2010). First, it is a proxy for the true offer premium as target abnormal returns reflect both the offer price and the likelihood of competition and bid failure at the initial offer date. Second, this premium measure is less likely to be affected by information leakage surrounding the announcement of the pending offer. We restrict this premium measure between zero and two to reduce any possible impact from outliers, as in Officer (2003).

4.3.2.2 Independent Variables

In this study, we adopt two measures for the synergies which may arise in M&A, namely operational and financial synergies. First, *operational synergies* are proxied by the industry relatedness between the acquirer and the target firms. Prior literature has measured industry relatedness by classifying M&A according to the SIC codes of the acquirer and the target firm (e.g., Pennings et al., 1994; Barkema and Schijven, 2008). Such SIC based proxies for industry relatedness are apparently objective, theoretically consistent with the rationale of the SIC code based scheme and can still be informative (Ramanujam and Varadarajan, 1989; Hoberg and Phillips, 2010). For the purposes of this study, we measure operational synergies using a binary variable that is equal to one if the acquirer and the target share the same four-digit SIC industry. Second, *financial synergies* are measured as the difference between the target's and the acquirer's debt ratio as in Cho et al. (2016). An M&A deal may create value resulting from the difference between the two merging firms' levels of financial slack, thus utilising the increased debt capacity of the combined firm and avoiding the transaction costs of securing external funds.

4.3.2.3 Moderating Variables

The moderating variables employed in this study are proxies for board monitoring, CEO pay incentives, and institutional investor monitoring. Firstly, board monitoring is proxied by three variables which have been associated with the monitoring effectiveness of the board (e.g. Linck et al., 2008; Wintoki et al., 2012): *board size*, a refined measure of board independence (*non-co-opted independence*) and *CEO/Chair duality*. *Board size* equals the number of directors on the board. *Non-co-opted independence* is measured as the fraction of directors who are independent and were appointed before the CEO assumed office. Independent directors have no material connection with the firm, are not current or former employees, and they do not have any family or other business relationship with executives or directors of the firm, nor any ties through interlocking directorships (i.e. each serves as a director on the other's board). It has been also argued that one potential reason for the mixed and inconclusive evidence of the impact of board independence on firm performance and other firm outcomes is the fact that many directors are co-opted. Co-opted directors, irrespective of whether they are classified as independent using the conventional definition of board independence mentioned above, are the directors that joined the board after the CEO assumed office and thus are less likely to be truly independent as they are more likely to exhibit their loyalty to the CEO who was engaged in their initial appointment. Therefore, we opt for using non-co-opted independence instead of the conventional measure of board independence which has been shown to be only a crude proxy for the monitoring effectiveness of the board. Specifically, Coles et al. (2014) show that the traditional measure of board independence has little power to explain CEO turnover-performance sensitivity, CEO total annual compensation, CEO pay-performance sensitivity or delta, and firm capital expenditure, whereas non-co-opted independence indeed increases the monitoring effectiveness of the board with regards to influencing the abovementioned CEO features and firm investment decisions. *CEO/Chair duality* is a binary variable that is equal to one if the CEO serves also as the Chairman of the board.

Secondly, we employ CEO vega and delta as proxies for CEO pay incentives. These variables are estimated following the approximation method developed by Core and Guay (2002) which has been used in a number of recent studies (e.g., Knopf et al., 2002; Coles et al., 2006; Brockman et al., 2010; Hagendorff and Vallascas, 2011) and uses the Black and Scholes (1973) model, allowing for dividends (Merton, 1973). *CEO vega*, otherwise termed as pay-risk sensitivity, is the dollar change in the portfolio of options of the CEO for a 1% change in the annual standard deviation of stock returns at the fiscal year-end. In line with Guay (1999), the vega of the equity portfolio is assumed to be zero, so the vega of the options

portfolio is only used. *CEO delta* (or the pay-performance sensitivity) is the dollar change in the portfolio of equity and options holdings of the CEO for a 1% change in the stock price at the fiscal year-end. Delta is calculated as the sum of the delta stock grants and option grants. To take into account the changes in the pre- and post-2006 reporting regime on executive compensation data, we follow Coles et al. (2006). Essentially, under the new reporting standards, all EBC arrangements should be estimated using their fair value at the grant date. Further, the CEO vega and delta are scaled by cash compensation (Graham and Rogers, 2002; Hagendorff and Vallascas, 2011; King et al., 2016) since pay incentives are correlated with firm size and are also highly correlated between them. Scaling the incentives measures also allows us to include both vega and delta in a single model and consider differences in their magnitude. In addition to CEO pay incentives, we include *CEO cash pay*, the fixed component in the compensation package which is calculated as the natural log transformation of the total CEO pay in the form of cash compensation (salary and bonus).

Finally, institutional ownership entails the third monitoring governance mechanism employed. Given the heterogeneous preferences and objectives of institutional investors, we employ the proportion of *dedicated institutional ownership* as proposed by Bushee (1998; 2001). Institutional investors are classified into three categories – dedicated, transient and, quasi-indexer – based on their investment horizons. Dedicated institutional investors are expected to actively engage with the investee firms and undertake a more active monitoring role to safeguard their long-term investments. By virtue of their long-term shareholdings, they devote more resources in collecting superior firm information and are more willing to influence firm decisions so as to protect shareholder value and realise monitoring benefits that typically emerge in the long term (Chen et al., 2007). On the contrary, transient institutions are not expected to intervene in corporate affairs and monitor the management of the firm as they choose to trade frequently with a focus on short-term performance. Quasi-indexers, despite their long-term portfolio holdings, may also avoid monitoring as their diversified holdings may prevent them from gathering and processing corporate information.

4.3.2.4 Control Variables

Following prior research on the determinants of the acquisition premium, we include a range of control variables in our analysis. In particular, we include several acquirer, target and deal characteristics that have been found in prior studies to have an impact on acquisition premiums.

With regard to the acquirer characteristics, we control for *CEO overconfidence* or hubris as there is evidence that overconfident CEOs overestimate their ability to create value via an acquisition and consequently tend to pay higher acquisition premiums (Hayward and

Hambrick, 1997). We also include *firm size* as large acquirers pay higher premiums (Moeller et al., 2004). In addition, *book leverage* is associated with growth opportunities and thereby may affect bidding behaviour. Martin (1996) provides evidence that the higher the acquirer's growth opportunities, the more likely the acquirer is to use stock financing in an acquisition. Moreover, acquirers with higher *Tobin's Q* ratios are more likely to pay significantly higher premiums (Officer, 2003), while acquirers with excess *cash holdings* have been argued to systematically overpay for their targets (Harford, 1999). Further, we use a control for the acquirer's prior performance measured by *ROA* at the fiscal year-end prior to the deal announcement as in Wang and Xie (2009). Finally, we control for the acquirer's prior *M&A experience* during the three years preceding the year of the deal announcement (Reuer et al., 2012) and whether acquiring firms make multiple acquisitions using the indicator variable *Serial acquirer*. Managers of frequent acquirers may develop overconfidence via acquisition experience (Billett and Qian, 2008) and thus overpay to acquire a target firm (Roll, 1986).

In terms of the target characteristics, we add *firm size* since there are various reasons why acquirers would pay lower instead of higher premiums for large targets. For example, since there are fewer bidders to compete for large targets (Gorton et al., 2009), then the "winner's curse" problem is alleviated and thus lower acquisition premiums are paid (Alexandridis et al., 2010). Alexandridis et al. (2013) provide evidence that there is a negative relationship between the offer premium and target size. Furthermore, we include the target's *Tobin's Q* as Bargeron et al. (2008) show that targets with higher Tobin's Q receive lower premiums. In addition, we employ the *cash holdings* of the target firm. Billett and Ryngaert (1997) argue that firms with abundant cash reserves are expected to receive higher premiums as there should be greater potential for these firms to be managed in a more efficient way (Jensen, 1986). Relatedly, a higher proportion of liquid assets may be a sub-optimal policy from a tax viewpoint and hence correcting for this would result in rather higher premiums. We also control for the target's previous performance measured by the firm's *ROA* (Wang and Xie, 2009; Guo et al., 2019).

The third set of control variables captures certain deal characteristics. M&A deals which are cash-financed involve higher premiums compared to those deals with stock as the method of payment, so as to compensate target shareholder for the immediate taxable cash transaction (Huang and Walkling, 1987; Savor and Lu, 2009). Therefore, we define *pure cash deal* as an indicator variable to control for this effect that is equal to one if the deal was paid entirely by cash, and zero otherwise. Next, we control for the *toehold* (pre-bid fraction of ownership in the target) which may have a potentially negative effect on the acquisition premium. A toehold reduces the ownership stake that must be acquired at the full acquisition

premium and raises the valuation of the target by the bidder. There is evidence that toeholds are linked to lower offer premiums in winning bids considering the fact that they can help deter competitive bids for the same target (e.g., Betton and Eckbo, 2000). Additionally, we use a control to account for *multiple bidders* in a deal as they tend to increase both the competition and the bargaining power of the target driving the premiums upwards (Schwert, 2000). Similarly, deals that have been characterised as hostile have been associated with higher premiums resulting from the target firm's management resistance to the transaction (Schwert, 2000). *Hostile deal* is an indicator variable that equals one if the deal was reported as "hostile" or "unsolicited" by T1B, and zero otherwise. Premiums have also been found to be higher in tender offers than in mergers (Kohers et al., 2007). Thus, as a final deal characteristic we include a *tender offer* dummy variable that takes the value of one if a tender offer was made to the target shareholders, and zero otherwise.

Following prior studies, the explanatory variables are one-year lagged. Also, to limit the influence of outliers, all continuous variables are winsorised at the 1st and 99th percentiles.

4.3.3 Descriptive Statistics

The sample consists of 703 M&A deals. Table 4-1 illustrates the M&A sample distribution by announcement year and industry of the acquirers. We report the deal median values per year, together with the mean values, in order to avoid the effects of outliers at both ends. In general, we observe a spike of the M&A activity in the late 1990s, coinciding with the information technology bubble. Then it drops off significantly before reaching a new peak within 2005-2007, which coincides with the peak of the sixth merger wave (Alexandridis et al., 2012) and directly precedes the global economic downturn following the 2008 financial crisis. Starting in 2014, both the number and the total value of M&A deals significantly increase as the seventh merger wave emerged (Mavis et al., 2017). It is also noteworthy that a substantial fraction of deals were financed entirely by stock during the peak of the fifth merger wave (1998-1999), as opposed to the predominance of all cash-financed deals during the sixth merger wave (2004-2007) in which cash-paying acquirers exhibited excess cash reserves (Alexandridis et al., 2012).

The industry classification is based on the Fama-French 12-industry categories of the acquirers (utilities and financial firms are excluded from the sample). We observe that 'Business Equipment' companies are the most acquisitive, representing 33% of the deals of our entire sample, followed by the 'Healthcare and Medical Equipment' sector which accounts for approximately 18% of all deals in our sample.

*** Insert Table 4-1 here ***

Table 4-2 provides descriptive statistics of the variables used in our main analysis. Detailed definitions of all variables are provided in Appendix B. Panel A shows that the mean four-week premium is 47% which is comparable to average premiums reported in prior studies (e.g., Reuer et al., 2012; Alexandridis et al., 2013). Panel B displays the statistics of the independent variables. First, the mean of the operational synergies proxy is 0.39, signifying that 39% of the acquisitions in the sample involve acquirers and targets that operate in the same four-digit SIC industry. Second, the mean of the financial synergies variable is around -0.01 which is comparable to the figure reported in Cho et al. (2016).

Panel C reports the summary statistics of the acquirer characteristics and Panel D shows the statistics for the target-related variables. With respect to the acquirer governance variables, their values are largely in line with those reported in previous corporate governance studies (e.g., Bushee, 2001; Hagendorff and Vallascas, 2011; Callen and Fang, 2013; Coles et al., 2014; King et al., 2016; Aktas et al., 2019). Further, the average acquirer (target) has total assets of $8.7 billion ($5.8 billion), book leverage of 20.7%, a Tobin's Q ratio of 2.47 (2.17), cash holdings of 14.5% (25%), and a ROA of 6.6% (-4.3%). On average, the acquirers in our sample completed 1.4 acquisitions during the prior three-year period and 60% of the acquirers are serial acquirers.

The descriptive statistics of the deal characteristics are shown in Panel E and are generally comparable with those reported in previous empirical studies (e.g., Lim et al., 2016; de Bodt et al., 2018; Guo et al., 2019). On average, 47% of the M&A in our sample are purely cash-financed, 5.5% involve multiple bidders, 2% are hostile, 30% are in the form of tender offers and the mean toehold is 0.7%.

*** Insert Table 4-2 here ***

Table 4-3 presents the correlation matrix along with collinearity diagnostics for the variables employed in the main specifications. With respect to the main variables of interest, financial synergies are positively correlated with the four-week premium, while operational synergies are insignificantly correlated with our dependent variable. Further, it is evident that there are not any serious concerns for multicollinearity as all regressors present a Variance Inflation Factor (VIF) value lower than 5.

*** Insert Table 4-3 here ***

4.3.4 Methodology

This section presents the methodology to test our key hypothesis. We investigate the moderating role of certain acquirer's governance mechanisms in the relationship between M&A synergistic motives and the size of the acquisition premium paid. We estimate the following baseline model, before including the two-way interaction terms:

$$Premium_i = a + \beta OS_i + \gamma FS_i + \delta Controls_i + Year_t + Industry_i + \varepsilon_i \quad (4.1)$$

where i and t indexes the M&A deal and year, respectively. The dependent variable is the four-week acquisition premium. The main explanatory variables are defined as above, where OS stands for operational synergies and FS stands for financial synergies. $Controls$ is a vector of all the moderating and control variables as described in Section 4.3.2. $Year_t$ and $Industry_i$ represent year and industry fixed effects, respectively, and ε_i is the error term.

To investigate H1 we perform an interaction analysis. We explore all possible two-way interaction terms between the main explanatory variables (i.e. operational and financial synergies) and each governance variable using the *hierarchical moderated regression analysis* (e.g., Jaccard et al., 1990; Cortina, 1993). According to this approach, we enter the variables in an incremental stepwise manner, by adding each two-way interaction term one at a time, while controlling for the effects of the other covariates on the acquisition premium. We also mean-centered all continuous predictor variables to facilitate the interpretation of the interaction effects (Aiken et al., 1991; Edwards, 2008).

4.4 Empirical Results

4.4.1 Main Results

Having described the data, our sample and the methodology adopted in this study, we now present the regression results of the empirical analysis to test our hypotheses. As M&A occur in waves and are industry-clustered (e.g., Mitchell and Mulherin, 1996; Harford, 2005) we include year and industry[37] dummies (not shown for reasons of brevity) in all model specifications. Robust standard errors are calculated and clustered at the firm level throughout the empirical analysis (Petersen, 2009). The four-week premium is the dependent variable in all models.

[37] Throughout the empirical analysis we use the Fama-French 17-industry classification.

Table 4-4 presents the OLS regression results for testing H1. Model 1 shows the baseline model with only the independent, moderating and control variables (main effects). Models 2-8 present the results of all the two-way interaction terms between the operational synergies proxy and each governance variable examined. In each model, we controlled for the effects of the other untested governance variables on the acquisition premium.

Turning to the control variables (Model 1 of Tables 4-4 and 4-5), we find several results that are noteworthy. Also, the estimated coefficients on these variables are consistent with the existing literature on the determinants of acquisition premiums (Martin, 1996; Billett and Ryngaert, 1997; Schwert, 2000; Moeller et al., 2004; Kohers et al., 2007; Bargeron et al., 2008; Alexandridis et al., 2013). In particular, we observe that acquisition premiums are significantly higher when acquirers are larger in size, and have higher leverage, when target firms have greater cash holdings, in transactions with multiple bidders and tender offers. Conversely, we find that acquisition premiums are significantly lower when targets are larger and when targets have higher Tobin's Q ratios.

In Models 4 and 7 we find significant pair-wise interaction terms providing support for H1. Figures 4-1 and 4-2 display graphically these significant interactions. Specifically, in Model 4, we find a positive and significant interaction between operational synergies (OS) and CEO/Chair duality ($\Delta R^2 = 0.0059$, $p < 0.05$). The dual CEO (i.e. when she also holds the board chair role) pays higher acquisition premiums in related M&A deals, as shown in Figure 4-1. In other words, CEO duality intensifies the positive effect of operational synergies proxied by industry relatedness on the acquisition premium. In contrast, the absence of CEO duality, which has been associated with a better ability of the board to monitor management, results in lower premiums in related M&A deals.

In Model 7, there is a positive and significant interaction between operational synergies (OS) and CEO cash pay ($\Delta R^2 = 0.0054$, $p < 0.05$). As shown in Figure 4-2, the results suggest that the higher the CEO cash pay, the CEO is less willing to pay more in unrelated deals resulting in lower acquisition premiums being paid for such deals. If, on the other hand, CEO cash pay is low, the positive effect of CEO cash pay on the acquisition premium becomes stronger in unrelated deals, driving premiums upward.

*** Insert Table 4-4 here ***

Subsequently, we explore the interactive effects of the acquirer's governance arrangements on the relationship between financial synergies and the size of the acquisition premium. Table 4-5 reports the OLS regression results for this analysis.

Model 1 includes the independent, moderating and control variables as the main effects. Models 2-8 present the results of all the pair-wise interaction terms between the financial synergies proxy and each governance variable tested. In Model 8, we find a negative and significant interaction between financial synergies and dedicated institutional ownership ($\Delta R^2 = 0.0158$, $p < 0.05$). A simple slope test suggests that the relationship between financial synergies and acquisition premium is significant when dedicated institutional ownership is both low (simple slope = 0.544, $p < 0.01$) and high (simple slope = -0.498, $p < 0.10$). To plot this interaction effect we used the maximum (high) and minimum (low) values of the two interacted variables while holding all other covariates at their mean values. Figure 4-3 portrays this result. The presence of a high level of dedicated institutional investors reduces the acquisition premium paid for those M&A deals with high financial synergies. This finding supports H1.

Finally, we summarise the economic significance of our main results. First, using the estimates in Model 4 of Table 4-4, dual CEOs pay on average a premium of 13.29 percentage points more for related M&A deals than their non-dual counterparts, ceteris paribus. With a mean premium in the sample of 46.9%, this translates to a 28.3% further increase in the premium paid on average (13.29/46.9) for related acquisitions. In addition, with a mean deal value in the sample of $3170 million, this corresponds to an average increase in the deal value by $421 million for such deals. Second, using the estimated coefficients in Model 7 of Table 4, for a firm with average CEO cash pay of roughly $1.5 million [exp(7.334) = 1531.496][38], an increase in CEO cash pay by 1 SD which corresponds to approximately $3 million [exp(8.069) = 3193.906], would increase the premium paid by a further 6.37% (69.88% - 63.51%)[39] for related M&A, ceteris paribus. With an average sample premium of 46.9%, this suggests a 13.6% further increase in the premium paid on average (6.37/46.9) or an extra amount of $202 million for related acquisitions, using the mean deal value. Third, using the estimates in Model 8 of Table 4-5, for two merging parties with high financial synergies (e.g., using the 75th percentile: 0.111) and an average dedicated institutional ownership of 6.6%, an increase in the ownership by dedicated institutional investors by 7.8% (1 SD) further reduces the acquisition premium paid by 3% (5%-2%)[40]. This suggests a 6.4% further decrease in the

[38] CEO cash pay is measured as the natural logarithm of the total CEO pay in the form of cash compensation (salary and bonus in thousands of dollars).

[39] In Model 7 of Table 4-4, the coefficient on OS × CEO cash pay shows that for a firm with an average CEO cash pay, the acquisition premium increases by 63.51% for related M&A [1 × 7.334 × 0.0866]. Increasing CEO cash pay by 1 SD (i.e. to 8.069), is associated with a 69.88% higher premium paid for related M&A [1 × 8.069 × 0.0866]. The net effect is therefore a further increase in the acquisition premium paid of 6.37%.

[40] In Model 8 of Table 4-5, the coefficient on FS × Ded IO shows that for a firm with high FS (e.g., 75th Pctl.: 0.111) and average Ded IO, the acquisition premium is reduced by 2% [0.111 × 0.066 × (-3.1201)]. Increasing

acquisition premium using the mean sample premium (3/46.9) or average savings of $95 million using the average deal value.

*** Insert Table 4-5 here ***

*** Insert Figures 4-1 to 4-3 here ***

4.4.2 Robustness Tests

This section presents variations of the main results to confirm the robustness of our empirical findings. The above findings remained consistent using alternative measures of the acquisition premium as shown in Table 4-6. The analysis was re-estimated using the *one-week premium* (Models 1-4) and then the *offer premium* (Models 5-8) as the dependent variable. We define the *one-week premium* as the percentage difference between the offer price and the target closing stock price one week before the M&A deal announcement date. Following Baker et al. (2012) we calculate the *offer premium* as the log percentage difference between the offer price and the target's share price four weeks before the deal announcement. Models 1 and 5 include the main effects of the explanatory variables of interest (i.e. operational and financial synergies) and Models 2-4 and 6-8 show the significant pair-wise interaction terms of the interaction analysis.

In the premium analysis using the offer premium as the dependent variable (Models 5-8), we also introduce the target 52-week high stock price[41] as a control variable. According to Baker et al. (2012), the target 52-week high stock price plays a salient role in the valuation of the target firm and in merger negotiations about the offer premium. Specifically, they propose that offer premiums are affected by the target peak prices over various horizons. The target's 52-week high reference point is often reported by the financial media as a means of a negotiating anchor in the bidding process of a merger transaction. The authors document a strong positive relationship between the target's 52-week high stock price and the offer premium showing that this reference point is indeed important in shaping executives' perceptions of the target's valuation and thus influencing the price that a bidding firm offers for a target. We also verify a highly significant positive relation between the target

Ded IO by 1 SD is associated with a 5% lower acquisition premium [0.111 × 0.144 × (-3.1201)]. The net effect is therefore a further reduction in the acquisition premium paid of 3%.

[41] We measure this variable as the log percentage difference of the target's 52-week high stock price over the target's stock price four weeks prior to the M&A deal announcement as in Baker et al. (2012).

52-week high and the offer premium as presented in the offer premium regressions (Models 5-8), in line with recent empirical studies (e.g., Alexandridis et al., 2013; Guo et al., 2019).

In sum, the results of all of the models of Table 4-6 led to identical conclusions regarding our hypotheses with slightly different coefficients and significance levels of the main and interaction effects presented in the previous sub-section (4.4.1).

*** Insert Table 4-6 here ***

4.4.3 Additional Analysis

As an additional test, we repeat our main analysis excluding the years of the recent financial crisis (2008-2010). Fralich and Papadopoulos (2018) provide evidence that during periods of economic downturn bidders tend to pay higher premiums. They argue that one possible explanation for the overall observed increase in average premiums during volatile economic conditions is that in the presence of increased information asymmetry, bidders have less information about the quality, synergy potential, and therefore target true value compared to a better-informed target management (Coff, 1999). During the recent financial crisis bidders' ability to accurately assess the value of naturally devalued targets was compromised by the heightened information uncertainty due to increased difficulties in disentangling the market from idiosyncratic effects. This resulted in bidders facing a risk of overestimating the potential synergies to be realised from an M&A deal and hence overbid for distressed targets. Taking this reasoning a step further, we conjecture that during the recent financial crisis the efficacy of corporate governance mechanisms may have been confined as acquirers were subject to increased asymmetric information issues which in turn may have given rise to more severe agency problems manifesting in the M&A context. To investigate this possibility we exclude the recent financial crisis years (2008-2010) and rerun all the regression models of the main analysis as shown in Tables 7 and 8. The results in Table 4-8 confirm our prediction: besides confirming a negative and significant interaction between financial synergies and dedicated institutional ownership (also found in Table 4-5 of the main analysis), we also find three more negative and significant interaction terms between financial synergies (FS) and three other governance mechanisms (i.e. FS × Board size, FS × CEO vega, and FS × CEO cash pay). Taken together, these results lend strong support to the key study hypothesis that acquirer corporate governance moderates the effect of synergies (in this case financial synergies) on the acquisition premium paid. The results in Table 4-7 confirm the findings presented in Table 4-4.

*** Insert Table 4-7 here ***

*** Insert Table 4-8 here ***

4.5 Discussion and Conclusion

This chapter investigates how synergistic motives can influence acquisition premium decisions and how the acquirer's corporate governance arrangements can temper the influence of such M&A motives on the acquisition premium paid. In particular, we examine the direct effects of two key types of synergies, namely operational and financial synergies, on the merger premium as well as how certain governance mechanisms of the acquiring firm condition the above relationships. Overall, our analysis suggests that financial synergies are a key determinant of the size of the acquisition premium paid, consistent with our expectations and earlier empirical studies (e.g., Slusky and Caves, 1991). The results also provide strong evidence concerning the interplay of synergies and governance mechanisms towards determining the acquisition premium. Specifically, we detect three significant interactions, two between operational synergies and two governance variables (CEO/Chair duality, CEO cash pay) and one interaction between financial synergies and dedicated institutional ownership. These are now discussed in turn.

First, there is a significant and positive interaction between operational synergies, proxied by the industry relatedness of the acquirer and the target, and CEO/Chair duality. In this case, we observe that when the CEOs also hold the board chair role then they tend to overpay for related M&A deals. As mentioned in Section 4.2, when the acquirer and the target operate in the same or related industry, it has been argued to facilitate the realisation of operational synergies after the deal, including economies of scale and scope (Harrison et al., 1991; Haspeslagh and Jemison, 1991; Hitt et al., 2001). From an agency theory perspective, CEO duality enables the CEO to gain greater influence over board decision making and become entrenched, thus weakening the board's effectiveness to monitor and discipline them (Finkelstein and D'aveni, 1994). A possible explanation for the aforementioned finding is that powerful CEOs, by holding the titles of both the CEO and chairperson of the board, may overstate the importance of related M&A deals. As these deals may have more scope for generating value via exploiting operational synergies, they may provide dual CEOs with the opportunity to fulfil their aspirations for empire building (Jensen, 1986) and seek personal benefits by increasing firm size so as to receive higher compensation (Grinstein and Hribar, 2004; Harford and Li, 2007) or improve their prestige (Avery et al., 1998). This, in turn, would result in higher premiums being paid by dual CEOs

of the acquiring firms for targets operating in the same or related industry as they might expect to realise self-serving gains through this type of M&A deals. On the other hand, CEOs may discount the value of unrelated M&A deals when they are the sole decision-maker (CEO/Chair duality) and pay lower premiums, since financial and not operational synergies are the main driver of these deals, in which case, acquirers are more likely to allow the target to operate autonomously (Lubatkin and O'Neill, 1987). Thus, dual CEOs may not perceive unrelated deals as valuable to them as these deals may not allow much scope for maximising their personal benefits via the ways described above. Interestingly, we further observe that the improvement of board monitoring in the presence of a chairperson, results in acquirers paying more for unrelated M&A deals as firms can reduce their operating risk by merging with firms with imperfectly correlated or even countercyclical earning streams, resulting in greater debt capacity and interest tax shields (Lewellen, 1971; Stein, 2003).

Second, we find a positive and significant interaction between operational synergies and CEO cash pay. This implies that a higher level of CEO cash-based compensation is, in fact, more effective in curbing the propensity of the acquirer to pay a higher premium for a target in an unrelated rather than in a related industry. This result may be explained by the fact that as long as the CEO compensation is more cash-based than equity-based which is closely linked to firm performance, then the CEO is more likely to view unrelated M&A deals not as important to her compared to related ones, as firms in unrelated industries share little or no common resources (Montgomery, 1982), a transfer of pre-existing competencies among the merging parties is not feasible and hence these M&A deals entail higher risk and uncertainty (Pennings et al., 1994).

Third, we show a negative and significant interaction between financial synergies and dedicated institutional ownership. In general, when financial synergies - which may take the form of tax benefits of interest deduction - are detected in a prospective M&A transaction, then the acquirer is more prone to pay a higher premium for such deals. However, the presence of a high level of dedicated institutional investors in the acquiring firms actually curbs their propensity to overpay. This unique finding reinforces the view that institutional investors with long-term investment horizons can be effective external monitors and influence firm decisions so as to boost firm value in the long term and joins an emerging stream of empirical research that explores the impact of shareholders investment horizons on firm investment decisions and outcomes (e.g., Gaspar et al., 2005; Chen et al., 2007; Attig et al., 2012; Derrien et al., 2013). Further, this interactive relationship reveals another interesting finding. In the absence of financial synergies (low FS), the presence of a large fraction of dedicated institutional investors is not as effective in reducing overpayment in an

M&A deal. In this case, it can be conjectured that there have to be other motives other than immediate financial gains, such as increasing leverage and utilising additional tax benefits that would induce the acquirer to overbid and overpay for such targets.

Our study adds to both the M&A and corporate governance literatures. An important contribution of this study lies in introducing the acquirer's corporate governance structure in acquisition premium decisions. To the best of our knowledge, the present study is the first that attempts to empirically test the moderating effects of certain governance mechanisms of the acquirer on the relationship between M&A motives based on synergies and the size of the acquisition premium paid. Most notably, our findings shed light on a heavily under-investigated concept within the M&A literature, namely the acquisition premium by uncovering a new determinant in the form of interactive effects of governance arrangements with synergy-driven merger motives that have an influence on the size of the acquisition premium paid. As acquirers exhibit a natural inclination to pay a premium for expected synergies to be materialised pursuant to a merger, the results of this study lend support to our theoretical predictions that corporate governance arrangements in the acquirer can temper the influence of operational and financial synergies on the acquisition premium paid.

Finally, our study has important practical implications for managers seeking to implement M&A strategies. For example, when firms aim to diversify in unrelated industries then consolidating the positions of CEO and board Chair in one person and switching their compensation into a higher cash component, then these governance structures will protect the acquirer from overpaying for this type of corporate acquisitions. But, for the case of related acquisitions the opposite governance prescriptions should be preferred in order to avoid overpayment, which is the separate leadership structure and maintaining a lower element of cash pay in the CEO compensation package.

Thus far, this chapter has focussed on the cost of a corporate acquisition in terms of the premium paid by the acquirer to secure the target firm and the moderating role of corporate governance in premium decisions. The final empirical chapter of this thesis investigates the value effects of M&A activity from the acquirer's perspective and accordingly examines the impact of acquirers' governance arrangements on shareholder wealth in the post-acquisition period, adopting the *configurational* approach in corporate governance as employed in Chapter 3.

Tables and Figures – Chapter 4

Table 4-1 M&A Sample distribution by announcement year and acquirer industry

The table illustrates our complete sample of 703 US M&A deals between 1998 and 2015 by year (Panel A) and industry of the acquiring firm (Panel B). Panel A shows the descriptive statistics (5th percentile, median, mean and 95th percentile) of the deals' values per year. Panel B reports the same statistics as Panel A, but across the Fama-French 12-industry categories (utilities and financial firms are excluded from the sample).

Panel A: M&A sample distribution by announcement year

							Payment method		
Year	Number of Deals	Total Deals Value ($mil)	5th Pctl. Value ($mil)	Median Value ($mil)	Mean Value ($mil)	95th Pctl. Value ($mil)	Pure cash	Pure stock	Mixed[1]
1998	67	439,343.40	36.05	789.92	6,557.36	53,592.49	16	24	27
1999	82	278,355.20	64.67	520.56	3,394.58	10,935.53	26	33	23
2000	57	276,431.50	21.03	450.98	4,849.68	14,391.72	15	15	27
2001	58	99,720.08	5.03	389.06	1,719.31	11,070.28	20	18	20
2002	29	75,939.71	12.20	247.88	2,618.61	6,677.81	13	7	9
2003	30	29,080.18	24.23	454.71	969.34	5,442.13	13	7	10
2004	40	33,068.77	39.84	474.12	826.72	2,581.55	23	6	11
2005	49	172,905.90	99.25	1,119.98	3,528.69	18,718.51	24	4	21
2006	38	110,568.10	20.89	1,246.93	2,909.69	25,833.71	25	3	10
2007	49	70,067.69	55.55	687.72	1,429.95	6,610.62	36	1	12
2008	27	35,738.26	17.19	276.92	1,323.64	6,497.47	17	0	10
2009	30	159,627.80	154.46	1,625.10	5,320.93	38,615.31	15	3	12
2010	36	58,727.30	89.44	459.44	1,631.31	7,453.19	26	1	9
2011	21	73,593.43	241.49	777.67	3,504.45	16,182.72	11	2	8
2012	21	28,393.42	72.64	649.94	1,352.07	3,918.85	15	0	6
2013	17	50,452.86	262.67	1,233.33	2,967.82	15,501.39	9	1	7
2014	21	88,017.29	191.24	2,448.38	4,191.30	12,000.10	13	2	6
2015	31	148,405.90	129.25	2,455.56	4,787.29	16,124.13	16	3	12
Total	703	2,228,436.79					333	130	240

[1]Mixed category includes cash and stock less than 100% as well as 'other' and 'unknown' payment types and all of their combinations.

Panel B: M&A sample distribution by acquirer industry

Fama-French (12) Industry Code & Description	No. of deals	Percent	5th Pctl. Value ($mil)	Median Value ($mil)	95th Pctl. Value ($mil)
1.Consumer NonDurables	42	5.97%	37.88	554.35	14,391.72
2.Consumer Durables	7	1%	2.94	789.92	3,252.40
3.Manufacturing	96	13.66%	40.19	507.62	7,472.21
4.Energy, Oil, Gas and Coal	35	4.98%	80.48	2,672.30	35,395.01
5.Chemicals and Allied Products	21	2.99%	85.04	1,549.79	6,327.52
6.Business Equipment	232	33%	23.54	402.04	6,677.81
7.Telephone and Television Transmission	32	4.55%	241.49	4,016.10	62,592.54
9.Wholesale and Retail	61	8.68%	70.77	806.99	14,319.71
10.Healthcare and Medical Equipment	126	17.92%	21.57	744.53	16,900.01
12.Other	51	7.25%	52.70	886.59	7,857.31
Total	703	100.00%			

Table 4-2 Sample descriptive statistics

The table presents the descriptive statistics for our complete sample of 703 US M&A deals between 1998 and 2015. Panel A reports the statistics for the dependent variable, the *four-week premium*. Panel B reports the statistics of the independent variables employed in the empirical analysis. Panel C reports the statistics for the acquirer characteristics. Panel D reports the statistics for the target characteristics. Panel E reports the statistics for the deal-related variables. Variable definitions are provided in Appendix B.

Variables	Obs.	Mean	Std. Dev.	25th Pctl.	Median	75th Pctl.
Panel A: Dependent variable						
Four-week premium	703	0.469	0.385	0.225	0.378	0.592
Panel B: Independent variables						
Operational synergies	703	0.388	0.488	0.000	0.000	1.000
Financial synergies	703	-0.007	0.216	-0.147	-0.025	0.111
Panel C: Acquirer characteristics						
Board size	703	9.899	2.691	8.000	10.000	12.000
Non-co-opted independence	703	0.367	0.253	0.143	0.357	0.583
CEO/Chair duality	703	0.667	0.472	0.000	1.000	1.000
CEO vega (scaled)	703	0.165	0.161	0.053	0.120	0.225
CEO delta (scaled)	703	0.669	1.183	0.180	0.332	0.697
CEO cash pay	703	7.334	0.735	6.861	7.225	7.803
Dedicated institutional ownership	703	0.066	0.078	0.000	0.042	0.101
CEO overconfidence	703	0.226	0.419	0.000	0.000	0.000
Firm size ($ billion)	703	8.651	1.611	7.472	8.594	9.829
Book leverage	703	0.207	0.146	0.106	0.194	0.289
Tobin's Q	703	2.470	1.580	1.473	1.995	2.743
Cash holdings	703	0.145	0.151	0.030	0.088	0.211
ROA	703	0.066	0.073	0.035	0.070	0.106
M&A experience	703	1.371	1.786	0.000	1.000	2.000
Serial acquirer	703	0.597	0.491	0.000	1.000	1.000
Panel D: Target characteristics						
Firm size ($ billion)	703	5.781	1.752	4.445	5.724	6.987
Tobin's Q	703	2.169	1.430	1.273	1.715	2.471
Cash holdings	703	0.250	0.248	0.038	0.160	0.414
ROA	703	-0.043	0.233	-0.056	0.030	0.072
Panel E: Deal characteristics						
Pure cash deal	703	0.474	0.500	0.000	0.000	1.000
Toehold	703	0.724	4.480	0.000	0.000	0.000
Multiple bidders	703	0.055	0.229	0.000	0.000	0.000
Hostile deal	703	0.017	0.130	0.000	0.000	0.000
Tender offer	703	0.302	0.459	0.000	0.000	1.000

Table 4-3 Pearson correlation matrix and collinearity diagnostics

The table presents the Pearson correlation coefficients for all the variables used in the main regressions. The bold figures indicate significance at the 5% level or better. Variance inflation factors (VIFs) are also reported as tests to detect the presence of multicollinearity among the independent and control variables.

#	Variable	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Four-week premium		1												
2	Operational synergies	1.17	-0.07	1											
3	Financial synergies	1.58	**0.08**	0.03	1										
4	Board size	1.84	**0.08**	**-0.10**	0.04	1									
5	Non-co-opted independence	1.15	0.02	-0.04	-0.03	**0.15**	1								
6	CEO/Chair duality	1.18	0.02	**-0.12**	0.02	**0.24**	0.00	1							
7	CEO vega (scaled)	1.44	0.03	0.01	-0.06	**0.13**	0.00	0.05	1						
8	CEO delta (scaled)	1.39	0.02	0.06	0.05	-0.07	**-0.20**	0.06	**0.28**	1					
9	CEO cash pay	2.34	-0.05	**-0.20**	0.00	**0.44**	0.06	**0.27**	-0.06	**-0.10**	1				
10	Dedicated institutional ownership	1.11	-0.07	0.07	-0.03	-0.04	**-0.08**	**0.10**	**-0.13**	0.00	-0.02	1			
11	CEO overconfidence	1.07	0.01	-0.03	-0.02	**0.09**	-0.03	0.04	-0.06	0.06	**0.13**	0.07	1		
12	Acquirer size	3.49	0.03	**-0.15**	0.02	**0.61**	**0.17**	**0.27**	**0.27**	0.00	**0.65**	**-0.16**	0.06	1	
13	Acquirer book leverage	1.74	-0.02	0.02	**-0.34**	**0.21**	-0.01	0.06	-0.06	**-0.13**	0.07	**0.10**	-0.01	**0.15**	1
14	Acquirer Tobin's Q	1.94	0.05	0.00	0.00	0.01	-0.05	0.00	0.05	**0.35**	**0.09**	0.00	**0.10**	-0.06	**-0.22**
15	Acquirer cash holdings	1.79	0.03	**0.15**	-0.05	**-0.33**	-0.04	**-0.18**	**0.12**	**0.18**	**-0.25**	-0.05	-0.05	**-0.27**	**-0.40**
16	Acquirer ROA	1.57	0.02	-0.06	**0.08**	**0.13**	0.07	**0.09**	0.07	0.04	**0.25**	**-0.12**	0.04	**0.17**	**-0.19**
17	M&A experience	1.91	-0.01	**-0.13**	**-0.11**	0.06	-0.07	**0.08**	**0.13**	**0.12**	**0.27**	0.00	0.03	**0.24**	-0.05
18	Serial acquirer	1.78	0.00	**-0.14**	-0.06	**0.13**	**-0.11**	**0.08**	**0.12**	**0.13**	**0.23**	0.01	**0.08**	**0.23**	-0.04
19	Target size	2.06	**-0.17**	**0.16**	**0.21**	**0.22**	**0.13**	0.06	0.03	-0.02	**0.20**	-0.01	0.01	**0.36**	**0.20**
20	Target Tobin's Q	1.49	-0.02	0.01	-0.04	0.06	-0.01	0.05	**0.15**	**0.15**	**0.08**	-0.02	-0.02	**0.10**	**-0.12**
21	Target cash holdings	2.25	**0.10**	0.01	**-0.25**	-0.07	-0.03	**-0.08**	**0.26**	**0.15**	0.02	**-0.07**	-0.04	0.03	**-0.27**
22	Target ROA	1.45	**-0.15**	0.00	-0.04	0.00	0.05	0.04	**-0.13**	-0.03	0.07	0.01	0.07	0.03	0.05
23	Pure cash deal	1.55	**0.10**	**-0.15**	**-0.22**	0.01	0.05	-0.01	**0.19**	0.04	0.04	**-0.12**	0.03	**0.12**	**-0.14**
24	Toehold	1.07	0.00	-0.04	-0.05	**0.10**	-0.02	-0.03	**0.09**	0.00	0.04	-0.04	-0.04	0.05	0.06
25	Multiple bidders	1.05	**0.08**	**0.09**	-0.01	0.01	-0.03	-0.04	-0.01	-0.03	0.01	0.00	0.05	0.00	0.01
26	Hostile deal	1.08	0.01	0.05	0.06	0.03	-0.05	0.00	0.02	-0.02	0.04	-0.05	-0.02	-0.01	0.00
27	Tender offer	1.19	**0.21**	-0.07	-0.01	**0.10**	-0.06	-0.04	0.07	0.06	0.00	-0.06	0.02	0.04	**-0.10**

#	Variable	14	15	16	17	18	19	20	21	22	23	24	25	26	27
14	Acquirer Tobin's Q	1													
15	Acquirer cash holdings	**0.29**	1												
16	Acquirer ROA	**0.39**	-0.02	1											
17	M&A experience	**0.13**	0.04	**-0.08**	1										
18	Serial acquirer	**0.10**	0.02	-0.03	**0.63**	1									
19	Target size	**-0.13**	**-0.20**	0.05	**-0.13**	**-0.11**	1								
20	Target Tobin's Q	**0.41**	**0.20**	**0.12**	**0.15**	**0.18**	**-0.15**	1							
21	Target cash holdings	**0.31**	**0.48**	-0.01	**0.27**	**0.20**	**-0.38**	**0.42**	1						
22	Target ROA	**-0.11**	**-0.18**	**0.18**	**-0.10**	**-0.09**	**0.36**	**-0.13**	**-0.36**	1					
23	Pure cash deal	0.00	**0.14**	**0.14**	0.07	**0.12**	**-0.33**	-0.03	**0.25**	**-0.09**	1				
24	Toehold	-0.01	-0.06	0.02	0.01	-0.02	-0.03	0.06	0.00	-0.07	0.01	1			
25	Multiple bidders	0.00	-0.02	0.04	-0.03	0.00	**0.10**	-0.04	-0.02	0.02	0.01	-0.03	1		
26	Hostile deal	-0.05	-0.01	0.00	-0.03	-0.03	**0.08**	**-0.08**	**-0.08**	0.04	**-0.08**	**0.12**	**0.11**	1	
27	Tender offer	0.06	0.02	**0.10**	0.02	**0.08**	**-0.13**	-0.02	**0.08**	**-0.10**	**0.31**	0.04	**0.08**	**0.08**	1

Table 4-4 Regression results: The effect of operational synergies on the acquisition premium and the moderating role of acquirer governance

The table presents the results from the OLS regressions for identifying governance moderating variables of the relationship between operational synergies and the acquisition premium. The dependent variable is the four-week premium in all models. Model 1 is the main effects model with all determinants of the acquisition premium. Models 2-8 present the results of all the pair-wise interactions between the operational synergies proxy and each governance variable examined. ΔR^2 denotes the change in R^2 from the main effects model (Model 1). ΔF denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix B. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
Operational synergies (OS)	-0.0201	-0.0201	-0.0207	-0.1076**	-0.0206	-0.0195	-0.0131	-0.0220
	(0.0284)	(0.0283)	(0.0283)	(0.0467)	(0.0286)	(0.0284)	(0.0276)	(0.0283)
Financial synergies (FS)	0.3373***	0.3372***	0.3354***	0.3437***	0.3387***	0.3388***	0.3473***	0.3354***
	(0.1199)	(0.1197)	(0.1201)	(0.1193)	(0.1199)	(0.1200)	(0.1199)	(0.1193)
Board size	-0.0019	-0.0017	-0.0017	-0.0010	-0.0019	-0.0020	-0.0017	-0.0015
	(0.0075)	(0.0091)	(0.0075)	(0.0074)	(0.0075)	(0.0075)	(0.0074)	(0.0075)
Non-co-opted independence (NCI)	0.0833	0.0834	0.1197	0.0880	0.0808	0.0847	0.0875	0.0797
	(0.0608)	(0.0608)	(0.0767)	(0.0605)	(0.0608)	(0.0607)	(0.0603)	(0.0605)
CEO/Chair duality	0.0262	0.0262	0.0246	-0.0302	0.0243	0.0270	0.0226	0.0255
	(0.0302)	(0.0303)	(0.0305)	(0.0376)	(0.0308)	(0.0302)	(0.0300)	(0.0302)
CEO vega	-0.0186	-0.0188	-0.0158	-0.0288	-0.0611	-0.0167	-0.0307	-0.0209
	(0.1347)	(0.1353)	(0.1343)	(0.1340)	(0.1583)	(0.1353)	(0.1348)	(0.1344)
CEO delta	0.0071	0.0070	0.0068	0.0067	0.0062	0.0133	0.0087	0.0066
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0161)	(0.0113)	(0.0114)
CEO cash pay	-0.0428	-0.0428	-0.0436	-0.0416	-0.0427	-0.0422	-0.0719**	-0.0446
	(0.0322)	(0.0325)	(0.0325)	(0.0320)	(0.0322)	(0.0324)	(0.0343)	(0.0325)
Dedicated institutional ownership (Ded IO)	-0.1907	-0.1912	-0.1805	-0.2088	-0.1911	-0.1869	-0.1971	-0.3726
	(0.2442)	(0.2447)	(0.2451)	(0.2436)	(0.2453)	(0.2442)	(0.2438)	(0.2693)
CEO overconfidence	0.0285	0.0285	0.0311	0.0285	0.0284	0.0273	0.0233	0.0308
	(0.0355)	(0.0355)	(0.0353)	(0.0351)	(0.0355)	(0.0355)	(0.0356)	(0.0359)
Acquirer size	0.0339*	0.0339*	0.0339*	0.0321*	0.0337*	0.0337*	0.0344*	0.0340*
	(0.0194)	(0.0195)	(0.0195)	(0.0194)	(0.0194)	(0.0195)	(0.0195)	(0.0195)
Acquirer book leverage	0.3405**	0.3403**	0.3357**	0.3598**	0.3462**	0.3404**	0.3497**	0.3416**
	(0.1443)	(0.1456)	(0.1451)	(0.1440)	(0.1446)	(0.1445)	(0.1436)	(0.1446)

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
Acquirer Tobin's Q	0.0004	0.0004	0.0005	-0.0014	0.0006	-0.0002	-0.0003	0.0005
	(0.0139)	(0.0139)	(0.0138)	(0.0139)	(0.0139)	(0.0139)	(0.0140)	(0.0139)
Acquirer cash holdings	0.1141	0.1139	0.1095	0.1235	0.1068	0.1145	0.1175	0.1164
	(0.1474)	(0.1483)	(0.1477)	(0.1456)	(0.1493)	(0.1474)	(0.1465)	(0.1476)
Acquirer ROA	0.1235	0.1240	0.1231	0.1443	0.1220	0.1223	0.0818	0.1258
	(0.3042)	(0.3049)	(0.3036)	(0.3010)	(0.3038)	(0.3042)	(0.3055)	(0.3031)
M&A experience	-0.0075	-0.0075	-0.0081	-0.0061	-0.0080	-0.0076	-0.0075	-0.0070
	(0.0084)	(0.0085)	(0.0083)	(0.0085)	(0.0085)	(0.0085)	(0.0087)	(0.0083)
Serial acquirer	-0.0390	-0.0390	-0.0388	-0.0449	-0.0373	-0.0387	-0.0422	-0.0413
	(0.0355)	(0.0356)	(0.0354)	(0.0353)	(0.0355)	(0.0355)	(0.0355)	(0.0357)
Target size	-0.0431***	-0.0431***	-0.0429***	-0.0434***	-0.0429***	-0.0432***	-0.0455***	-0.0426***
	(0.0128)	(0.0128)	(0.0129)	(0.0130)	(0.0129)	(0.0128)	(0.0130)	(0.0128)
Target Tobin's Q	-0.0275**	-0.0275**	-0.0271**	-0.0267**	-0.0277**	-0.0275**	-0.0266**	-0.0280**
	(0.0112)	(0.0112)	(0.0111)	(0.0110)	(0.0112)	(0.0112)	(0.0110)	(0.0111)
Target cash holdings	0.2134**	0.2133**	0.2154**	0.2195**	0.2126**	0.2136**	0.2255***	0.2150**
	(0.0867)	(0.0870)	(0.0867)	(0.0861)	(0.0865)	(0.0868)	(0.0861)	(0.0869)
Target ROA	-0.0260	-0.0261	-0.0236	-0.0234	-0.0257	-0.0271	-0.0182	-0.0291
	(0.1166)	(0.1172)	(0.1159)	(0.1169)	(0.1163)	(0.1167)	(0.1178)	(0.1165)
Pure cash deal	0.0098	0.0097	0.0097	0.0066	0.0103	0.0103	0.0126	0.0096
	(0.0364)	(0.0362)	(0.0364)	(0.0365)	(0.0362)	(0.0363)	(0.0366)	(0.0364)
Toehold	-0.0004	-0.0004	-0.0003	-0.0008	-0.0005	-0.0004	-0.0002	-0.0002
	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0049)
Multiple bidders	0.1641**	0.1642**	0.1595*	0.1656**	0.1630**	0.1652**	0.1582*	0.1648**
	(0.0821)	(0.0822)	(0.0833)	(0.0818)	(0.0819)	(0.0823)	(0.0815)	(0.0826)
Hostile deal	-0.0128	-0.0129	-0.0063	-0.0076	-0.0196	-0.0127	0.0090	-0.0079
	(0.0852)	(0.0854)	(0.0878)	(0.0827)	(0.0860)	(0.0846)	(0.0831)	(0.0847)
Tender offer	0.1098***	0.1099***	0.1110***	0.1089***	0.1082***	0.1098***	0.1074***	0.1113***
	(0.0393)	(0.0392)	(0.0392)	(0.0395)	(0.0397)	(0.0393)	(0.0392)	(0.0392)
OS × Board size		-0.0004						
		(0.0113)						

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
OS × NCI			-0.0857					
			(0.1111)					
OS × CEO/Chair duality				0.1329**				
				(0.0576)				
OS × CEO vega					0.1261			
					(0.2014)			
OS × CEO delta						-0.0117		
						(0.0194)		
OS × CEO cash pay							0.0866**	
							(0.0362)	
OS × Ded IO								0.3883
								(0.3443)
Constant	0.5946***	0.5944***	0.5910***	0.6251***	0.5928***	0.5948***	0.5978***	0.5945***
	(0.0925)	(0.0927)	(0.0921)	(0.0922)	(0.0929)	(0.0924)	(0.0926)	(0.0927)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	703	703	703	703	703	703	703	703
R^2	0.1860	0.1860	0.1868	0.1919	0.1866	0.1863	0.1915	0.1875
Adjusted R^2	0.1141	0.1127	0.1135	0.1191	0.1133	0.1131	0.1187	0.1143
F	3.1925	3.1927	3.1719	3.6941	3.1544	3.1175	3.5739	3.1147
⊿R^2 from Model 1		0.0000	0.0007	0.0059	0.0005	0.0003	0.0054	0.0014
⊿F from Model 1		0.0011	0.5943	5.3341	0.3920	0.3609	5.7122	1.2725
(Prob > F)		(0.9734)	(0.4412)	(0.0214)	(0.5316)	(0.5484)	(0.0173)	(0.2600)

Table 4-5 Regression results: The effect of financial synergies on the acquisition premium and the moderating role of acquirer governance

The table presents the results from the OLS regressions for identifying governance moderating variables of the relationship between financial synergies and the acquisition premium. The dependent variable is the four-week premium in all models. Model 1 is the main effects model with all determinants of the acquisition premium. Models 2-8 present the results of all the pair-wise interactions between the financial synergies proxy and each governance variable examined. ⊿R^2 denotes the change in R^2 from the main effects model (Model 1). ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix B. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Operational synergies (OS)	-0.0201	-0.0218	-0.0190	-0.0216	-0.0214	-0.0202	-0.0217	-0.0158
	(0.0284)	(0.0283)	(0.0285)	(0.0281)	(0.0288)	(0.0284)	(0.0286)	(0.0282)
Financial synergies (FS)	0.3373***	0.3596***	0.3414***	0.5305***	0.3414***	0.3420***	0.3484***	0.3394***
	(0.1199)	(0.1121)	(0.1216)	(0.1596)	(0.1220)	(0.1235)	(0.1197)	(0.1136)
Board size	-0.0019	-0.0024	-0.0016	-0.0024	-0.0020	-0.0018	-0.0021	-0.0028
	(0.0075)	(0.0078)	(0.0076)	(0.0075)	(0.0075)	(0.0075)	(0.0075)	(0.0072)
Non-co-opted independence (NCI)	0.0833	0.0787	0.0865	0.0845	0.0801	0.0850	0.0782	0.0961
	(0.0608)	(0.0615)	(0.0614)	(0.0602)	(0.0609)	(0.0610)	(0.0612)	(0.0609)
CEO/Chair duality	0.0262	0.0265	0.0254	0.0226	0.0259	0.0265	0.0267	0.0205
	(0.0302)	(0.0301)	(0.0302)	(0.0308)	(0.0302)	(0.0302)	(0.0303)	(0.0295)
CEO vega	-0.0186	-0.0167	-0.0095	-0.0241	-0.0188	-0.0254	-0.0072	-0.0070
	(0.1347)	(0.1353)	(0.1314)	(0.1349)	(0.1339)	(0.1360)	(0.1375)	(0.1288)
CEO delta	0.0071	0.0061	0.0074	0.0074	0.0065	0.0094	0.0049	0.0096
	(0.0114)	(0.0115)	(0.0114)	(0.0113)	(0.0114)	(0.0115)	(0.0119)	(0.0114)
CEO cash pay	-0.0428	-0.0441	-0.0424	-0.0458	-0.0426	-0.0440	-0.0474	-0.0399
	(0.0322)	(0.0319)	(0.0321)	(0.0318)	(0.0322)	(0.0324)	(0.0329)	(0.0312)
Dedicated institutional ownership (Ded IO)	-0.1907	-0.1829	-0.2033	-0.1948	-0.1866	-0.1908	-0.1778	-0.2974
	(0.2442)	(0.2426)	(0.2444)	(0.2418)	(0.2447)	(0.2443)	(0.2412)	(0.2412)
CEO overconfidence	0.0285	0.0285	0.0288	0.0282	0.0285	0.0275	0.0293	0.0236
	(0.0355)	(0.0353)	(0.0355)	(0.0352)	(0.0355)	(0.0358)	(0.0354)	(0.0345)
Acquirer size	0.0339*	0.0337*	0.0337*	0.0353*	0.0342*	0.0341*	0.0337*	0.0371*
	(0.0194)	(0.0197)	(0.0194)	(0.0193)	(0.0197)	(0.0195)	(0.0192)	(0.0190)
Acquirer book leverage	0.3405**	0.3653**	0.3435**	0.3548**	0.3443**	0.3452**	0.3639**	0.3036**
	(0.1443)	(0.1424)	(0.1449)	(0.1445)	(0.1442)	(0.1462)	(0.1448)	(0.1359)

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Acquirer Tobin's Q	0.0004	0.0000	0.0005	0.0004	0.0014	0.0014	-0.0002	0.0002
	(0.0139)	(0.0140)	(0.0139)	(0.0137)	(0.0140)	(0.0141)	(0.0137)	(0.0136)
Acquirer cash holdings	0.1141	0.1205	0.1115	0.1161	0.1180	0.1152	0.1242	0.1098
	(0.1474)	(0.1479)	(0.1469)	(0.1458)	(0.1465)	(0.1470)	(0.1474)	(0.1471)
Acquirer ROA	0.1235	0.1232	0.1217	0.1283	0.1071	0.1119	0.1500	0.1165
	(0.3042)	(0.3019)	(0.3053)	(0.2988)	(0.3036)	(0.3059)	(0.3024)	(0.2978)
M&A experience	-0.0075	-0.0068	-0.0079	-0.0086	-0.0081	-0.0079	-0.0072	-0.0113
	(0.0084)	(0.0081)	(0.0085)	(0.0085)	(0.0085)	(0.0085)	(0.0082)	(0.0094)
Serial acquirer	-0.0390	-0.0407	-0.0359	-0.0368	-0.0373	-0.0377	-0.0408	-0.0291
	(0.0355)	(0.0349)	(0.0353)	(0.0356)	(0.0355)	(0.0353)	(0.0355)	(0.0348)
Target size	-0.0431***	-0.0420***	-0.0435***	-0.0420***	-0.0426***	-0.0429***	-0.0423***	-0.0433***
	(0.0128)	(0.0133)	(0.0130)	(0.0129)	(0.0127)	(0.0128)	(0.0129)	(0.0132)
Target Tobin's Q	-0.0275**	-0.0272**	-0.0267**	-0.0272**	-0.0280**	-0.0281**	-0.0265**	-0.0267**
	(0.0112)	(0.0111)	(0.0110)	(0.0112)	(0.0111)	(0.0112)	(0.0111)	(0.0112)
Target cash holdings	0.2134**	0.2184**	0.2090**	0.2145**	0.2128**	0.2169**	0.2108**	0.1968**
	(0.0867)	(0.0868)	(0.0879)	(0.0870)	(0.0868)	(0.0869)	(0.0874)	(0.0850)
Target ROA	-0.0260	-0.0282	-0.0225	-0.0404	-0.0278	-0.0231	-0.0360	-0.0193
	(0.1166)	(0.1167)	(0.1162)	(0.1177)	(0.1173)	(0.1171)	(0.1170)	(0.1157)
Pure cash deal	0.0098	0.0125	0.0114	0.0158	0.0106	0.0107	0.0100	0.0090
	(0.0364)	(0.0360)	(0.0367)	(0.0359)	(0.0362)	(0.0363)	(0.0359)	(0.0361)
Toehold	-0.0004	-0.0004	-0.0007	0.0000	-0.0003	-0.0003	-0.0005	-0.0003
	(0.0049)	(0.0048)	(0.0049)	(0.0048)	(0.0049)	(0.0048)	(0.0048)	(0.0048)
Multiple bidders	0.1641**	0.1676**	0.1635**	0.1640**	0.1658**	0.1656**	0.1631**	0.1535*
	(0.0821)	(0.0815)	(0.0825)	(0.0815)	(0.0820)	(0.0826)	(0.0823)	(0.0827)
Hostile deal	-0.0128	-0.0062	-0.0076	0.0025	-0.0158	-0.0147	0.0031	-0.0257
	(0.0852)	(0.0848)	(0.0870)	(0.0847)	(0.0853)	(0.0854)	(0.0871)	(0.0819)
Tender offer	0.1098***	0.1079***	0.1090***	0.1060***	0.1082***	0.1095***	0.1108***	0.1175***
	(0.0393)	(0.0387)	(0.0393)	(0.0388)	(0.0398)	(0.0393)	(0.0389)	(0.0394)
FS × Board size		-0.0274						
		(0.0414)						

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
FS × NCI			0.2431					
			(0.3394)					
FS × CEO/Chair duality				-0.2567				
				(0.1910)				
FS × CEO vega					-0.2441			
					(0.4525)			
FS × CEO delta						-0.0266		
						(0.0388)		
FS × CEO cash pay							-0.1351	
							(0.1059)	
FS × Ded IO								-3.1201**
								(1.2083)
Constant	0.5946***	0.5992***	0.5859***	0.5992***	0.5972***	0.5942***	0.5997***	0.5837***
	(0.0925)	(0.0936)	(0.0939)	(0.0914)	(0.0931)	(0.0926)	(0.0927)	(0.0896)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	703	703	703	703	703	703	703	703
R^2	0.1860	0.1876	0.1872	0.1897	0.1866	0.1864	0.1886	0.2019
Adjusted R^2	0.1141	0.1145	0.1140	0.1167	0.1133	0.1131	0.1156	0.1300
F	3.1925	3.2389	3.1332	3.1308	3.1831	3.1094	3.2319	3.3048
⊿R^2 from Model 1		0.0016	0.0011	0.0036	0.0005	0.0004	0.0026	0.0158
⊿F from Model 1		0.4374	0.5128	1.8057	0.2910	0.4718	1.6277	6.6676
(Prob > F)		(0.5088)	(0.4744)	(0.1798)	(0.5899)	(0.4926)	(0.2028)	(0.0102)

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Figure 4-1 Interaction effect of operational synergies and CEO duality on acquisition premium

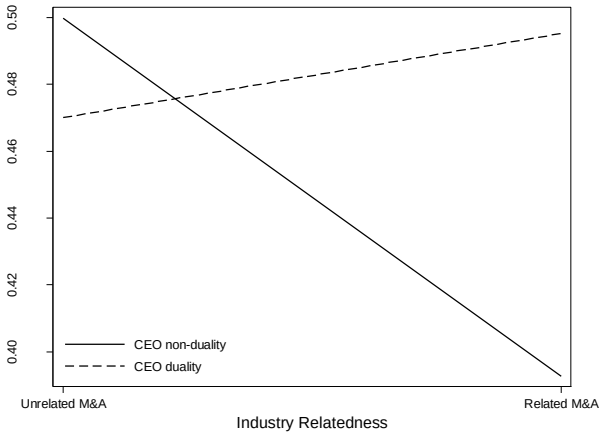

Figure 4-2 Interaction effect of operational synergies and CEO cash pay on acquisition premium

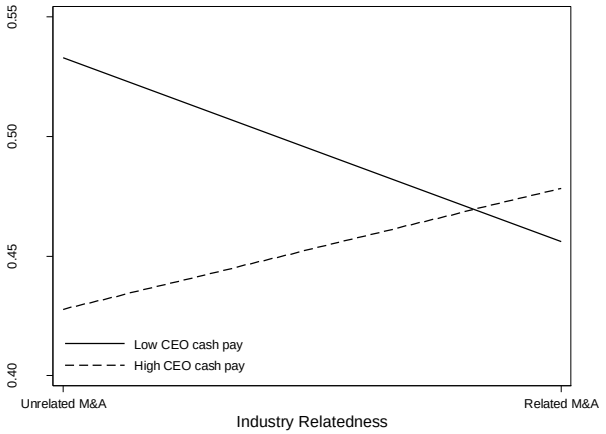

Figure 4-3 Interaction effect of financial synergies and dedicated institutional ownership on acquisition premium

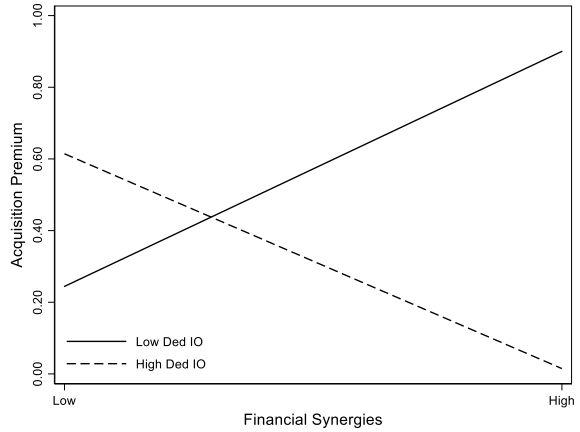

Table 4-6 Robustness checks

The table reports OLS regression estimates of different measures of the acquisition premium on the premium determinants used in the main regression analysis. The dependent variable is the *one-week premium* in Models 1-4 and the *Offer premium* in Models 5-6. Models 1 and 5 are the main effects models and Models 2-4 and 6-8 present the results of the significant pair-wise interactions between the proxies of operational and financial synergies and the governance variables examined. ⊿R^2 denotes the change in R^2 from the main effects models. ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects models. Variable definitions are provided in Appendix B. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	One-week premium				Offer premium			
	Main Effects	Interactions			Main Effects	Interactions		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Operational synergies (OS)	-0.0385	-0.0992**	-0.0331	-0.0358	-0.0061	-0.0630**	-0.0019	-0.0047
	(0.0273)	(0.0397)	(0.0283)	(0.0268)	(0.0199)	(0.0306)	(0.0192)	(0.0198)
Financial synergies (FS)	0.3180***	0.3224***	0.3258***	0.3193***	0.1014*	0.1046**	0.1077**	0.1006*
	(0.1010)	(0.1004)	(0.1006)	(0.0961)	(0.0526)	(0.0522)	(0.0532)	(0.0525)
Board size	-0.0014	-0.0008	-0.0012	-0.0020	-0.0009	-0.0003	-0.0008	-0.0013
	(0.0063)	(0.0062)	(0.0062)	(0.0062)	(0.0049)	(0.0048)	(0.0048)	(0.0048)
Non-co-opted independence (NCI)	0.0718	0.0751	0.0751	0.0801	0.0410	0.0448	0.0432	0.0455
	(0.0544)	(0.0541)	(0.0541)	(0.0553)	(0.0370)	(0.0369)	(0.0370)	(0.0368)
CEO/Chair duality	0.0001	-0.0390	-0.0027	-0.0035	0.0018	-0.0348	0.0001	0.0004
	(0.0265)	(0.0325)	(0.0261)	(0.0263)	(0.0185)	(0.0232)	(0.0184)	(0.0184)
CEO vega	0.0057	-0.0014	-0.0038	0.0131	-0.0221	-0.0271	-0.0303	-0.0172
	(0.1286)	(0.1287)	(0.1291)	(0.1249)	(0.0670)	(0.0663)	(0.0663)	(0.0667)
CEO delta	0.0051	0.0049	0.0064	0.0067	0.0035	0.0034	0.0045	0.0044
	(0.0117)	(0.0116)	(0.0117)	(0.0117)	(0.0092)	(0.0092)	(0.0090)	(0.0091)
CEO cash pay	-0.0213	-0.0205	-0.0443	-0.0195	-0.0108	-0.0099	-0.0281	-0.0098
	(0.0334)	(0.0333)	(0.0338)	(0.0326)	(0.0188)	(0.0186)	(0.0199)	(0.0186)
Dedicated institutional ownership (Ded IO)	-0.2030	-0.2155	-0.2080	-0.2717	-0.1259	-0.1347	-0.1332	-0.1701
	(0.2047)	(0.2046)	(0.2040)	(0.2082)	(0.1579)	(0.1587)	(0.1572)	(0.1553)

	One-week premium				Offer premium			
	Main Effects	Interactions			Main Effects	Interactions		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Target 52-week high stock price (%)					0.1895***	0.1882***	0.1891***	0.1867***
					(0.0312)	(0.0309)	(0.0311)	(0.0308)
OS × CEO/Chair duality		0.0922*				0.0857**		
		(0.0521)				(0.0351)		
OS × CEO cash pay			0.0681*				0.0518**	
			(0.0388)				(0.0245)	
FS × Ded IO				-2.0112**				-1.1140*
				(0.9780)				(0.6368)
Constant	0.5253***	0.5465***	0.5279***	0.5184***	0.4437***	0.4622***	0.4455***	0.4399***
	(0.0913)	(0.0891)	(0.0915)	(0.0906)	(0.0583)	(0.0591)	(0.0580)	(0.0570)
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Target control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	703	703	703	703	654	654	654	654
R^2	0.1589	0.1627	0.1634	0.1677	0.2588	0.2652	0.2641	0.2640
Adjusted R^2	0.0846	0.0872	0.0881	0.0927	0.1865	0.1923	0.1910	0.1909
F	3.1902	3.3036	3.1680	3.1073	4.3264	4.7906	4.6986	4.4195
⊿R^2 from main effects model		0.0038	0.0045	0.0088		0.1063	0.1052	0.1052
⊿F from main effects model		3.1292	3.0759	4.2286		5.9740	4.4836	3.0603
(Prob > F)		(0.0777)	(0.0803)	(0.0404)		(0.0150)	(0.0349)	(0.0811)

Table 4-7 Additional analysis: The effect of operational synergies on the acquisition premium and the moderating role of acquirer governance

The table presents the results from further analysis using OLS regressions for identifying governance moderating variables of the relationship between operational synergies and the acquisition premium excluding the financial crisis period from the sample (2008-2010). The dependent variable is the four-week premium in all models. Model 1 is the main effects model with all determinants of the acquisition premium. Models 2-8 present the results of all the pair-wise interactions between the operational synergies proxy and each governance variable examined. ⊿R^2 denotes the change in R^2 from the main effects model (Model 1). ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix B. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
Operational synergies (OS)	-0.0082	-0.0077	-0.0089	-0.0843*	-0.0055	-0.0075	-0.0059	-0.0116
	(0.0317)	(0.0314)	(0.0316)	(0.0510)	(0.0315)	(0.0317)	(0.0310)	(0.0321)
Financial synergies (FS)	0.2265**	0.2274**	0.2253**	0.2335**	0.2324**	0.2258**	0.2373**	0.2255**
	(0.1055)	(0.1058)	(0.1057)	(0.1053)	(0.1062)	(0.1059)	(0.1063)	(0.1054)
Board size	-0.0033	-0.0046	-0.0032	-0.0024	-0.0032	-0.0034	-0.0032	-0.0031
	(0.0079)	(0.0094)	(0.0079)	(0.0078)	(0.0079)	(0.0079)	(0.0078)	(0.0079)
Non-co-opted independence (NCI)	0.0800	0.0796	0.1115	0.0821	0.0762	0.0826	0.0832	0.0774
	(0.0646)	(0.0646)	(0.0820)	(0.0641)	(0.0643)	(0.0644)	(0.0642)	(0.0646)
CEO/Chair duality	0.0217	0.0216	0.0203	-0.0247	0.0207	0.0223	0.0185	0.0214
	(0.0313)	(0.0313)	(0.0314)	(0.0386)	(0.0316)	(0.0314)	(0.0311)	(0.0314)
CEO vega	0.0587	0.0597	0.0644	0.0523	-0.0222	0.0603	0.0544	0.0606
	(0.1251)	(0.1246)	(0.1244)	(0.1245)	(0.1368)	(0.1255)	(0.1248)	(0.1256)
CEO delta	0.0070	0.0073	0.0067	0.0069	0.0056	0.0157	0.0088	0.0068
	(0.0118)	(0.0118)	(0.0118)	(0.0119)	(0.0120)	(0.0164)	(0.0116)	(0.0118)
CEO cash pay	-0.0300	-0.0296	-0.0309	-0.0295	-0.0303	-0.0289	-0.0587*	-0.0311
	(0.0315)	(0.0315)	(0.0318)	(0.0311)	(0.0315)	(0.0315)	(0.0333)	(0.0316)
Dedicated institutional ownership (Ded IO)	-0.2116	-0.2061	-0.2043	-0.2242	-0.2091	-0.2051	-0.2180	-0.3113
	(0.2473)	(0.2490)	(0.2481)	(0.2477)	(0.2488)	(0.2479)	(0.2474)	(0.2722)
OS × Board size		0.0032						
		(0.0112)						
OS × NCI			-0.0777					
			(0.1209)					
OS × CEO/Chair duality				0.1131*				
				(0.0614)				

	Main Effects				Interactions			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
OS × CEO vega					0.2051			
					(0.2056)			
OS × CEO delta						-0.0149		
						(0.0194)		
OS × CEO cash pay							0.0827**	
							(0.0378)	
OS × Ded IO								0.2166
								(0.3722)
Constant	0.6155***	0.6179***	0.6101***	0.6379***	0.6134***	0.6172***	0.6177***	0.6149***
	(0.0953)	(0.0956)	(0.0949)	(0.0956)	(0.0955)	(0.0951)	(0.0961)	(0.0958)
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Target control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	610	610	610	610	610	610	610	610
R^2	0.1773	0.1774	0.1779	0.1818	0.1786	0.1778	0.1830	0.1778
Adjusted R^2	0.0973	0.0958	0.0963	0.1006	0.0971	0.0962	0.1019	0.0962
F	2.9737	2.9883	2.9268	3.3825	2.8969	2.9283	3.3893	2.8995
⊿R^2 from Model 1		0.0001	0.0006	0.0045	0.0013	0.0005	0.0057	0.0005
⊿F from Model 1		0.0810	0.4130	3.3892	0.9952	0.5954	4.7844	0.3388
(Prob > F)		(0.7761)	(0.5209)	(0.0665)	(0.3192)	(0.4409)	(0.0294)	(0.5609)

Table 4-8 Additional analysis: The effect of financial synergies on the acquisition premium and the moderating role of acquirer governance

The table presents the results from further using OLS regressions for identifying governance moderating variables of the relationship between financial synergies and the acquisition premium excluding the financial crisis period from the sample (2008-2010). The dependent variable is the four-week premium in all models. Model 1 is the main effects model with all determinants of the acquisition premium. Models 2-8 present the results of all the pair-wise interactions between the financial synergies proxy and each governance variable examined. ΔR^2 denotes the change in R^2 from the main effects model (Model 1). ΔF denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix B. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
Operational synergies (OS)	-0.0082	-0.0126	-0.0074	-0.0113	-0.0131	-0.0086	-0.0112	-0.0055
	(0.0317)	(0.0316)	(0.0318)	(0.0313)	(0.0325)	(0.0318)	(0.0320)	(0.0316)
Financial synergies (FS)	0.2265**	0.2742**	0.2291**	0.4481***	0.2287**	0.2289**	0.2435**	0.2494**
	(0.1055)	(0.1082)	(0.1071)	(0.1653)	(0.1079)	(0.1072)	(0.1069)	(0.1075)
Board size	-0.0033	-0.0053	-0.0033	-0.0037	-0.0034	-0.0032	-0.0035	-0.0038
	(0.0079)	(0.0083)	(0.0079)	(0.0078)	(0.0079)	(0.0079)	(0.0079)	(0.0078)
Non-co-opted independence (NCI)	0.0800	0.0716	0.0822	0.0806	0.0713	0.0817	0.0720	0.0904
	(0.0646)	(0.0646)	(0.0659)	(0.0640)	(0.0641)	(0.0648)	(0.0641)	(0.0656)
CEO/Chair duality	0.0217	0.0228	0.0215	0.0171	0.0199	0.0217	0.0227	0.0183
	(0.0313)	(0.0313)	(0.0313)	(0.0318)	(0.0313)	(0.0313)	(0.0314)	(0.0309)
CEO vega	0.0587	0.0768	0.0632	0.0576	0.0584	0.0502	0.0849	0.0691
	(0.1251)	(0.1208)	(0.1205)	(0.1247)	(0.1174)	(0.1261)	(0.1292)	(0.1238)
CEO delta	0.0070	0.0047	0.0072	0.0072	0.0054	0.0094	0.0036	0.0084
	(0.0118)	(0.0120)	(0.0119)	(0.0118)	(0.0121)	(0.0118)	(0.0124)	(0.0120)
CEO cash pay	-0.0300	-0.0311	-0.0296	-0.0338	-0.0298	-0.0310	-0.0366	-0.0279
	(0.0315)	(0.0310)	(0.0312)	(0.0308)	(0.0315)	(0.0315)	(0.0319)	(0.0313)
Dedicated institutional ownership (Ded IO)	-0.2116	-0.1941	-0.2163	-0.2167	-0.1957	-0.2101	-0.1951	-0.2933
	(0.2473)	(0.2452)	(0.2473)	(0.2446)	(0.2482)	(0.2477)	(0.2448)	(0.2462)
FS × Board size		-0.0673**						
		(0.0323)						

	Main Effects		Interactions					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
FS × NCI			0.1227					
			(0.3977)					
FS × CEO/Chair duality				-0.2994				
				(0.1856)				
FS × CEO vega					-0.6820*			
					(0.3644)			
FS × CEO delta						-0.0223		
						(0.0385)		
FS × CEO cash pay							-0.1659*	
							(0.0944)	
FS × Ded IO								-2.2778*
								(1.1655)
Constant	0.6155***	0.6251***	0.6115***	0.6203***	0.6174***	0.6156***	0.6200***	0.6062***
	(0.0953)	(0.0968)	(0.0964)	(0.0943)	(0.0962)	(0.0953)	(0.0962)	(0.0938)
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Target control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	610	610	610	610	610	610	610	610
R^2	0.1773	0.1870	0.1776	0.1828	0.1814	0.1776	0.1817	0.1866
Adjusted R^2	0.0973	0.1063	0.0960	0.1016	0.1001	0.0959	0.1004	0.1059
F	2.9737	3.0660	2.9336	2.9369	2.9404	2.9516	2.9945	2.9423
⊿R^2 from Model 1		0.0097	0.0003	0.0055	0.0041	0.0003	0.0044	0.0093
⊿F from Model 1		4.3336	0.0952	2.6009	3.5021	0.3351	3.0868	3.8196
(Prob > F)		(0.0381)	(0.7578)	(0.1077)	(0.0621)	(0.5630)	(0.0798)	(0.0515)

5 Corporate Governance "Bundles" and Acquirer Post-acquisition Performance

5.1 Introduction

The past few decades have witnessed a proliferation of research on the determinants of acquirer performance from several academic fields including finance and strategic management (Haleblian et al., 2009). Notwithstanding this, there is still significant unexplained variance in M&A returns and the underlying factors of takeover-related success are yet to be identified (Andrade et al., 2001; King et al., 2004; Golubov et al., 2015). At the same time, the ongoing popularity of M&A as a strategic tool for firm inorganic growth is puzzling, given the fact that their performance effects are often disappointing for the shareholders in acquiring firms (e.g., Andrade et al., 2001; Moeller et al., 2005).

The relationship between corporate governance mechanisms and firm performance has been at the centre of governance research. Although a sizeable amount of empirical research has dealt with the impact of corporate governance on firm performance, the evidence from this research has yielded conflicting results (e.g., Dalton et al., 1998; 2007; Deutsch, 2005). This is due, at least in part, to the fact that the extant literature has examined governance mechanisms in isolation from each other, thus largely ignoring the relatively unexplored effects of the *Substitution/Complementarity Hypotheses* (Cuomo et al., 2016). To overcome this shortcoming, a more holistic approach to corporate governance has been proposed, by considering a *configurational* perspective. Under the *configurational* perspective, substitutive and/or complementary effects between governance mechanisms result in the creation of multiple combinations or "bundles" of governance mechanisms (Rediker and Seth, 1995) that work effectively together towards firm outcomes (Aguilera et al., 2012; 2015; Cuomo et al., 2016). To date, nevertheless, there has been limited empirical research into this *configurational* perspective of corporate governance.

In line with the overarching objective of this thesis is to examine the role of corporate governance in the M&A activity, this chapter, therefore, investigates the interplay of firm-level governance mechanisms with respect to influencing acquirer post-acquisition performance by considering the *configurational* perspective in corporate governance, as empirically tested in Chapter 3. In doing so, we follow a more fruitful way to understand the effects of certain monitoring and incentive alignment governance mechanisms, by considering their interrelations on M&A which are discrete strategic events and represent a setting where agency problems are particularly severe between shareholders and managers (Jensen, 1986; Morck et al., 1990; Masulis et al., 2007).

This chapter focusses on three key governance mechanisms and their interrelations, namely board monitoring, CEO pay incentives, and institutional investor monitoring which have been previously examined in Chapter 3. First, boards of directors represent the primary internal monitoring governance mechanism (Fama and Jensen, 1983b). As M&A require board approval, vigilant boards could prove particularly effective in serving as a brake on managers' pursuit of unnecessary value-destroying acquisition investments that bring them personal gains. Second, as the CEO of a firm is usually the initiator of M&A, it would be interesting to study the efficacy of CEO compensation in the form of equity-based pay as a significant incentive alignment governance mechanism within the M&A framework. Third, given the predominance of institutional investors in US public firms (Derrien et al., 2013), these investors represent another important monitoring, yet external governance mechanism. Again it would be interesting to investigate their monitoring role and how they influence acquirer performance.

Using a sample of US firm M&A deals between 1998 and 2015, we empirically test the *Substitution* and *Complementarity Hypotheses* in the context of M&A outcomes using the *marginal effects* concept as used in the field of economics (e.g., Vives, 1990). The substitutive assumption (e.g., Zajac and Westphal, 1994; Rediker and Seth, 1995; Oh et al., 2016) suggests that one governance mechanism may weaken the marginal effects of another mechanism on firm outcomes. This, in turn, implies that simultaneously deploying multiple governance mechanisms may not always lead to optimal outcomes, as the associated costs of additional mechanisms may exceed their benefits. Alternatively, the complementarity view (e.g., Cremers and Nair, 2005; Schepker and Oh, 2013; Misangyi and Acharya, 2014) assumes that two (or more) governance mechanisms work in a synergistic fashion and that one mechanism could increase the marginal effects of another.

Our study reveals several interesting findings. In the primary analysis, we estimate regressions in which the dependent variable is acquirer abnormal stock returns to assess the short-term post-acquisition performance. Overall, the results of this analysis provide support for both the *Substitution* and *Complementarity Hypotheses* between different pairs of monitoring and incentive alignment governance mechanisms. Next, we examine the long-term operating performance of the acquiring firms and interestingly we find complementary only effects between pairs of either monitoring and incentive alignment governance mechanisms or pairs of monitoring governance mechanisms.

These results are largely qualitatively robust to variations in event windows and alternative measures for institutional investor monitoring (for the short-term performance evaluation), as well as M&A deal size inclusion criteria (both for the short- and long-run performance

analysis). Further analysis of a sub-sample of acquisitions involving private only targets reveals that governance "bundles" have at least some explanatory power in influencing acquirer post-acquisition performance even in such M&A deals which are plagued by substantial information asymmetry issues about the true value of the target firm due to the increased accounting opacity of unlisted targets (Fuller et al., 2002; Officer, 2007; Ekkayokkaya et al., 2009).

Our study contributes to both the corporate governance and the M&A literatures. First and foremost, it contributes to the emerging body of research which advocates the *configurational* perspective of corporate governance research. Our findings reinforce the governance "bundles" approach in the context of M&A and suggest that researchers need to consider the interactive effects of multiple governance mechanisms in improving acquirer post-acquisition performance. Second, our study builds on and extends the previous M&A research regarding what impacts the post-acquisition performance of the acquirer. As previously mentioned, despite a large body of M&A research conducted to delineate the factors that affect the performance of firms engaging in corporate acquisitions, there is still significant unexplained variance in the post-acquisition performance (Andrade et al., 2001; King et al., 2004; Golubov et al., 2015). There is also a need to understand under what conditions certain factors have a greater influence on acquisition outcomes such as acquisition performance (Haleblian et al., 2009). Thus, our study advances the M&A literature by demonstrating that combinations or "bundles" of governance mechanisms are a new factor that has an independent influence on the performance of the acquiring firm.

The remainder of the chapter is presented as follows. Section 5.2 provides a summary of the relevant theoretical and empirical literature which motivates the development of our key research question in Section 5.3. Section 5.4 describes the sample, measurement of variables and the methodology employed. Section 5.5 presents the empirical results of the main analysis, along with robustness and additional tests. Section 5.6 discusses the empirical results and concludes.

5.2 Related Research

5.2.1 The Board of Directors

Within agency theory, in firms with widely diffused ownership the board of directors is considered one of the most powerful internal monitoring mechanisms (Fama and Jensen, 1983b). To protect shareholders' interests, boards fulfil their monitoring role by holding management accountable, thus mitigating the costs of potential self-serving opportunistic behaviour of managers-agents. M&A represent important corporate investments for which board monitoring is particularly salient: acquisition decisions, unlike day-to-day managerial decisions, are complex and time-consuming and can have long-term consequences on the shareholder value of the acquiring firm (Haleblian et al., 2009). Thus, they require intensive board scrutiny and, ultimately, approval. In this regard, M&A provide an ideal setting to investigate the effectiveness of board monitoring.

First, agency theorists favour a higher presence of independent directors on the board as they are expected to be vigilant supervisors of management actions. These outside directors are assumed to contribute to superior firm performance because they are detached from management. Despite substantial research on the impact of board independence on firm performance, the results are still mixed and inconclusive (e.g., Dalton et al., 1998; 2007; Dalton and Dalton, 2011).

Similarly, empirical studies that examine the link between board independence and acquirer performance have yielded ambiguous results. For example, Byrd and Hickman (1992) investigate a sample of 128 US tender offers and find that acquirers with outsider-dominated boards exhibit higher announcement abnormal returns than other acquirers. However, this relationship is non-linear and becomes negative when the proportion of outside directors is extremely high (exceeds 60%), suggesting that too many outside directors on the board may have detrimental effects on board effectiveness. In the same vein, Paul (2007) document a negative relationship between board independence and the likelihood of completing acquisitions receiving a negative market reaction. Also, for "bad" bids that are completed, a positive relationship is found between board independence and subsequent asset downsizing, indicating that independent boards initiate corrective post-bid action following acquisitions that are considered value-decreasing by investors. Correspondingly, Walters et al. (2007) stress the importance of including more independent directors on the board of the acquiring firm as well as granting independent directors with equity stakes, as they find evidence of value-increasing acquisitions in terms of positive acquisition

announcement-related returns, even in the presence of high levels of CEO tenure, suggesting that independent directors are sufficiently vigilant and able to curb CEO entrenchment.

Bauguess and Stegemoller (2008), on the other hand, study a sample of S&P 500 acquirers and report that acquirer stock returns increase in the presence of insider-dominated boards, consistent with the view that highlights the benefits resulting from an increased scope of managerial value-enhancing initiative. Using a sample of 3,333 US acquisitions of both listed and unlisted targets over the period 1990-2003, Masulis et al. (2007), among other findings, show an insignificant relationship between board independence and acquirer returns. More recently, Dahya et al. (2016) provide evidence from the UK takeover market of a positive relationship between outside director representation and acquirer returns, but only in M&A deals involving public targets. The authors attribute this finding to the increased reputational exposure of outside directors brought about by a high deal publicity observed in public firm acquisitions.

Second, a significant body of research argues that board size is a key characteristic contributing to the monitoring effectiveness of the board of directors (Jensen, 1993). However, while board size has been studied extensively, there is no consensus in the existing empirical work regarding the subject of optimal board size. On the one hand, several studies suggest that smaller boards are more effective monitors and can improve firm performance because they avoid, for example, communication, coordination and slower decision-making issues encountered by larger boards (e.g., Yermack, 1996; Eisenberg et al., 1998). On the other hand, there is evidence of larger boards being more beneficial in certain cases, for instance, in firms with greater advising needs (Coles et al., 2008). In such cases, larger boards are particularly effective because they bring more valuable knowledge and expertise and can provide better advice and counsel with respect to strategic decisions of the firm. With respect to the M&A setting, Bauguess and Stegemoller (2008) find that larger boards are associated with positive acquirer returns, while Masulis et al. (2007) fail to report any relationship between board size and acquirer announcement returns.

Third, from an agency theory perspective, a board's monitoring effectiveness is compromised when CEO/Chair duality is present, as CEOs become too powerful vis-à-vis the board when they hold both titles, resulting in managerial entrenchment (Fama and Jensen, 1983b; Jensen, 1993; Finkelstein and D'aveni, 1994). Nevertheless, also here there is no clear consensus on the relationship between CEO/Chair duality and firm financial performance (e.g., Dalton et al., 1998; 2007; Dalton and Dalton, 2011). With regards to the M&A context, Masulis et al. (2007) show that CEO/Chair duality is associated with negative acquirer returns, providing strong support of the agency theory which predicts that

consolidating the positions of the CEO and board Chair in one person impairs board oversight, thus enabling dual CEOs to pursue empire-building acquisition investments that are value-destroying. Relatedly, Aktas et al. (2019) present evidence of the adverse impact of CEO/Chair duality on the investment efficiency of diversified firms. Specifically, using a large sample of diversified US firms over the period 1992-2013, they document that in the presence of CEO/Chair duality diversified firms misallocate corporate resources across business segments, resulting in investment inefficiencies that are detrimental to shareholder value.

To conclude this sub-section, recent work by Goranova et al. (2017) shows that board monitoring leads to less extreme M&A performance using a sample of US M&A deals from 1997 to 2006. Interestingly, the authors employed an aggregate measure of board monitoring and included all three aforementioned board characteristics, namely board independence and size, as well as CEO/Chair duality. Their findings indicate that board monitoring can be a "double-edged sword" because, on the one hand, it is associated with lower M&A losses since it constrains managers' self-serving behaviour, thereby restricting them from pursuing value-destructive M&A deals. On the other hand, board monitoring is found to be associated with lower M&A gains as it constrains managerial discretion from undertaking value-creating M&A deals.

5.2.2 Managerial Incentives

A key source of agency conflicts arises because shareholders, which typically have well-diversified financial portfolios, are risk-neutral, whereas managers as they have most of their human capital tied up in the firm in which they are employed, they tend to be more risk averse and avoid corporate actions which would put at stake this capital (Fama and Jensen, 1983a). Managerial risk aversion can result in misalignment of interests between shareholders and managers (Jensen and Meckling, 1976). Thus, performance-contingent compensation has been viewed as an important governance mechanism for curbing managerial opportunism, by motivating managers to take actions that maximise firm performance, hence, their personal wealth, and in doing so, co-aligning their interests with those of shareholders (Fama and Jensen, 1983b). M&A are among the largest and most visible forms of corporate investment with major upside and downside performance potential and long-term wealth consequences for the acquiring firm (Haleblian et al., 2009; Devers et al., 2013; Steinbach et al., 2017). In this respect, acquisition investments present a suitable setting for examining how managerial incentives embedded in executive compensation influence acquirer shareholders' wealth.

Two of the most widely considered measures of managerial incentives are the vega and delta incentives: the former represents the sensitivity of managerial wealth to the volatility of stock returns, while the latter entails the sensitivity of managerial wealth to stock price (e.g., Guay, 1999; Core and Guay, 2002). The main rationale for option-based managerial compensation is that stock options induce convexity in the wealth-performance relationship, by increasing the sensitivity of managerial wealth to stock return volatility (vega). This encourages managers to take more risk in order to gain benefits (Guay, 1999). Stock options limit managerial risk aversion and induce managers to pursue value-creating (riskier) investment projects (Smith and Stulz, 1985; Hirshleifer and Suh, 1992; Edmans and Gabaix, 2011).

A growing body of research has investigated the impact of pay incentives on acquisition performance. For example, Datta et al. (2001) find a strong positive relationship between EBC - measured by the sum of the value of new stock options as a fraction of total compensation - received by the acquiring firm's managers and stock price response around and following the deal announcement, using a large sample of 1,719 mergers and tender offers made by US firms from 1993 to 1998. This relationship is found to be highly robust after controlling for various characteristics such as the method of deal payment (cash versus noncash), acquisition mode (mergers), managerial equity ownership, and previous options grants. Thus, this study provides support for the view grounded in agency theory that EBC contracts effectively incentivise managers and encourage them to make value-creating investment decisions. By contrast, Masulis et al. (2007) did not report any significant relationship between their CEO pay incentive measures and acquirer announcement returns. In the same vein, Boulton et al. (2014) examine the effect of CEO pay incentives captured by the CEO pay–performance sensitivity (i.e. delta) on acquirer announcement-period abnormal returns and fail to find evidence of a significant relationship. Building on the work of Boulton et al. (2014), Croci and Petmezas (2015) study the role of CEO pay-risk sensitivity (i.e. vega) in acquisition investment decisions, controlling also for delta, and provide evidence of a positive relationship between CEO vega and acquirer returns. This finding reinforces the view that risk-taking incentives encourage managers to make acquisitions of better quality for their shareholders.

5.2.3 Institutional Ownership

Finally, within the corporate governance literature a principal monitoring mechanism is institutional ownership which has increased substantially over the past few decades. Indeed, institutional investors have now become the largest class of investors of US firms (Gillan and Starks, 2000; Derrien et al., 2013). Given their sizeable shareholdings and sophisticated

expertise, institutional investors have been suggested to be better positioned to monitor the investee firms' management and to do so at lower cost than individual shareholders (Shleifer and Vishny, 1986). It has been argued that the larger the institutional holdings, the smaller the monitoring costs an institution will have to incur as there are economies of scale for collecting and processing firm information (Chen et al., 2007). Furthermore, total monitoring costs may decrease for institutions with large ownership as they often gain easier access to senior management and board members (Carleton et al., 1998).

However, different types of institutional investors may have divergent investment objectives and preferences, thereby leading to considerable differences in their degree of monitoring. Prior research has shown that the investment horizons of institutional investors are one of the dimensions along which they may differ and which would have an impact on the efficacy of their monitoring role (e.g., Bushee, 1998; 2001). The presence of institutional investors with longer investment horizons improves the effectiveness of governance practices within a firm (McCahery et al., 2016), as they actively engage and monitor the management (Attig et al., 2012) compared to short-term institutional investors.

A burgeoning empirical literature focusses on the role of institutional investors in determining acquisition outcomes. These investors have been shown to play an important disciplinary role in management during the different stages of the acquisition process (Aktas et al., 2016a). Chen et al. (2007) find that only independent institutions with concentrated shareholdings and a long-term orientation, compared to other types of institutional investors, are effective monitors of the corporate acquisition activity rather than trade for short-term gains. Specifically, the authors operationalise *ownership concentration* by identifying the five largest institutional investors as in Hartzell and Starks (2003), *independence* by following the (Brickley et al., 1988) classification, assuming that the "pressure-resistant" institutions are independent, and the *length of time invested* in each firm by following Bushee's (1998, 2001) standards and considering the "dedicated" and "quasi-indexer" institutions as having long-term relationships with a firm. When independent long-term institutions have concentrated ownership, they benefit both themselves as well as the shareholders of the acquirer from their monitoring efforts, as they are found to be associated with superior post-acquisition performance. Moreover, there is evidence of their active monitoring role as their presence in acquirers makes the withdrawal of bad bids more likely, suggesting their influence on management to reverse poor acquisition decisions. Furthermore, these institutions only sell out of firms in advance of very poor bids, thus, supporting the hypothesis that they are effective monitors of firms.

Taking a different approach, Gaspar et al. (2005) employ shareholder investment horizons in terms of the average turnover of investors' entire portfolios in order to investigate their role in the takeover market. According to this study, investment horizons indicate the degree of monitoring exercised by institutions as well as the degree of bargaining power of each party involved in an M&A deal. The authors show that acquirers with short-term institutional investors experience both higher short-term and long-term underperformance. Their findings demonstrate that weaker monitoring from short-term institutions enables managers to engage in value-destructive M&A or to bargain for the extraction of private benefits of control, such as employment stability and empire-building ambitions.

Lastly, Goranova et al. (2017) document that institutional investor monitoring, besides board monitoring (see sub-section 5.2.1), may have also a "dark side" as it is found to be related to less extreme M&A performance leading to lower M&A losses but also fewer M&A gains. The authors employ institutional ownership concentration as their primary measure for institutional investor monitoring and in further tests they replace this measure with dedicated institutional ownership. Their results remain consistent. In sum, the findings of this study support the view that governance mechanisms, particularly monitoring ones, may have unintended consequences on the overall M&A performance.

5.2.4 The Interdependence of Governance Mechanisms

A burgeoning body of governance literature adopts a configurational perspective, which posits that firm performance depends on the effectiveness of the "bundle" of governance arrangements, rather than the effectiveness of any single governance mechanism (Rediker and Seth, 1995; Aguilera et al., 2008; 2012; Ward et al., 2009). The configurational approach in corporate governance assumes that in order to achieve a desired firm outcome, the interdependencies of governance mechanisms should be considered. This suggests the existence of multiple combinations or "bundles" of governance mechanisms. Therefore, it challenges universalistic governance policy prescriptions (Aguilera et al., 2008; Cuomo et al., 2016) and supports the notion of "equifinality", whereby alternative combinations of governance mechanisms can lead to similar firm outcomes (Rediker and Seth, 1995; Gresov and Drazin, 1997). In the growing body of research focussing on the interdependence of governance mechanisms, two competing hypotheses have been developed, namely the *Substitution* and *Complementarity Hypotheses*.

5.2.4.1 The Substitution Hypothesis

First, the *Substitution Hypothesis* predicts that governance mechanisms can substitute one another and, in doing so, effectively mitigate agency costs, especially considering the costly implementation of these mechanisms in a firm (e.g., Agrawal and Knoeber, 1996). This assumption has already received empirical support. For example, several studies provide evidence of substitutive effects between monitoring and incentive alignment mechanisms with respect to organisational outcomes such as firm value - as measured by Tobin's Q - (Randøy and Goel, 2003; Kim and Lu, 2011) and corporate social responsibility (Oh et al., 2016). In the same spirit, other studies find support for the substitutive perspective between various monitoring governance mechanisms with regards to outcomes such as firm performance - as measured by Tobin's Q - (Agrawal and Knoeber, 1996) and the impact on shareholder wealth associated with the adoption of antitakeover provisions (Sundaramurthy et al., 1997).

In the context of this study, we posit, using the marginal effects concept - as employed in the field of economics (e.g., Vives, 1990) - that there are substitutive effects between two governance mechanisms if one governance mechanism decreases the marginal effect of another mechanism on acquirer post-acquisition performance. The substitutive perspective implies that if certain governance mechanisms are sufficiently high, the costs of implementing additional mechanisms - either monitoring or incentive alignment - may exceed the benefits. Therefore, the joint presence of multiple governance mechanisms may not always be effective in achieving certain firm outcomes; hence, the marginal effect of each mechanism will not be strengthened or will even weaken.

5.2.4.2 The Complementarity Hypothesis

Alternatively, the *Complementarity Hypothesis* posits that the coexistence of multiple firm-level governance mechanisms is required in order to reduce a firm's agency costs, implying synergistic effects among governance mechanisms. A recent stream of research confirms the presence of complementary effects between monitoring and incentive alignment governance mechanisms, for instance, with respect to reducing information asymmetry and mitigating agency costs (Rutherford et al., 2007), repealing poison pills (Schepker and Oh, 2013) and improving firm profitability in terms of ROA (Misangyi and Acharya, 2014). Other studies also offer evidence in favour of complementarities between various monitoring governance mechanisms. Cremers and Nair (2005), for instance, find evidence that shareholder activism and the market for corporate control work together as complements towards increasing shareholder wealth in terms of long-term equity returns. Specifically, a portfolio which buys firms with the highest degree of takeover vulnerability and shorts firms with the lowest

degree of takeover vulnerability generates annualised abnormal returns between 10%-15%, only in the presence of high public pension fund (blockholder) ownership. Masulis et al. (2007) extend the work of Cremers and Nair (2005) and demonstrate that there are complementary effects between takeover vulnerability, product market competition and CEO/Chair non-duality in the M&A context. Acquirers that face more pressure from the market for corporate control, operate in industries with higher competition and separate the positions of CEO and chairperson, are found to engage in more profitable acquisitions in terms of higher abnormal announcement returns.

In the specific context of M&A, the complementarity perspective implies that the adoption of multiple governance mechanisms would have a greater impact on an acquiring firm's performance in the post-acquisition period than either governance mechanism in isolation. Complementarity, therefore, assumes that governance mechanisms work in a synergistic fashion and the adoption of certain combinations of governance mechanisms is required to maximise their impact on firm outcomes, such as acquirer post-acquisition performance in our case. On the basis of the *marginal effects* concept, two governance mechanisms are complementary when the marginal effect of one increases the marginal effect of the other on acquirer performance.

5.3 Research Question

Traditional agency theory-based assumptions suggest that higher levels of EBC should create long-term incentives for managers towards maximising shareholder value (Fama and Jensen, 1983b; Eisenhardt, 1989). As such, CEOs having equity compensation as a substantial part of their compensation package, are more likely to engage in strategic investments such as M&A which could benefit not only shareholder value in the long-term but also enhance their personal wealth through these investments. In other words, if the CEO believes that undertaking M&A pays off over the long run, firms will be more likely to pursue value-creating M&A strategies that they would otherwise forgo.

Since monitoring governance mechanisms, such as the board of directors or the presence of institutional investors, are employed in order to reduce managerial opportunism, acquisition decisions are expected to receive intensive scrutiny and deliberation, given also their inherent complexity and the potential major long-term consequences on the shareholder wealth of the acquirer. For example, the board of directors as the primary monitoring mechanism in a public firm, is involved in the approval (or rejection) of strategic initiatives proposed by the firm's management and is expected to constrain CEO discretion, particularly in cases where the proposed M&A may be driven by value-destroying motives,

such as hubris (Roll, 1986), empire building (e.g., Jensen, 1986; Andrade et al., 2001), and employment risk reduction (Amihud and Lev, 1981). Likewise, institutional investors with long-term investment horizons are expected to engage in active monitoring and scrutinise the acquisition decisions of their investee firms for shared gain. Therefore, monitoring governance mechanisms will be more likely direct managerial initiative away from value-destroying M&A deals towards value-enhancing acquisition activity.

Considering the situation in which the positive effect of CEO pay incentives (incentive alignment mechanism) on acquirer post-acquisition performance becomes weaker (i.e. has a smaller marginal effect) in the presence of high levels of a monitoring governance mechanism, for example, in the form of a large or independent board of directors, then that would suggest that there is a *substitutive* effect between CEO pay incentives and board monitoring on acquirer post-acquisition performance. If we consider the case in which the positive effect of CEO incentive pay on acquirer post-acquisition performance becomes stronger in the presence of high levels of a monitoring governance mechanism, for instance, in the form of institutional investor monitoring, then this would imply that these two mechanisms - one incentive alignment and one monitoring - interact as *complements*.

In a similar vein, if the positive effect of a strong board of directors on acquirer performance becomes weaker when there is a high level of institutional investor monitoring, then that would also suggest that these two monitoring mechanisms act as *substitutes* for each other in improving acquirer performance. In this case, additional monitoring by another monitoring mechanism would not significantly affect the firm's performance following the acquisition because monitoring by one mechanism would be sufficient. If, one the other hand, the positive effect of a strong board of directors becomes stronger (i.e. has a greater marginal effect) concurrently with the presence of a high level of monitoring by institutional investors (compared to when there is a low level of institutional investor monitoring), then this would imply a *complementary* effect between the two monitoring mechanisms.

The two hypotheses (*Substitution* & *Complementarity*) suggest that governance "bundles" may operate in different ways towards influencing firm outcomes. Given that extant research has not provided a uniformed answer as yet, the synergies (or not) are dependent on the types of governance mechanisms investigated and the exploratory nature of the study, our main research question is the following: "*To what extent do firm-level governance mechanisms operate in a substitutive and/or a complementary fashion in influencing acquirer post-acquisition performance?*"

5.4 Research Design

5.4.1 Data and Sample Selection

We obtain our initial sample of all US domestic M&A deals involving public acquirers from T1B which took place between January 1, 1998, and December 31, 2015. Following conventions in the M&A literature, we impose the following standard M&A sample selection criteria:

vi. All exchange offers, leveraged buyouts, repurchases, recapitalisations, spinoffs, minority stake purchases, acquisitions of remaining interest, self-tenders and privatisations are excluded.

vii. The deal status is completed. We refer to the year of the deal announcement as the year of the acquisition.

viii. The target firms included are either public or private firms.

ix. The acquirer controls less than 50% of the target's shares before the deal announcement and controls more than 50% after the deal completion, to ensure that transactions included in the sample represent a transfer of control.

x. The deal value is at least $1 million at the announcement date.

There are 16,642 M&A deals that meet the above criteria over the specified sample period[42]. We then match this sample with Compustat for firm-level accounting data, CRSP for stock market data, ISS (formerly known as RiskMetrics and IRRC before that) for data on the boards of directors, ExecuComp for CEO compensation data and Thomson Financial 13F for institutional ownership data. After this merging procedure, we are left with a sample of 3,904 M&A deals that includes 1,339 unique acquiring firms with data items available to construct the variables used in our empirical analysis. Following previous literature, we exclude financials (SIC 6000–6999) and utilities (SIC 4900–4999) and we require that all firms must have complete data on the variables used in our estimations. Our final samples consist of 2,041 completed M&A deals for the short-term post-acquisition performance analysis and 1,890 deals for the long-term post-acquisition performance evaluation.

[42] This chapter studies the same M&A sample as the one in the first empirical chapter, i.e. Chapter 3.

5.4.2 Variables

5.4.2.1 Dependent Variables

5.4.2.1.1 Short-term post-acquisition performance

To assess the short-term valuation effects of a corporate event, such as an acquisition, extant literature uses the standard event study methodology (Brown and Warner, 1980; 1985). In the M&A setting, an event study attempts to examine the market's reaction in the stock prices surrounding the announcement of an acquisition based on the calculation of abnormal returns. These returns are measured as the difference between the actual (or realised) returns obtained on a given day, and the expected (or normal) returns based on a benchmark model which would have occurred if the M&A event would not have taken place. A range of models of expected returns (e.g., market-adjusted model, market model, Fama French three-factor model) are used in event studies. The most common benchmark model used to estimate normal returns is the market model. One underlying assumption of the event study approach is that under the *efficient market hypothesis*, investors are able to assess in an efficient and unbiased manner the immediate wealth effects of an M&A event as stock prices are assumed to incorporate all financially relevant information at the acquisition announcement dates.

Our main dependent variable to measure acquirer announcement effects are the *5-day cumulative abnormal returns (CARs)* computed by summing the daily abnormal returns over event days (-2, +2), where time 0 is the announcement date of the acquisition. For robustness purposes we calculated 3-day (-1, +1) and 7-day (-3, +3) CARs. Using these alternative measures our results remain qualitatively unchanged. The returns are calculated using the CAPM with the market model parameters estimated over an estimation window of 200 trading days, beginning 210 days prior to the event date and ending 11 days prior to the announcement date, in an attempt to account for the likelihood of information leakage about the M&A deal influencing the model estimation. We use the CRSP value-weighted index as the proxy for the market return.

5.4.2.1.2 Long-term post-acquisition performance

To measure the long-term operating performance of the acquirer we use the *three-year post-acquisition industry-adjusted ROA* which is calculated as the difference between the acquirer's ROA and the median ROA of all the firms in the same two-digit SIC industry and year, following Chen et al. (2007). As ROA could be influenced by industry-wide effects, industry-adjusting this proxy of firm performance eliminates any of these industry effects.

5.4.2.2 Independent Variables

The main variables of interest are proxies for board monitoring, CEO pay incentives, and institutional investor monitoring. Firstly, board monitoring is proxied by three variables (previously discussed) which have been associated with the monitoring effectiveness of the board (e.g. Linck et al., 2008; Wintoki et al., 2012): *board size*, a refined measure of board independence (*non-co-opted independence*) and *CEO/Chair duality*. *Board size* equals the number of directors on the board. *Non-co-opted independence* is measured as the fraction of directors who are independent and were appointed before the CEO assumed office. Independent directors have no material connection with the firm, are not current or former employees and they do not have any family or other business relationship with executives or directors of the firm, nor any ties through interlocking directorships (i.e. each serves as a director on the other's board). It has been also argued that one potential reason for the mixed and inconclusive evidence of the impact of board independence on firm performance and other firm outcomes is the fact that many directors are co-opted. Co-opted directors, irrespective of whether they are classified as independent using the conventional definition of board independence mentioned above, are the directors that joined the board after the CEO assumed office and thus are less likely to be truly independent as they are more likely to exhibit their loyalty to the CEO who was engaged in their initial appointment. Therefore, we opt for using non-co-opted independence instead of the conventional measure of board independence which has been shown to be only a crude proxy for the monitoring effectiveness of the board. Specifically, Coles et al. (2014) show that the traditional measure of board independence has little power to explain CEO turnover-performance sensitivity, CEO total annual compensation, CEO pay-performance sensitivity or delta, and firm capital expenditure, whereas non-co-opted independence indeed increases the monitoring effectiveness of the board with regards to influencing the abovementioned CEO features and firm investment decisions. *CEO/Chair duality* is a binary variable that is equal to one if the CEO serves also as the Chairman of the board.

Secondly, we employ CEO vega and delta as proxies for CEO pay incentives. These variables are estimated following the approximation method developed by Core and Guay (2002) which has been used in a number of recent studies (e.g., Knopf et al., 2002; Coles et al., 2006; Brockman et al., 2010; Hagendorff and Vallascas, 2011) and uses the Black and Scholes (1973) model, allowing for dividends (Merton, 1973). *CEO vega*, otherwise termed as pay-risk sensitivity, is the dollar change in the portfolio of options of the CEO for a 1% change in the annual standard deviation of stock returns at the fiscal year-end. In line with Guay (1999), the vega of the equity portfolio is assumed to be zero, so the vega of the options

portfolio is only used. *CEO delta* (or the pay-performance sensitivity) is the dollar change in the portfolio of equity and options holdings of the CEO for a 1% change in the stock price at the fiscal year-end. Delta is calculated as the sum of the deltas of the stock and options portfolios. To take into account the changes in the pre- and post-2006 reporting regime on executive compensation data, we follow Coles et al. (2006). Essentially, under the new reporting standards, all EBC arrangements should be estimated using their fair value at the grant date. Further, the CEO vega and delta are scaled by cash compensation (Graham and Rogers, 2002; Hagendorff and Vallascas, 2011; King et al., 2016), since pay incentives are correlated with firm size and are also highly correlated between them. Scaling the incentives measures also allows us to include both vega and delta in a single model and consider differences in their magnitude. In addition to CEO pay incentives, we include *CEO cash pay*, the fixed component in the compensation package which is calculated as the natural log transformation of the total CEO pay in the form of cash compensation (salary and bonus).

Finally, institutional ownership entails the third monitoring governance mechanism employed. Given the heterogeneous preferences and objectives of institutional investors, we employ the proportion of *dedicated institutional ownership* as proposed by Bushee (1998; 2001). Institutional investors are classified into three categories – dedicated, transient and, quasi-indexer – based on their investment horizons. Dedicated institutional investors are expected to actively engage with the investee firms and undertake a more active monitoring role to safeguard their long-term investments. By virtue of their long-term shareholdings, they devote more resources in collecting superior firm information and are more willing to influence firm decisions so as to protect shareholder value and realise monitoring benefits that typically emerge in the long term (Chen et al., 2007). On the contrary, transient institutions are not expected to intervene in corporate affairs and monitor the management of the firm as they choose to trade frequently with a focus on short-term performance. Quasi-indexers, despite their long-term portfolio holdings, may also avoid monitoring as their diversified holdings may prevent them from gathering and processing corporate information.

5.4.2.3 Control Variables

Following prior studies, we incorporate in our analysis an extensive set of control variables as potential drivers of the acquirer's post-acquisition performance. Specifically, we include three sets of control variables focussing on acquirer-related, CEO-related and deal-related characteristics.

In terms of acquirer-specific variables, we control for the *firm size* which has been shown to affect acquirer post-acquisition performance. For example, Moeller et al. (2004) find a negative correlation between firm size and the acquirer's CARs, which they interpret as

evidence of the managerial hubris hypothesis (Roll, 1986). Masulis et al. (2007) provide another explanation by conjecturing that large firms can use their size as a potent antitakeover defense since more resources are needed to acquire a target larger in size. Hence, managers of larger firms that are subject to weak market-imposed discipline become entrenched and are more inclined to embark on value-reducing acquisitions. Next, we control for the *book leverage* which is expected to have a positive effect on the acquirer's announcement-period CAR. Higher debt levels are expected to prevent managers from making value-destroying acquisitions by reducing future free cash flows, thus constraining managerial discretion, and also by incentivising managers to improve firm performance so as to avoid being fired if their firms become financially distressed (Masulis et al., 2007). Previous studies also show that an acquirer's *Tobin's Q,* as a proxy for the firm's investment opportunities, can affect announcement returns but the direction of its effect is not straightforward. On the one hand, Lang et al. (1991) document that acquirers with high *q* ratios exhibit positive abnormal returns when they engage in tender offer acquisitions. Servaes (1991) confirms that the findings of Lang et al. (1991) also hold for public firm acquisitions. On the other hand, Moeller et al. (2004) report a negative relationship between *q* ratios and acquirer CARs using a large sample of domestic acquisitions of US public acquirers. Furthermore, we include the acquirer's *cash flows* based on the free cash flow hypothesis (Jensen, 1986). Managers at firms with excess cash flows have more resources available to them to act opportunistically and undertake value-destroying acquisitions. However, firms with more free cash flows may exhibit improved performance, which could be correlated with higher quality management who engages in acquisitions that increase shareholders' wealth. Thus, free cash flows have an ambiguous effect on acquirer abnormal returns. We also control for prior performance by the firm's *ROA* at the fiscal year end prior to the deal announcement (Goranova et al., 2017). Finally, we control for the acquirer's prior *M&A experience* during the three years preceding the year of the deal announcement (Goranova et al., 2017) and whether acquiring firms make multiple acquisitions using the indicator variable *Serial acquirer*. Managers of frequent acquirers may develop overconfidence via acquisition experience and thus engage in value destructive deals (Billett and Qian, 2008). With regard to the acquirer industry characteristics, we add the *M&A Liquidity Index* since it proxies for potential competition among bidders, and there is evidence of industries with a higher liquidity index (i.e. more M&A) experiencing lower acquirer abnormal returns (Moeller et al., 2004; Masulis et al., 2007).

We also control for *CEO overconfidence* as Malmendier and Tate (2008), amongst others, find evidence consistent with the hubris hypothesis. Specifically, they report that managers

who are over-optimistic of their abilities and skills to run a larger combined firm engage in lower quality M&A that ultimately lead to value destruction for their shareholders. Managers are inherently risk averse as they have a relatively undiversified wealth portfolio with a significant portion of their human and financial capital tied up in the firm in which they are employed. Thus, risk aversion and under-diversification are expected to induce CEOs to exercise their stock options early if the stock price is sufficiently high so as to "lock-in" a profit (Hall and Murphy, 2002). However, overconfident CEOs may be overly optimistic about the future returns of their investments, and as a result they may postpone the exercise of their stock options in anticipation of higher firm stock prices. As in Croci and Petmezas (2015), we construct CEO overconfidence using the options-based measure developed by Campbell et al. (2011).

The third group of control variables captures certain deal characteristics. In particular, we control for target ownership status, method of deal payment, relative deal size and industry relatedness between the acquirer and the target firms. Previous studies show that acquirers experience zero or negative abnormal returns when acquiring public target firms but significantly positive abnormal returns when buying private targets (e.g., Fuller et al., 2002; Moeller et al., 2004; Faccio et al., 2006). One possible explanation is the lack of liquidity since private firms cannot be purchased and sold as easily as public firms, thus making these assets less attractive and less valuable compared to similar, more liquid assets. As such, the acquirer captures a liquidity discount when acquiring private targets, translating into higher abnormal returns. Therefore, we define *public target* as a binary variable to control for this effect that is equal to one if the target is a public firm, and zero otherwise. The form of deal payment is also associated with the market's reaction to acquisition announcements. The existing literature provides evidence that acquirers experience significantly negative abnormal returns when the method of payment is stock (e.g., Travlos, 1987; Brown and Ryngaert, 1991; Servaes, 1991). This has been largely attributed on the model proposed by Myers and Majluf (1984) which suggests that issuances of new equity, for example via stock-financed acquisitions, may convey negative information to the market about the true value of the firm's existing assets, implying that the acquiring firm is overvalued. *Stock deal* is a binary variable that equals one if the deal was financed entirely by stock, and zero otherwise. Further, we control for the *relative deal size* to account for the influence of an acquisition's value on the acquirer's market capitalisation. Following Fuller et al. (2002), we calculate the relative deal size as the ratio of the target market value using the deal value to the acquirer market value. Variations in deal size and acquirer market value may conceal the true wealth effects of bids and thus returns should be adjusted for relative deal size (Draper et al., 2008).

For instance, when very large bidders acquire very small targets, then the impact of such deals on the acquirer wealth would be immaterial (Antoniou et al., 2008). Numerous studies have found significant this variable, but the sign of the coefficient can be either negative (e.g., Travlos, 1987; Fuller et al., 2002) or positive (e.g., Asquith, 1983; Moeller et al., 2004). Finally, we control for diversifying acquisitions which have been found to destroy shareholder value (e.g., Denis et al., 2002), while self-interested, risk averse managers benefit from such deals either by promoting personal interests (Morck et al., 1990) or by reducing the risk of their own relatively undiversified wealth portfolio (Amihud and Lev, 1981). Thus, we include a binary variable (*diversifying deal*) which takes the value of one if the acquirer and the target firm operate in a different four-digit SIC industry, and zero otherwise.

To mitigate endogeneity and reverse causality concerns all explanatory variables are one-year lagged. Also, all continuous variables are winsorised at the 1st and 99th percentiles to minimise the influence of outliers on our results.

5.4.3 Descriptive Statistics

The M&A sample used for the short-term post-acquisition performance analysis[43] comprises 2,041 deals with complete information on all the variables of interest. Table 5-1 presents the M&A sample by announcement year (Panel A) and acquirer industry (Panel B). We report the deal median values per year, together with the mean values, in order to avoid the effects of outliers at both ends.

Panel A shows that the M&A activity is strongly clustered around the so-called merger waves (Mitchell and Mulherin, 1996; Harford, 2005). The spike of the M&A activity in our sample coincides with the peaks of the fifth merger wave (1998-1999), the sixth merger wave (2005-2006) and the emergence of the seventh merger wave starting from 2014 (Alexandridis et al., 2012; Mavis et al., 2017). Interestingly, we observe that cash was the dominant payment method for deals during the sixth merger wave (2003-2007) due to abundant cash reserves of acquirers (Alexandridis et al., 2012).

Panel B provides an industry breakdown of the M&A deals in our sample according to the Fama-French 12-industry categories of the acquirers (utilities and financial firms are excluded from the sample). As shown, 'Business Equipment' and 'Healthcare and Medical Equipment' are the sectors with the largest number of deals, together representing approximately 52% of the whole sample.

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[43] The M&A sample used for the long-term post-acquisition performance analysis is slightly different than the one used in the short-term analysis due to the availability of data on all the necessary variables. Descriptive statistics for this sample are provided in Appendix C.

*** Insert Table 5-1 here ***

Table 5-2 provides summary statistics of the variables used in our analysis for the short-term post-acquisition performance evaluation. Detailed definitions of all variables are provided in Appendix C. Panel A shows that the mean CARs for acquirers over the 3-day, 5-day and 7-day periods are -0.1%, -0.1% and -0.2%, respectively.

Panel B presents the summary statistics of the independent variables. Their values are largely comparable to those reported in prior governance literature (e.g., Bushee, 2001; Hagendorff and Vallascas, 2011; Callen and Fang, 2013; Coles et al., 2014; King et al., 2016; Aktas et al., 2019). The average board of directors consists of 9 members, of which 36.5% are independent outsiders non-co-opted by the CEO. This suggests that roughly a third of the board consists of directors who are more likely to be truly independent, thus acting as more effective monitors. In about 60% of the sample, the CEO also holds the Chair role. Concerning the CEO pay incentive structure, we observe that the pay incentives scaled by cash compensation vary considerably in our sample. For example, the median vega (delta) scaled is around 10% (30%) against a mean value of 15% (71%). Finally, the average holdings by dedicated institutional investors are approximately 6%.

Panel C contains summary statistics for the firm and industry characteristics. The average acquirer has total assets of $8 billion, book leverage of 19.6%, a Tobin's Q ratio of 2.36, cash flows of 9.8%, and a ROA of 6%. Moreover, the acquirers in our sample completed, on average, 1.42 acquisitions during the prior three-year period and 61% of them are serial acquirers. At the industry level, the mean M&A liquidity index is 0.026 and median 0.012. Further, 21.7% of CEOs are overconfident on average as reported in Panel D.

The deal characteristics are shown in Panel E. On average, 34.6% of the M&A in our sample involve public targets, 10% are purely stock-financed, acquirers, are on average, 13 times larger than their targets, and 66.5% of the acquisitions involve acquirers and targets that do not operate in the same four-digit SIC industry.

*** Insert Table 5-2 here ***

Table 5-3 presents the correlation matrix along with collinearity diagnostics for the variables employed in the main regressions for the short-term post-acquisition performance. Certain pair-wise correlation coefficients are significant, but examination of Variance Inflation Factor (VIF) values (< 5) indicates no serious concerns for multicollinearity in our sample.

*** Insert Table 5-3 here ***

5.4.4 Methodology

This section presents the methodology to address the chapter's research question. We investigate the influences of the three key corporate governance mechanisms (i.e. board of directors' characteristics, CEO pay incentives, and dedicated institutional ownership) in an exploratory way so as to identify which, if any, of these mechanisms, act in a substitutive or complementary fashion with each other in influencing the acquirer's post-acquisition performance (both short-term and long-term). We test the substitutive/complementary effects of these mechanisms by including in our specifications all pairwise two-way interaction terms by introducing product terms, and examining the marginal effect of one mechanism on acquisitiveness depending on the levels of the other for the significant interaction terms. For the purposes of this study, two governance mechanisms interact as complements (substitutes) if the marginal effect of one governance mechanism on firm post-acquisition performance increases (decreases) as the other governance mechanism increases (Poppo and Zenger, 2002; Siggelkow, 2002). The aforementioned approach has been employed, for instance, by studies exploring interactive relationships between governance mechanisms in promoting a firm's corporate social responsibility (Oh et al., 2016). A significant interaction effect exists when the estimated coefficient of the product term is statistically significant and if the inclusion of this term significantly increases the variance explained in the dependent variable.

Interaction effects are tested via *hierarchical moderated regression analysis* (e.g. Jaccard et al., 1990; Cortina, 1993) which essentially involves two steps: in the first step, which represents the baseline model, only the main effects of the three governance mechanisms of interest are included. In the second step, the product terms are entered in a hierarchical manner, by adding each interaction term with the associated main effects in a separate model. In each case, a significant increase in R^2 from the baseline model (by means of an F-test, i.e. the ratio of the variance explained only by the interaction term to the unexplained variance in the full model) is attributed to the interaction term included in that model (Elbanna and Child, 2007). We also mean-center all continuous predictor variables to facilitate the interpretation of the interaction effects (Aiken et al., 1991; Edwards, 2008).

Accordingly, the baseline model before including the two-way interaction terms is:

$$PERF_i = \beta_0 + \beta_1 BSIZE_i + \beta_2 NCI_i + \beta_3 DUAL_i + \beta_4 VEGA_i + \beta_5 DELTA_i + \beta_6 CASH_i + \beta_7 DEDIO_i + \gamma Controls_{i+} + Year_t + Industry_i + + \varepsilon_i \quad (5.1)$$

where i and t indexes the M&A deal and year, respectively. The dependent variable $PERF$ is the *5-day cumulative abnormal returns (CARs)* or the *three-year post-acquisition industry-adjusted ROA*. The main explanatory variables are defined as above, where $BSIZE$ stands for board size, NCI stands for non-co-opted independence, $DUAL$ stands for CEO/Chair duality, $VEGA$ stands for CEO vega, $DELTA$ stands for CEO delta, $CASH$ stands for CEO cash pay, and $DEDIO$ stands for dedicated institutional ownership. $Controls$ is a vector of all the control variables as described in sub-ection 5.4.2.3. $Year_t$ and $Industry_i$ represent year and industry fixed effects, respectively, and ε_i is the error term.

5.5 Empirical Results

5.5.1 Main Results

In this sub-section, we present the results of the main regressions of short-run abnormal stock returns and long-run operating post-acquisition performance of the acquirer. All models include year and industry[44] dummies, whose coefficients are suppressed, as M&A activity exhibits time-series and industry clustering (e.g., Mitchell and Mulherin, 1996; Harford, 2005), and heteroscedasticity-robust standard errors clustered at the firm level (Petersen, 2009).

5.5.1.1 Short-term post-acquisition performance

Table 5-4 presents the OLS regression results for the main regression analysis with the *5-day CARs* as the dependent variable in all models. We begin our analysis by including the control variables in Model 1. We add the main effects of the governance variables in Model 2. We then perform an interaction analysis via the hierarchical approach to investigate the interplay of heterogeneous governance mechanisms on acquirer short-term post-acquisition performance. We thus introduce in a stepwise fashion, each pair-wise interaction term one at a time in a separate model, while controlling for the effects of the other untested governance mechanisms. For parsimony reasons, we only present the significant pair-wise

[44] Throughout the empirical analysis we use the Fama-French 17-industry classification.

interaction terms in Models 3-4[45]. Figures 5-1 and 5-2 depict graphically the significant interactions found.

In Model 3, we find a negative and significant interaction between board size and CEO delta ($\Delta R^2 = 0.0031$, $p < 0.01$). A simple slope test suggests that the relationship between CEO delta and acquirer announcement returns is significant when board size is both low (simple slope = 0.006, $p < 0.01$) and high (simple slope = -0.007, $p < 0.05$). To plot this interaction effect we used the maximum (high) and minimum (low) values of the two interacted variables while holding all other covariates at their mean values. Figure 5-1 illustrates this finding. This result suggests that the 5-day CARs of the acquirer increase with CEO delta, but only in the presence of a smaller board of directors. If, on the other hand, CEO delta is low, larger board size is, in fact, more effective in generating positive acquirer announcement returns. This finding supports the *Substitution Hypothesis*.

In Model 4, there is a negative and significant interaction between CEO duality and CEO delta ($\Delta R^2 = 0.0020$, $p < 0.05$). As shown in Figure 5-2, this result suggests that acquirer announcement returns can be maximised when more CEO pay incentives - in the form of CEO delta - are offered and in the absence of CEO duality which has been associated with a better ability of the board to monitor management. Thus, CEO delta and CEO non-duality work together and interact as complements in improving acquirer short-term post-acquisition performance. This finding, therefore, lends support to the *Complementarity Hypothesis*.

Coming to the control variables, our findings are broadly consistent with Fuller et al. (2002). The market reacts negatively to the acquisition of a publicly owned target and announcement returns decrease the larger the target relative to the acquirer. We also find a negative relationship between acquirer size and acquirer abnormal returns (Moeller et al., 2004), but is significant only in Model 3. All other control variables are insignificant.

In terms of economic magnitude, for example, in Model 3 of Table 5-4, for a firm with an average board size of 9 members and average CEO delta of 70.7%, an increase in the board size by one member further reduces the 5-day CARs by approximately 12% (0.85%-0.76%/0.76%)[46], ceteris paribus.

*** Insert Table 5-4 here ***

[45] For the sake of completeness, we provide the results of the non-significant two-way interaction terms in Appendix C.

[46] In Model 3 of Table 5-4, the coefficient on Board size × CEO delta shows that for a firm with an average board size and average CEO delta, the 5-day CARs are reduced by 0.76% [9 × 0.707 × (-0.0012)]. Increasing board size by one unit corresponds to 0.85% lower 5-day CARs [10 × 0.707 × (-0.0012)].

*** Insert Figures 5-1 and 5-2 here ***

5.5.1.2 Long-term post-acquisition performance

Table 5-5 reports the OLS regression results for the operating performance of acquirers three years post-acquisition. The three-year post-acquisition industry-adjusted ROA is the dependent variable in all models. Model 1 shows the results including only the control variables, Model 2 is the main effects model and Models 3 and 4 are the models with the significant only interactions found[47].

In Model 3, we find a positive and significant interaction between board size and CEO cash pay ($\Delta R^2 = 0.0008$, $p < 0.10$). A simple slope test suggests that while the relationship between board size and acquirer industry-adjusted ROA three years after the acquisition is not significant when CEO cash pay is low (simple slope = -0.005, n.s.), it is significant when CEO cash pay is high (simple slope = 0.025, $p < 0.05$). Figure 5-3 displays this finding. This result suggests that acquirer long-term operating post-acquisition performance can be maximised in the presence of a large board of directors and when more CEO cash-based compensation is offered, which supports the *Complementarity Hypothesis*.

In Model 4, there is a negative and significant interaction between CEO duality and dedicated institutional ownership ($\Delta R^2 = 0.0021$, $p < 0.05$). As shown in Figure 5-4, CEO non-duality which acts as a monitoring governance mechanism intensifies the positive effect of dedicated institutional ownership on acquirer operating post-acquisition performance in the long-run. This result also lends support to the *Complementarity Hypothesis*.

With regards to the estimated coefficients on the control variables, most of them are of the expected sign and largely in line with prior studies although not always statistically significant. Long-term operating performance increases if the acquiring firm is larger, has higher pre-acquisition Tobin's Q and ROA, and is a serial acquirer. Interestingly, acquirer prior M&A experience has a negative effect on operating performance. Billett and Qian (2008) show evidence of previous acquisition experience leading to the development of managerial overconfidence which may, in turn, motivate the undertaking of value-destructive M&A deals.

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[47] For the sake of completeness, we provide the results of the non-significant two-way interaction terms in Appendix C.

To get a sense of economic significance, using the estimates in Model 3 of Table 5-5, for a firm with average CEO cash pay of around US$1.1 million [exp(7.052) = 1155.167][48] and an average board size of 9 members, an increase in CEO cash pay by 1 SD which corresponds to approximately US$2.3 million [exp(7.725) = 2264.253], would increase the three-year post-acquisition industry-adjusted ROA by a tenth (0.4797-0.4379/0.4379)[49], which corresponds to a 4% increase in absolute value, ceteris paribus.

*** Insert Table 5-5 here ***

*** Insert Figures 5-3 and 5-4 here ***

5.5.2 Robustness Tests

We perform several robustness checks on our main results to test them for robustness. First, we re-run our interaction analysis for the short-term post-acquisition performance evaluation using as the dependent variable CARs of two alternative event windows, namely *3-day* and *7-day CARs,* so as to ascertain that our results are correctly attributed to the announcement of the M&A event. On the one hand, a shorter event window minimises the "noise" from other confounding events which might have an impact on the acquirer's stock price, and on the other hand, the longer the event window the more time is available to market participants to incorporate new information into stock prices as well as to capture potential information leakage prior to the official deal announcement date. The results in Table 5-6 confirm the findings of the main analysis (see Models 3 and 4 of Table 5-4). Specifically, we find the same two negative and significant interaction terms, (i.e. Board size × CEO delta and CEO/Chair duality × CEO delta) with slight differences in the significance and magnitude of their estimated coefficients.

*** Insert Table 5-6 here ***

Second, we replace the *dedicated institutional ownership* variable with *institutional ownership concentration (IOC)* which is another proxy for the institutional investor monitoring. Institutional ownership concentration is calculated as the percentage of the sum of

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[48] CEO cash pay is measured as the natural logarithm of the total CEO pay in the form of cash compensation (salary and bonus in thousands of dollars).

[49] In Model 3 of Table 5-5, the coefficient on Board size × CEO cash pay shows that for a firm with an average CEO cash pay and average board size, the 3-year post-acquisition industry adjusted ROA increases by 43.79% [7.052 × 9 × 0.0069]. Increasing CEO cash pay by 1 SD (i.e. to 7.725), is associated with an increase in the 3-year post-acquisition industry adjusted ROA by 47.97% [7.725 × 9 × 0.0069].

shareholdings by the five largest institutional investors to the total shares outstanding at the fiscal year-end, following, amongst others, Hartzell and Starks (2003), Sauerwald et al. (2016), and Goranova et al. (2017). With the significant increase in institutional shareholdings in US public firms in recent years, there has also been an increase in the concentration of institutional ownership. Institutional investors with large shareholdings are expected to have much stronger incentives to monitor and influence acquisition decisions because the M&A outcome can significantly affect shareholder value. The results of Table 5-7 confirm the findings of the main results section (see Table 5-4) for the short-term post-acquisition performance analysis. The estimates of the significant interaction terms in Table 5-7 (see Models 2 and 3) are exactly the same as those in Table 5-4 (see Models 3 and 4).

*** Insert Table 5-7 here ***

Furthermore, the potential of endogeneity to have contaminated our results has been examined, considering three sources of endogeneity bias, namely reverse causality, omitted variable bias and self-selection bias. First, we circumvent any potential reverse causality issues, in the sense that the post-acquisition performance of the acquirers may determine their governance characteristics prior to the M&A event, by performing an event study analysis for our M&A sample firms, and also by including corporate governance variables with a lag of one year in all of our regression models. Second, by including an extensive range of governance, firm, CEO and deal characteristics in our model specifications, the risk of unobserved heterogeneity (or omitted variable bias) driving our results is reduced. Third, since we are focussing only on firms that have decided to engage in M&A, then by definition we acknowledge the presence of self-selection bias. However, we can still draw important conclusions from our findings that can apply to large public US firms in which corporate governance is an important aspect. Our sample is a good representation of the population of these firms since we essentially study the S&P 1500 firms which account for roughly 90% of the US market capitalisation and, according to Compustat-Capital IQ[50], 81% of these firms have engaged in at least one domestic M&A deal during the period of our study.

[50] See Figure C-1 in Appendix C for a bar chart illustrating the frequencies of the top 20 most active acquirers (by number of M&A transactions) of the S&P Composite 1500 Index during our sample period. The top 20 most active acquirers engaged in 1,102 M&A deals in total and another 1,200 acquirers-S&P 1500 constituents account for a total of 9,810 M&A deals.

5.5.3 Sub-sample Analyses

In this sub-section, we present and discuss the results from sub-sample analyses as additional robustness checks. At first, we consider a sub-group of large and important acquisitions to see whether the results of our main analysis, both for the short-term and long-term post-acquisition performance evaluation, still hold. In particular, we repeat the analysis for a sub-sample of M&A with a deal value of at least US$10 million as in Nguyen et al. (2012). Such large M&A deals should be particularly relevant as we investigate the interplay of CEO pay incentives with other governance mechanisms in influencing the post-acquisition performance of the acquiring firm. This is because these large and important acquisitions are more likely to require the attention and involvement of the CEO during the acquisition process. The results are presented in Table 5-8 and are consistent with the findings of our main analysis using either the 5-day CARs (short-term analysis) or industry-adjusted ROA (long-term analysis) as the dependent variables. We find the same significant interaction terms and their coefficients have the same significance level, sign, and in most cases the exact same value.

*** Insert Table 5-8 here ***

Next, we split our sample by the public status of target firms and investigate only the M&A deals involving private targets. It has been argued that agency problems resulting from information asymmetry issues are more severe in acquisitions of privately held targets as these firms have fewer disclosure requirements than publicly traded firms and thus acquirers are less informed about the target's value, thus enabling managers of such targets to conceal negative information about their firm (Fuller et al., 2002; Officer, 2007; Ekkayokkaya et al., 2009). In such an environment of obscured financial reporting, managers of the acquiring firm may find it easier to mask their self-serving motives in an attempt to realise private benefits at the expense of shareholder wealth, when pursuing acquisitions involving particular private targets (Ekkayokkaya et al., 2009).

This, in turn, raises concerns regarding the effectiveness of different governance configurations in conditions of increased information asymmetry, such as in the case of acquisitions of private targets. To examine this possibility, we focus on this type of M&A deals and re-estimate all the regression models of the main analysis. The results in Table 5-9 confirm our prediction as we only find one of the two interaction terms significant in each of the stock return (short-term) or operating (long-term) post-acquisition performance regressions. Specifically, in the interaction analysis where the dependent variable is the 5-day CARs we only find a negative and significant interaction between board size and CEO delta

(see Model 2) as with the earlier analysis in sub-section 5.5.1.1, which supports the *Substitution Hypothesis*. However, the interaction term between CEO duality and CEO cash pay is now insignificant (see Model 3). Similarly, for the operating performance analysis where the dependent variable is the three-year post-acquisition industry-adjusted ROA, we also find one negative and significant interaction between CEO duality and dedicated institutional ownership (see Model 6) as in the main analysis (see sub-section 5.5.1.2). This finding as previously explained lends support to the *Complementarity Hypothesis*. The interaction term between board size and CEO cash pay has now become insignificant (see Model 5). Taken together, these results suggest that the efficacy of certain corporate governance "bundles" may be affected when acquirers engage in M&A deals subject to high information asymmetry. Hence, governance configurations may be only partially effective in improving the post-acquisition performance of acquirers buying private targets, either in the short run or in the long run.

*** Insert Table 5-9 here ***

5.6 Discussion and Conclusion

Drawing from the *configurational* perspective of corporate governance, this chapter investigates how various governance mechanisms in the acquiring firm interactively influence its post-acquisition performance both in the short run and in the long run. In particular, we examine how three key governance mechanisms (board monitoring, CEO pay incentives, and institutional investor monitoring) substitute or complement each other in influencing the post-acquisition performance of the acquirer.

The results of the short-term analysis provide support for both the *Substitution* and *Complementarity Hypotheses* between different pairs of monitoring and incentive alignment governance mechanisms. Specifically, we find substitutive effects between board size which is a monitoring governance mechanism and CEO pay incentives in the form of CEO delta. In this case, the market reacts more positively, as reflected by the higher acquirer abnormal returns measured by acquirer 5-day CARs, when board size is small in the presence of well-incentivised CEOs (high levels of CEO delta). This result suggests that the market may view a larger board of directors as an impediment to increasing acquirer value, perhaps due to costs resulting from greater bureaucracy, and more cumbersome coordination and decision making, if the CEO is already well-aligned with a high level of pay incentives towards maximising firm value. However, in the case where incentive compensation contracts are not perceived by the market to provide efficient incentives (low CEO delta in our case), then a

larger board size allows for greater monitoring of the acquirer's management and is associated with higher acquirer returns. Conversely, we also detect a complementary effect between the separate board leadership structure (i.e. CEO non-duality) and CEO delta. This is presumably because there is a mutual enhancement effect between CEO-board Chair separation, which strengthens the ability of the board to effectively monitor management decisions, and well-aligned CEO compensation contracts, in increasing acquirer short-term post-acquisition performance. The aforementioned results remain consistent when using alternative acquirer's abnormal announcement returns (3-day and 7-day CARs) and a different measure for institutional investor monitoring (i.e. institutional ownership concentration).

Interestingly, the long-run analysis reveals complementary only effects between pairs of either monitoring and incentive alignment governance mechanisms or pairs of monitoring governance mechanisms in influencing the long-term operating performance of the acquirer. This implies that the governance configurations that are perceived by market participants as effective for improving acquirer performance in the short run may be somewhat different from the governance configurations that actually affect the long-term performance of the acquirer. The differences between findings can be attributed to the fact that M&A are complex strategic events that their full performance implications and economic impact can be assessed using long horizons rather than short-window event studies (e.g., Lubatkin, 1987; Oler et al., 2008; Zollo and Meier, 2008). First, we find that board size and CEO cash pay act as complements in improving the industry-adjusted ROA of the acquiring firm during the three years after deal completion. This suggests that high levels of both monitoring (board size) governance arrangements and managerial incentives in the form of CEO cash pay work synergistically to increase the long-term operating performance of the acquirer. The second finding from this analysis is that vigilant monitoring by both the board of directors and dedicated institutional investors interact as complements in promoting the acquirer's operating performance in the long run.

In further tests, we find that for a sub-sample of large and important M&A deals that are more likely to require the personal involvement of the CEO during the takeover process, our main inferences remain in both the short-term and long-term performance analysis. We then show that for the sub-group of M&A deals which involve only private targets, our main findings are only partially supported as some of the significant interactive effects of pairs of governance mechanisms do not continue to hold. We argue that this reflects the increased asymmetric information issues which are prevalent in these types of acquisitions and may

hinder the effectiveness of certain governance configurations with respect to influencing the post-acquisition performance of the acquirer.

Our findings have important practical implications as they shed additional light on how an acquiring firm can enhance its post-acquisition performance by configuring corporate governance mechanisms effectively. For example, firms can increase their short-term post-acquisition performance by offering higher levels of pay incentives to the CEO, but these incentives will be more effective in encouraging the CEO to increase shareholder wealth via acquisition investments when the level of monitoring by a large board of directors is low. In this regard, the "less is more" notion seems to apply when it comes to certain combinations of monitoring and incentive alignment mechanisms, as they substitute each other in promoting short-term post-acquisition performance. Alternatively, short-term post-acquisition gains are promoted when combining a board monitoring mechanism, namely the presence of a non-dual CEO concurrently with a well-incentivised CEO who earns a higher equity-based compensation. In contrast, acquirers can increase their post-acquisition performance in the long run by employing more monitoring mechanisms or pair-wise combinations of monitoring and incentive alignment mechanisms. For instance, according to our findings, there is a joint interplay between higher levels of board and institutional investor monitoring as their positive effects on acquirer long-term operating post-acquisition performance are strengthened when combined.

In sum, consistent with the idea of "equifinality" (Rediker and Seth, 1995; Gresov and Drazin, 1997), acquiring firms are flexible to configure their bundles of governance arrangements so as to maximise their performance in the post-acquisition period.

Tables and Figures – Chapter 5

Table 5-1 M&A Sample distribution by announcement year and acquirer industry

The table shows our complete sample of 2,041 US M&A deals during the 1998-2015 period used in the short-term post-acquisition performance analysis by year (Panel A) and industry of the acquiring firm (Panel B). Panel A shows the descriptive statistics (5th percentile, median, mean and 95th percentile) of the deals' values per year. Panel B reports the same statistics as Panel A, but across the Fama-French 12-industry categories (utilities and financial firms are excluded from the sample).

Panel A: M&A sample distribution by announcement year

Year	Number of Deals	Total Deals Value ($mil)	5th Pctl. Value ($mil)	Median Value ($mil)	Mean Value ($mil	95th Pctl. Value ($mil)	Payment method		
							Pure cash	Pure stock	Mixed[1]
1998	124	373,267.50	5.30	145.49	3,010.22	11,187.71	32	30	62
1999	162	317,723.50	8.00	181.49	1,961.26	5,075.71	48	52	62
2000	140	279,205.00	8.70	160.04	1,994.32	4,905.13	38	40	62
2001	119	105,764.70	5.00	114.53	888.78	3,229.30	35	28	56
2002	92	83,709.85	4.60	75.33	909.89	987.21	37	15	40
2003	111	36,209.14	6.50	88.00	326.21	1,559.85	54	8	49
2004	146	43,443.02	10.00	76.78	297.55	1,820.72	67	13	66
2005	165	185,804.10	5.00	111.00	1,126.09	3,566.79	80	4	81
2006	112	87,020.72	7.00	103.25	776.97	3,475.36	65	4	43
2007	132	77,795.44	9.00	112.50	589.36	3,292.09	70	0	62
2008	102	55,195.16	6.00	71.50	541.13	3,014.47	59	0	43
2009	86	179,950.40	4.35	196.00	2,092.45	5,240.49	39	4	43
2010	109	84,235.90	9.70	200.00	772.81	3,566.08	60	2	47
2011	102	89,607.41	9.00	155.50	878.50	3,088.23	49	2	51
2012	92	46,477.27	10.00	130.00	505.19	2,796.48	46	0	46
2013	79	56,345.91	5.80	147.27	713.24	2,543.54	44	1	34
2014	94	93,541.48	12.00	180.00	995.12	5,134.44	46	2	46
2015	74	145,854.30	11.90	278.83	1,971.00	14,076.63	41	1	32
Total	2,041	2,341,150.80					910	206	925

[1]Mixed category includes cash and stock less than 100% as well as 'other' and 'unknown' payment types and all of their combinations.

Panel B: M&A sample distribution by acquirer industry

Fama-French (12) Industry Code & Description	No. of Deals	Percent	5th Pctl. Value ($mil)	Median Value ($mil)	95th Pctl. Value ($mil)
1.Consumer NonDurables	128	6.27%	13.00	154.07	4,100.00
2.Consumer Durables	33	1.62%	2.00	65.00	1,300.00
3.Manufacturing	298	14.60%	8.35	114.27	2,914.06
4.Energy, Oil, Gas and Coal	88	4.31%	6.00	220.00	6,215.03
5.Chemicals and Allied Products	49	2.40%	5.00	276.17	5,075.71
6.Business Equipment	728	35.67%	7.00	95.47	2,301.75
7.Telephone and Television Transmission	54	2.65%	16.00	948.28	53,592.49
9.Wholesale and Retail	164	8.04%	6.50	153.79	2,637.42
10.Healthcare and Medical Equipment	330	16.17%	8.50	203.50	6,497.47
12.Other	169	8.28%	5.00	70.00	1,522.46
Total	2,041	100.00%			

Table 5-2 Sample descriptive statistics

The table reports descriptive statistics of the variables used in the short-term post-acquisition performance analysis. Panel A reports the statistics for the dependent variables. Panel B reports the statistics of the independent variables employed in the empirical analysis. Panel C reports the statistics for the firm and industry characteristics. Panel D reports the statistics for the CEO characteristics. Panel E reports the statistics for the deal-related variables. Variable definitions are provided in Appendix C.

Variables	Obs.	Mean	Std. Dev.	25th Pctl.	Median	75th Pctl.
Panel A: Dependent variable						
3-day CARs	2,041	-0.001	0.053	-0.022	0.000	0.022
5-day CARs	2,041	-0.001	0.062	-0.028	0.000	0.028
7-day CARs	2,041	-0.002	0.071	-0.035	-0.001	0.033
Panel B: Independent variables						
Board size	2,041	9.105	2.423	7.000	9.000	11.000
Non-co-opted independence (NCI)	2,041	0.365	0.262	0.125	0.375	0.571
CEO/Chair duality	2,041	0.579	0.494	0.000	1.000	1.000
CEO vega (scaled)	2,041	0.152	0.164	0.043	0.096	0.204
CEO delta (scaled)	2,041	0.707	1.367	0.154	0.301	0.697
CEO cash pay	2,041	7.069	0.705	6.592	6.968	7.496
Dedicated institutional ownership (Ded IO)	2,041	0.057	0.073	0.000	0.032	0.089
Panel C: Firm & Industry characteristics						
Firm size ($ billion)	2,041	7.954	1.589	6.726	7.824	9.048
Book leverage	2,041	0.196	0.151	0.072	0.187	0.292
Tobin's Q	2,041	2.357	1.458	1.430	1.908	2.705
Cash flows	2,041	0.098	0.062	0.066	0.096	0.129
ROA	2,041	0.060	0.087	0.035	0.066	0.099
M&A experience	2,041	1.424	1.890	0.000	1.000	2.000
Serial acquirer	2,041	0.612	0.487	0.000	1.000	1.000
M&A liquidity index	2,041	0.026	0.040	0.005	0.012	0.028
Panel D: CEO characteristics						
CEO overconfidence	2,041	0.217	0.412	0.000	0.000	0.000
Panel E: Deal characteristics						
Public target	2,041	0.346	0.476	0.000	0.000	1.000
Stock deal	2,041	0.101	0.301	0.000	0.000	0.000
Relative deal size	2,041	0.128	0.248	0.009	0.031	0.109
Diversifying deal	2,041	0.665	0.472	0.000	1.000	1.000

Table 5-3 Pearson correlation matrix and collinearity diagnostics of key variables used in the short-term post-acquisition performance analysis

The table presents the Pearson correlation coefficients for all the variables used in the main analysis for the short-term post-acquisition performance. The bold figures indicate significance at the 5% level or better. Variance inflation factors (VIFs) are also reported as tests to detect the presence of multicollinearity among the independent and control variables.

#	Variable	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1	5-day CARs		1												
2	Board size	1.65	0.00	1											
3	Non-co-opted independence	1.15	-0.02	**0.16**	1										
4	CEO/Chair duality	1.17	-0.01	**0.21**	**-0.13**	1									
5	CEO vega (scaled)	1.41	-0.01	**0.17**	-0.02	**0.07**	1								
6	CEO delta (scaled)	1.33	-0.01	0.00	**-0.21**	**0.09**	**0.30**	1							
7	CEO cash pay	2.50	-0.02	**0.45**	**0.07**	**0.27**	0.04	-0.04	1						
8	Dedicated institutional ownership	1.07	-0.03	0.00	**-0.07**	**0.06**	**-0.07**	0.04	0.03	1					
9	Firm size	3.44	-0.04	**0.60**	**0.16**	**0.22**	**0.36**	**0.08**	**0.70**	**-0.08**	1				
10	Book leverage	1.17	-0.01	**0.21**	-0.01	**0.13**	-0.03	**-0.13**	**0.14**	**0.11**	**0.17**	1			
11	Tobin's Q	1.60	**-0.05**	-0.02	**-0.06**	-0.04	**0.11**	**0.33**	**0.11**	0.03	0.02	**-0.23**	1		
12	Cash flows	1.89	0.01	**0.06**	**-0.05**	0.03	**0.09**	**0.11**	**0.14**	-0.02	**0.06**	**-0.09**	**0.37**	1	
13	ROA	1.88	0.02	**0.12**	0.03	**0.08**	**0.08**	**0.07**	**0.20**	**-0.06**	**0.14**	**-0.09**	**0.29**	**0.65**	1
14	M&A experience	1.70	**-0.05**	**0.06**	-0.02	0.04	**0.14**	**0.07**	**0.22**	-0.01	**0.25**	-0.02	**0.15**	**0.04**	-0.02
15	Serial acquirer	1.60	-0.04	**0.06**	-0.02	**0.07**	**0.12**	**0.06**	**0.17**	-0.01	**0.22**	0.01	**0.08**	-0.01	-0.03
16	M&A liquidity index	1.19	**-0.06**	**0.05**	-0.02	**0.08**	0.01	0.04	**0.20**	-0.02	**0.11**	**-0.04**	**0.28**	**0.09**	**0.04**
17	CEO overconfidence	1.02	-0.02	0.02	-0.02	**0.05**	0.02	0.04	**0.07**	0.01	0.03	-0.01	**0.09**	**0.05**	0.04
18	Public target	1.37	**-0.11**	**0.24**	0.02	**0.11**	**0.05**	-0.02	**0.28**	**0.06**	**0.33**	**0.09**	0.04	0.03	0.04
19	Stock deal	1.19	**-0.09**	0.04	**-0.04**	0.04	**-0.06**	**0.07**	0.11	**0.10**	**0.06**	0.01	**0.22**	-0.01	**-0.09**
20	Relative deal size	1.23	**-0.08**	-0.01	0.03	-0.01	**-0.12**	**-0.09**	**-0.06**	0.03	**-0.07**	**0.13**	**-0.13**	**-0.05**	**-0.05**
21	Diversifying deal	1.06	0.01	**0.08**	**0.06**	**0.09**	0.00	-0.03	0.12	**-0.04**	**0.07**	0.02	-0.03	-0.01	**0.06**

#	Variable	14	15	16	17	18	19	20	21
14	M&A experience	1							
15	Serial acquirer	**0.60**	1						
16	M&A liquidity index	**0.14**	**0.07**	1					
17	CEO overconfidence	0.03	0.00	**0.07**	1				
18	Public target	0.00	0.01	**0.13**	0.01	1			
19	Stock deal	**0.12**	0.02	**0.25**	**0.05**	**0.19**	1		
20	Relative deal size	**-0.12**	**-0.10**	0.04	-0.02	**0.32**	**0.07**	1	
21	Diversifying deal	**0.07**	**0.07**	-0.01	0.02	**-0.06**	**-0.07**	**-0.12**	1

Table 5-4 Regression results: The effect of acquirers' governance on short-run abnormal stock returns

The table presents the results from the OLS regressions of the acquirers' *5-day CARs*. Model 1 includes only the control variables and Model 2 is the main effects model with the governance mechanisms variables added. Models 3 and 4 present the significant pair-wise interactions between the main governance mechanisms examined. ΔR^2 denotes the change in R^2 from the main effects model (Model 2). ΔF denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 2). Variable definitions are provided in Appendix C. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Controls	Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4
Firm size	-0.0005	-0.0025	-0.0028*	-0.0026
	(0.0010)	(0.0017)	(0.0017)	(0.0017)
Book leverage	0.0025	0.0021	0.0011	0.0022
	(0.0104)	(0.0104)	(0.0104)	(0.0104)
Tobin's Q	-0.0016	-0.0018	-0.0022	-0.0020
	(0.0014)	(0.0015)	(0.0015)	(0.0014)
Cash flows	0.0297	0.0266	0.0273	0.0273
	(0.0363)	(0.0363)	(0.0362)	(0.0362)
ROA	0.0090	0.0064	0.0052	0.0051
	(0.0254)	(0.0253)	(0.0249)	(0.0251)
M&A experience	-0.0004	-0.0004	-0.0004	-0.0003
	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Serial acquirer	-0.0025	-0.0025	-0.0028	-0.0028
	(0.0038)	(0.0038)	(0.0038)	(0.0038)
M&A liquidity index	0.0034	0.0030	0.0042	0.0045
	(0.0382)	(0.0382)	(0.0384)	(0.0382)
CEO overconfidence	-0.0019	-0.0020	-0.0015	-0.0021
	(0.0036)	(0.0035)	(0.0035)	(0.0035)
Public target	-0.0090**	-0.0091**	-0.0095***	-0.0093***
	(0.0035)	(0.0035)	(0.0035)	(0.0035)
Stock deal	-0.0083	-0.0083	-0.0082	-0.0082
	(0.0065)	(0.0065)	(0.0065)	(0.0065)
Relative deal size	-0.0179*	-0.0179*	-0.0179*	-0.0180*
	(0.0097)	(0.0096)	(0.0097)	(0.0096)
Diversifying deal	-0.0020	-0.0024	-0.0019	-0.0023
	(0.0033)	(0.0033)	(0.0033)	(0.0033)
Board size		0.0008	0.0009	0.0009
		(0.0007)	(0.0007)	(0.0007)
Non-co-opted independence (NCI)		-0.0049	-0.0045	-0.0048
		(0.0059)	(0.0058)	(0.0058)
CEO/Chair duality		-0.0015	-0.0017	-0.0019
		(0.0031)	(0.0031)	(0.0031)
CEO vega		-0.0053	-0.0034	-0.0067
		(0.0109)	(0.0109)	(0.0109)
CEO delta		0.0007	0.0010	0.0040***
		(0.0011)	(0.0010)	(0.0015)
CEO cash pay		0.0051	0.0058	0.0054
		(0.0037)	(0.0036)	(0.0037)
Dedicated institutional ownership (Ded IO)		-0.0175	-0.0192	-0.0194
		(0.0285)	(0.0285)	(0.0285)
Board size × CEO delta			-0.0012***	
			(0.0004)	
CEO/Chair duality × CEO delta				-0.0045**
				(0.0018)

	Controls	Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4
Constant	0.0123	0.0131	0.0125	0.0136
	(0.0104)	(0.0114)	(0.0113)	(0.0115)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Number of Observations	2,041	2,041	2,041	2,041
R^2	0.0453	0.0480	0.0511	0.0500
Adjusted R^2	0.0243	0.0236	0.0263	0.0252
F	2.2343	2.0661	2.1488	2.0873
⊿R^2 from Model 2			0.0031	0.0020
⊿F from Model 2			8.3670	6.1253
(Prob > F)			(0.004)	(0.014)

Figure 5-1 Substitutive effect of CEO delta and board size on acquirer short-term post-acquisition performance

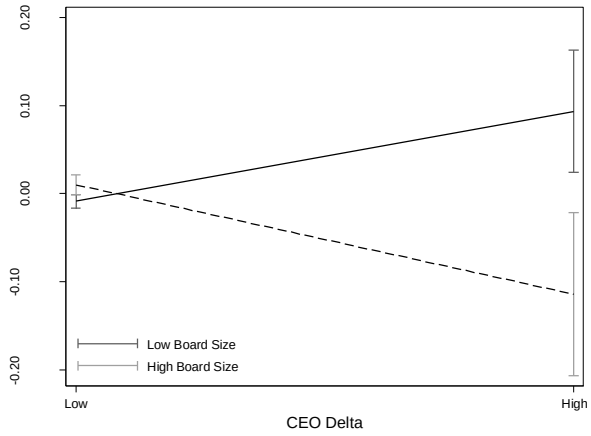

Figure 5-2 Complementary effect of CEO delta and CEO non-duality on acquirer short-term post-acquisition performance

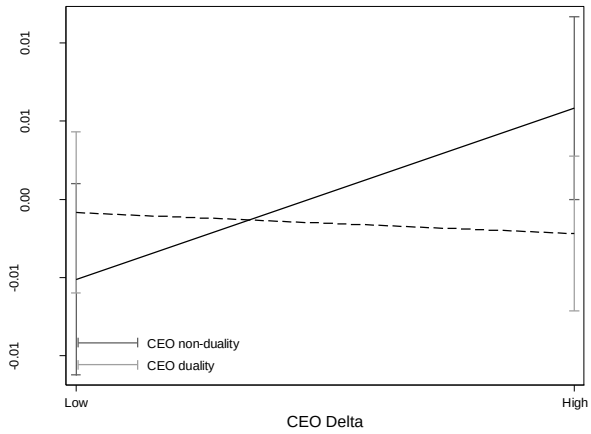

Table 5-5 Regression results: The effect of acquirers' governance on long-run post-acquisition operating performance

The table presents the results from the OLS regressions of the acquirers' *industry-adjusted ROA* for the three years after the acquisition. Model 1 includes only the control variables and Model 2 is the main effects model with the governance mechanisms variables added. Models 3 and 4 present the significant pair-wise interactions between the main governance mechanisms examined. ΔR^2 denotes the change in R^2 from the main effects model (Model 2). ΔF denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 2). Variable definitions are provided in Appendix C. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Controls	Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4
Firm size	0.0220***	0.0190*	0.0180*	0.0188*
	(0.0068)	(0.0105)	(0.0102)	(0.0105)
Book leverage	0.0732	0.0705	0.0786	0.0699
	(0.0560)	(0.0613)	(0.0616)	(0.0610)
Tobin's Q	0.0240***	0.0248***	0.0246***	0.0246***
	(0.0082)	(0.0081)	(0.0081)	(0.0080)
Cash flows	-0.1357	-0.1159	-0.1010	-0.1085
	(0.2177)	(0.2102)	(0.2097)	(0.2077)
ROA	0.4435***	0.4444***	0.4500***	0.4335***
	(0.1153)	(0.1167)	(0.1168)	(0.1155)
M&A experience	-0.0122**	-0.0116**	-0.0114**	-0.0112**
	(0.0050)	(0.0052)	(0.0051)	(0.0051)
Serial acquirer	0.0462**	0.0479**	0.0471**	0.0475**
	(0.0202)	(0.0208)	(0.0208)	(0.0207)
M&A liquidity index	-0.4377	-0.4058	-0.4166	-0.4135
	(0.5188)	(0.5264)	(0.5251)	(0.5260)
CEO overconfidence	-0.0107	-0.0091	-0.0120	-0.0103
	(0.0272)	(0.0274)	(0.0266)	(0.0276)
Public target	-0.0284	-0.0265	-0.0272	-0.0256
	(0.0230)	(0.0228)	(0.0229)	(0.0228)
Stock deal	0.0137	0.0176	0.0180	0.0170
	(0.0247)	(0.0235)	(0.0233)	(0.0233)
Relative deal size	0.0198	0.0172	0.0178	0.0185
	(0.0301)	(0.0290)	(0.0291)	(0.0291)
Diversifying deal	-0.0119	-0.0127	-0.0130	-0.0121
	(0.0184)	(0.0187)	(0.0187)	(0.0186)
Board size		0.0114**	0.0104**	0.0116**
		(0.0052)	(0.0052)	(0.0052)
Non-co-opted independence (NCI)		0.0276	0.0300	0.0291
		(0.0367)	(0.0366)	(0.0369)
CEO/Chair duality		-0.0072	-0.0075	-0.0072
		(0.0188)	(0.0188)	(0.0187)
CEO vega		0.0037	0.0081	0.0041
		(0.0561)	(0.0542)	(0.0554)
CEO delta		0.0018	0.0019	0.0015
		(0.0042)	(0.0042)	(0.0043)
CEO cash pay		-0.0257	-0.0234	-0.0276
		(0.0285)	(0.0278)	(0.0284)
Dedicated institutional ownership (Ded IO)		-0.0897	-0.0878	0.1816
		(0.1508)	(0.1503)	(0.1529)
Board size × CEO cash pay			0.0069*	
			(0.0042)	

	Controls	Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4
CEO/Chair duality × Ded IO				-0.4966**
				(0.2065)
Constant	0.0567	0.0567	0.0535	0.0663*
	(0.0367)	(0.0348)	(0.0350)	(0.0358)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Number of Observations	1,890	1,890	1,890	1,890
R^2	0.0995	0.1041	0.1050	0.1062
Adjusted R^2	0.0780	0.0793	0.0796	0.0809
F	5.5866	5.7156	5.8222	5.6973
⊿R^2 from Model 2			0.0008	0.0021
⊿F from Model 2			2.7149	5.7842
(Prob > F)			(0.100)	(0.016)

Figure 5-3 Complementary effect of CEO cash pay and board size on acquirer long-term post-acquisition performance

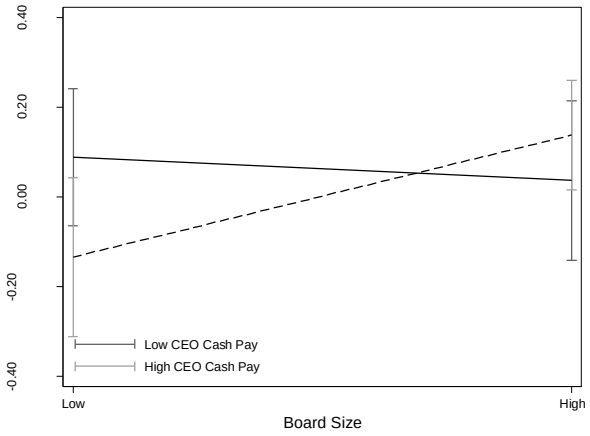

Figure 5-4 Complementary effect of dedicated institutional ownership and CEO non-duality on acquirer long-term post-acquisition performance

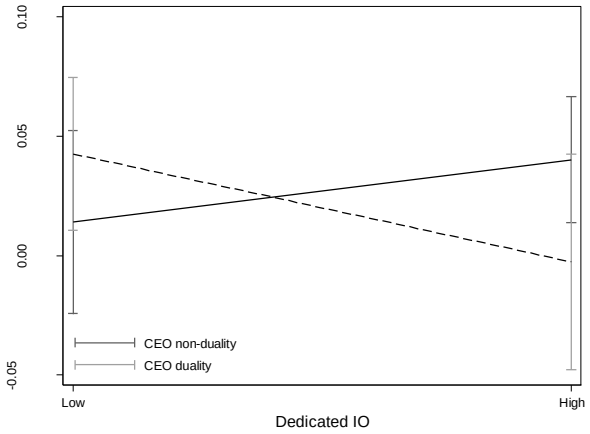

Table 5-6 Robustness test using alternative event windows for the short-term post-acquisition performance analysis

The table reports OLS regression estimates of different event windows for the calculation of CARs used in the short-term post-acquisition performance analysis. The dependent variable is the acquirers' *3-day CARs* in Models 1-3 and the *7-day CARs* in Models 4-6. Models 1 and 4 are the main effects models and Models 2-3 and 5-6 present the results of the significant pair-wise interactions between the main governance mechanisms examined. ⊿R^2 denotes the change in R^2 from the main effects models. ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects models. Variable definitions are provided in Appendix C. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	3-day CARs			7-day CARs		
	Main Effects	Interactions		Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Board size	0.0006	0.0007	0.0007	0.0002	0.0003	0.0003
	(0.0007)	(0.0007)	(0.0007)	(0.0009)	(0.0009)	(0.0009)
Non-co-opted independence (NCI)	-0.0056	-0.0052	-0.0055	-0.0075	-0.0071	-0.0073
	(0.0049)	(0.0049)	(0.0049)	(0.0068)	(0.0068)	(0.0068)
CEO/Chair duality	-0.0013	-0.0014	-0.0016	-0.0022	-0.0024	-0.0027
	(0.0026)	(0.0026)	(0.0026)	(0.0036)	(0.0036)	(0.0036)
CEO vega	-0.0043	-0.0029	-0.0056	0.0019	0.0035	0.0002
	(0.0093)	(0.0093)	(0.0093)	(0.0123)	(0.0123)	(0.0124)
CEO delta	0.0012	0.0013	0.0043*	0.0000	0.0002	0.0039**
	(0.0010)	(0.0010)	(0.0022)	(0.0013)	(0.0012)	(0.0016)
CEO cash pay	0.0062**	0.0068**	0.0065**	0.0037	0.0044	0.0041
	(0.0029)	(0.0029)	(0.0029)	(0.0042)	(0.0042)	(0.0042)
Dedicated institutional ownership (Ded IO)	-0.0072	-0.0084	-0.0089	-0.0583*	-0.0597*	-0.0604*
	(0.0229)	(0.0229)	(0.0228)	(0.0341)	(0.0342)	(0.0341)
Board size × CEO delta		-0.0008**			-0.0010**	
		(0.0004)			(0.0005)	
CEO/Chair duality × CEO delta			-0.0043*			-0.0053***
			(0.0023)			(0.0019)
Constant	0.0117	0.0113	0.0121	0.0258**	0.0253**	0.0263**
	(0.0092)	(0.0091)	(0.0092)	(0.0128)	(0.0127)	(0.0129)

	3-day CARs			7-day CARs		
	Main Effects	Interactions		Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm & Industry control variables	Yes	Yes	Yes	Yes	Yes	Yes
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	2,041	2,041	2,041	2,041	2,041	2,041
R^2	0.0614	0.0636	0.0639	0.0412	0.0428	0.0433
Adjusted R^2	0.0374	0.0391	0.0394	0.0166	0.0178	0.0183
F	2.5659	2.5668	2.5681	1.6615	1.7448	1.7083
⊿R^2 from main effects model		0.0022	0.0025		0.0016	0.0021
⊿F from main effects model		5.4854	3.3999		4.3622	7.6859
(Prob > F)		(0.019)	(0.066)		(0.037)	(0.006)

Table 5-7 Robustness test using institutional ownership concentration

The table presents the results from the OLS regressions of the acquirers' *5-day CARs* using institutional ownership concentration as a proxy for monitoring institutional investors instead of dedicated institutional ownership. Model 1 is the main effects model. Models 2 and 3 present the significant pair-wise interactions between the main governance mechanisms examined. ⊿R^2 denotes the change in R^2 from the main effects model (Model 1). ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects model (Model 1). Variable definitions are provided in Appendix C. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Main Effects	Interactions	
	Model 1	Model 2	Model 3
Board size	0.0008	0.0009	0.0009
	(0.0007)	(0.0008)	(0.0007)
Non-co-opted independence (NCI)	-0.0048	-0.0043	-0.0047
	(0.0059)	(0.0058)	(0.0058)
CEO/Chair duality	-0.0015	-0.0017	-0.0019
	(0.0031)	(0.0031)	(0.0031)
CEO vega	-0.0053	-0.0033	-0.0067
	(0.0108)	(0.0108)	(0.0108)
CEO delta	0.0007	0.0009	0.0039***
	(0.0011)	(0.0010)	(0.0015)
CEO cash pay	0.0049	0.0057	0.0052
	(0.0036)	(0.0036)	(0.0037)
Institutional ownership concentration (IOC)	-0.0142	-0.0160	-0.0149
	(0.0209)	(0.0209)	(0.0210)
Board size × CEO delta		-0.0012***	
		(0.0004)	
CEO/Chair duality × CEO delta			-0.0045**
			(0.0018)
Constant	0.0104	0.0095	0.0106
	(0.0111)	(0.0110)	(0.0112)
Firm & Industry control variables	Yes	Yes	Yes
CEO control variables	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Number of Observations	2,041	2,041	2,041
R^2	0.0481	0.0512	0.0500
Adjusted R^2	0.0237	0.0264	0.0252
F	2.0856	2.1773	2.1036
⊿R^2 from Model 1		0.0032	0.0020
⊿F from Model 1		8.4859	6.0515
(Prob > F)		(0.004)	(0.014)

Table 5-8 Sub-sample analysis: Regression results for the sub-sample of large M&A deals

The table reports the results from the OLS regressions for the sub-sample of large M&A deals (i.e. deal value is at least US$ 10 million). The dependent variable is the *5-day CARs* in Models 1-3 and the *industry-adjusted ROA* for the three years after acquisition in Models 4-6. Models 1 and 4 are the main effects models and Models 2-3 and 5-6 present the results of the significant pair-wise interactions between the main governance mechanisms examined. ⊿R^2 denotes the change in R^2 from the main effects models. ⊿F denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects models. Variable definitions are provided in Appendix C. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	5-day CARs			Industry-adjusted ROA		
	Main Effects	Interactions		Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Board size	0.0008	0.0009	0.0009	0.0124**	0.0113**	0.0127**
	(0.0008)	(0.0008)	(0.0008)	(0.0052)	(0.0052)	(0.0052)
Non-co-opted independence (NCI)	-0.0086	-0.0082	-0.0085	0.0101	0.0128	0.0115
	(0.0061)	(0.0061)	(0.0061)	(0.0353)	(0.0350)	(0.0355)
CEO/Chair duality	-0.0019	-0.0021	-0.0022	-0.0157	-0.0156	-0.0156
	(0.0032)	(0.0032)	(0.0032)	(0.0196)	(0.0196)	(0.0195)
CEO vega	-0.0041	-0.0022	-0.0056	0.0143	0.0180	0.0149
	(0.0111)	(0.0111)	(0.0112)	(0.0494)	(0.0481)	(0.0489)
CEO delta	0.0006	0.0009	0.0038***	0.0007	0.0008	0.0005
	(0.0012)	(0.0010)	(0.0015)	(0.0037)	(0.0037)	(0.0038)
CEO cash pay	0.0047	0.0055	0.0049	-0.0248	-0.0229	-0.0267
	(0.0037)	(0.0037)	(0.0038)	(0.0239)	(0.0233)	(0.0238)
Dedicated institutional ownership (Ded IO)	-0.0165	-0.0181	-0.0184	-0.2142	-0.2114	0.0449
	(0.0292)	(0.0292)	(0.0292)	(0.1496)	(0.1492)	(0.1401)
Board size × CEO delta		-0.0012***				
		(0.0004)				
CEO/Chair duality × CEO delta			-0.0043**			
			(0.0018)			
Board size × CEO cash pay					0.0068*	
					(0.0039)	
CEO/Chair duality × Ded IO						-0.4745**
						(0.2118)
Constant	0.0121	0.0115	0.0125	0.0723**	0.0686**	0.0815**
	(0.0116)	(0.0115)	(0.0117)	(0.0333)	(0.0335)	(0.0348)

	5-day CARs			Industry-adjusted ROA		
	Main Effects	Interactions		Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm & Industry control variables	Yes	Yes	Yes	Yes	Yes	Yes
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1,894	1,894	1,894	1,761	1,761	1,761
R^2	0.0568	0.0602	0.0587	0.0989	0.0998	0.1010
Adjusted R^2	0.0307	0.0336	0.0322	0.0720	0.0724	0.0736
F	2.2376	2.3281	2.2593	5.8365	5.9954	5.8348
⊿R^2 from main effects model		0.0033	0.0019		0.0009	0.0021
⊿F from main effects model		8.0602	5.7797		3.0357	5.0174
(Prob > F)		(0.005)	(0.016)		(0.082)	(0.025)

Table 5-9 Sub-sample analysis: Regression results for the sub-sample of M&A deals involving private targets

The table reports the results from the OLS regressions for the sub-sample of M&A deals involving private targets only. The dependent variable is the *5-day CARs* in Models 1-3 and the *industry-adjusted ROA* for the three years after acquisition in Models 4-6. Models 1 and 4 are the main effects models and Models 2-3 and 5-6 present the results of the pair-wise interactions between the main governance mechanisms found significant in the full-sample (main) analysis. ΔR^2 denotes the change in R^2 from the main effects models. ΔF denotes a test of the joint significance of the subset of coefficients that are introduced in each model compared to the main effects models. Variable definitions are provided in Appendix C. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	5-day CARs			Industry-adjusted ROA		
	Main Effects	Interactions		Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Board size	0.0000	0.0002	0.0000	0.0087	0.0086	0.0093
	(0.0009)	(0.0009)	(0.0009)	(0.0059)	(0.0060)	(0.0059)
Non-co-opted independence (NCI)	-0.0030	-0.0022	-0.0031	0.0414	0.0423	0.0440
	(0.0068)	(0.0068)	(0.0068)	(0.0412)	(0.0413)	(0.0412)
CEO/Chair duality	0.0024	0.0022	0.0025	-0.0070	-0.0071	-0.0093
	(0.0037)	(0.0037)	(0.0037)	(0.0222)	(0.0222)	(0.0226)
CEO vega	0.0056	0.0073	0.0059	0.0166	0.0174	0.0200
	(0.0135)	(0.0137)	(0.0135)	(0.0717)	(0.0708)	(0.0700)
CEO delta	0.0010	0.0017	0.0005	0.0008	0.0009	0.0006
	(0.0013)	(0.0012)	(0.0024)	(0.0056)	(0.0056)	(0.0058)
CEO cash pay	0.0018	0.0026	0.0017	-0.0265	-0.0247	-0.0274
	(0.0048)	(0.0048)	(0.0049)	(0.0343)	(0.0332)	(0.0342)
Dedicated institutional ownership (Ded IO)	-0.0103	-0.0136	-0.0099	-0.1258	-0.1270	0.1886
	(0.0333)	(0.0334)	(0.0333)	(0.2032)	(0.2038)	(0.1548)
Board size × CEO delta		-0.0012**				
		(0.0005)				
CEO/Chair duality × CEO delta			0.0007			
			(0.0025)			
Board size × CEO cash pay					0.0026	
					(0.0050)	
CEO/Chair duality × Ded IO						-0.6627**
						(0.3166)
Constant	0.0210	0.0209	0.0209	0.0890	0.0874	0.1049*
	(0.0151)	(0.0150)	(0.0151)	(0.0602)	(0.0604)	(0.0629)

	5-day CARs			Industry-adjusted ROA		
	Main Effects	Interactions		Main Effects	Interactions	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm & Industry control variables	Yes	Yes	Yes	Yes	Yes	Yes
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1,334	1,334	1,334	1,246	1,246	1,246
R^2	0.0499	0.0541	0.0500	0.1281	0.1282	0.1322
Adjusted R^2	0.0129	0.0165	0.0122	0.0916	0.0910	0.0951
F	1.1044	1.1327	1.0818	4.7480	4.6829	4.7155
⊿R^2 from Model 1		0.0042	0.0000		0.0001	0.0041
⊿F from Model 1		6.5478	0.0725		0.2754	4.3812
(Prob > F)		(0.011)	(0.788)		(0.600)	(0.037)

6 Conclusion

6.1 Background of the Thesis

Even though M&A constitute major forms of corporate investment and have become a central focus of study of a rich body of research in several academic fields, yet our understanding of their antecedents and consequences still remains fragmented. There has been also less attention to the implications of corporate governance on the investment function of the firm.

The overarching purpose of this thesis is therefore to provide a more nuanced understanding of the role of corporate governance in acquisition decisions and outcomes. In doing so, this thesis examined three major research questions: *(Q1) "To what extent do firm-level governance mechanisms operate in a substitutive and/or a complementary fashion in influencing firm acquisitiveness?" (Q2) "What is the role of acquirer corporate governance in acquisition premium decisions?", and (Q3) "To what extent do firm-level governance mechanisms operate in a substitutive and/or a complementary fashion in influencing acquirer post-acquisition performance?"*

The three research questions have been addressed in the three empirical chapters comprising the thesis.

6.2 Summary of Findings

6.2.1 Corporate Governance "Bundles" and Firm Acquisitiveness

Chapter 3 which is the first empirical study, shows strong evidence that the interrelations of certain firm-specific governance mechanisms influence a firm's propensity to undertake corporate acquisitions. Using a sample of US firm acquisitions for the period from 1998 to 2015 and drawing from the literature on the *configurational* perspective in corporate governance, the chapter finds a number of significant interactions between incentive alignment and monitoring governance mechanisms with regards to influencing the likelihood of a firm to undertake an acquisition. Specifically, the findings show significant substitutive effects between the following incentive alignment and monitoring governance mechanisms: CEO delta and board size, CEO cash pay and non-co-opted board independence, CEO cash pay and CEO non-duality, and CEO cash pay and institutional ownership concentration; thus mainly providing support for the *Substitution Hypothesis*. In this respect, the "less is more" notion seems to apply when it comes to pairs of monitoring and incentive alignment mechanisms, as they substitute each other to encourage firm acquisitiveness. Notably, the

chapter also finds a complementary effect between board size and institutional ownership concentration, which implies that in the presence of vigilant monitoring by both the board of directors and large and concentrated institutional shareholders, then these mechanisms work synergistically in reducing a firm's acquisition likelihood.

The abovementioned findings are robust to alternative model specifications and to the use of a different proxy for institutional investor monitoring based on the investment horizons of the institutional investors.

Overall, the study confirms the importance of considering the interdependence of governance mechanisms and the results supplement the growing body of research which explores the substitutive and complementary effects between different governance mechanisms with respect to certain organisational outcomes, such as post-acquisition performance of the acquiring firm (Masulis et al., 2007), poison pill repeal (Schepker and Oh, 2013), firm profitability (Misangyi and Acharya, 2014), and corporate social responsibility (Oh et al., 2016).

6.2.2 The Moderating Role of Corporate Governance in Acquisition Premium Decisions

The second empirical investigation, presented in Chapter 4, examines the role of corporate governance in acquisition premium decisions. The study is novel by offering evidence of the moderating role of the acquirer's corporate governance in the relationship between synergy-driven M&A motives and the size of the acquisition premium paid. Two key types of synergies are considered in this study, namely operational and financial synergies. By using a sample of M&A made by publicly traded US firms from 1998-2015, and after controlling for an extensive set of acquirer, target and deal characteristics, the main findings of this chapter show three significant pair-wise interaction effects between synergy proxies and various acquirer's governance mechanisms with respect to influencing the size of the four-week acquisition premium. First, a significant and positive interaction between operational synergies and CEO/Chair duality is found, suggesting that the dual board leadership structure results in firms overpaying for related M&A deals. Second, there is a positive and significant interaction between operational synergies and CEO cash pay, indicating that a higher level of CEO cash-based compensation is, in fact, more effective in curbing the propensity of the acquirer to pay a higher premium for targets in unrelated industries. Third, a negative and significant interaction between financial synergies and dedicated institutional ownership is detected, which implies that the presence of a large fraction of dedicated institutional investors is effective in reducing overpayment in an M&A

deal. These results are qualitatively robust to using different measures of the acquisition premium.

In addition, the chapter finds that during the recent financial crisis the efficacy of corporate governance mechanisms has been hampered due to increased information asymmetry problems which in turn resulted in more pronounced agency conflicts in the M&A setting. Specifically, by excluding the recent financial crisis years (2008-2010), the results reveal three more negative and significant interaction terms between financial synergies (FS) and three other governance mechanisms (i.e. FS × Board size, FS × CEO vega, and FS × CEO cash pay). Taken together, these results lend additional support to the key hypothesis of this study that acquirer corporate governance moderates the effect of synergies (in this case financial synergies) on the acquisition premium paid.

6.2.3 Corporate Governance "Bundles" and Acquirer Post-Acquisition Performance

Chapter 5, finally, provides evidence that the interdependence of firm-level governance mechanisms affects acquirer post-acquisition performance both in the short run and in the long run, by considering the *configurational* perspective in corporate governance, as previously tested in Chapter 3. The study is conducted for a sample of US firm M&A deals covering 1998 to 2015 to ensure that acquirers have the minimum required information for the long-term performance analysis three years after deal completion. In particular, the short-term performance analysis provides support for both the *Substitution* and *Complementarity Hypotheses* between different pairs of monitoring and incentive alignment governance mechanisms. First, board size which is a monitoring governance mechanism and CEO pay incentives in the form of CEO delta act as substitutes in promoting short-term acquirer performance, suggesting that the market perceives a larger board of directors as an impediment to increasing shareholder value, if the CEO is already well-aligned with a high level of pay incentives. However, in the case where incentive-based compensation is not perceived by the market to provide efficient incentives (low CEO delta), then a larger board size allows for better monitoring of the acquirer's management and is associated with higher acquirer returns. Second, the separate board leadership structure (i.e. CEO non-duality) and CEO delta synergistically promote short-term acquirer performance, implying a mutual enhancement effect between CEO-board Chair separation, which strengthens the ability of the board to effectively monitor management decisions, and well-aligned CEO compensation contracts, towards increasing acquirer performance in the short term.

Instead, the results of the long-run performance analysis point to complementary only effects between governance mechanisms in influencing the long-term operating performance

of the acquirer. Specifically, board size and CEO cash pay act as complements in improving the operating performance of the acquirer during the three years after deal completion. The second finding of this analysis is that CEO non-duality and dedicated institutional ownership complement each other in increasing the operating post-acquisition performance of the acquirer in the long-run.

In subsequent analyses, the findings of both the short-term and long-term performance analyses are robust to a sub-sample of large M&A deals which are more likely to require the personal attention of the CEO during the acquisition process. However, only partial support of the main inferences is found for the sub-sample of private acquisitions, in line with the possibility of heightened agency problems resulting from more severe information asymmetry issues in acquisitions of privately-held targets, which in turn may hinder the effectiveness of certain governance configurations with respect to influencing the post-acquisition performance of the acquirer.

In sum, the study successfully demonstrates the presence of interactive effects of various governance mechanisms on acquirer post-acquisition performance, thus providing valuable insights into the impact of corporate governance on the short-term and long-term value effects of M&A.

6.3 Theoretical and Managerial Implications

The findings reported in this thesis have important implications for the role of governance structure of firms seeking to pursue M&A investments in three key stages of the acquisition process, namely the decision to engage in M&A, the cost of the M&A deal in terms of the acquisition premium paid, and its effects on acquirer performance in the post-acquisition period.

Based on the findings of the three empirical chapters, the first conclusion is that monitoring exercised by internal mechanisms, such as the board of directors as well as by external third parties, such as institutional investors, have been found to influence significantly these three diverse aspects of the M&A activity. Specifically, the findings presented in the first and third empirical chapters provide strong support that in the presence of vigilant monitoring by two monitoring mechanisms (one internal and one external), then these mechanisms interact as complements in reducing a firm's acquisition propensity or promoting the acquirer's long-term operating post-acquisition performance. In addition, the findings of the second empirical chapter point to the benefits associated with internal and external monitoring mechanisms as they protect the firms from overpaying in M&A deals in terms of the acquisition premium paid. In particular, internal and external monitoring

governance mechanisms have been found to moderate the relationship between synergies (either operational or financial) and the size of the acquisition premium paid.

Second, this thesis provides evidence to show that incentive alignment governance mechanisms such as managerial incentives, are in fact more effective in either encouraging firm acquisitiveness or promoting short-term acquirer performance when there are low (rather than high) levels of either internal (board of directors) or external (institutional investors) monitoring governance mechanisms. Conversely, the presence of high levels of monitoring mechanisms weakens the positive effect of incentive alignment mechanisms on both the acquisition propensity and the short-term post-acquisition performance of the acquirer.

Third, the findings presented in the last empirical chapter of this thesis show that certain pairs of incentive alignment and monitoring governance mechanisms work synergistically in enhancing the short-term as well as the long-term post-acquisition performance of the acquirer. In other words, vigilant monitoring and the presence of well-incentivised CEOs complement each other towards increasing acquirer performance both in the short term and in the long term.

Overall, the empirical findings in this thesis clearly demonstrate the influence of "bundles" of governance arrangements on M&A decisions and outcomes. Considering the fact that implementing simultaneously multiple governance practices is costly to the firm (Rediker and Seth, 1995), this thesis highlights the need for firms to design and implement a corporate governance structure in terms of governance "bundles" to achieve optimal outcomes, especially when M&A comprise a significant part of their strategic growth. In particular, the findings of the first and third empirical chapters should be of interest to governance practitioners as they call into question the development of "one-size-fits-all" policy prescriptions in governance. Using a "bundles" perspective moves governance research and practice beyond universalistic approaches and toward a configurational logic that takes into account the interdependence of governance mechanisms in influencing organisational decisions and outcomes. Consistent with the idea of "equifinality", firms should take into account trade-offs among different governance mechanisms in designing governance structures to reach optimal outcomes depending on their own circumstances. Moreover, the findings of the second empirical chapter in this thesis show that acquirer governance arrangements can indeed affect the cost of an M&A deal and reduce the overpayment potential in M&A.

6.4 Limitations and Future Research Directions

As with all research, it is necessary to acknowledge certain limitations of the empirical studies of this thesis and consider avenues for future research. Regarding the first empirical chapter, the main limitation relates to the fact that we concentrated exclusively on US firms so as to explore the interdependence of firm-level governance mechanisms on acquisition decisions. Thus, our findings apply mainly to the Anglo-American or shareholder-oriented governance system. More work is therefore needed to reveal if the observed interactive effects between the governance mechanisms under investigation hold in international settings, considering cross-national differences and differences in the national models of corporate governance. Future research could make important contributions by extending the sample to include cross-border or M&A deals in other countries and explore how different governance arrangements may interact with one another to influence a firm's acquisitiveness; for example, in countries where the continental or stakeholder-oriented governance model is prevalent such as Germany and Japan. Moving beyond the M&A setting and given the emerging interest in the *configurational* perspective in corporate governance, it would be interesting to examine the substitutive and/or complementary effects between governance mechanisms in other firm decisions, such as decisions about R&D expenditures and asset divestitures, or how different governance configurations may work better at avoiding financial misconduct.

Concerning the empirical investigation presented in the second empirical chapter, the market value-based premium employed in the analysis is not a clean overpayment proxy, considering the strong empirical support for the *misvaluation hypothesis* as an important driver of the M&A activity (e.g., Rhodes-Kropf and Viswanathan, 2004; Rhodes–Kropf et al., 2005; Dong et al., 2006). The *misvaluation hypothesis* of M&A predicts that targets (and bidders) may have market values that deviate from the true value of their firms (and the potential synergies), which, in turn, affects different facets of the M&A process, including the acquisition premium. Although actual overpayment is complex to measure, future research could address this issue by using analysts' forecasts of earnings to replace the target stock price prior to the deal announcement in the calculation of the market-value based premium. This measure of potential overpayment could provide greater insight into the moderating role of the acquirer's corporate governance in the relationship between synergy-driven merger motives and actual overpayment in M&A deals.

The post-acquisition performance analysis presented in the third empirical chapter is based on stock market returns and financial accounting measures for the short-term and long-term performance effects, respectively, with an aim to evaluate the impact of M&A

events on the value of the firm. However, organisational performance is a multi-dimensional construct that can be measured by a variety of imperfect performance metrics, whereas organisational effectiveness is a broader concept that captures both organisational performance as well as other performance objectives linked with the efficiency or effectiveness of firm operations, taking also into account the heterogeneous firm resources, strategic choices and management practices (Richard et al., 2009). In line with this reasoning, to develop a deeper understanding of the consequences of M&A and assess the true value effects of such strategic events, greater attention to exploring the factors that foster effective post-acquisition integration and successful M&A implementation seems warranted. Accordingly, future research could explore how the interrelations of governance mechanisms influence an acquirer's post-acquisition systematic risk, as another facet of acquisition performance, or whether certain governance "bundles" affect the possibility of withdrawn M&A deals.

There are also several limitations pertaining to the thesis as a whole that present fruitful avenues for future research. First, we focussed on the board of directors and institutional shareholders as monitoring mechanisms and on certain CEO compensation-alignment mechanisms for the governance variables used in the three empirical chapters. Given a plethora of corporate governance mechanisms available to firms, future research could examine the interplay of other governance mechanisms in the context of acquisition decisions and outcomes. An interesting avenue for future work would be to examine how the compensation of top management teams (TMT) interacts with other governance mechanisms in influencing key strategic events such as corporate acquisitions. Besides the CEO, other executives of the so-called "C-suite" like the Chief Financial Officer (CFO) are considered to contribute to the firm's strategic decision making. Other mechanisms relating to the board of directors include, for instance, the presence of board committees, board busyness, board diversity, directors' compensation, and other director characteristics. Furthermore, there is scope for exploring the interrelations between different aspects of the same governance mechanism such as the interrelations between different elements of the managerial compensation package (both equity and non-equity based).

Second, we used only archival data in this thesis. Arguably, we used more refined proxies for our board characteristics than previously used "noisy" measures (e.g., non-co-opted board independence vs. a conventional measure of board independence-proportion of independent directors). Nevertheless, our measures still prevent us from gaining an in-depth understanding of the underlying team-based and decision-making processes of boards of directors. Hence, a fruitful avenue for future enquiry would be to delve into the inner

workings of boardrooms by collecting primary data through questionnaire surveys and interviews of board members in order to better capture the effects of board monitoring on acquisition decisions and outcomes.

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Appendix A

Table A-1 Variable definitions

Variables	Definition	Data source
Panel A: Dependent variable		
Acquisition propensity	A dummy variable which takes the value of one if the firm made an acquisition in a given year, and zero otherwise.	Thomson One Banker
Acquisition likelihood	A continuous variable which is the sum of the predicted acquisition probabilities for the sample years derived from the first phase of the two-phase approach following Pindado et al. (2008) and Hillier et al. (2011).	As estimated in Table 3-1
Panel B: Independent variables		
Board size	The total number of directors on the board.	ISS (former RiskMetrics)
Non-co-opted independence	The number of independent directors appointed before the CEO assumed office divided by the board size.	ISS, https://sites.temple.edu/lnaveen/data/
CEO/Chair duality	A dummy variable which takes the value of one if the CEO is also the Chair of the board, and zero otherwise.	ExecuComp
CEO vega (scaled)	The dollar change in the portfolio of options of the CEO for a 1% change in the annual standard deviation of stock returns at the fiscal year-end, scaled by CEO cash pay and expressed as a percentage.	ExecuComp, https://sites.temple.edu/lnaveen/data/
CEO delta (scaled)	The dollar change in the portfolio of options and equity holdings of the CEO for a 1% change in stock price at the fiscal year-end, scaled by CEO cash compensation and expressed as a percentage.	ExecuComp, https://sites.temple.edu/lnaveen/data/
CEO cash pay	The natural logarithm of the CEO cash compensation (sum of salary and bonus in thousands of dollars) at the fiscal year-end.	ExecuComp
Institutional Ownership Concentration	The percentage of the sum of shareholdings held by the five largest institutional investors to the total shares outstanding at the fiscal year-end.	Thomson Financial 13F, CRSP
Dedicated Institutional Ownership	The percentage of ownership by dedicated institutional investors by Bushee's (1998; 2001) standards.	http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html, Thomson Financial 13F, CRSP

Variables	Definition	Data source
Panel C: Firm & Industry characteristics		
Firm size	The natural logarithm of the book value of total assets in the fiscal year.	Compustat
Book leverage	The book value of total debt (long-term plus short-term debt) divided by the book value of total assets at the fiscal year-end.	Compustat
Sales growth	The ratio of the sales in the current fiscal year to the sales in the previous fiscal year minus one.	Compustat
Market-to-book ratio	The ratio of the market value of total assets to the book value of total assets at the fiscal year-end, where the market value of assets is defined as the book value of assets plus the market value of common stock minus the book value of common stock.	Compustat
Cash flows	Operating income before depreciation minus income taxes minus interest expenses minus dividends (common and preferred), divided by the book value of total assets at the fiscal year-end.	Compustat
Cash holdings	Cash and short-term investments, scaled by the book value of total assets at the fiscal year-end.	Compustat
ROA	Net income divided by the book value of total assets at the fiscal year-end.	Compustat
M&A liquidity index	The ratio of the value of all corporate control transactions of at least $1 million reported by the Thomson One Banker for each Fama–French 49-industry classification and year to the total book value of assets of all Compustat firms in the same Fama–French 49-industry classification and year.	Compustat, Thomson One Banker
Panel D: CEO characteristics		
CEO tenure	The tenure of the CEO in years at the fiscal year-end. It is the difference between the fiscal year-end date and the date that the person became CEO.	ExecuComp
CEO age	The age of the CEO in years at the fiscal year-end.	ExecuComp
CEO gender	A dummy variable which takes the value of one if the CEO is female, and zero otherwise.	ExecuComp
CEO overconfidence	A dummy variable which takes the value of one if the CEO is identified as overconfident, and zero otherwise. CEOs are overconfident if they delay the exercise of vested options which are at least 67% in the money. We follow Campbell et al. (2011) in order to calculate the average moneyness of the CEO's option for each sample year. First, for each CEO-year, the average realisable value per option is calculated by dividing the total realisable value of options by the number of options held by the CEO. Second, the strike price is calculated by subtracting the average realisable value per option from the stock price at the end of the fiscal year. The average percent moneyness of the options is computed by dividing the stock price at the fiscal year-end by the estimated strike price minus one.	ExecuComp
CEO ownership	The shares held by the CEO, excluding options, divided by the number of shares outstanding at the fiscal year-end.	ExecuComp, Compustat

Table A-2 Non-significant interaction effects

The table reports the non-significant pair-wise interactions between the main governance mechanisms examined for the firm fixed effects model. The dependent variable is the predicted acquisition likelihood derived from the first phase of the two-phase approach, as shown in Table 3-1. The following control variables are included in all of the regressions, whose coefficients are suppressed: CEO tenure, CEO age, CEO gender, CEO overconfidence, CEO ownership, and year fixed effects. Variable definitions are provided in Appendix A, Table A-1. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Interactions									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Board size	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003	-0.0003
	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Non-co-opted independence (NCI)	-0.0054	-0.0054	-0.0054	-0.0052	-0.0053	-0.0052	-0.0053	-0.0052	-0.0054	-0.0052
	(0.0044)	(0.0044)	(0.0044)	(0.0045)	(0.0044)	(0.0044)	(0.0044)	(0.0044)	(0.0044)	(0.0044)
CEO/Chair duality	0.0009	0.0009	0.0010	0.0009	0.0009	0.0010	0.0011	0.0010	0.0009	0.0009
	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)	(0.0024)
CEO vega	0.0049	0.0049	0.0014	0.0011	0.0012	-0.0058	0.0018	0.0012	0.0025	0.0013
	(0.0089)	(0.0089)	(0.0083)	(0.0085)	(0.0084)	(0.0125)	(0.0084)	(0.0084)	(0.0083)	(0.0084)
CEO delta	0.0037***	0.0037***	0.0037***	0.0038***	0.0037***	0.0037***	0.0026**	0.0037***	0.0038***	0.0037***
	(0.0007)	(0.0007)	(0.0007)	(0.0008)	(0.0007)	(0.0007)	(0.0013)	(0.0007)	(0.0007)	(0.0007)
CEO cash pay	0.0244***	0.0244***	0.0244***	0.0244***	0.0244***	0.0245***	0.0245***	0.0244***	0.0244***	0.0244***
	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)	(0.0023)
Institutional ownership concentration (IOC)	-0.0632***	-0.0632***	-0.0629***	-0.0628***	-0.0628***	-0.0630***	-0.0624***	-0.0651***	-0.0620***	-0.0629***
	(0.0110)	(0.0110)	(0.0110)	(0.0110)	(0.0110)	(0.0110)	(0.0110)	(0.0146)	(0.0112)	(0.0110)
Board size × CEO vega	-0.0038	-0.0038								
	(0.0028)	(0.0028)								
NCI × CEO vega			-0.0199							
			(0.0254)							
NCI × CEO delta				0.0002						
				(0.0021)						

	Interactions									
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
NCI × IOC					-0.0137					
					(0.0363)					
CEO/Chair duality × CEO vega						0.0111				
						(0.0139)				
CEO/Chair duality × CEO delta							0.0018			
							(0.0016)			
CEO/Chair duality × IOC								0.0040		
								(0.0185)		
CEO vega × IOC									0.0497	
									(0.0744)	
CEO delta × IOC										-0.0006
										(0.0027)
Constant	0.1901***	0.1901***	0.1900***	0.1901***	0.1901***	0.1900***	0.1899***	0.1901***	0.1901***	0.1901***
	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0047)
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	12,643	12,643	12,643	12,643	12,643	12,643	12,643	12,643	12,643	12,643
R^2	0.1460	0.1460	0.1458	0.1457	0.1458	0.1458	0.1462	0.1457	0.1458	0.1457
Adjusted R^2	0.1440	0.1440	0.1438	0.1437	0.1437	0.1438	0.1441	0.1437	0.1438	0.1437

Appendix B

Table B-1 Variable definitions

Variables	Definition	Data source
Panel A: Dependent variables		
Four-week premium	The percentage difference between the offer price and the target's closing stock price four weeks prior to the M&A deal announcement date (field PPM4WK in Thomson One Banker).	Thomson One Banker
One-week premium	The percentage difference between the offer price to target closing stock price one week prior to the M&A deal announcement date (field PPMWK in Thomson One Banker).	Thomson One Banker
Offer premium	The log percentage difference between the offer price (from Thomson One Banker) and the target's share price (from CRSP) four weeks prior to the M&A deal announcement as in Baker et al. (2012).	Thomson One Banker, CRSP
Panel B: Independent variables		
Operational synergies	A dummy variable which takes the value of one if the acquirer and the target firm operate in the same industry, sharing the same four-digit SIC codes, and zero otherwise.	Thomson One Banker
Financial synergies	The target debt ratio less the acquirer debt ratio at the fiscal year-end., where debt ratio is the book value of total debt (long-term plus short-term debt) divided by the book value of total assets.	Compustat
Panel C: Acquirer characteristics		
Board size	The total number of directors on the board.	ISS (former RiskMetrics)
Non-co-opted independence	The number of independent directors appointed before the CEO assumed office divided by the board size.	ISS, https://sites.temple.edu/lnaveen/data/
CEO/Chair duality	A dummy variable which takes the value of one if the CEO is also the Chair of the board, and zero otherwise.	ExecuComp
CEO vega (scaled)	The dollar change in the portfolio of options of the CEO for a 1% change in the annual standard deviation of stock returns at the fiscal year-end, scaled by CEO cash pay and expressed as a percentage.	ExecuComp, https://sites.temple.edu/lnaveen/data/
CEO delta (scaled)	The dollar change in the portfolio of options and equity holdings of the CEO for a 1% change in stock price at the fiscal year-end, scaled by CEO cash compensation and expressed as a percentage.	ExecuComp, https://sites.temple.edu/lnaveen/data/
CEO cash pay	The natural logarithm of the CEO cash compensation (sum of salary and bonus in thousands of dollars) at the fiscal year-end.	ExecuComp

Variables	Definition	Data source
Panel C: Acquirer characteristics		
CEO overconfidence	A dummy variable which takes the value of one if the CEO is identified as overconfident, and zero otherwise. CEOs are overconfident if they delay the exercise of vested options which are at least 67% in the money. We follow Campbell et al. (2011) in order to calculate the average moneyness of the CEO's option for each sample year. First, for each CEO-year, the average realisable value per option is calculated by dividing the total realisable value of options by the number of options held by the CEO. Second, the strike price is calculated by subtracting the average realisable value per option from the stock price at the end of the fiscal year. The average percent moneyness of the options is computed by dividing the stock price at the fiscal year-end by the estimated strike price minus one.	ExecuComp
Firm size	The natural logarithm of the book value of total assets in the fiscal year.	Compustat
Book leverage	The book value of total debt (long-term plus short-term debt) divided by the book value of total assets at the fiscal year-end.	Compustat
Tobin's Q	The ratio of the market value of total assets to the book value of total assets at the fiscal year-end, where the market value of assets is defined as the book value of assets plus the market value of common stock minus the book value of common stock.	
Cash holdings	Cash and short-term investments, scaled by the book value of total assets at the fiscal year-end.	Compustat
ROA	Net income divided by the book value of total assets at the fiscal year-end.	Compustat
M&A experience	The number of M&A deals completed by the acquirer during the three years preceding the year of the deal announcement.	Thomson One Banker
Serial acquirer	A dummy variable which takes the value of one if the acquirer has completed more than one deal during the three years preceding the year of the deal announcement, and zero otherwise.	Thomson One Banker
Panel D: Target characteristics		
Firm size	The natural logarithm of the book value of total assets in the fiscal year.	Compustat
Tobin's Q	The ratio of the market value of total assets to the book value of total assets at the fiscal year-end, where the market value of assets is defined as the book value of assets plus the market value of common stock minus the book value of common stock.	Compustat
Cash holdings	Cash and short-term investments, scaled by the book value of total assets at the fiscal year-end.	Compustat
ROA	Net income divided by the book value of total assets at the fiscal year-end.	Compustat
Target 52-week high (%)	Tthe log percentage difference of the target's 52-week high stock price over the target's stock price four weeks prior to the M&A deal announcement as in Baker et al. (2012).	CRSP

Variables	Definition	Data source
Panel E: Deal characteristics		
Pure cash deal	A dummy variable which takes the value of one if the deal was entirely financed with cash, and zero otherwise.	Thomson One Banker
Toehold	The fraction of the target shares owned by the acquirer prior to the deal announcement.	Thomson One Banker
Multiple bidders	A dummy variable which takes the value of one if the deal involved more than one bidder, and zero otherwise.	Thomson One Banker
Hostile deal	A dummy variable which takes the value of one if the deal was reported as "hostile" or "unsolicited" by Thomson One Banker, and zero otherwise.	Thomson One Banker
Tender offer	A dummy variable which takes the value of one if the deal represents a tender offer, and zero otherwise.	Thomson One Banker

Appendix C

Table C-1 Variable definitions

Variables	Definition	Data source
Panel A: Dependent variables		
3-day CARs	Cumulative abnormal returns for the acquirer in the 5-day event window (-1, +1), where time 0 is the announcement date of the acquisition.	CRSP
5-day CARs	Cumulative abnormal returns for the acquirer in the 5-day event window (−2, +2), where time 0 is the announcement date of the acquisition.	CRSP
7-day CARs	Cumulative abnormal returns for the acquirer in the 5-day event window (−3, +3), where time 0 is the announcement date of the acquisition.	CRSP
3-year post-acquisition industry-adjusted ROA	The difference between the acquirer's ROA and the median ROA of all the firms in the same two-digit SIC industry and year.	Compustat
Panel B: Independent variables		
Board size	The total number of directors on the board.	ISS (former RiskMetrics)
Non-co-opted independence	The number of independent directors appointed before the CEO assumed office divided by the board size.	ISS, https://sites.temple.edu/lnaveen/data/
CEO/Chair duality	A dummy variable which takes the value of one if the CEO is also the Chair of the board, and zero otherwise.	ExecuComp
CEO vega (scaled)	The dollar change in the portfolio of options of the CEO for a 1% change in the annual standard deviation of stock returns at the fiscal year-end, scaled by CEO cash pay and expressed as a percentage.	ExecuComp, https://sites.temple.edu/lnaveen/data/
CEO delta (scaled)	The dollar change in the portfolio of options and equity holdings of the CEO for a 1% change in stock price at the fiscal year-end, scaled by CEO cash compensation and expressed as a percentage.	ExecuComp, https://sites.temple.edu/lnaveen/data/
CEO cash pay	The natural logarithm of the CEO cash compensation (sum of salary and bonus in thousands of dollars) at the fiscal year-end.	ExecuComp
Institutional Ownership Concentration	The percentage of the sum of shareholdings held by the five largest institutional investors to the total shares outstanding at the fiscal year-end.	Thomson Financial 13F, CRSP
Dedicated Institutional Ownership	The percentage of ownership by dedicated institutional investors by Bushee's (1998; 2001) standards.	http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html, Thomson Financial 13F, CRSP

Variables	Definition	Data source
Panel C: Firm & Industry characteristics		
Firm size	The natural logarithm of the book value of total assets in the fiscal year.	Compustat
Book leverage	The book value of total debt (long-term plus short-term debt) divided by the book value of total assets at the fiscal year-end.	Compustat
Tobin's Q	The ratio of the market value of total assets to the book value of total assets at the fiscal year-end, where the market value of assets is defined as the book value of assets plus the market value of common stock minus the book value of common stock.	Compustat
Cash flows	Operating income before depreciation minus income taxes minus interest expenses minus dividends (common and preferred), divided by the book value of total assets at the fiscal year-end.	Compustat
ROA	Net income divided by the book value of total assets at the fiscal year-end.	Compustat
M&A experience	The number of M&A deals completed by the acquirer during the three years preceding the year of the deal announcement.	Thomson One Banker
Serial acquirer	A dummy variable which takes the value of one if the acquirer has completed more than one deal during the three years preceding the year of the deal announcement, and zero otherwise.	Thomson One Banker
M&A liquidity index	The ratio of the value of all corporate control transactions of at least $1 million reported by the Thomson One Banker for each Fama–French 49-industry classification and year to the total book value of assets of all Compustat firms in the same Fama–French 49-industry classification and year.	Compustat, Thomson One Banker
Panel D: CEO characteristics		
CEO overconfidence	A dummy variable which takes the value of one if the CEO is identified as overconfident, and zero otherwise. CEOs are overconfident if they delay the exercise of vested options which are at least 67% in the money. We follow Campbell et al. (2011) in order to calculate the average moneyness of the CEO's option for each sample year. First, for each CEO-year, the average realisable value per option is calculated by dividing the total realisable value of options by the number of options held by the CEO. Second, the strike price is calculated by subtracting the average realisable value per option from the stock price at the end of the fiscal year. The average percent moneyness of the options is computed by dividing the stock price at the fiscal year-end by the estimated strike price minus one.	ExecuComp
Panel E: Deal characteristics		
Public target	A dummy variable which takes the value of one if the target is a public firm, and zero otherwise.	Thomson One Banker
Stock deal	A dummy variable which takes the value of one if the deal was entirely financed with stock, and zero otherwise.	Thomson One Banker
Relative deal size	The ratio of the deal value to the acquirer's market capitalisation four weeks prior to the M&A deal announcement date.	Thomson One Banker
Diversifying deal	A dummy variable which takes the value of one if the acquirer and the target firm operate in a different four-digit SIC industry, and zero otherwise.	Thomson One Banker

Table C-2 Non-significant interactions for the short-term post-acquisition performance analysis

The table reports the non-significant pair-wise interactions between the main governance mechanisms examined for the short-term post-acquisition performance analysis. The dependent variable is the acquirers' *5-day CARs*. Variable definitions are provided in Appendix C, Table C-1. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Interactions												
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
Board size	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009
	(0.0007)	(0.0008)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Non-co-opted independence (NCI)	-0.0049	-0.0049	-0.0049	-0.0049	-0.0052	-0.0048	-0.0052	-0.0046	-0.0050	-0.0049	-0.0048	-0.0049	-0.0050
	(0.0059)	(0.0059)	(0.0059)	(0.0058)	(0.0059)	(0.0058)	(0.0059)	(0.0059)	(0.0059)	(0.0059)	(0.0059)	(0.0059)	(0.0059)
CEO/Chair duality	-0.0015	-0.0015	-0.0016	-0.0016	-0.0015	-0.0017	-0.0015	-0.0016	-0.0015	-0.0016	-0.0015	-0.0015	-0.0017
	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)	(0.0031)
CEO vega	-0.0038	-0.0054	-0.0055	-0.0052	-0.0047	-0.0050	-0.0050	0.0067	-0.0053	-0.0054	-0.0068	-0.0053	-0.0052
	(0.0121)	(0.0109)	(0.0109)	(0.0108)	(0.0112)	(0.0110)	(0.0109)	(0.0141)	(0.0108)	(0.0109)	(0.0112)	(0.0109)	(0.0109)
CEO delta	0.0007	0.0007	0.0008	0.0007	0.0004	0.0008	0.0007	0.0007	0.0007	0.0007	0.0008	0.0007	0.0007
	(0.0011)	(0.0011)	(0.0011)	(0.0012)	(0.0018)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
CEO cash pay	0.0051	0.0051	0.0051	0.0051	0.0050	0.0053	0.0051	0.0050	0.0046	0.0049	0.0051	0.0051	0.0054
	(0.0037)	(0.0036)	(0.0036)	(0.0037)	(0.0037)	(0.0036)	(0.0036)	(0.0036)	(0.0043)	(0.0037)	(0.0037)	(0.0036)	(0.0036)
Dedicated institutional ownership (Ded IO)	-0.0179	-0.0176	-0.0192	-0.0175	-0.0177	-0.0177	-0.0196	-0.0185	-0.0173	0.0187	-0.0200	-0.0175	-0.0217
	(0.0285)	(0.0285)	(0.0277)	(0.0285)	(0.0285)	(0.0285)	(0.0285)	(0.0284)	(0.0285)	(0.0346)	(0.0285)	(0.0285)	(0.0285)
Board size × CEO vega	-0.0016												
	(0.0035)												
Board size × CEO cash pay		0.0000											
		(0.0009)											
Board size × Ded IO			-0.0039										
			(0.0088)										
NCI × CEO vega				0.0049									
				(0.0339)									
NCI × CEO delta					-0.0018								
					(0.0051)								
NCI × CEO cash pay						0.0031							

	Interactions												
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
NCI × Ded IO							-0.0735						
							(0.0900)						
CEO/Chair duality × CEO vega								-0.0173					
								(0.0160)					
CEO/Chair duality × CEO cash pay									0.0007				
									(0.0044)				
CEO/Chair duality × Ded IO										-0.0654			
										(0.0416)			
CEO vega × Ded IO											-0.1506		
											(0.1600)		
CEO delta × Ded IO												0.0014	
												(0.0167)	
CEO cash pay × Ded IO													-0.0317
													(0.0348)
Constant	0.0131	0.0131	0.0134	0.0130	0.0129	0.0131	0.0124	0.0132	0.0130	0.0144	0.0120	0.0131	0.0129
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0115)	(0.0115)	(0.0114)	(0.0114)
Firm & Industry control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	2,041	2,041	2,041	2,041	2,041	2,041	2,041	2,041	2,041	2,041	2,041	2,041	2,041
R^2	0.0481	0.0480	0.0481	0.0480	0.0481	0.0481	0.0485	0.0484	0.0480	0.0494	0.0486	0.0480	0.0486
Adjusted R^2	0.0232	0.0231	0.0232	0.0231	0.0232	0.0232	0.0236	0.0235	0.0231	0.0245	0.0237	0.0231	0.0237

Table C-3 M&A Sample distribution by announcement year and acquirer industry

The table shows our complete sample 1,890 US M&A deals during the 1998-2015 period used in the long-term post-acquisition performance analysis by year (Panel A) and industry of the acquiring firm (Panel B). Panel A shows the descriptive statistics (5th percentile, median and 95th percentile) of the deals' values per year. Panel B reports the same statistics as Panel A, but across the Fama-French 12-industry categories (utilities and financial firms are excluded from the sample).

Panel A: M&A sample distribution by announcement year

						Payment method		
Year	Number of Deals	Total Deals Value ($mil)	5th Pctl. Value ($mil)	Median Value ($mil)	95th Pctl. Value ($mil)	Pure cash	Pure stock	Mixed[1]
1998	105	223,024.40	5.30	184.21	9,123.71	26	25	54
1999	140	251,379.10	6.76	133.83	5,061.36	42	43	55
2000	128	115,962.70	10.00	152.02	5,158.03	35	33	60
2001	106	66,385.11	7.00	123.25	2,133.37	34	21	51
2002	80	80,608.74	4.55	62.15	1,185.86	32	14	34
2003	103	28,095.04	5.70	91.00	1,310.10	53	5	45
2004	137	44,116.55	9.60	77.90	1,840.20	61	14	62
2005	143	152,638.20	5.00	110.00	3,412.27	66	3	74
2006	109	111,557.50	4.70	80.64	3,824.61	60	4	45
2007	126	79,410.65	9.00	110.00	4,100.00	71	1	54
2008	99	44,186.59	6.00	73.00	2,637.42	54	1	44
2009	75	120,039.70	4.35	170.00	4,067.19	36	2	37
2010	96	76,603.05	9.70	196.47	3,578.19	55	1	40
2011	105	56,808.67	10.00	155.00	2,672.30	55	1	49
2012	98	61,248.35	11.50	142.55	3,918.85	47	0	51
2013	79	68,296.48	5.00	150.00	3,067.16	43	0	36
2014	94	77,689.67	12.20	195.14	5,134.44	47	1	46
2015	67	153,377.20	13.40	385.00	14,076.63	37	0	30
Total	1,890	1,811,427.70				854	169	867

[1]Mixed category includes cash and stock less than 100% as well as 'other' and 'unknown' payment types and all of their combinations.

Panel B: M&A sample distribution by acquirer industry

Fama-French Industry Code & Description	No. of Deals	Percent	5th Pctl. Value ($mil)	Median Value ($mil)	95th Pctl. Value ($mil)
1.Consumer NonDurables	110	5.82%	8.90	140.00	4,100.00
2.Consumer Durables	31	1.64%	2.94	65.00	2,653.71
3.Manufacturing	291	15.40%	8.35	109.05	2,610.83
4.Energy, Oil, Gas and Coal	73	3.86%	5.00	260.00	6,215.03
5.Chemicals and Allied Products	46	2.43%	5.00	211.50	5,075.71
6.Business Equipment	668	35.34%	7.25	95.20	2,247.71
7.Telephone and Television Transmission	42	2.22%	18.50	649.97	49,278.87
9.Wholesale and Retail	157	8.31%	7.00	150.00	2,575.00
10.Healthcare, Medical Equipment, and Drugs	311	16.46%	9.00	210.00	5,047.02
12.Other	161	8.52%	4.70	90.00	3,000.00
Total	1,890	100.00%			

Table C-4 Sample descriptive statistics

The table reports descriptive statistics of the variables used in the long-term post-acquisition performance analysis. Panel A reports the statistics for the dependent variables. Panel B reports the statistics of the independent variables employed in the empirical analysis. Panel C reports the statistics for the firm and industry characteristics. Panel D reports the statistics for the CEO characteristics. Panel E reports the statistics for the deal-related variables.

Variables	Obs.	Mean	Std. Dev.	25th Pctl.	Median	75th Pctl.
Panel A: Dependent variable						
3-year post-acquisition industry-adjusted ROA	1,890	0.022	0.369	0.002	0.040	0.092
Panel B: Independent variables						
Board size	1,890	9.144	2.395	7.000	9.000	11.000
Non-co-opted independence (NCI)	1,890	0.365	0.264	0.125	0.375	0.571
CEO/Chair duality	1,890	0.576	0.494	0.000	1.000	1.000
CEO vega (scaled)	1,890	0.157	0.168	0.044	0.098	0.208
CEO delta (scaled)	1,890	0.713	1.414	0.157	0.322	0.697
CEO cash pay	1,890	7.052	0.673	6.595	6.957	7.453
Dedicated institutional ownership (Ded IO)	1,890	0.055	0.072	0.000	0.028	0.088
Panel C: Firm & Industry characteristics						
Firm size	1,890	7.942	1.579	6.726	7.817	9.025
Book leverage	1,890	0.195	0.149	0.073	0.187	0.290
Tobin's Q	1,890	2.372	1.484	1.436	1.908	2.709
Cash flows	1,890	0.099	0.060	0.068	0.097	0.128
ROA	1,890	0.063	0.080	0.035	0.066	0.100
M&A experience	1,890	1.394	1.916	0.000	1.000	2.000
Serial acquirer	1,890	0.597	0.491	0.000	1.000	1.000
M&A liquidity index	1,890	0.026	0.040	0.005	0.012	0.028
Panel D: CEO characteristics						
CEO overconfidence	1,890	0.219	0.413	0.000	0.000	0.000
Panel E: Deal characteristics						
Public target	1,890	0.340	0.474	0.000	0.000	1.000
Stock deal	1,890	0.089	0.285	0.000	0.000	0.000
Relative deal size	1,890	0.124	0.247	0.010	0.031	0.106
Diversifying deal	1,890	0.663	0.473	0.000	1.000	1.000

Table C-5 Pearson correlation matrix and collinearity diagnostics of key variables used in the long-term post-acquisition performance analysis

The table presents the Pearson correlation coefficients for all the variables used in the main analysis for the long-term post-acquisition performance. The bold figures indicate significance at the 5% level or better. Variance inflation factors (VIFs) are also reported as tests to detect the presence of multicollinearity among the independent and control variables.

#	Variable	VIF	1	2	3	4	5	6	7	8	9	10	11	12	13
1	3-year post-acquisition industry-adjusted ROA		1												
2	Board size	1.63	**0.20**	1											
3	Non-co-opted independence	1.16	0.06	**0.17**	1										
4	CEO/Chair duality	1.17	**0.06**	**0.22**	**-0.14**	1									
5	CEO vega (scaled)	1.45	**0.16**	**0.16**	-0.02	**0.06**	1								
6	CEO delta (scaled)	1.32	0.04	0.00	**-0.21**	**0.09**	**0.32**	1							
7	CEO cash pay	2.39	**0.09**	**0.44**	**0.07**	**0.26**	**0.05**	-0.03	1.00						
8	Dedicated institutional ownership	1.07	**-0.08**	-0.01	**-0.05**	0.04	**-0.08**	0.02	0.02	1					
9	Firm size	3.35	**0.21**	**0.59**	**0.17**	**0.21**	**0.37**	**0.09**	**0.69**	**-0.07**	1				
10	Book leverage	1.15	0.02	**0.20**	0.00	**0.11**	-0.01	**-0.10**	**0.10**	**0.11**	**0.17**	1			
11	Tobin's Q	1.62	**0.15**	-0.04	**-0.08**	**-0.05**	**0.11**	**0.31**	**0.12**	**0.06**	0.01	**-0.22**	1.00		
12	Cash flows	1.89	**0.15**	0.04	**-0.05**	0.01	**0.08**	**0.08**	**0.14**	-0.03	**0.06**	**-0.10**	**0.38**	1	
13	ROA	1.95	**0.24**	**0.11**	0.04	**0.08**	**0.08**	0.04	**0.21**	**-0.08**	**0.13**	**-0.12**	**0.32**	**0.66**	1
14	M&A experience	1.69	-0.04	**0.06**	-0.04	0.03	**0.14**	**0.09**	**0.21**	-0.02	**0.24**	-0.04	**0.15**	**0.05**	-0.02
15	Serial acquirer	1.59	0.04	**0.06**	-0.03	0.04	**0.13**	**0.08**	**0.15**	0.00	**0.20**	0.00	**0.08**	-0.02	**-0.05**
16	M&A liquidity index	1.18	-0.03	**0.05**	-0.02	**0.05**	0.00	0.04	**0.19**	0.02	**0.10**	-0.04	**0.28**	**0.07**	0.03
17	CEO overconfidence	1.02	0.04	0.00	-0.03	0.03	0.03	0.04	**0.06**	0.01	0.03	0.00	**0.09**	**0.08**	**0.06**
18	Public target	1.34	**0.05**	**0.21**	0.03	**0.10**	**0.07**	-0.02	**0.25**	**0.09**	**0.30**	**0.05**	0.04	0.03	**0.05**
19	Stock deal	1.21	**-0.06**	0.03	**-0.06**	0.03	**-0.07**	**0.06**	**0.10**	**0.13**	0.04	0.01	**0.23**	-0.01	**-0.10**
20	Relative deal size	1.21	**-0.05**	-0.02	0.03	-0.02	**-0.12**	**-0.09**	**-0.06**	0.03	**-0.08**	**0.10**	**-0.13**	-0.04	-0.04
21	Diversifying deal	1.05	0.00	**0.08**	**0.05**	**0.07**	0.01	-0.02	**0.11**	**-0.05**	0.08	0.02	-0.02	0.00	**0.06**

#	Variable	14	15	16	17	18	19	20	21
14	M&A experience	1							
15	Serial acquirer	**0.60**	1						
16	M&A liquidity index	**0.13**	**0.06**	1					
17	CEO overconfidence	**0.05**	0.00	**0.09**	1				
18	Public target	-0.01	0.00	**0.13**	0.00	1			
19	Stock deal	**0.13**	0.03	**0.24**	**0.05**	**0.18**	1.00		
20	Relative deal size	**-0.11**	**-0.10**	0.06	-0.03	**0.30**	0.02	1	
21	Diversifying deal	**0.07**	**0.08**	0.00	-0.01	**-0.08**	**-0.05**	**-0.13**	1

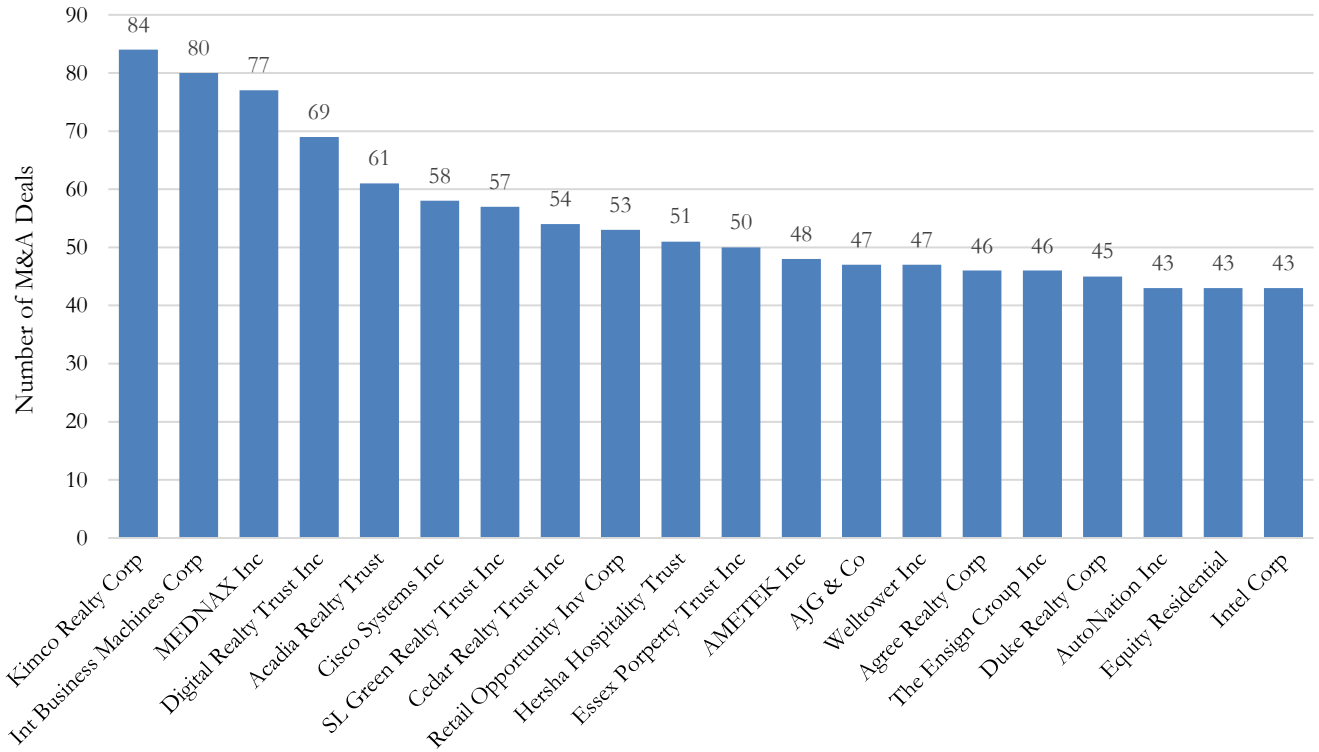
Table C-6 Non-significant interactions for the long-run post-acquisition operating performance analysis

The table reports the non-significant pair-wise interactions between the main governance mechanisms examined for the long-run post-acquisition operating performance analysis. The dependent variable is the acquirers' *industry-adjusted ROA* for the three years after acquisition. Variable definitions are provided in Appendix C, Table C-1. Robust standard errors clustered at the firm level are shown in parentheses. Superscripts ***, **, and * denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Interactions												
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
Board size	0.0113**	0.0114**	0.0118**	0.0114**	0.0113**	0.0113**	0.0112**	0.0113**	0.0112**	0.0114**	0.0115**	0.0114**	0.0116**
	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)	(0.0052)
Non-co-opted independence (NCI)	0.0276	0.0279	0.0275	0.0280	0.0236	0.0275	0.0290	0.0267	0.0268	0.0281	0.0285	0.0276	0.0273
	(0.0367)	(0.0367)	(0.0367)	(0.0363)	(0.0353)	(0.0367)	(0.0373)	(0.0364)	(0.0365)	(0.0367)	(0.0362)	(0.0367)	(0.0369)
CEO/Chair duality	-0.0072	-0.0073	-0.0073	-0.0075	-0.0067	-0.0071	-0.0074	-0.0072	-0.0066	-0.0077	-0.0070	-0.0070	-0.0081
	(0.0186)	(0.0189)	(0.0187)	(0.0187)	(0.0188)	(0.0187)	(0.0189)	(0.0188)	(0.0188)	(0.0182)	(0.0187)	(0.0187)	(0.0182)
CEO vega	0.0043	0.0049	-0.0003	0.0044	0.0109	0.0032	0.0019	-0.0138	0.0057	0.0035	-0.0054	0.0049	0.0020
	(0.0611)	(0.0558)	(0.0562)	(0.0558)	(0.0563)	(0.0548)	(0.0563)	(0.0588)	(0.0564)	(0.0563)	(0.0578)	(0.0568)	(0.0563)
CEO delta	0.0018	0.0020	0.0019	0.0019	-0.0027	0.0018	0.0020	0.0018	-0.0037	0.0017	0.0018	0.0015	0.0018
	(0.0042)	(0.0044)	(0.0042)	(0.0042)	(0.0055)	(0.0042)	(0.0044)	(0.0043)	(0.0055)	(0.0043)	(0.0042)	(0.0041)	(0.0042)
CEO cash pay	-0.0257	-0.0252	-0.0254	-0.0255	-0.0261	-0.0260	-0.0261	-0.0256	-0.0260	-0.0214	-0.0258	-0.0256	-0.0248
	(0.0285)	(0.0288)	(0.0285)	(0.0285)	(0.0287)	(0.0289)	(0.0285)	(0.0285)	(0.0286)	(0.0296)	(0.0285)	(0.0285)	(0.0291)
Dedicated institutional ownership (Ded IO)	-0.0900	-0.0915	-0.1100	-0.0897	-0.0906	-0.0892	-0.0797	-0.0880	-0.0857	-0.0920	-0.1106	-0.0896	-0.1082
	(0.1516)	(0.1508)	(0.1468)	(0.1509)	(0.1510)	(0.1489)	(0.1488)	(0.1510)	(0.1506)	(0.1480)	(0.1504)	(0.1507)	(0.1400)
Board size × CEO vega	-0.0007												
	(0.0167)												
Board size × CEO delta		-0.0008											
		(0.0019)											
Board size × Ded IO			-0.0518										
			(0.0400)										
NCI × CEO vega				0.0314									
				(0.1809)									
NCI × CEO delta					-0.0182								
					(0.0202)								
NCI × CEO cash pay						-0.0052							
						(0.0536)							

							Interactions						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
NCI × Ded IO							0.4858						
							(0.5148)						
CEO/Chair duality × CEO vega								0.0258					
								(0.0812)					
CEO/Chair duality × CEO delta									0.0068				
									(0.0070)				
CEO/Chair duality × CEO cash pay										-0.0069			
										(0.0273)			
CEO vega × Ded IO											-1.1740		
											(0.9069)		
CEO delta × Ded IO												0.0221	
												(0.0497)	
CEO cash pay × Ded IO													-0.1410
													(0.2055)
Constant	0.0568	0.0568	0.0624*	0.0562	0.0547	0.0566	0.0614	0.0562	0.0555	0.0578	0.0496	0.0570	0.0573*
	(0.0350)	(0.0348)	(0.0337)	(0.0350)	(0.0348)	(0.0347)	(0.0375)	(0.0347)	(0.0348)	(0.0352)	(0.0363)	(0.0350)	(0.0347)
Firm & Industry control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Deal control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890	1,890
R^2	0.1041	0.1042	0.1046	0.1041	0.1043	0.1041	0.1047	0.1041	0.1042	0.1042	0.1051	0.1042	0.1044
Adjusted R^2	0.0788	0.0788	0.0793	0.0788	0.0789	0.0788	0.0793	0.0788	0.0789	0.0788	0.0798	0.0788	0.0790

Figure C-1 Number of M&A deals completed by each of the top 20 most active acquirers of the S&P Composite 1500 Index, 1997-2014



Source: Compustat-Capital IQ